Mitutoyo

MICROMETER HEADS

MEASUREMENT AND PRECISION POSITIONING

SMALL TOOL INSTRUMENTS
AND DATA MANAGEMENT

PRE1441

MICROMETER HEADS

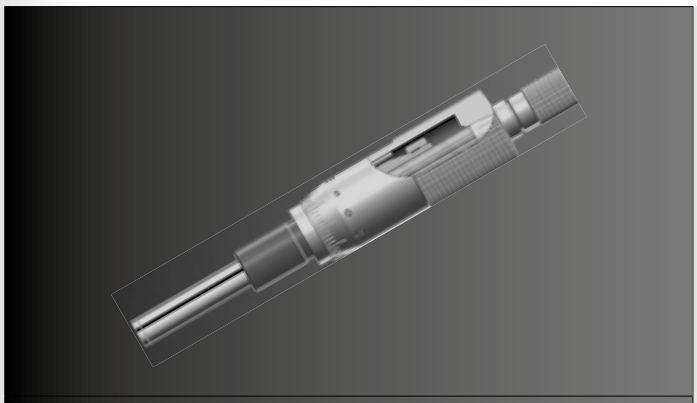
Mitutoyo started business in 1934 as a trailblazing micrometer manufacturer in Japan and celebrated the 80th anniversary of its foundation in October, 2014. Nowadays, Mitutoyo enjoys the confidence of many customers in various fields as a worldwide full-range manufacturer of precision measuring tools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

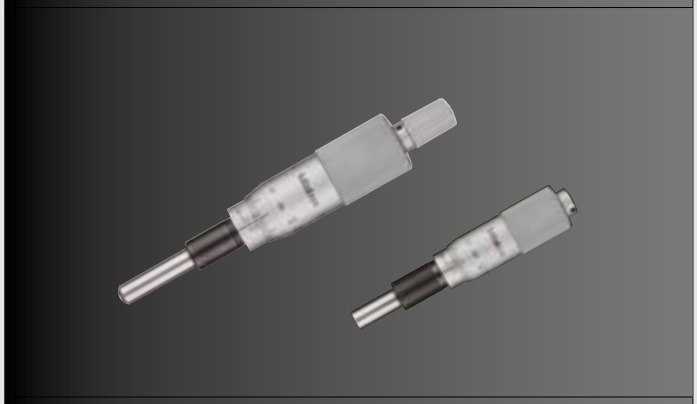


Selection Guide .....Page 8

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.

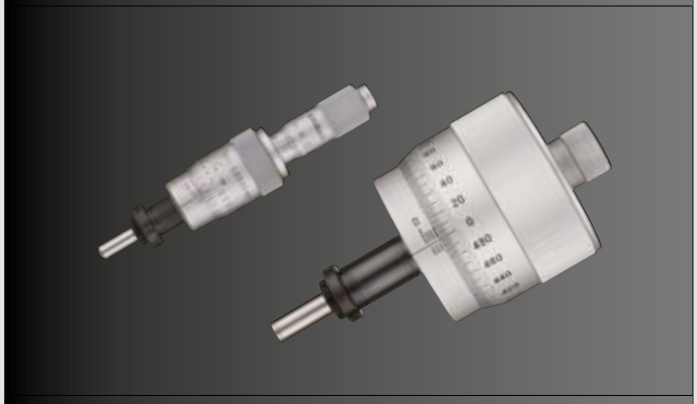
Digimatic heads .....Page 12

Digital readout heads that can output measurement data in Digimatic format to enable incorporation into a process control system. Some models are waterproof to IP65 level.



Standard heads .....Page 16

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



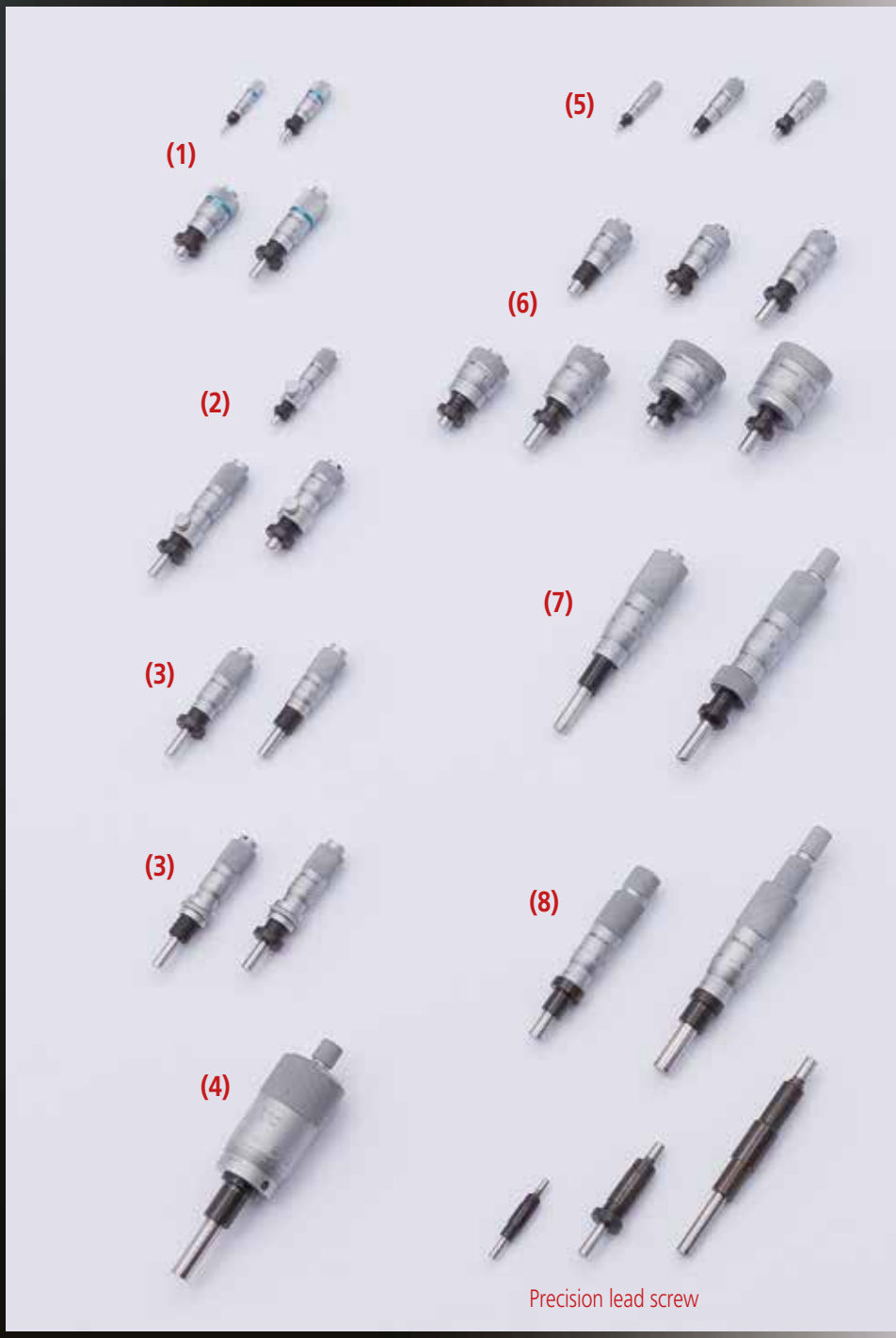
High Function heads .....Page 32

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

Special Order heads .....Page 50

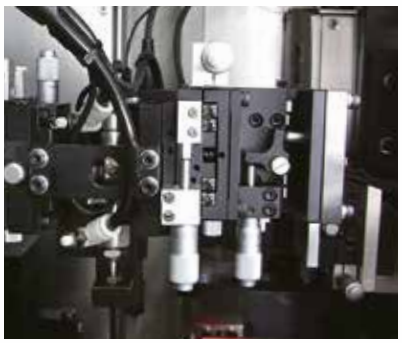
Small quantities of heads, even one-offs, can be supplied to meet a customer's specification of features such as type of spindle tip, thimble graduation, custom engraving, etc.

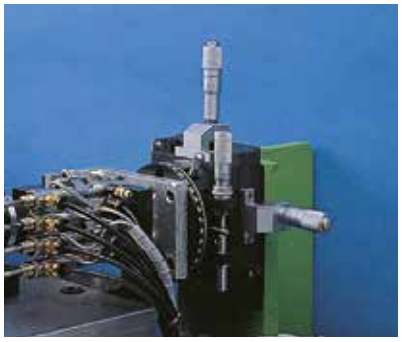
Micrometer Heads



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)	148	33, 34
	Standard	Ultra-small / Small Type	(5)		16, 17
0 - 6.5mm/0- .25"	Standard	Locking-screw Type	(2)		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
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			35
		Fine Spindle Feed of 0.25mm/rev	(11)	110	32
		Short Body with Choice of Thimble Diameter	(6)	148	18, 19
	Standard	Short Body with Choice of Thimble Diameter	(3)		20, 21
		Small Standard Type with Zero-adjustable Thimble	(10)		22, 23





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		152	40
		Large Thimble Type for Fine Feed			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)	
150-802				W/ clamp nut		
150-821				Plain	Flat (carbide tip)	Reverse reading
150-822				W/ clamp nut		
150-190				Plain		W/vernier (0.001mm)
150-189				W/ clamp nut		
150-183**				Plain*		
150-184				W/ clamp nut*		
150-196				Plain		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"/ **0 - 25.4mm**	±.0001"/ **±0.003mm**	.375"/ **9.525mm**	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)	
150-812				W/ clamp nut		
150-831				Plain	Flat (carbide tip)	Reverse graduation
150-832				W/ clamp nut		
150-206				Plain		W/vernier (.0001")/ **(0.003mm)***
150-205**				W/ clamp nut		
150-215**				Plain*		
150-216**				W/ clamp nut*		
150-198				Plain		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		

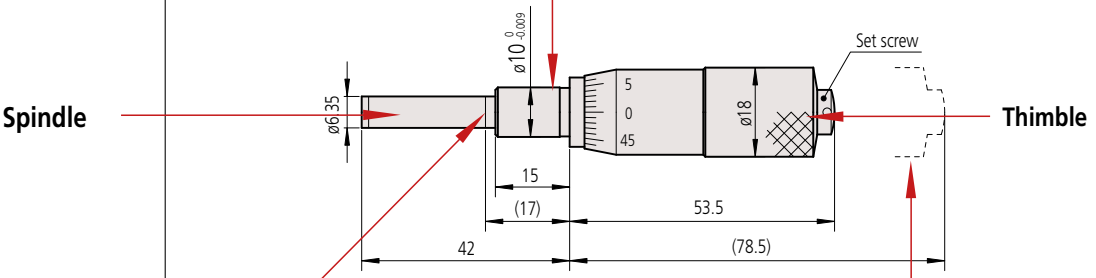
* with spindle lock ** made-to-order models *** graduation in inch only

DIMENSIONS

Plain stem

Plain stem

Stem



Spindle

Thimble

150-196 Mass: 95g

Spindle range is indicated

Thimble range is indicated by dashed line

Stem lock nut

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: ±2μm
- Measuring face: Material: Alloy tool steel (Only long spindle model is alloy tool steel) Hardness: 90 HRC or more (Only long spindle model is 60HRC or more) Lapped
- Scale finishing: Satin-chrome plated

Metric

Order No.	Range	Accuracy	Thimble 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)	
150-802				W/ clamp nut		
150-821				Plain	Flat (carbide tip)	Reverse reading
150-822				W/ clamp nut		
150-190				Plain		W/vernier (0.001mm)
150-189				W/ clamp nut		
150-183**				Plain*		
150-184				W/ clamp nut*		
150-196				Plain		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

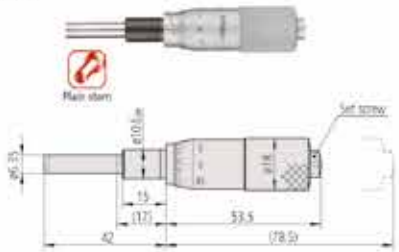
Order No.	Range	Accuracy	Thimble dia.	Stem	Spindle end	Special features
150-208	0 - 1" / 0 - 25.4mm	±.0001" / ±0.003mm	.375" / 9.525mm	Plain	Flat (carbide tip)	Standard
150-207				W/ clamp nut		
150-213**				Plain*		
150-214**				W/ clamp nut*		
150-811				Plain	Spherical (SR4) (carbide tip)	
150-812				W/ clamp nut		
150-831				Plain	Flat (carbide tip)	Reverse graduation
150-832				W/ clamp nut		
150-206				Plain		W/vernier (.0001"/ 0.003mm)***
150-205**				W/ clamp nut		
150-215**				Plain*		
150-216**				W/ clamp nut*		
150-198				Plain		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 *** graduation in inch only

DIMENSIONS

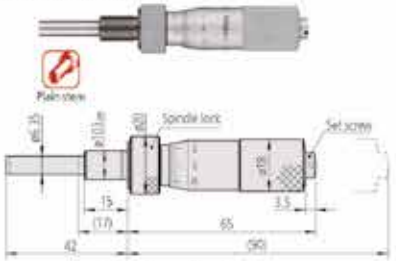
Unit: mm

Plain stem



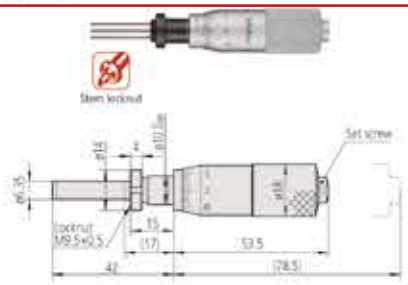
150-196 Mass: 95g

Plain stem and spindle lock



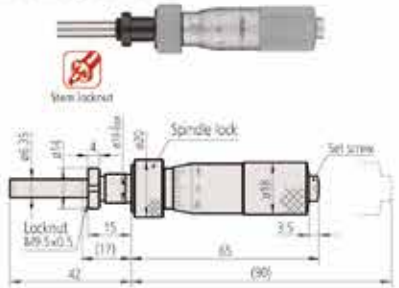
150-211 Mass: 115g

Stem locknut



Fixture thickness: 11.5mm
150-195 Mass: 110g

Stem locknut and spindle lock



Fixture thickness: 11.5mm
150-212 Mass: 115g

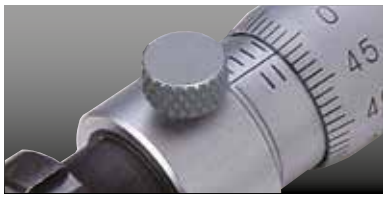
( ): with spindle fully retracted

● **CAD download service at Mitutoyo web site**

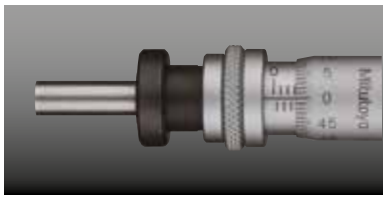
2D CAD data can be downloaded at our web site. For details, refer to page 10.

Selection Guide

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



Screw clamp

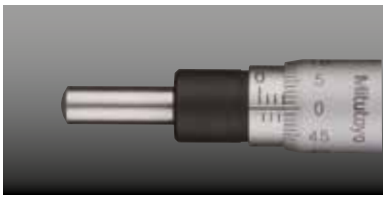


Clamp

- 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.

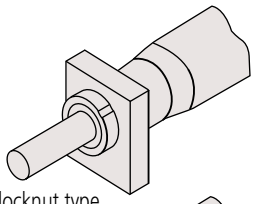
Stem

Plain stem

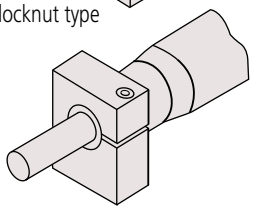


Stem locknut type

- 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 requires a split-fixture clamping arrangement or adhesive fixing.
- General-purpose mounting fixtures are available as optional accessories.



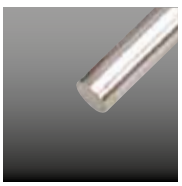
Stem locknut type



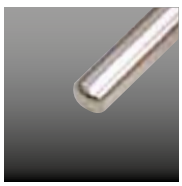
Plain stem

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.

Figure A

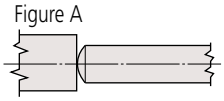


Figure B

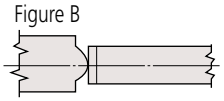
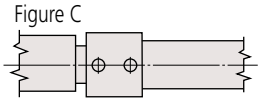
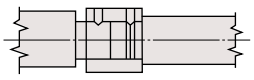


Figure C

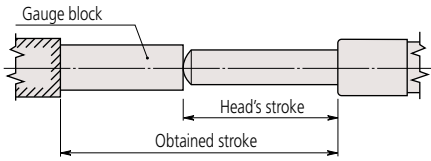




Measuring Range (Stroke)

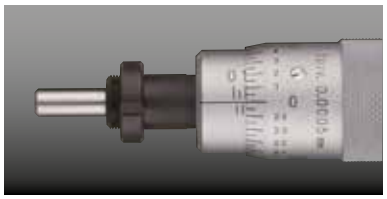
When choosing a measuring range for a micrometer head, allow an adequate margin in consideration of the expected measurement stroke. Six stroke ranges, 5 to 50mm, are available for standard micrometer heads.
Even if an expected stroke is small, such as 2mm to 3mm, it will be cost effective to choose 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.

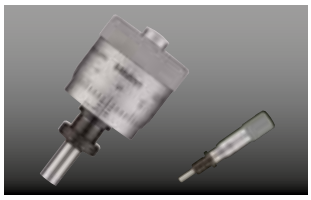


Ultra-fine Feed Applications

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

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.

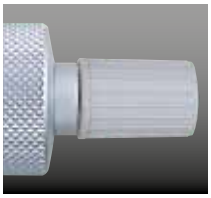


Spindle Thread Pitch

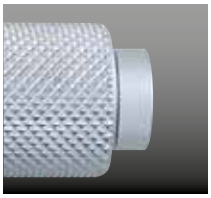
- The standard type head has 0.5mm pitch.
- 1mm-pitch type: quicker to set than standard type and avoids the possibility of a 0.5mm reading error. Excellent load-bearing characteristics due to larger screw thread.
- 0.25mm or 0.1mm-pitch type
  This type is the best for fine-feed or fine-positioning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

Constant-force Device

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



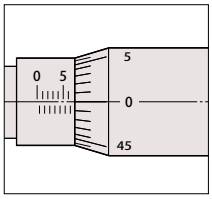
Micrometer head with constant-force device



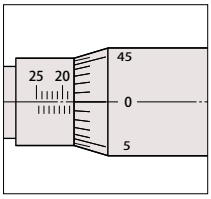
Micrometer head without constant-force device
(no ratchet)

Graduation Styles

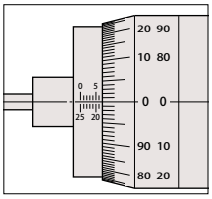
- Care is needed when taking a reading from a mechanical micrometer head, especially if the user is unfamiliar with the model.
- The "normal graduation" style, identical to that of an outside micrometer, is the standard. For this style the reading increases as the spindle retracts into the body.
- On 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



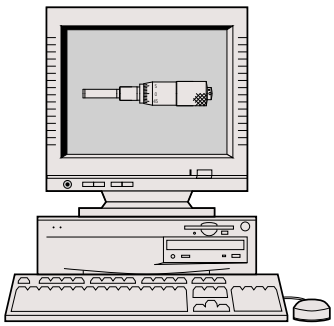
Reverse



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

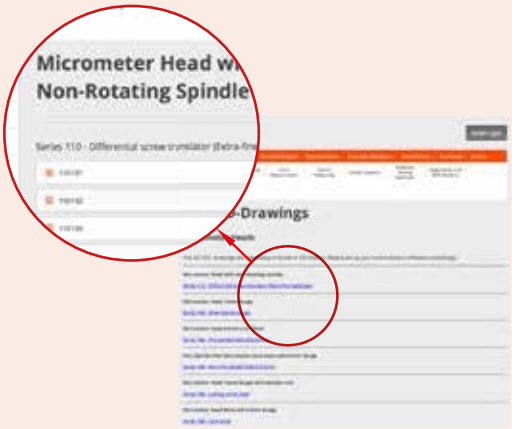
* For some models only 2D data files are available.

Mitutoyo home page http://www.mitutoyo.eu

How to download:

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 on the product you wish.

3

Please fill in the form to start download. Click the [Download Document] button and then click the [Save] button.

Contents/Index

■ Contents

• Applications index

• Digimatic heads

Page

• 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)

• High Function heads

Page

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	Plain	10mm	Flat (carbide tip)	Standard
350-252-30				W/ clamp nut			
350-253-30				Plain		Spherical (SR4) (carbide tip)	
350-254-30				W/ clamp nut			
350-281-30*				Plain	12mm	Flat (carbide tip)	
350-282-30*				W/ clamp nut			
350-283-30*				Plain		Spherical (SR4) (carbide tip)	
350-284-30*				W/ clamp nut			
350-261-30*				Plain		Flat	

* 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"/ **0 - 50.8mm**	.00005"/ **0.001mm**	±.00015"/ **±0.004mm**	Plain	0.709"/ **18.009mm**	Flat (carbide tip)	—
350-351-30	0 - 1"/ **0 - 25.4mm**		±.0001"/ **±0.003 mm**		0.375"/ **9.525mm**		Standard
350-352-30				W/ clamp nut			
350-353-30				Plain		Spherical (SR4) (carbide tip)	
350-354-30				W/ clamp nut			
350-381-30*				Plain	0.5"/ **12.7mm**	Flat (carbide tip)	
350-382-30*				W/ clamp nut			
350-383-30*				Plain		Spherical (SR4) (carbide tip)	
350-384-30*				W/ clamp nut			
350-361-30*				Plain		Flat	

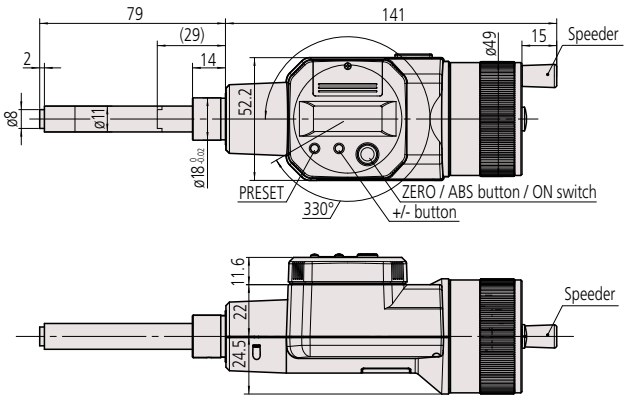
* IP65 dust/water protection type
** Excluding quantizing error
Note: Stem diameter of IP65 type is 12mm.

DIMENSIONS

Plain stem

Unit: mm

Plain stem



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

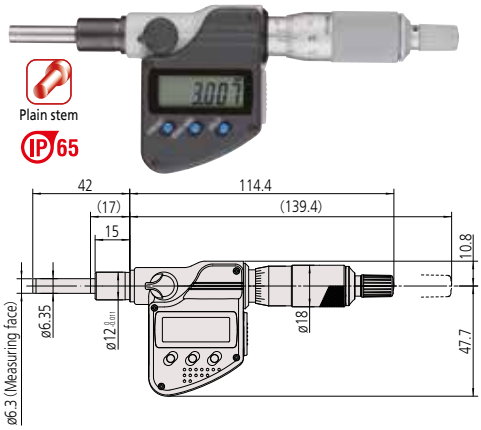
Origin point setting (ABS measurement system): Resets the ABS origin at the current spindle position to the minimum value of the measuring range and switches to ABS mode.
Zero-setting (INC measurement system):
A brief press on the ZERO/ABS button sets display to zero at the current spindle position and 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	
DIGIMATIC Cable 1m	959149
DIGIMATIC Cable 2m	959150
USB Input Tool Direct (2m)	06ADV380C
Connecting cable U-WAVE-T	02AZD790C
Connecting cable U-WAVE-T foot switch type	02AZE140C
Connecting cables for 350 series	
DIGIMATIC Cable 1m	05CZA662
DIGIMATIC Cable 2m	05CZA663
USB Input Tool Direct (2m)	06ADV380B
Connecting cable U-WAVE-T	02AZD790B
Connecting cable U-WAVE-T foot switch type	02AZE140B

DIMENSIONS

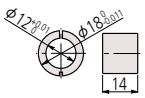
Plain stem

Unit: mm

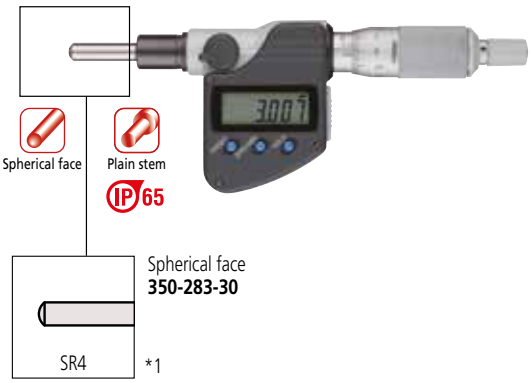


350-281-30 (Stem dia. 12mm, waterproof type) Mass: 230g

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

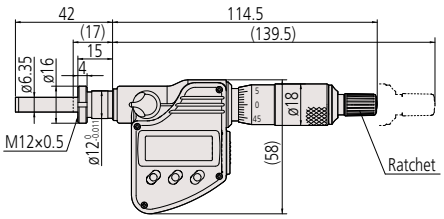
● **CAD download service at Mitutoyo web site**

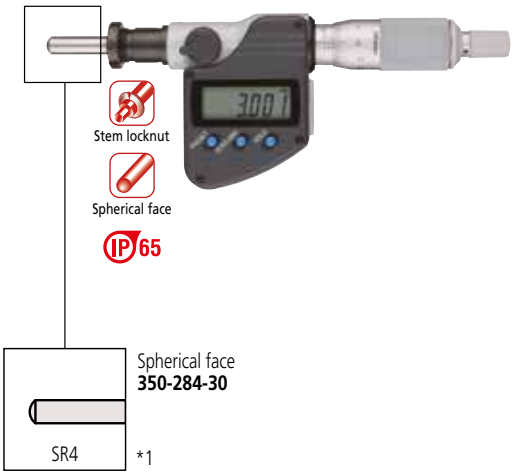
2D CAD data can be downloaded at our web site. For details, refer to page 10.

DIMENSIONS

Stem locknut

Unit: mm

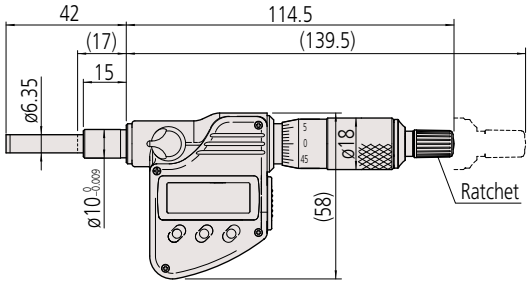


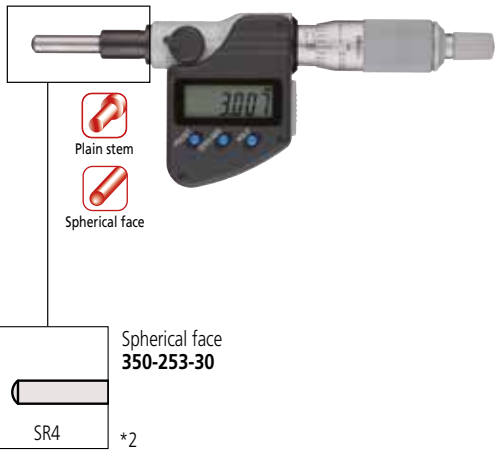


Fixture thickness: 11.5mm
350-282-30 (Stem dia. 12mm, equipped with locknut, waterproof type) Mass: 230g

*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**

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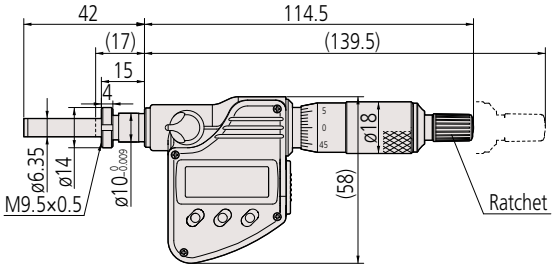
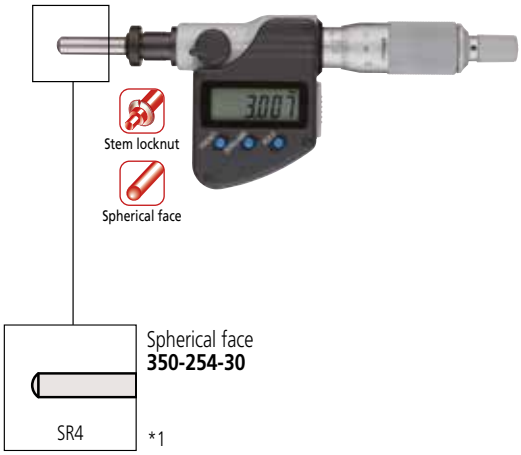
Stem locknut

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: ±5µm
- 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	Reverse reading
148-211				W/ clamp nut		

Inch

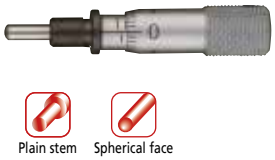
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation
148-217	0 - .2"/ **0 - 5.08mm**	±.00025" / **± 0.006mm**	.156"/ **3.962mm**	Plain	Spherical (SR1.5)	Standard
148-218				W/ clamp nut		
148-202	0 - .25"/ **6.35mm**		.25"/ **6.35mm**	Plain	Flat	
148-204				W/ clamp nut		
148-206				Plain	Spherical (SR3)	
148-208				W/ clamp nut		
148-210*				Plain	Flat	Reverse reading
148-212*				W/ clamp nut		

* made-to-order models

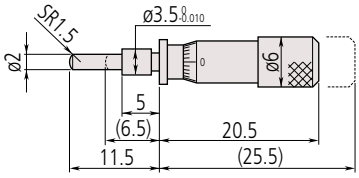
DIMENSIONS

Plain stem

Unit: mm

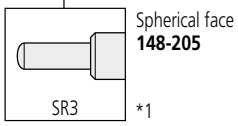


Plain stem Spherical face



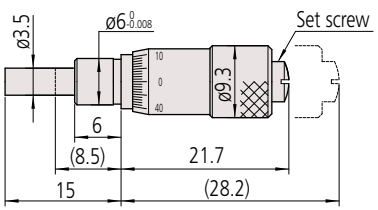
148-215 Mass: 4g

Plain stem Spherical face



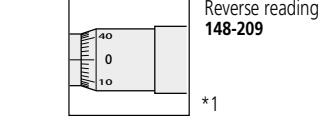
*1 Other dimensions are the same as **148-201.**

Plain stem



148-201 Mass: 10g

Plain stem



( ): with spindle fully retracted

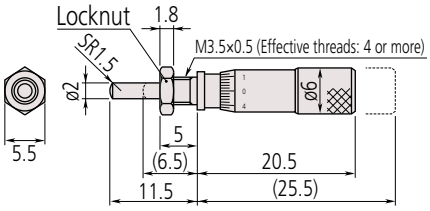
Standard heads

DIMENSIONS

Stem locknut

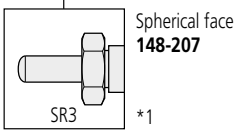
Unit: mm

Stem locknut Spherical face



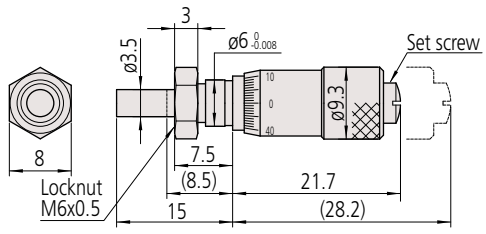
Fixture thickness: 3mm Mass: 4g
148-216

Stem locknut Spherical face



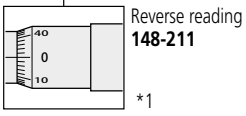
*1 Other dimensions are the same as **148-203**.

Stem locknut



Fixture thickness: 4mm Mass: 10g
148-203

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 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: ±2µm
- 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	±2µm	9.5mm	Plain	Flat	15mm thimble dia.
148-302				W/ clamp nut		
148-303				Plain		20mm thimble dia.
148-304				W/ clamp nut		
148-305				Plain		29mm thimble dia.
148-306				W/ clamp nut		
148-313				Plain	Spherical (SR4)	15mm thimble dia.
148-314				W/ clamp nut		
148-307	0 - 13mm			Plain	Flat	15mm thimble dia.
148-308				W/ clamp nut		
148-309				Plain		20mm thimble dia.
148-310				W/ clamp nut		
148-311				Plain		29mm thimble dia.
148-312				W/ clamp nut		

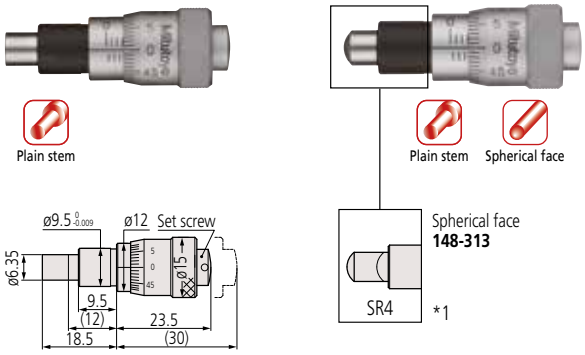
Inch

Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
148-351	0 - .25"/ **6.35mm**	±.0001"/ **±0.003mm**	.375"/ **9.525mm**	Plain	Flat	.59" thimble dia./ **14.986mm**
148-352				W/ clamp nut		
148-353				Plain		.79" thimble dia./ **20.066mm**
148-354				W/ clamp nut		
148-355				Plain		1.14" thimble dia./ **28.956mm**
148-356				W/ clamp nut		
148-357	0 - .5"/ **12.7mm**			Plain		.59" thimble dia./ **14.986mm**
148-358				W/ clamp nut		
148-359				Plain		.79" thimble dia./ **20.066mm**
148-360				W/ clamp nut		
148-361				Plain		1.14" thimble dia./ **28.956mm**
148-362				W/ clamp nut		

DIMENSIONS

Unit: mm

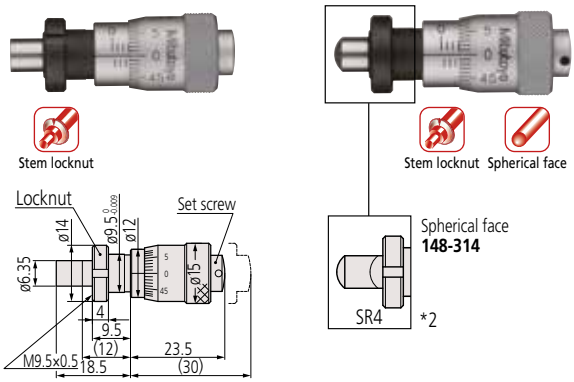
Plain stem



Mass: 26g
148-301 Thimble diameter: ø15

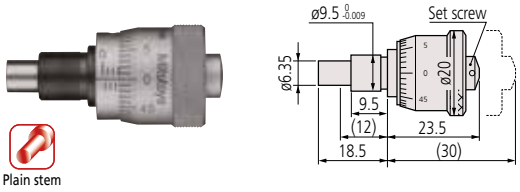
*1 Other dimensions are the same as **148-301.**

Stem locknut

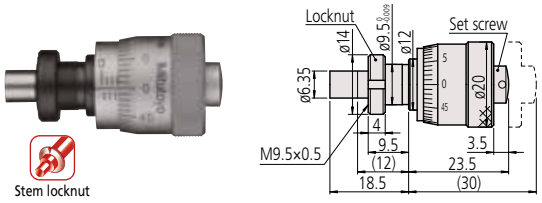


Fixture thickness : 6mm Mass: 26g
148-302 Thimble diameter: ø15

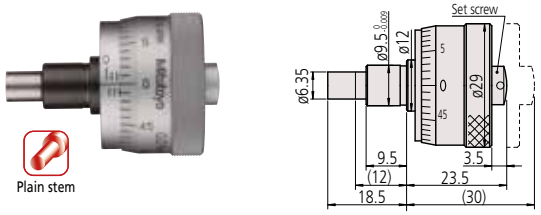
*2 Other dimensions are the same as **148-302**.



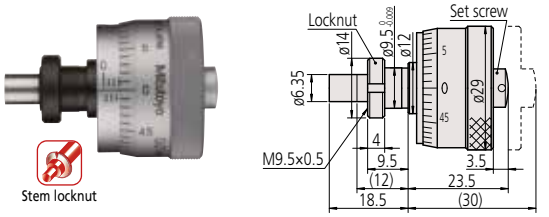
Mass: 39g
148-303 Thimble diameter: ø20



Fixture thickness : 6mm Mass: 39g
148-304 Thimble diameter: ø20



Mass: 71g
148-305 Thimble diameter: ø29

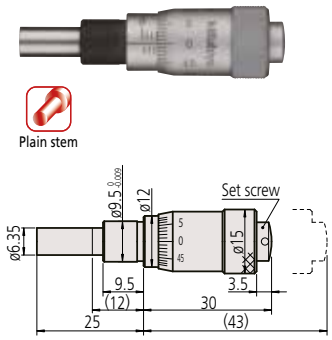


Fixture thickness : 6mm Mass: 71g
148-306 Thimble diameter: ø29

( ): with spindle fully retracted

DIMENSIONS

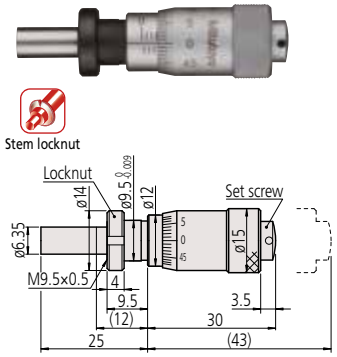
Plain stem



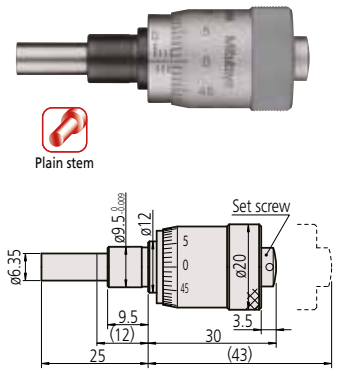
Mass: 35g
148-307 Thimble diameter: ø15

Stem locknut

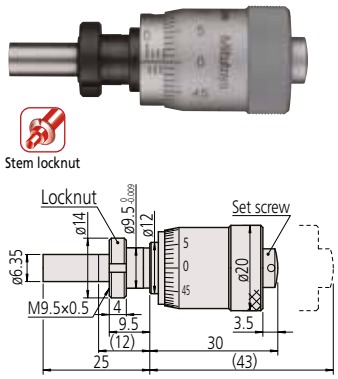
Unit: mm



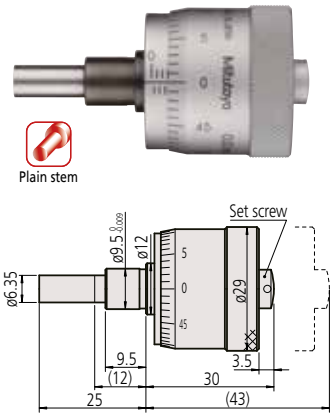
Fixture thickness : 6mm Mass: 35g
148-308 Thimble diameter: ø15



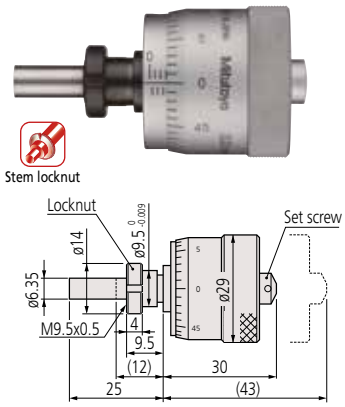
Mass: 55g
148-309 Thimble diameter: ø20



Fixture thickness : 6mm Mass: 55g
148-310 Thimble diameter: ø20



Mass: 103g
148-311 Thimble diameter: ø29



Fixture thickness : 6mm Mass: 103g
148-312 Thimble diameter: ø29

( ): 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: ±2µm
- 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
148-104	0 - 13mm	±2µm	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

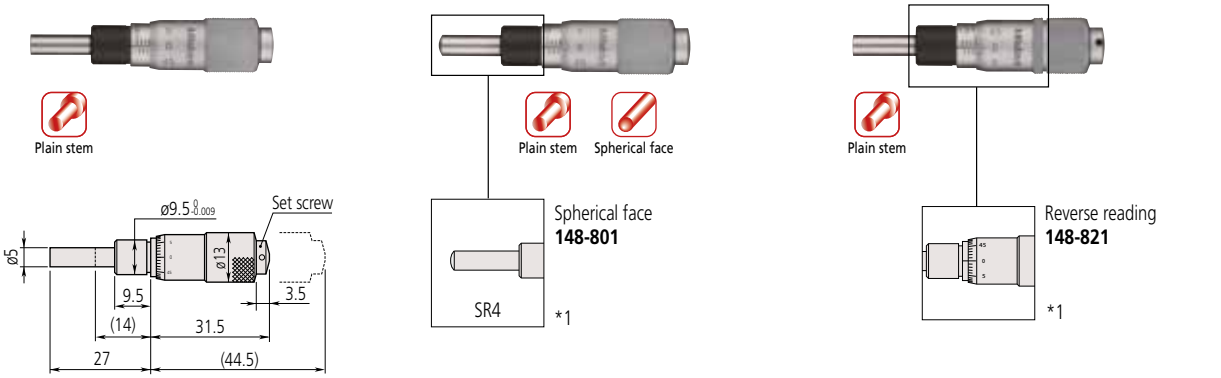
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation
148-112	0 - .5"/ **0 - 12.7mm**	±.0001"/ **±0.003mm**	.375"/ **9.525mm**	Plain	Flat	Standard
148-111**				W/ clamp nut		
148-123				Plain*		
148-122				W/ clamp nut*		
148-811				Plain	Spherical (SR4)	
148-812				W/ clamp nut		
148-813				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

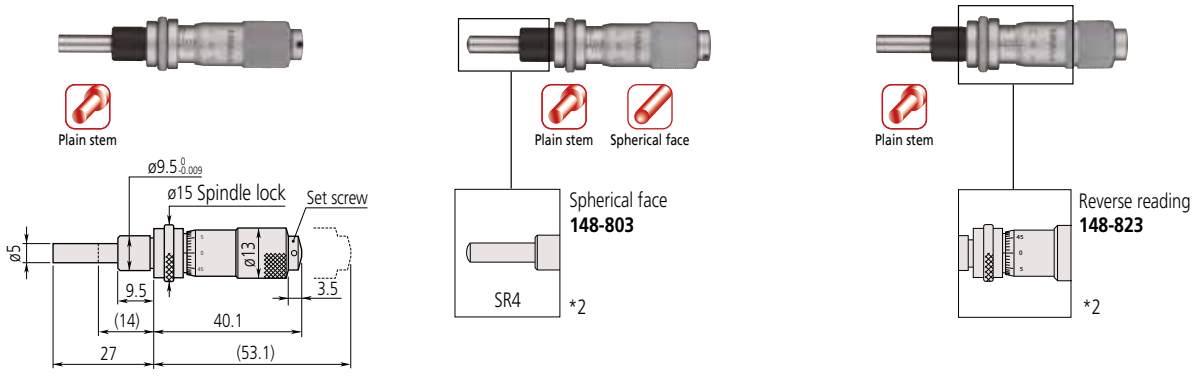
Unit: mm



148-104 Mass: 30g

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

Plain stem and spindle lock



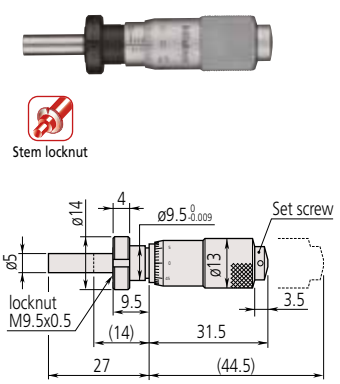
148-121 Mass: 40g

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

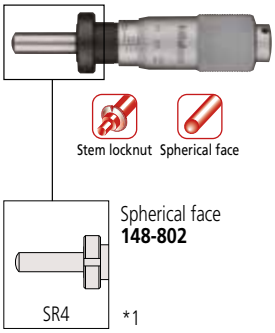
DIMENSIONS

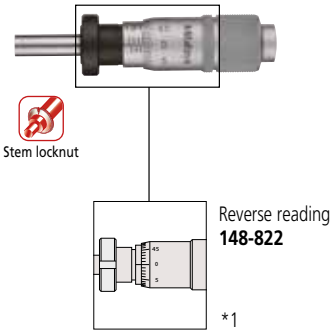
Stem locknut

Unit: mm



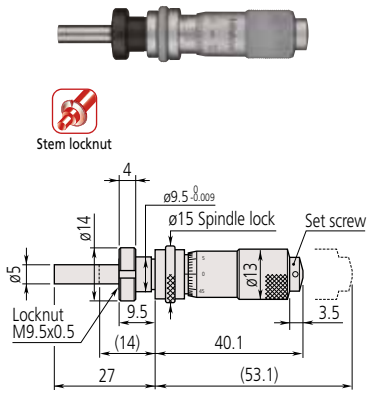
Fixture thickness: 6mm
148-103 Mass: 35g



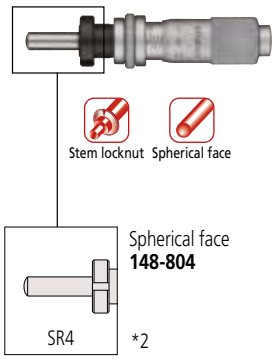


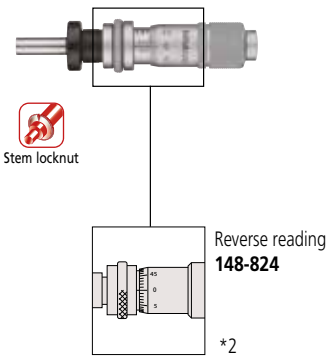
*1 Other dimensions are the same as **148-103.**

Stem locknut and spindle lock



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





*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: ±2µm
- 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	±2µm	9.5mm	Plain	Flat	Standard
148-513						Stainless steel throughout
148-508				W/ clamp nut		
148-506				Plain*		Standard
148-504				W/ clamp nut*		
148-853				Plain	Spherical (SR4)	
148-854				W/ clamp nut*		
148-863				Plain	Flat	Reverse reading
148-864				W/ clamp nut*		
148-518**				W/ clamp nut		Stainless steel throughout
148-858**				W/ clamp nut	Spherical (SR4)	Standard
148-866**				Plain*	Flat	Reverse reading
148-856**				Plain*	Spherical (SR4)	Standard
148-868**				W/ clamp nut	Flat	Reverse reading

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

Inch

Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
148-501	0 - .5"/ **12.7mm**	±.0001"/ **±0.003mm**	.375"/ **9.525mm**	Plain	Flat	Standard
148-511**						Stainless steel throughout
148-507**				W/ clamp nut		
148-505				Plain*		Standard
148-502				W/ clamp nut*		
148-851				Plain	Spherical (SR4)	
148-852				W/ clamp nut*		
148-861				Plain	Flat	Reverse reading
148-862				W/ clamp nut*		

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

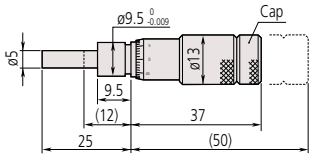
DIMENSIONS

Plain stem

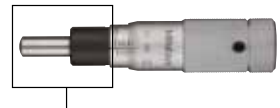
Unit: mm

All stainless steel model

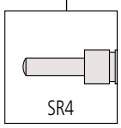
Plain stem



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

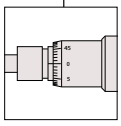


Plain stem Spherical face



Spherical face
148-853
*1

Plain stem

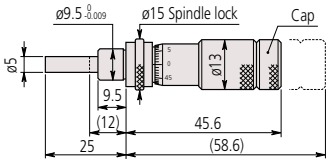


Reverse reading
148-863
*1

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

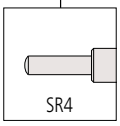
Plain stem and spindle lock

Plain stem

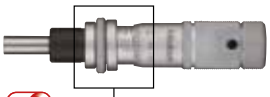


148-506 Mass: 35g

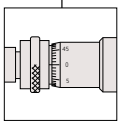
Plain stem Spherical face



Spherical face
148-856
*2



Plain stem



Reverse reading
148-866
*2

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

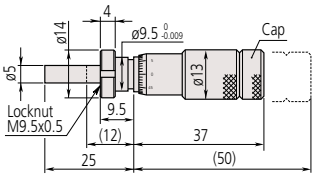
DIMENSIONS

Stem locknut

Unit: mm

All stainless steel model

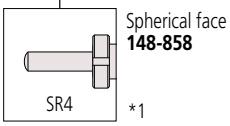
Stem locknut



Fixture thickness: 6mm Mass: 40g
148-508
148-518 All stainless steel model

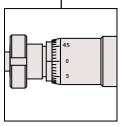
Stem locknut

Spherical face



Spherical face
148-858
*1

Stem locknut

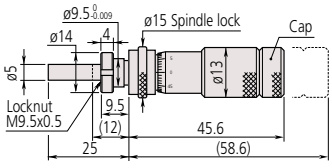


Reverse reading
148-868
*1

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

Stem locknut and spindle lock

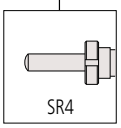
Stem locknut



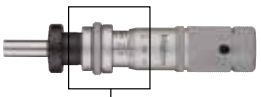
Fixture thickness: 6mm Mass: 40g
148-504

Stem locknut

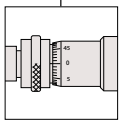
Spherical face



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: ±2µm
- 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
149-132	0 - 15mm	±2µm	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)	
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

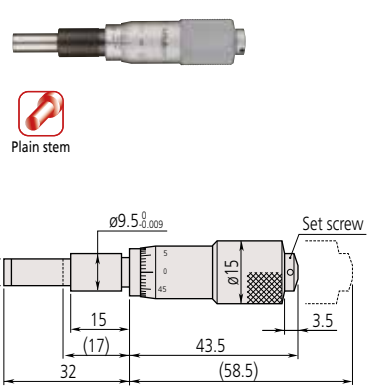
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Graduation
149-148	0 - .5"/ **12.7mm**	±.0001"/ **±0.003mm**	.375"/ **9.525mm**	Plain	Flat (carbide tip)	Standard
149-147				W/ clamp nut		
149-185***				Plain*		
149-182				W/ clamp nut*		
149-811				Plain	Spherical (SR4) (carbide tip)	
149-812				W/ clamp nut		
149-831**				Plain	Flat (carbide tip)	Reverse reading
149-832**				W/ clamp nut		
149-181**				Plain*		Standard

* with spindle lock ** made-to-order model
*** w/rachet (**149-181**) is available

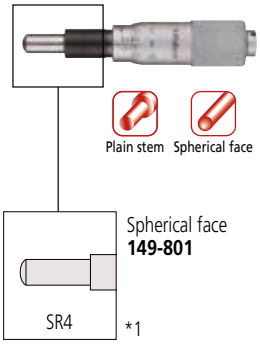
DIMENSIONS

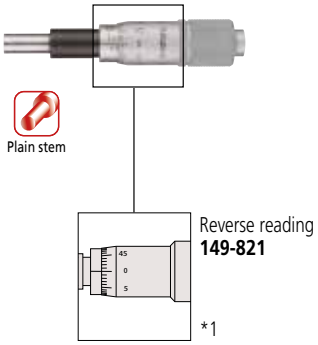
Plain stem

Unit: mm



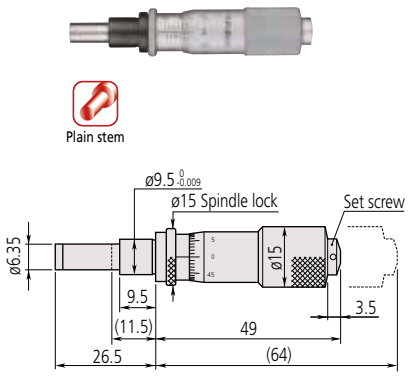
149-132 Mass: 55g



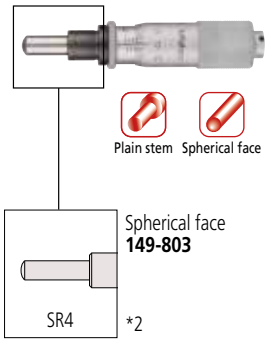


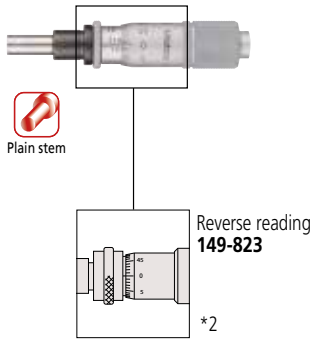
*1 Other dimensions are the same as **149-132**.

Plain stem and spindle lock



149-183 Mass: 55g



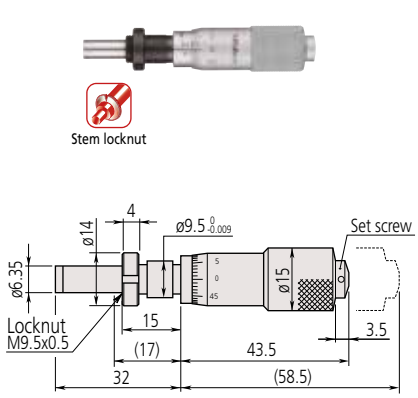


*2 Other dimensions are the same as **149-183**.
( ): with spindle fully retracted

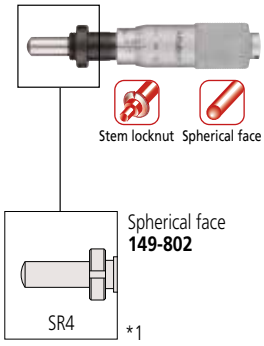
DIMENSIONS

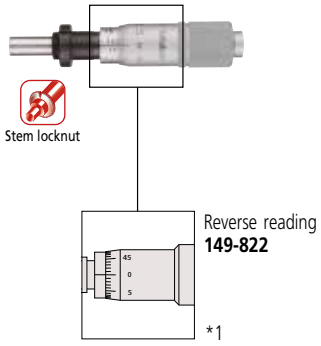
Stem locknut

Unit: mm



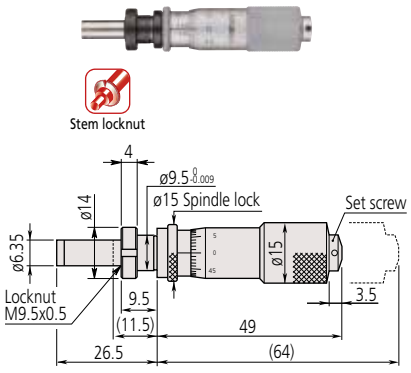
Fixture thickness: 11.5mm
149-131 Mass: 60g



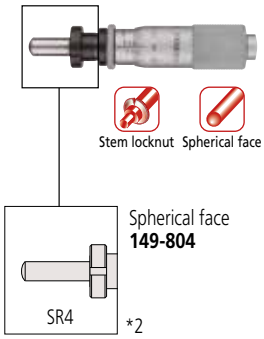


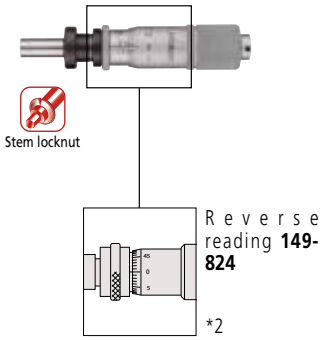
*1 Other dimensions are the same as **149-131**.

Stem locknut and spindle lock



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





*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: ±2µm
- 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

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)	
150-802				W/ clamp nut		
150-821				Plain	Flat (carbide tip)	Reverse reading
150-822				W/ clamp nut		
150-190				Plain		W/vernier (0.001mm)
150-189				W/ clamp nut		
150-183**				Plain*		
150-184				W/ clamp nut*		
150-196				Plain		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

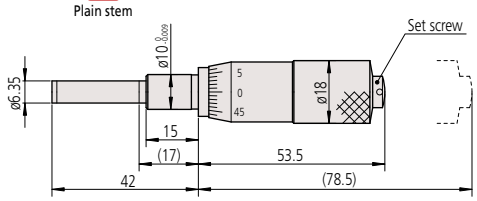
Order No.	Range	Accuracy	Stem dia.	Stem	Spindle end	Special features
150-208	0 - 1"/ 0 - 25.4mm	±.0001"/ ±0.003mm	.375"/ 9.525mm	Plain	Flat (carbide tip)	Standard
150-207				W/ clamp nut		
150-213**				Plain*		
150-214**				W/ clamp nut*		
150-811				Plain	Spherical (SR4) (carbide tip)	
150-812				W/ clamp nut		
150-831				Plain	Flat (carbide tip)	Reverse graduation
150-832				W/ clamp nut		
150-206				Plain		W/vernier (.0001")/ **(0.003mm)***
150-205**				W/ clamp nut		
150-215**				Plain*		
150-216**				W/ clamp nut*		
150-198				Plain		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 *** graduation in inch only

DIMENSIONS

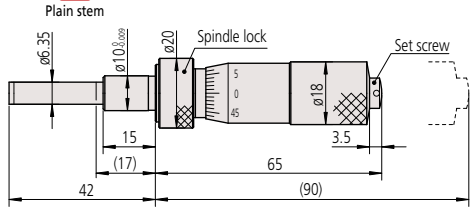
Unit: mm

Plain stem



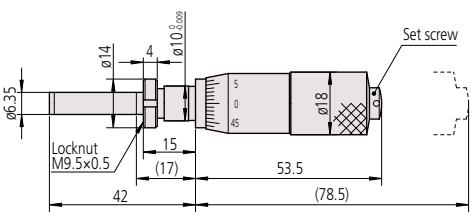
150-196 Mass: 95g

Plain stem and spindle lock



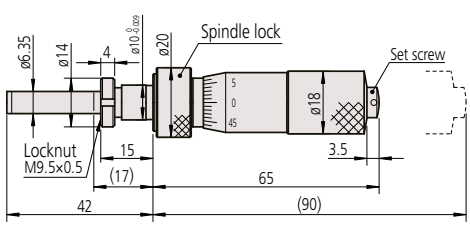
150-211 Mass: 115g

Stem locknut



Fixture thickness: 11.5mm
150-195 Mass: 110g

Stem locknut and spindle lock



Fixture thickness: 11.5mm
150-212 Mass: 115g

( ): with spindle fully retracted

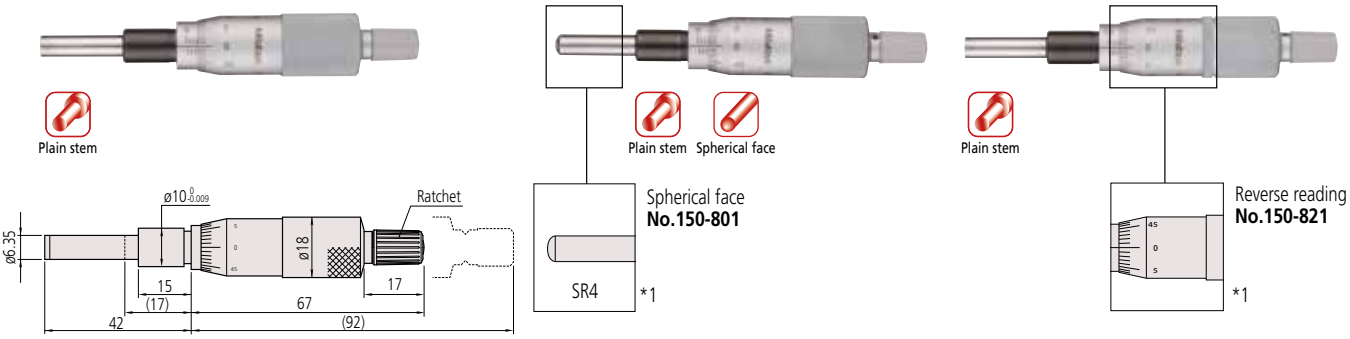
CAD download service at Mitutoyo web site

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

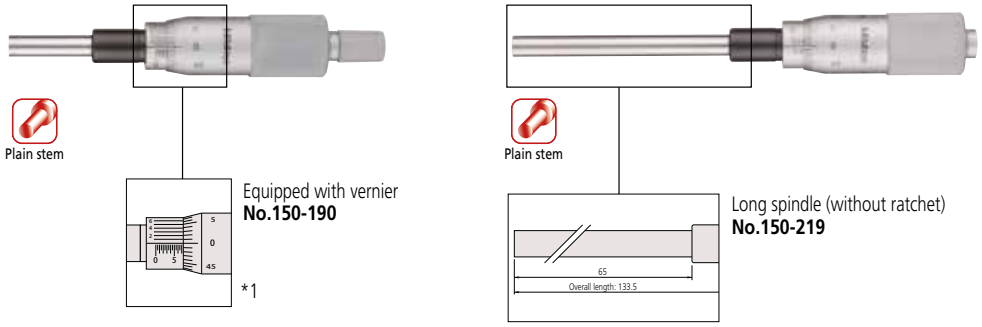
DIMENSIONS

Plain stem

( ): with spindle fully retracted Unit: mm

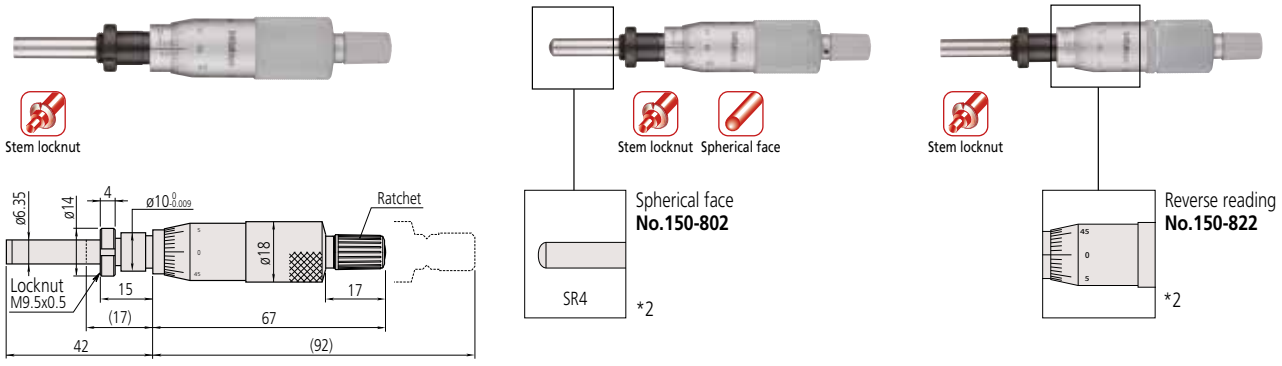


150-192 Mass: 95g

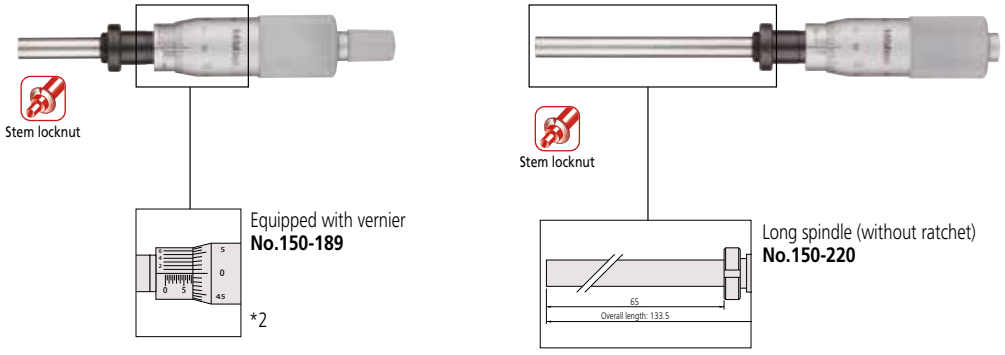


*1 Other dimensions are the same as **150-192**.

Stem locknut



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

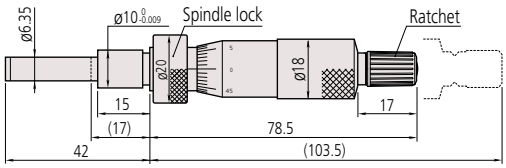


*2 Other dimensions are the same as **150-191**.

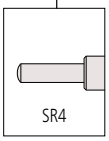
DIMENSIONS

Plain stem and spindle lock

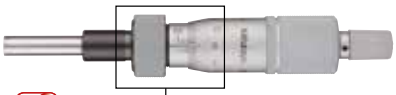
( ): with spindle fully retracted Unit: mm

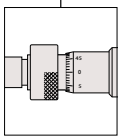


150-209 Mass: 110g

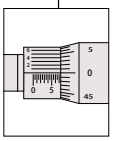


Spherical face
No.150-803
*1

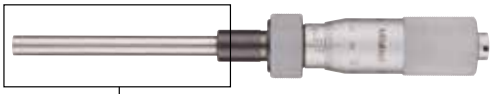


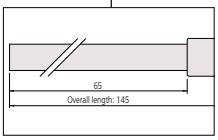


Reverse reading
No.150-823
*1



Equipped with vernier
No.150-183
*1

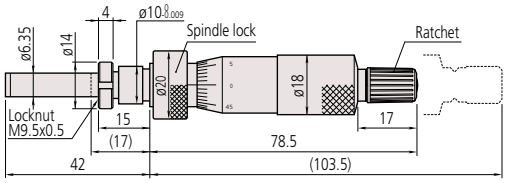




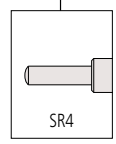
Long spindle (without ratchet)
No.150-223

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

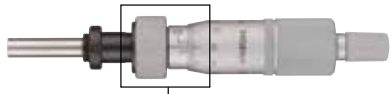
Stem locknut and spindle lock

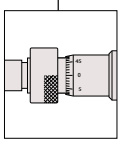


Fixture thickness: 11.5mm
150-210 Mass: 115g

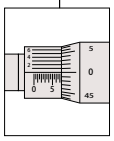


Spherical face
No.150-804
*2

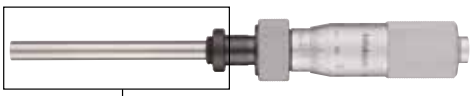


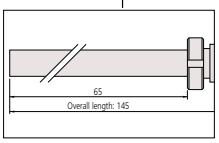


Reverse reading
No.150-824
*2



Equipped with vernier
No.150-184
*2





Long spindle (without ratchet)
No.150-224

*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: ±2μm (25mm range) ±4μm (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	±2μm	12mm	Plain	Flat (carbide tip)	—
151-223				W/ clamp nut		
151-214**				Plain*		
151-213**				W/ clamp nut*		
151-222				Plain		W/ vernier (0.001mm)
151-221				W/ clamp nut		
151-212**				Plain*		
151-211**				W/ clamp nut*		
151-227				Plain		w/o ratchet stop
151-228				W/ clamp nut		
151-225				Plain*		
151-226				W/ clamp nut*		
151-256	0 - 50mm	±4μm		Plain		—
151-255				W/ clamp nut		
151-260				Plain		w/o ratchet stop
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"/ **25.4mm**	±.0001"/ **±0.003mm**	.5"/ **12.7mm**	Plain	Flat (carbide tip)	—
151-239				W/ clamp nut		
151-238				Plain		W/ vernier (.0001")/**(0.003mm)**
151-237				W/ clamp nut		
151-241**				Plain*		w/o ratchet stop
151-242**				W/ clamp nut*		
151-243**				Plain*		w/o ratchet stop (.0001")/**(0.003mm)**
151-244**				W/ clamp nut*		
151-272	0 - 2"/ **50.8mm**	±.0002"/ **±0.005mm**		Plain		—
151-271				W/ clamp nut		

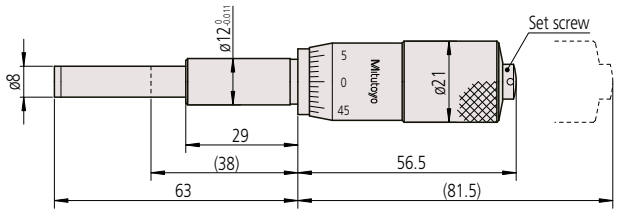
* with spindle lock ** made-to-order models *** Graduation in inch only

DIMENSIONS

Unit: mm

Plain stem

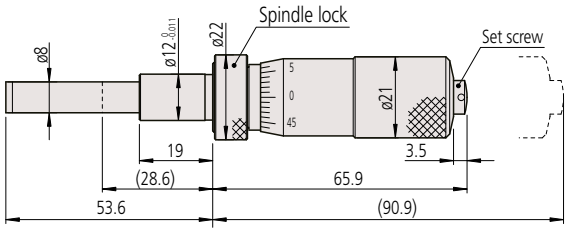
Plain stem



151-227 Mass: 150g

Plain stem and spindle lock

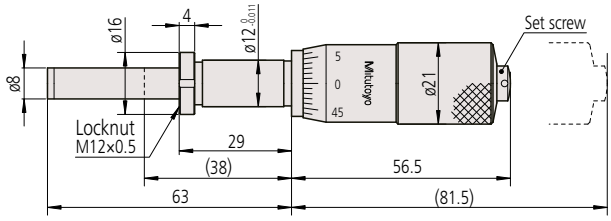
Plain stem



151-225 Mass: 165g

Stem locknut

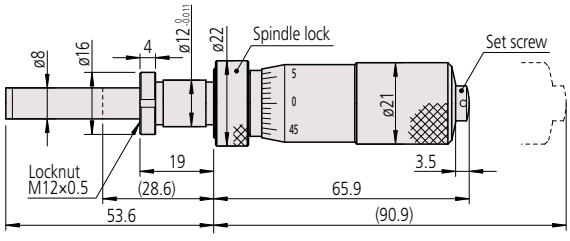
Stem locknut



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

Stem locknut and spindle lock

Stem locknut



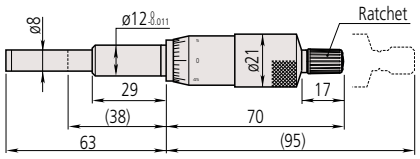
Fixture thickness: 15.5mm
151-226 Mass: 165g

( ): With spindle fully retracted.

DIMENSIONS

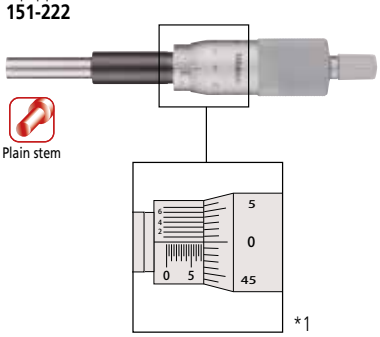
Unit: mm

Plain stem



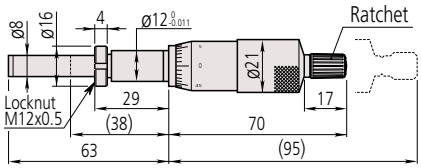
151-224 Mass: 150g

Equipped with vernier
151-222



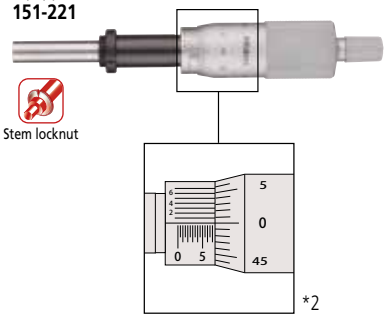
*1 Other dimensions are the same as **151-224**.

Stem locknut



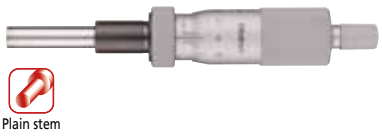
Fixture thickness: 25.5mm
151-223 Mass: 155g

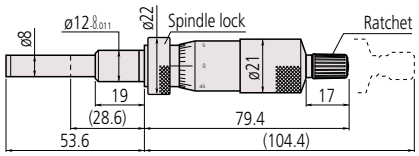
Equipped with vernier
151-221



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

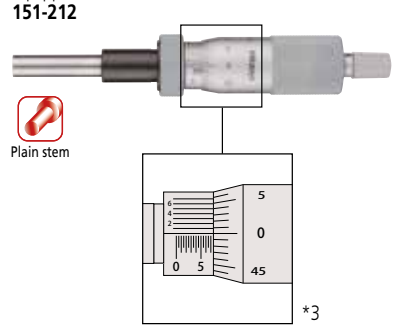
Plain stem and spindle lock





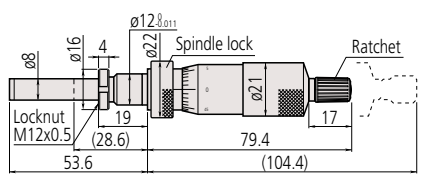
151-214 Mass: 160g

Equipped with vernier
151-212



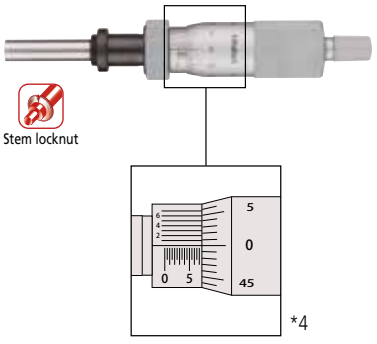
*3 Other dimensions are the same as **151-214**.

Stem locknut and spindle lock



Fixture thickness: 15.5mm
151-213 Mass: 165g

Equipped with vernier
151-211



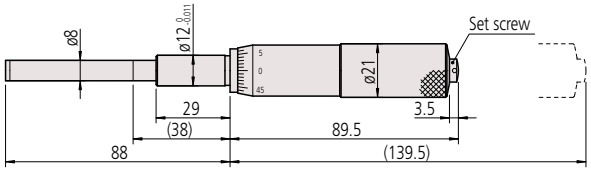
*4 Other dimensions are the same as **151-213**.
( ): With spindle fully retracted.

DIMENSIONS

Plain stem

Unit: mm

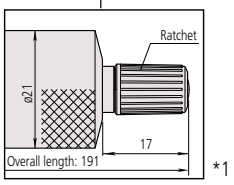
Plain stem



151-260 Mass: 240g

Plain stem

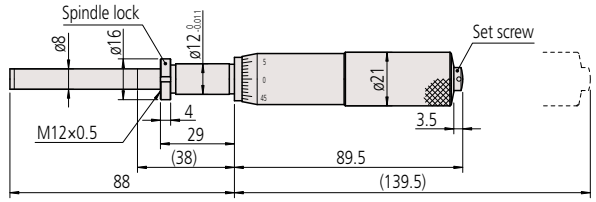
Equipped with ratchet
151-256



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

Stem locknut

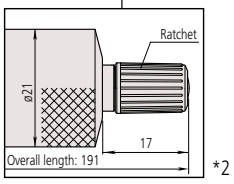
Stem locknut



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

Stem locknut

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
110-102			0.0001mm						Fine
110-105	0 - 1mm		0.001mm		±3µm/±1.5µm				Standard
110-106			0.0001mm						Fine
110-107			0.001mm					Spherical (SR10) (carbide tip)	Standard
110-108			0.0001mm						Fine
110-502	Thimble (fine)	0 - 0.2mm	Thimble (fine)	0.0005mm	±3µm/±1.5µm	9.5mm		Spherical (SR3)	Dual scales; 0.2mm fine-feed range
	Thimble (coarse)	0 - 13mm	Thimble (coarse)	0.01mm					

Inch

Order No.	Range		Graduation***		Accuracy**	Stem dia.	Stem	Spindle end	Graduation features
110-111	0 - .05"/**0 - 1.27mm**		.00002" / **0.0005mm**		±.00025"/±.00006"/ **±0.006mm/±0.002mm**	.5"/**12.7mm**	w/ clamp nut	Flat (carbide tip)	Standard
110-112			.000005" / **0.0001mm**						Fine
110-115*	0 - .02"/**0 - 0.508mm**		.00002" / **0.0005mm**		±.00015"/±.00006"/ **±0.004mm/±0.002mm**				Standard
110-116*			.000005" / **0.0001mm**						Fine
110-117*			.00002" / **0.0005mm**					Spherical (SR10) (carbide tip)	Standard
110-118*			.000005" / **0.0001mm**						Fine
110-504	Thimble (fine)	0 - .006"/ **0-0.152mm**	Thimble (fine)	.00002"/ **0.0005mm**	±.00015"/±.00006" **±0.006mm/±0.002mm**	.375"/**9.525mm**		Spherical (SR3)	Dual scales; **0.2mm**/.006" fine-feed range
	Thimble (coarse)	0 - .5"/ **0-12.7mm**	Thimble (coarse)	.001"/ **0.025mm**					

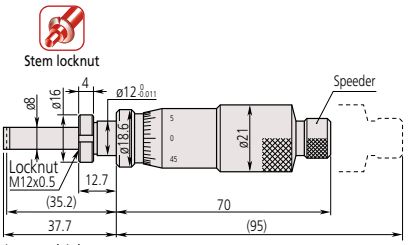
* made-to-order models ** Wide range / narrow range *** Graduation in inch only

DIMENSIONS

Unit: mm

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

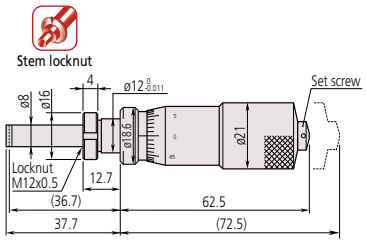
Equipped with vernier



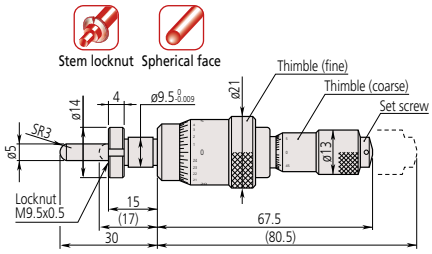
Fixture thickness: 9.5mm
110-101, 110-102 Equipped with vernier Mass: 150g

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

Equipped with vernier

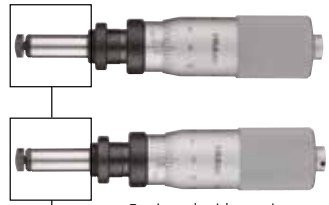


Fixture thickness: 9.5mm
110-105, 110-106 Equipped with vernier Mass: 150g

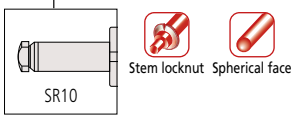


Fixture thickness: 11.5mm
110-502 Dual thimble Mass: 95g

Spherical face



Equipped with vernier



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

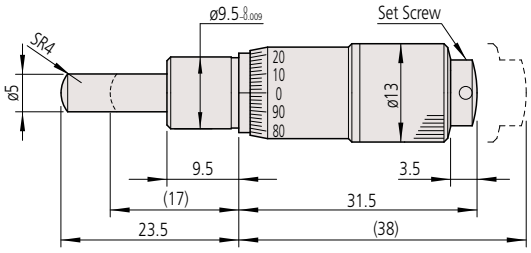
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Special features
148-142	0 - 6.5mm	0.002mm	±2μm	9.5mm	Plain	Spherical (SR4)	0.1mm	—
148-143					w/ clamp nut			
148-342					Plain			Thicker & shorter thimble
148-343					w/ clamp nut			
148-242			±5μm	6mm	Plain	Spherical (SR3)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

DIMENSIONS

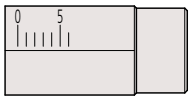
Plain stem

Unit: mm

Plain stem Spherical face



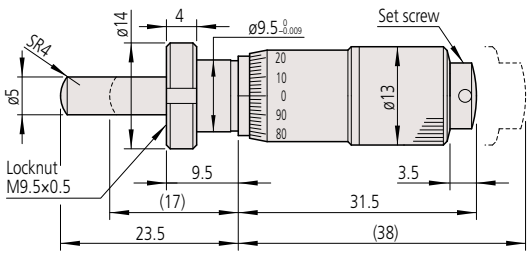
148-142 Mass: 31g



Sleeve marker

Stem locknut

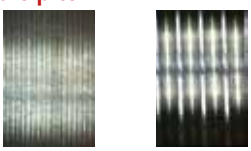
Stem locknut Spherical face



Fixture thickness: 6mm
148-143 Spherical face Mass: 34g

( ): with spindle fully retracted

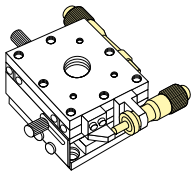
Spindle pitch



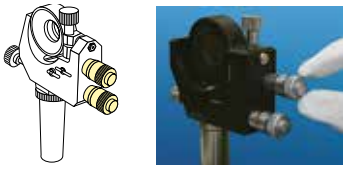
Pitch = 0.1mm Pitch = 0.5mm

Applications

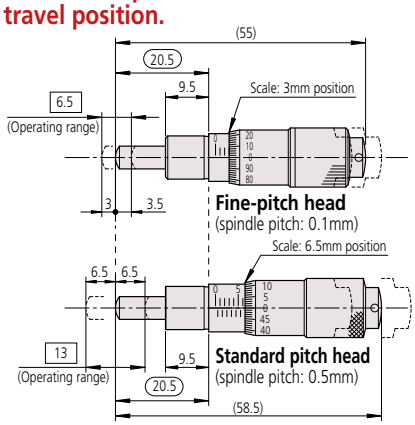
- Semiconductor-wafer positioning machinery and optical component alignment units, etc.
- Precision X-Y table positioning



- 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.



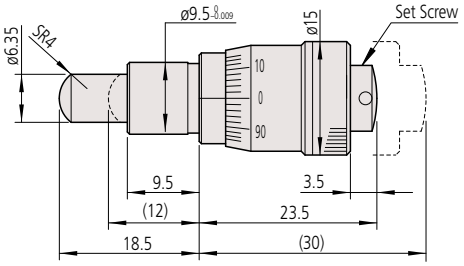
While the fine-pitch micrometer head has a measuring range of 6.5mm, the standard head has a larger range of 13mm.
When replacing a standard head, the fine-pitch type can use the common range in the middle of the spindle travel. The standard and compact types of fine-pitch head are otherwise completely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

DIMENSIONS

Unit: mm

Plain stem

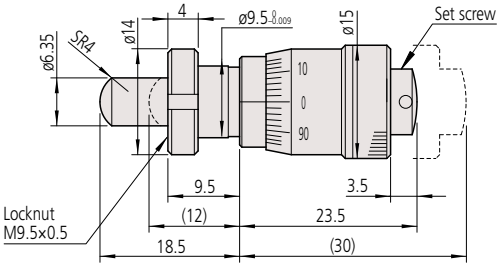
Plain stem Spherical face



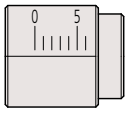
148-342 Mass: 29g

Stem locknut

Stem locknut Spherical face



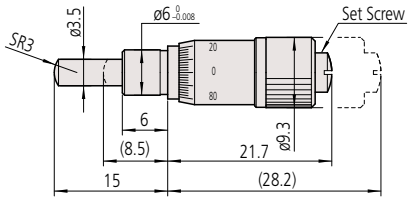
Fixture thickness: 6mm
148-343 Spherical face Mass: 31g



Sleeve marker

Plain stem

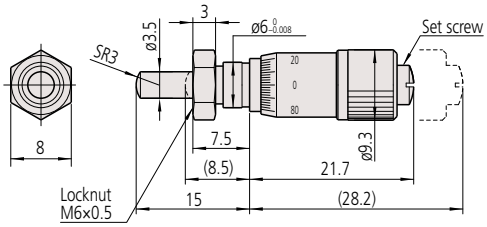
Plain stem Spherical face



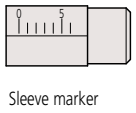
148-242 Mass: 10gg

Stem locknut

Stem locknut Spherical face



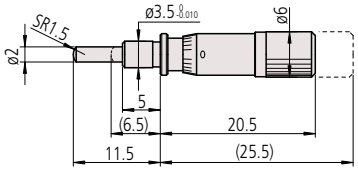
Fixture thickness: 4mm
148-243 Spherical face Mass: 10g



Sleeve marker

Plain stem

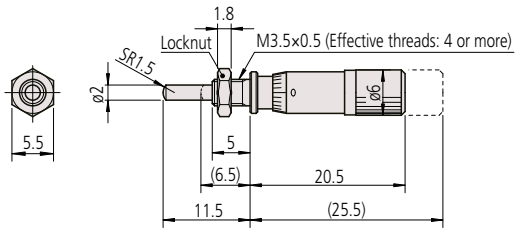
Plain stem Spherical face



148-244 Mass: 4g

Stem locknut

Stem locknut Spherical face



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

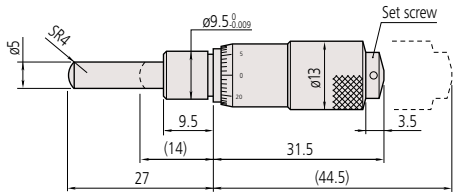
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch
148-132	0 - 13mm	0.01mm	±2µm	9.5mm	Plain	Spherical (SR4)	0.25mm
148-133					w/ clamp nut		
148-322	0 - 6.5mm				Plain		
148-323					w/ clamp nut		

DIMENSIONS

Plain stem

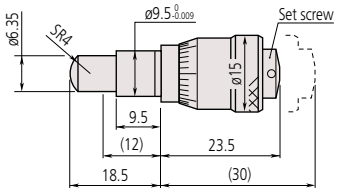
Unit: mm

Plain stem Spherical face



148-132 Mass: 30g

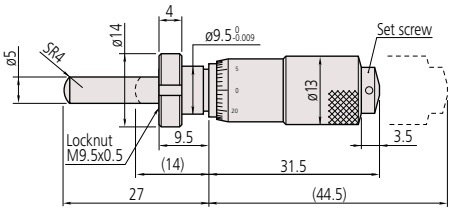
Stem locknut Spherical face



148-322 Mass: 30g

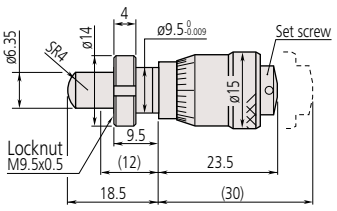
Stem locknut

Plain stem Spherical face



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

Stem locknut Spherical face



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.

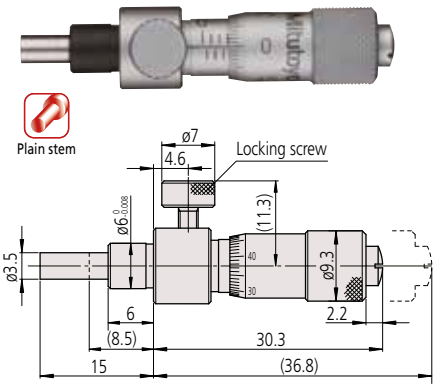
Series 148
Micrometer Heads Locking-screw Type

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

DIMENSIONS

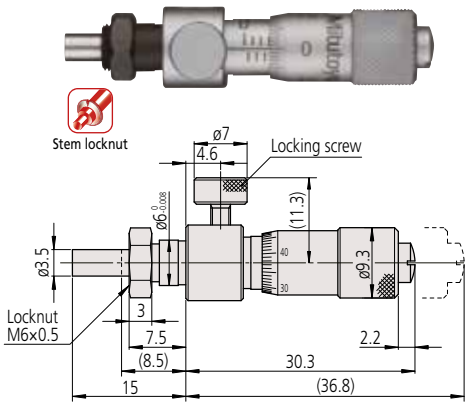
Unit: mm

Plain stem



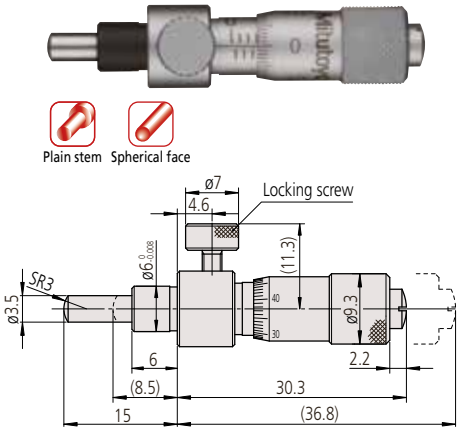
148-220 Mass: 16g

Stem locknut



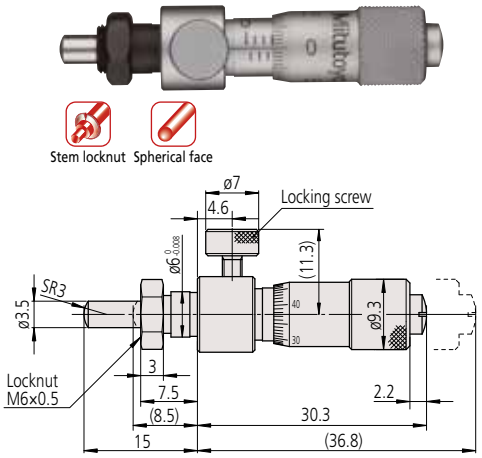
Fixture thickness: 4mm
148-221 Mass: 17g

Plain stem



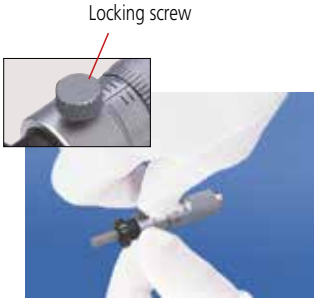
Spherical face (SR3)
148-222 Mass: 16g

Stem locknut



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

( ): with spindle fully retracted



Secure spindle

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		
148-222					Plain	Spherical (SR3)	
148-223					W/ clamp nut		
148-150	0 - 13mm		±2µm	9.5mm	Plain	Flat	
148-151					W/ clamp nut		
148-152					Plain	Spherical (SR4)	
148-153					W/ clamp nut		
148-316	0 - 6.5mm				Plain	Flat	
148-317					W/ clamp nut		
148-318					Plain	Spherical (SR4)	
148-319					W/ clamp nut		

Inch

Order No.	Range	Graduation*	Accuracy	Stem dia.	Stem	Spindle end	Graduation features
148-230	0 - .25"/ **6.35mm**	.001"/ **0.025mm**	±.00025"/ **±0.006mm**	.25"/ **6.35mm**	Plain	Flat	Standard
148-231					W/ clamp nut		
148-232					Plain	Spherical (SR3)	
148-233					W/ clamp nut		
148-160	0 - .5"/ **12.7mm**		±.0001"/ **±0.003mm**	.375"/ **9.525mm**	Plain	Flat	
148-161					W/ clamp nut		
148-162					Plain	Spherical (SR4)	
148-163					W/ clamp nut		
148-326	0 - .25"/ **6.35mm**				Plain	Flat	
148-327					W/ clamp nut		
148-328					Plain	Spherical (SR4)	
148-329					W/ clamp nut		

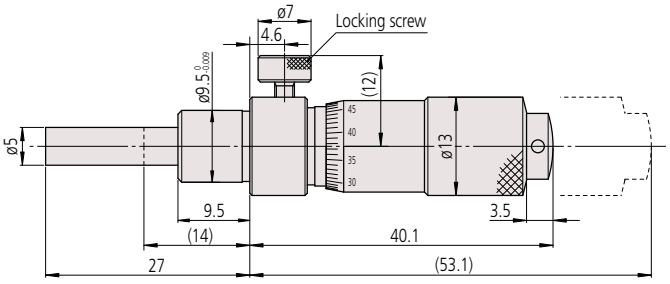
* graduation in inch only

DIMENSIONS

Unit: mm

Plain stem

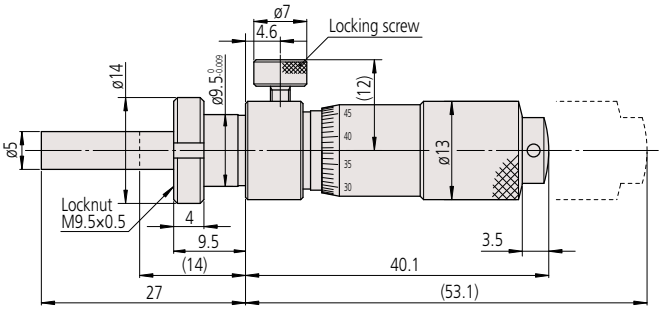
Plain stem



148-150 Mass: 40g

Stem locknut

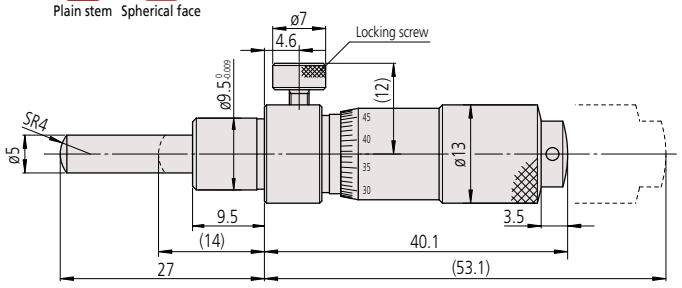
Stem locknut



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

Plain stem

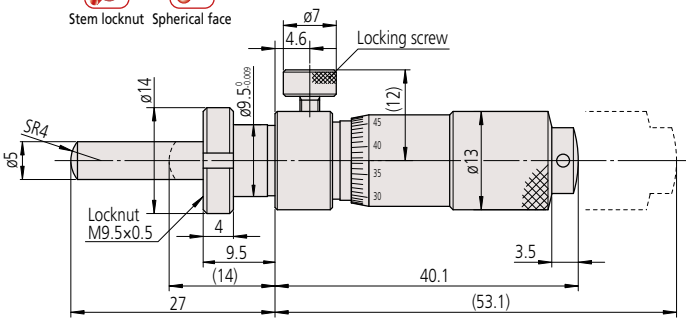
Plain stem Spherical face



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

Stem locknut

Stem locknut Spherical face



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

( ): with spindle fully retracted

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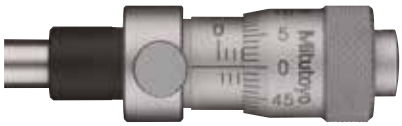
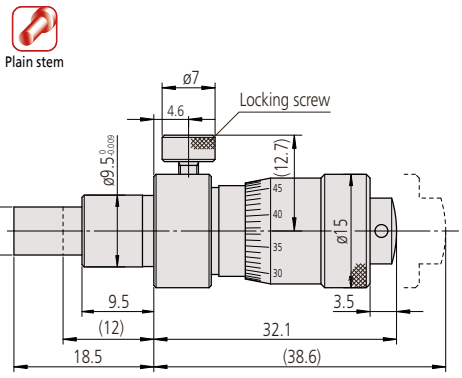
2D CAD data can be downloaded at our web site. For details, refer to page 10.

DIMENSIONS

Plain stem

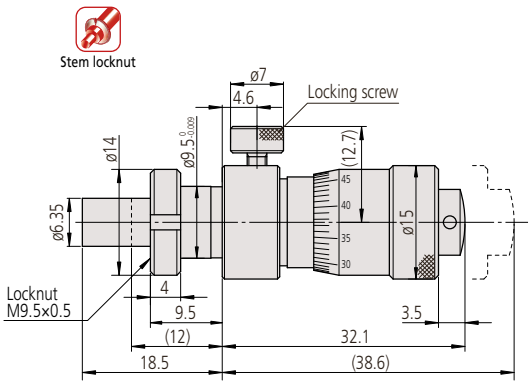




148-316 Mass: 40g

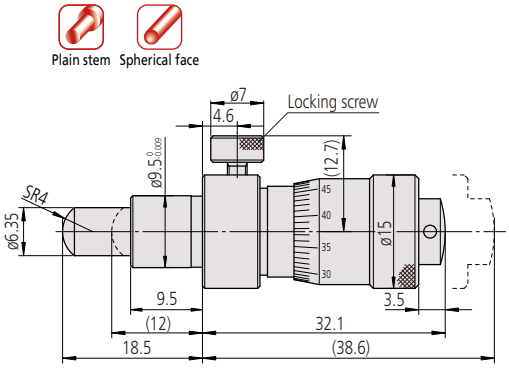
Stem locknut

Unit: mm



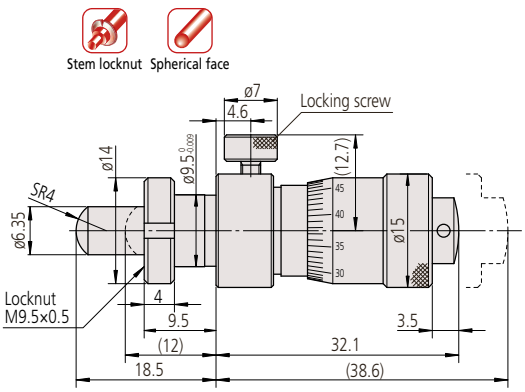
Fixture thickness: 6mm
148-317 Mass: 43g

Plain stem



Spherical surface (SR4)
148-318 Mass: 40g

Stem locknut



Spherical surface (SR4) Fixture thickness: 6mm
148-319 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.

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	0.01mm	±3μm	12mm	Plain	Flat (carbide tip)	0.5mm	Standard
153-202*	0 - 25mm	0.001mm	±3μm	12mm	Plain	Flat (carbide tip)	0.5mm	w/ vernier (0.001mm)
153-203	0 - 25mm	0.01mm	±3μm	12mm	Plain	Flat (carbide tip)	0.5mm	Standard
153-204	0 - 25mm	0.001mm	±3μm	12mm	Plain	Flat (carbide tip)	0.5mm	w/ vernier (0.001mm)

Inch

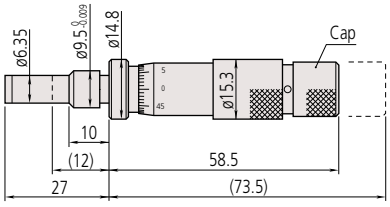
Order No.	Range	Graduation***	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Special features***
153-108**	0 - .5"/ **12.7mm**	.001"/ **0.025mm**	±.00015"/ **±0.004mm**	.375"/ **9.525mm**	Plain	Flat (carbide tip)	.025"/ **0.635mm**	w/ vernier (.0001")/**(0.003mm)**
153-205*	0 - 1"/ **25.4mm**	.001"/**0.025mm**	±.00015"/ **±0.004mm**	.5"/ **12.7mm**	Plain	Flat (carbide tip)	.025"/ **0.635mm**	Standard
153-206*	0 - 1"/ **25.4mm**	.0001"/**0.003mm**	±.00015"/ **±0.004mm**	.5"/ **12.7mm**	Plain	Flat (carbide tip)	.025"/ **0.635mm**	w/ vernier (.0001")/**(0.003mm)**
153-207	0 - 1"/ **25.4mm**	.001"/**0.025mm**	±.00015"/ **±0.004mm**	.5"/ **12.7mm**	Plain	Flat (carbide tip)	.025"/ **0.635mm**	Standard
153-208	0 - 1"/ **25.4mm**	.0001"/**0.003mm**	±.00015"/ **±0.004mm**	.5"/ **12.7mm**	Plain	Flat (carbide tip)	.025"/ **0.635mm**	w/ vernier (.0001")/**(0.003mm)**

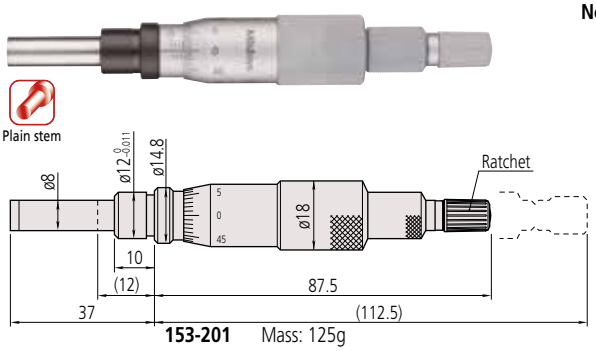
* with ratchet stop ** made-to-order model *** Graduation in inch only

DIMENSIONS

Unit: mm

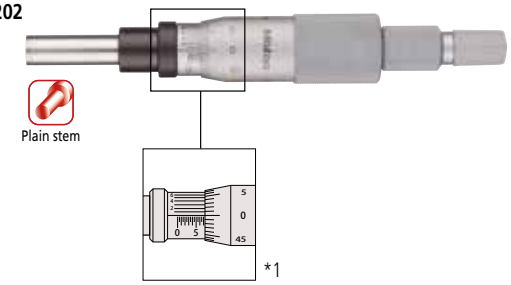
153-101 Mass: 70g



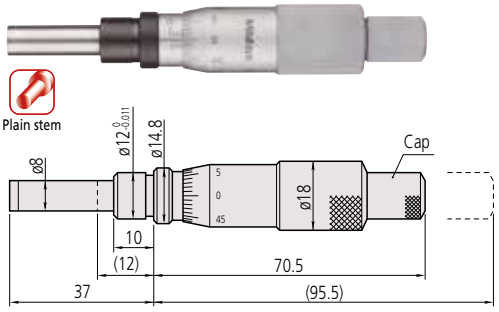


153-201 Mass: 125g

Equipped with ratchet and vernier ratchet
No.153-202

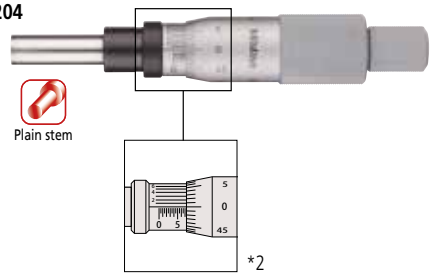


*1 Other dimensions are the same as **151-201**.



153-203 Mass: 125g

Without ratchet/ Equipped with vernier ratchet
No.153-204



*2 Other dimensions are the same as **153-203**.
( ): 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 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

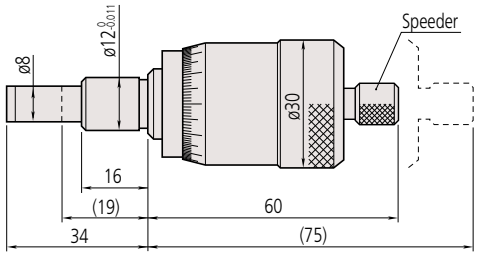
- Measuring face: Material: Carbide tip
  Hardness: 90HRC or more
  Lapped
- Scale finishing: Satin-chrome plated

Metric

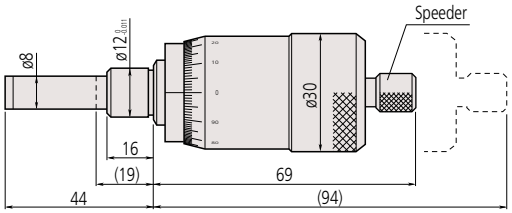
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch
152-101	0 - 15mm	0.01mm	±2µm	12mm	Plain	Flat (carbide tip)	1mm
152-102	0 - 25mm						
152-103	0 - 50mm		±4µm				

DIMENSIONS

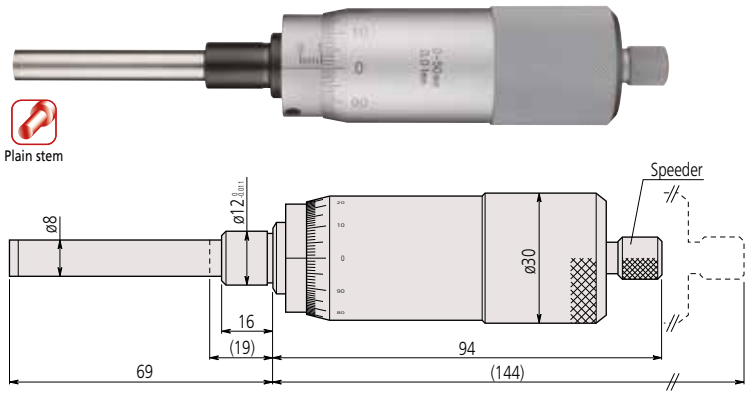
Unit: mm



152-101 Mass: 220g



152-102 Mass: 230g



152-103 Mass: 350g

( ): 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			
152-348								Bidirectional
152-380	0 - 50mm		±4µm					

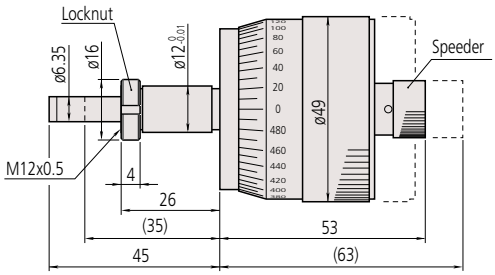
Inch

Order No.	Range	Graduation*	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
152-372	0 - 1"/**25.4mm**	.0001"/ **0.003mm**	±.0001"/ **± 0.003mm**	.5"/ **12.7mm**	w/ clamp nut	Flat (carbide tip)	.025"/**0.635mm**	Bidirectional
152-388	0 - 2"/**50.8mm**							

* Graduation in inch only

DIMENSIONS

Unit: mm



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

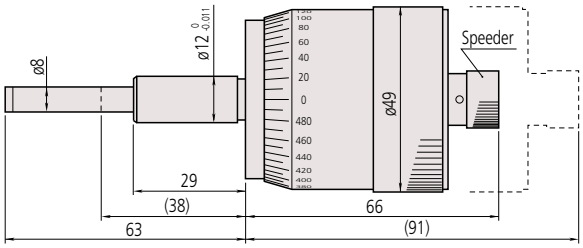
( ): With spindle fully retracted.

CAD download service at Mitutoyo web site

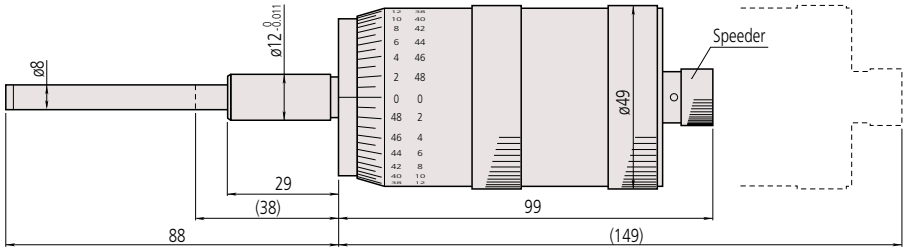
2D CAD data can be downloaded at our web site. For details, refer to page 10.

DIMENSIONS

Unit: mm



152-332
152-348 Bidirectional Mass: 310g



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 thimble 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							
152-402		0.001mm Vernier graduation					for X-axis, with Vernier
152-401							

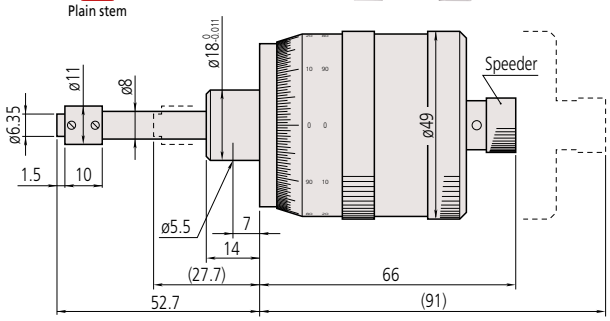
Inch

Order No.	Range	Graduation*	Accuracy	Stem dia.	Stem	Spindle pitch	Graduation features
152-392	0 - 1"/ **25.4mm**	.0001"/ **0.003mm**	±.0001"/ **±0.003mm**	.709"/ **18.009mm**	Plain	.025"/ **0.635mm**	for X-axis, bidirectional
152-391							

*Graduation in inch only

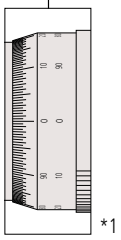
DIMENSIONS

Unit: mm



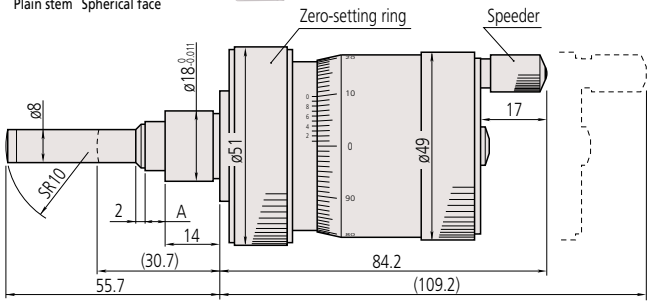
152-390 Mass: 270g

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



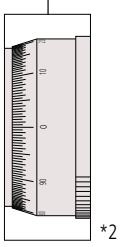
No.152-389

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



Length of A: 0 to 6 A = 6 in the drawing above.
152-402 Mass: 460g

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



No.152-401

*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
197-101	0 - 50mm	0.005mm	±5µm	18mm	Plain	Flat (carbide tip)	1mm	Bidirectional

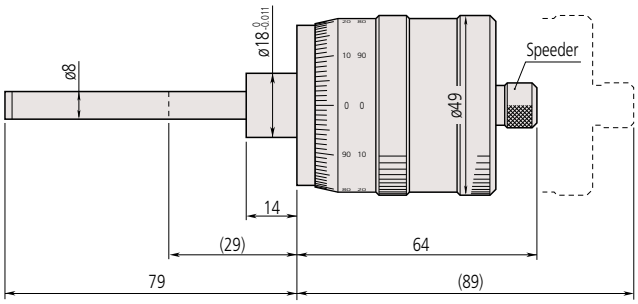
Inch

Order No.	Range	Graduation*	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation
197-201	0 - 2"/**50.8mm**	.0002"/**0.005mm**	±.0001"/ **±0.003mm**	.709"/**18.009mm**	Plain	Flat (carbide tip)	.05"/**1.27mm**	Bidirectional

* Graduation in inch only

DIMENSIONS

Unit: mm



197-101 Mass: 300g

( ): 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 — 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

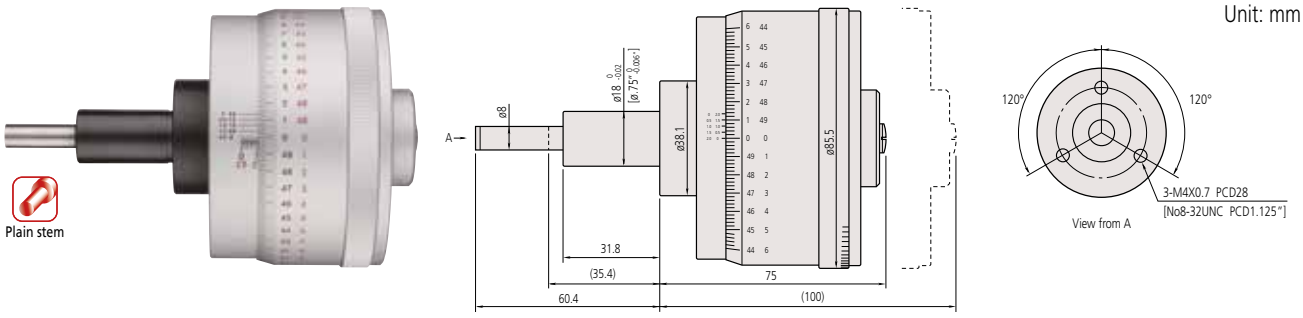
Order No.	Range	Graduation	Accuracy*	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
153-301	0 - 25mm	0.0005mm	±1/±0.5µm	18mm	Plain	Flat (carbide tip)	0.5mm	Bidirectional

Inch

Order No.	Range	Graduation**	Accuracy*	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
153-302	0 - 1"/ **25.4mm**	.00001"/ **0.0003mm**	±.00005"/±.00003"/ **±0.001mm/±0.0008mm**	.75"/ **19.05mm**	Plain	Flat (carbide tip)	.025"/ **0.635mm**	Bidirectional

* Wide range / narrow range ** Graduation in inch only

DIMENSIONS



153-301 Mass: 765g
153-302 Mass: 775g

[ ] : Order No.153-302
( ): With spindle fully retracted.

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: Satin-chrome plated

Metric

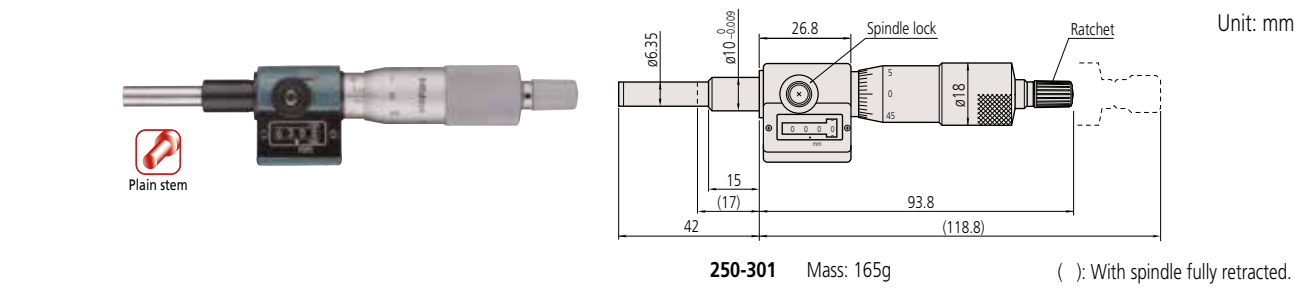
Order No.	Range	Graduation	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
250-301	0 - 25mm	0.01mm	±2µm	10mm	Plain	Flat (carbide tip)	0.5mm	—

Inch

Order No.	Range	Graduation*	Accuracy	Stem dia.	Stem	Spindle end	Spindle pitch	Graduation features
250-312	0 - 1"/ **0 - 25.4mm**	.0001"/ **0.003mm**	±.0001"/ **±0.003mm**	.375"/ **9.525mm**	Plain	Flat (carbide tip)	.025"/ **0.635mm**	Vernier scale

* Graduation in inch only

DIMENSIONS



250-301 Mass: 165g

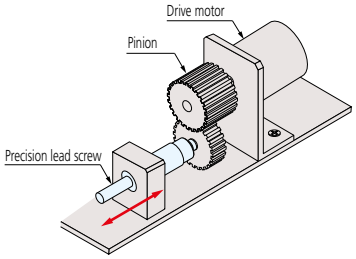
( ): With spindle fully retracted.

● CAD download service at Mitutoyo web site

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

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



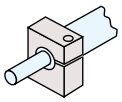
SPECIFICATIONS

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	

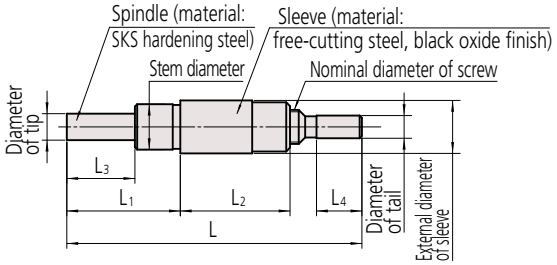
DIMENSIONS

Type AS: Plain stem

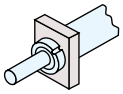
Unit: mm



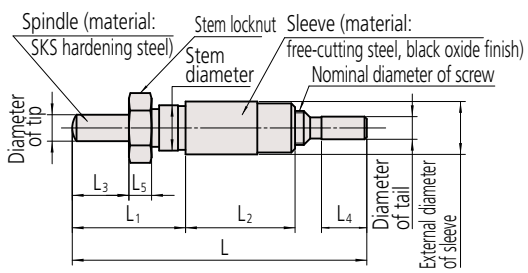
Plain stem



Type BS: Stem with locknut



Stem locknut Spherical face



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

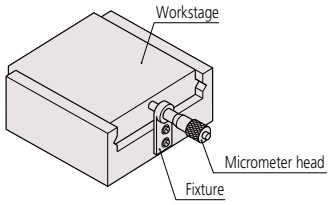
● Manufacturing brackets to mount micrometer heads for each particular application can be laborious and costly. Mitutoyo offers various types of fixtures for micrometer heads to meet a wide range of applications. These fixtures are made of nickel-plated cast iron.

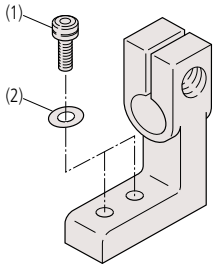
SPECIFICATIONS

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

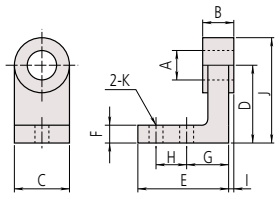
Recommended socket head screws for the fixtures

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

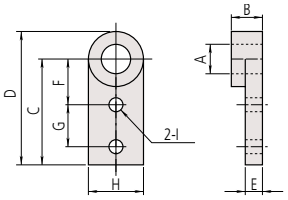
DIMENSIONS

Fixtures for micrometer heads with stem locknut



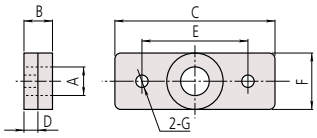
(Unit: mm)

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		11.5	20	30	35	7	16	12	1.75	40	ø4.5
303578	ø10										



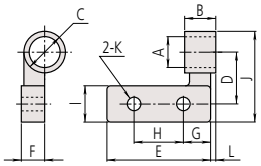
(Unit: mm)

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		11.5	40	50	6.5	18	15	20	ø4.5
303582	ø10								



(Unit: mm)

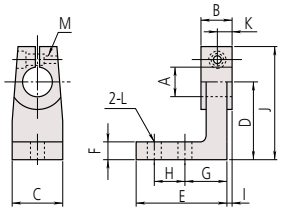
Order No.	A	B	C	D	E	F	G
303561	ø9.5	6	40	3.5	30	15	ø3.4
303570		11.5	60	5.5	40	20	ø4.5
303580	ø10						



(Unit: mm)

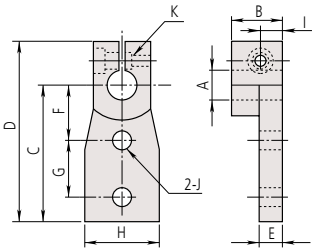
Order No.	A	B	C	D	E	F	G	H	I	J	K	L
303565	ø9.5	6	ø15	15	25	8.5	7.5	10	10	27.5	ø3.4	0.75
303574		11.5		20	40		10	20	15	35	ø4.5	1.25
303584	ø10											

Fixtures for plain stem type micrometer heads



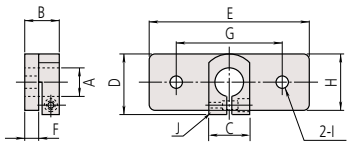
(Unit: mm)

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	M3×0.5
303569		14.5	20	30	35	7	16	12	3.25	4.25	7.25	ø4.5	
303579	ø10												



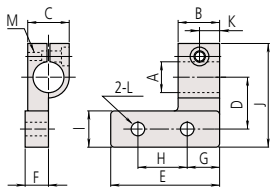
(Unit: mm)

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	M3×0.5
303573		14.5		5.25	6	18	15	20	7.25	ø4.5	
303583	ø10										



(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	M3×0.5
303571		14.5		22.5	60	5	40	20	ø4.5	
303581	ø10									



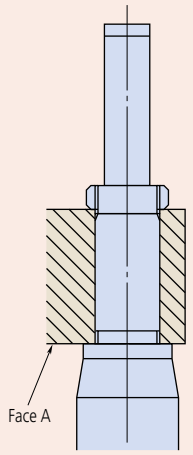
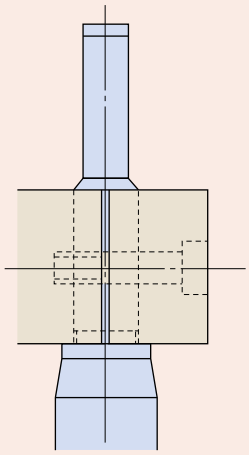
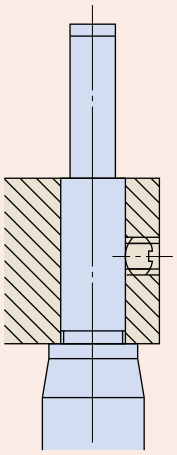
(Unit: mm)

Order No.	A	B	C	D	E	F	G	H	I	J	K	L	M
303566	ø9.5	9	15	15	25	8.5	7.5	10	10	32.5	4.5	ø3.4	M3×0.5
303575		14.5		20	40		10	20	15	40	7.25	ø4.5	
303585	ø10												

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 / Points to keep in mind	(1) Clamp nut	(2) Split-body clamp	(3) Setscrew clamp
			
Stem diameter	ø9.5 / ø10 / ø12 / ø18	ø9.5 / ø10 / ø12 / ø18	ø9.5 / ø10 / ø12 / ø18
Mounting hole Fitting tolerance	G7 +0.005 to +0.020 / G7 +0.006 to +0.024	G7 +0.005 to +0.020 / G7 +0.006 to +0.024	H5 0 to +0.006 / H5 0 to +0.008
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.

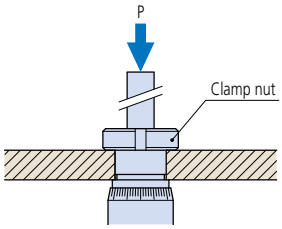
1. Recommended maximum loading limit

		Maximum loading limit
Standard type	spindle pitch: 0.5mm	Up to approx. **39.2N** (4kgf)*
High-function type	Spindle pitch: 0.1mm/0.25mm	Up to approx. **19.6N** (2kgf)
	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)

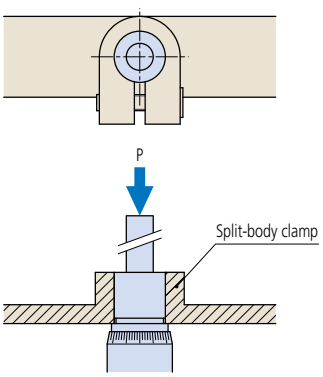
* Up to approx. 19.6N (2kgf) only for Ultra small models

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

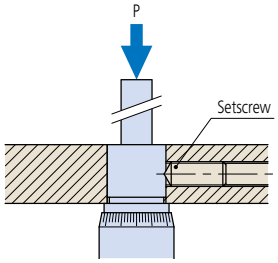
(1) Clamp nut



(2) Split-body clamp



(3) Setscrew clamp



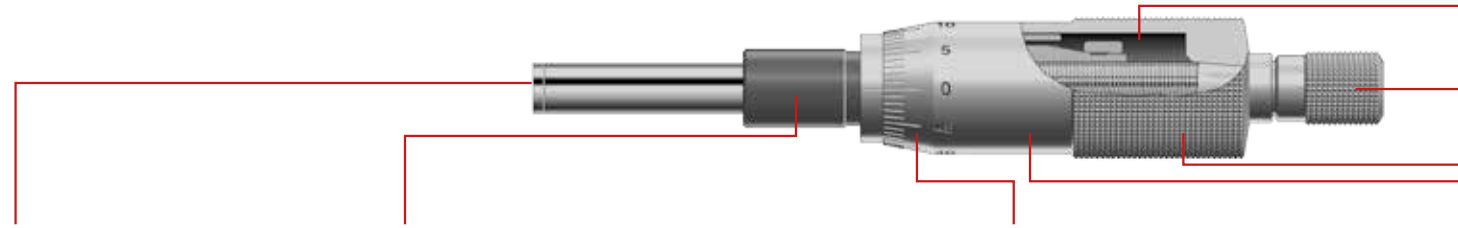
Test method
Micrometer heads were set up as shown and the force at which the head was damaged or pushed out of the fixture when a static load was applied, in direction P, was measured. (In the tests no account was taken of the guaranteed accuracy range.)

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)

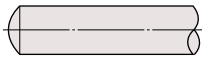
Micrometer heads have applications in many fields of science and industry and Mitutoyo offers a wide range of standard models to meet customers' needs. However, in those cases where the standard product is not suitable, Mitutoyo can custom build a head incorporating features better suited to your special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



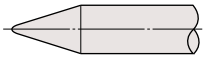
1. Spindle-end types

- Standard

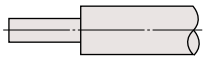
- Spherical



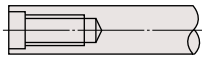
- Pointed



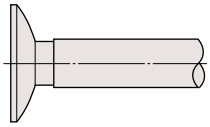
- Spline



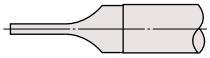
- Tapped



- Flanged



- Blade
  (for non-rotating spindle type only)

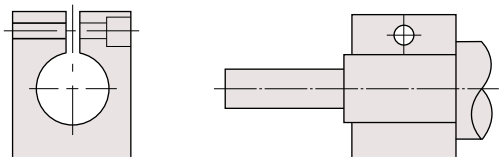


- Long spindle type is also available. Please consult Mitutoyo.

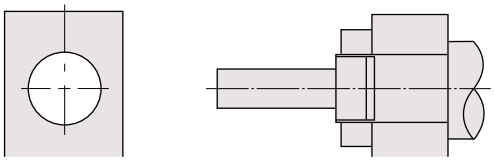
2. Stem types

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

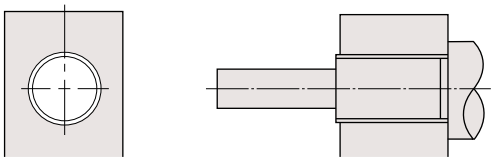
- Plain



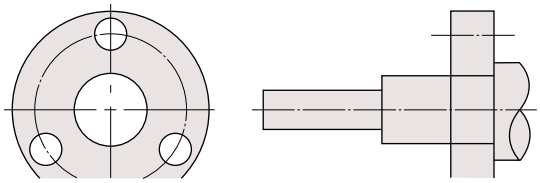
- Clamp nut



- Threaded



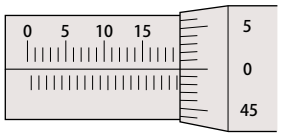
- Flanged



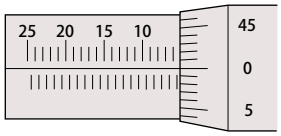
3. Scale graduation schemes

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.

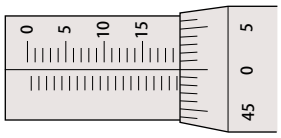
- Standard



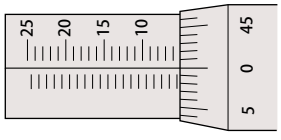
- Reverse



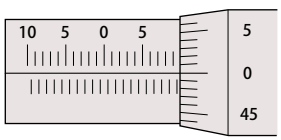
- Vertical



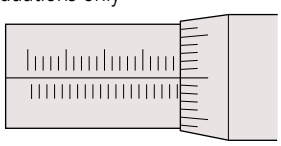
- Reverse vertical



- Offset zero



- Graduations only



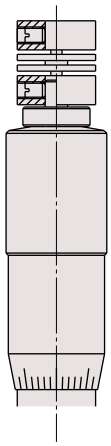
Customized micrometer heads can be offered even in one-off quantities.
Do not hesitate to contact your nearest Mitutoyo sales office for details.

4. Logo engraving

A specific logo can be engraved as required.

5. Motor Coupling

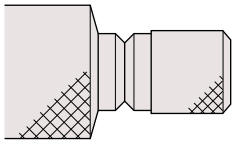
Couplings for providing motor drive to a head can be designed.



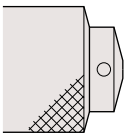
6. Thimble mounting

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

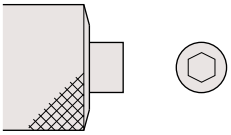
- Ratchet



- 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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Vision Measuring Systems

Form Measurement

Optical Measuring

Sensor Systems

Test Equipment and Seismometers

Digital Scale and DRO Systems

Small Tool Instruments and Data Management

Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver bespoke measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

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