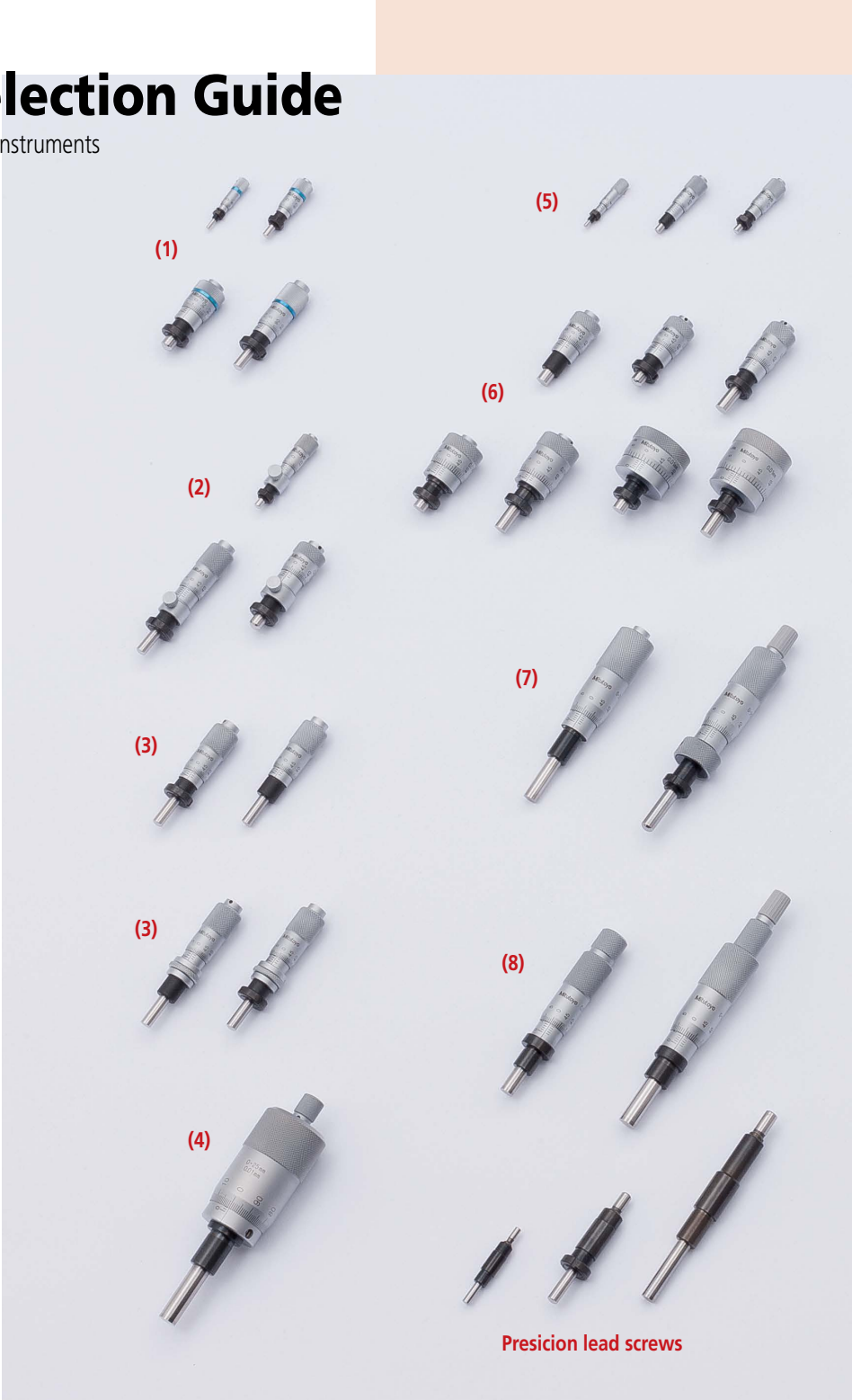


# Micrometer Head Selection Guide

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

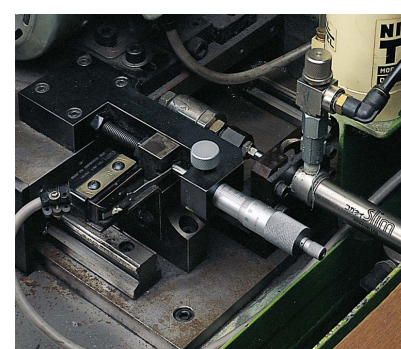
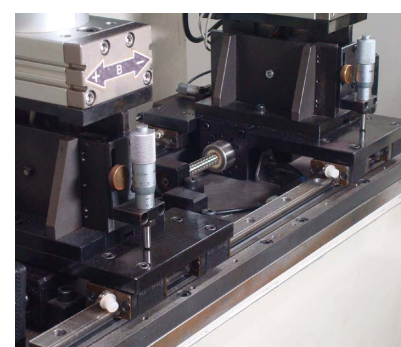
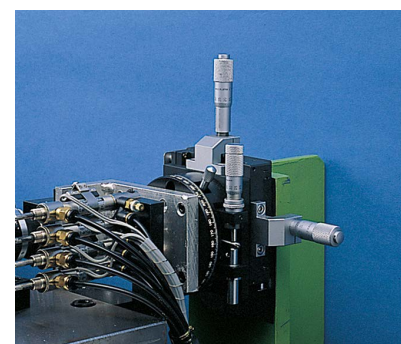
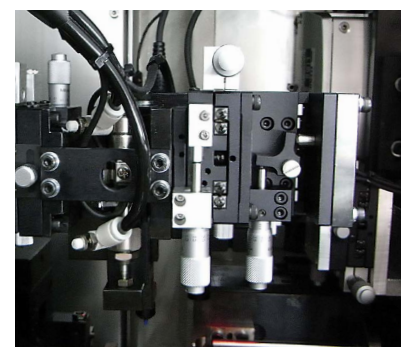
## SELECTION TABLE

Mounted on measuring instruments and precision instruments, micrometer heads are used for various purposes including measurement, feeding 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 demands, Mitutoyo provides standard micrometer heads with different measuring ranges, stem type and body size. Furthermore, high-performance types of Digimatic Micrometer Head, 0.1 mm spindle-pitch models (standard 0.5 mm), 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 offered even in one-off quantities.



Also refer to “Quick Guide to Precision Measuring Instruments” from page B-113.

Measuring stroke	Main feature of head		Series	Page
1 mm/0.02 in	High-Function	Differential Screw Translator (Extra-Fine Feed) Type	110	B-104
2.5 mm/0.05 in	High-Function	Differential Screw Translator (Extra-Fine Feed) Type (11)		B-104
5 mm/0.2 in	High-Function	Fine Spindle Feed of 0.1 mm/rev (1)	148	B-101 to B-102
	Standard	Small/Ultra-small Type (5)		B-80 to B-81
6.5 mm/0.25 in	Standard	Locking-screw Type (2)		B-96 to B-98
	High-Function	Fine Spindle Feed of 0.1 mm/rev (1)		B-101 to B-102
	High-Function	Fine Spindle Feed of 0.25 mm/rev		B-103
	Standard	Small/Ultra-small Type (5)		B-80 to B-81
10 mm	Standard	Short Thimble with Choice of Diameter (6)		B-82 to B-83
	High-Function	Large Thimble Type (13)	152	B-105 to B-106
13 mm/0.5 in	Standard	Locking-screw Type (2)	148	B-96 to B-98
	High-Function	Fine Spindle Feed of 0.25 mm/rev	110	B-103
		Differential Screw Translator (Extra-Fine Feed) Type (11)		B-104
		Short Thimble with Choice of Diameter (6)	148	B-82 to B-83
	Standard	Small Standard Type (3)		B-84 to B-85
		Small Thimble Diameter Standard Type (10)		B-86 to B-87



Measuring stroke	Main feature of head		Series	Page
15 mm/0.5 in	High-Function	Non-rotating Spindle Type	(8) 153	B-99
	High-Function	Quick Spindle Feed of 1 mm/rev	(4) 152	B-100
	Standard	Small Standard Type with Carbide-Tipped Spindle	(9) 149	B-88 to B-89
25 mm/1 in	Digimatic		350	B-77 to B-79
	High-Function	Non-rotating Spindle Type	(8) 153	B-99
		Quick Spindle Feed of 1 mm/rev	152	B-100
		Large Thimble Type		B-105 to B-106
		XY-Stage Type		B-107
		High Accuracy and Resolution	153	B-108
		Digit Counter Type	250	B-109
	Standard	Medium-sized Standard Type	(7) 150	B-90 to B-92
50 mm/2 in		Medium-sized Standard Type with 8 mm Diameter Spindle	151	B-93 to B-95
	Digimatic		(15) 164	B-77 to B-79
	High-Function	Quick Spindle Feed of 1 mm/rev	152	B-100
		Large Thimble Type		B-105 to B-106
	Standard	Long Stroke Non-rotating Spindle	197	B-108
60 - 75 mm		Medium-sized Standard Type with 8 mm Diameter Spindle	(12) 151	B-93 to B-95
	Micro Jack		7	B-109





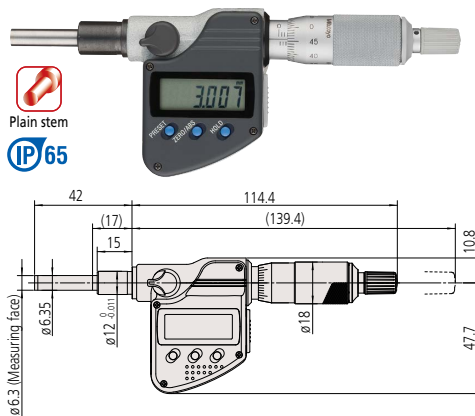
## Technical Data

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

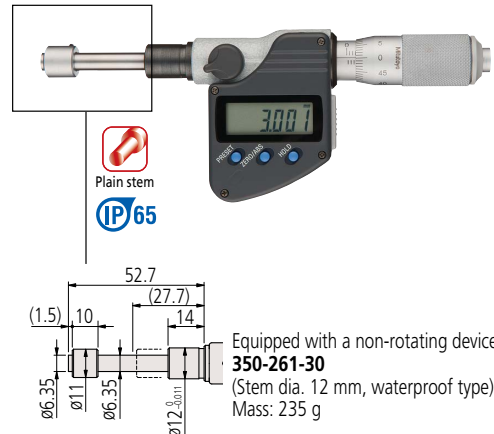
## DIMENSIONS

### Plain Stem

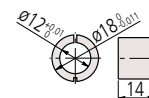
Unit: mm



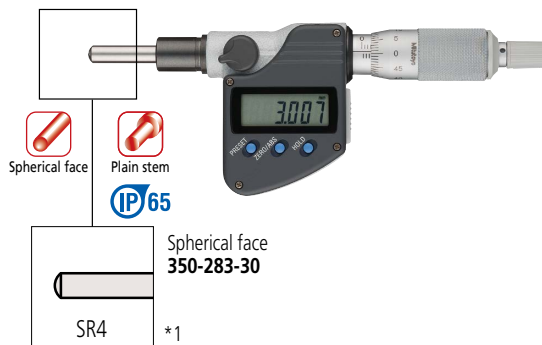
**350-281-30** (Stem dia. 12mm, waterproof type) Mass: 230 g



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



Bush (standard accessory)  
**350-261-30**

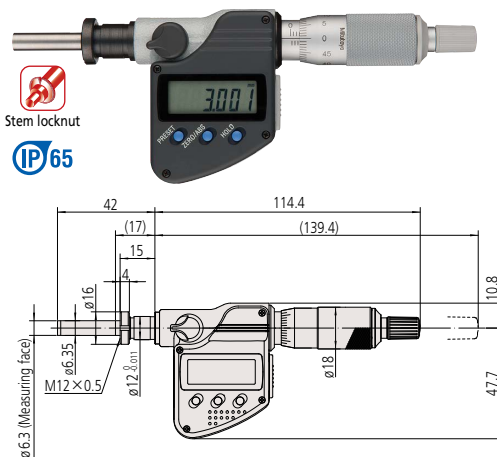


Spherical face  
**350-283-30**

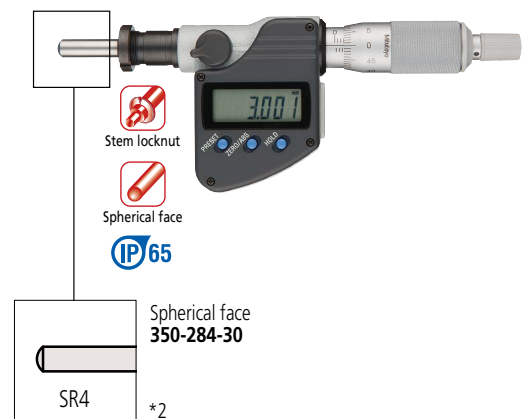
SR4 \*1

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

### Stem locknut



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



Spherical face  
**350-284-30**

SR4 \*2

\*2 Other dimensions are the same as **350-282-30**.  
( ): with spindle fully retracted.



# Micrometer Head

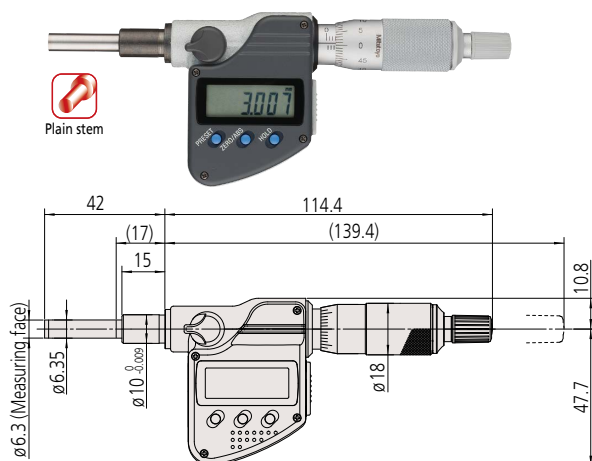
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## Digimatic Micrometer Heads SERIES 164, 350

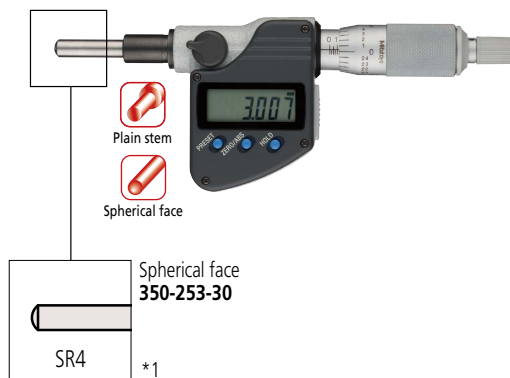
### DIMENSIONS

#### Plain Stem

Unit: mm

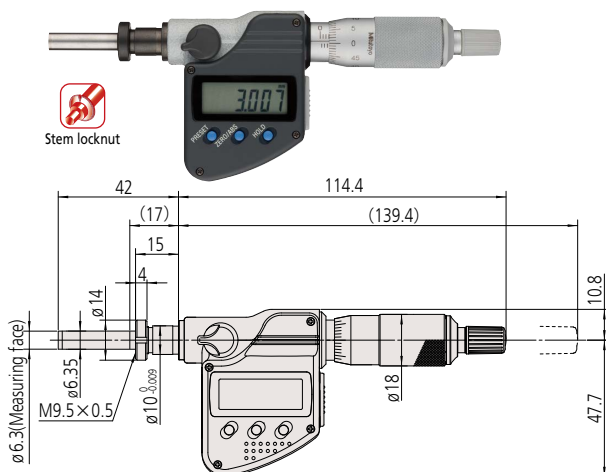


**350-251-30**  
(Stem dia. 10 mm, for general use) Mass: 230 g

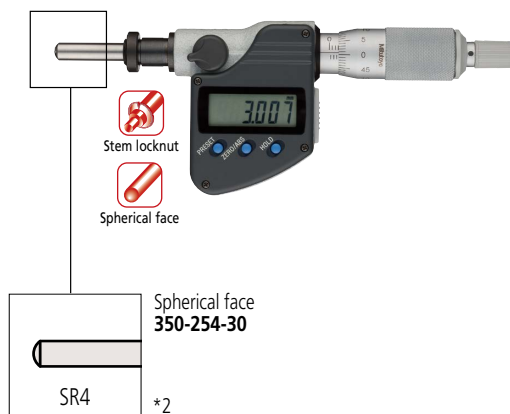


\*1 Other dimensions are the same as **350-251-30**.  
( ): with spindle fully retracted.

#### Stem Locknut



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



\*2 Other dimensions are the same as **350-252-30**.  
( ): with spindle fully retracted.

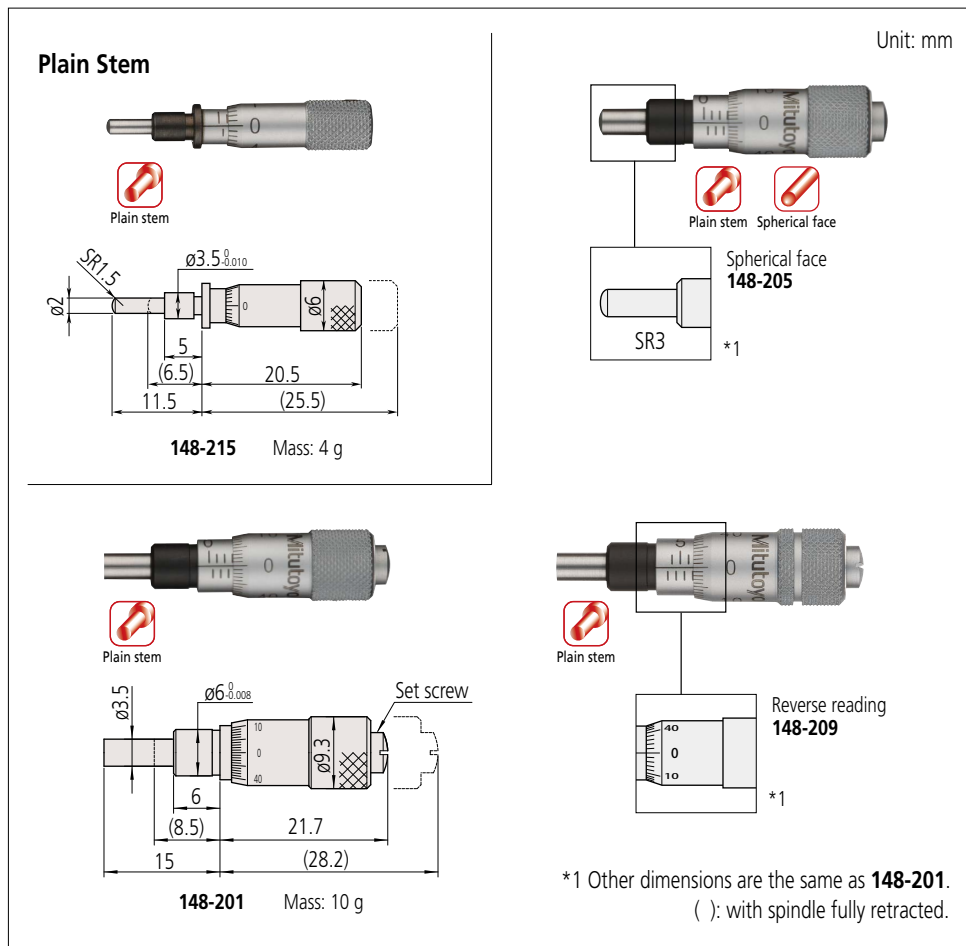
## Technical Data

- Graduation: 0.02 mm (**148-215**, **148-216**),  
0.01 mm or 0.001 in
- Measuring face  
Material: Alloy tool steel  
Hardness: 60 HRC or more  
Lapped
- Scale finishing:  
Satin-chrome plated

## Micrometer Heads SERIES 148 — Small/Ultra-small Type

- Miniature micrometer heads for ease of incorporating into machines.

## DIMENSIONS



## SPECIFICATIONS

Metric						
Order No.	Stroke (mm)	Stem dia. (mm)	Stem	Spindle end	Graduation	Maximum permissible error <i>J</i> <sub>MPE</sub> (μm)
148-215	5	3.5	Plain	Spherical (SR1.5)	Standard	±5
148-216			W/clamp nut			
148-201	6.5	6	Plain	Flat		
148-203			W/clamp nut			
148-205			Plain	Spherical (SR3)		
148-207			W/clamp nut			
148-209			Plain	Flat		
148-211			W/clamp nut		Reverse reading	
Inch						
Order No.	Stroke (in)	Stem dia. (in)	Stem	Spindle end	Graduation	Maximum permissible error <i>J</i> <sub>MPE</sub> (in)
148-217	0.2	0.156	Plain	Spherical (SR1.5)	Standard	±0.00025
148-218			W/clamp nut			
148-202	0.25	0.25	Plain	Flat		
148-204			W/clamp nut			
148-206			Plain	Spherical (SR3)		
148-208			W/clamp nut			
148-210* <sup>1</sup>			Plain	Flat		
148-212* <sup>1</sup>			W/clamp nut		Reverse reading	

\*1 Made-to-order models

# Micrometer Head

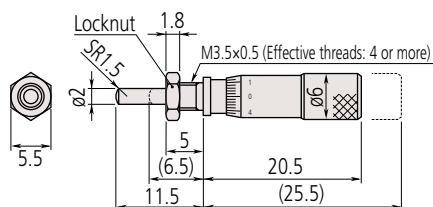
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## Micrometer Heads SERIES 148 — Small Standard Type

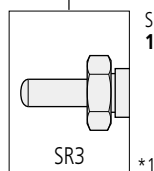
### DIMENSIONS

#### Stem Locknut

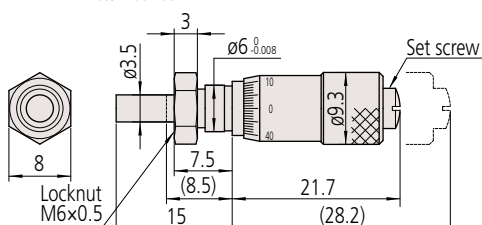
Unit: mm



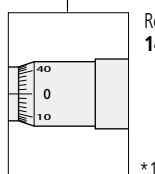
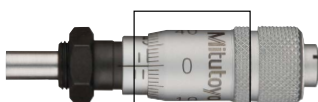
- Fixture thickness: 3 mm  
**148-216** Mass: 4 g



Spherical face  
**148-207**



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



Reverse reading  
**148-211**

- \*1 Other dimensions are the same as **148-203**.  
( ): with spindle fully retracted.



## Technical Data

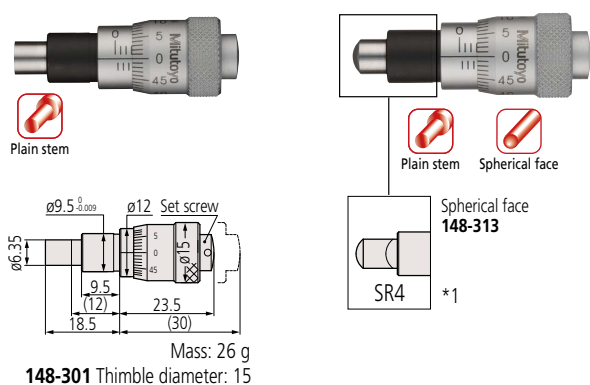
- Graduation: 0.01 mm or 0.001 in
- Spindle pitch: 0.5 mm or 0.025 in
- Measuring face  
Material: Alloy tool steel  
Hardness: 60 HRC or more  
Lapped
- Scale finishing:  
Satin-chrome plated

## DIMENSIONS

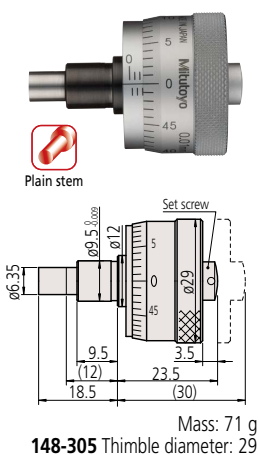
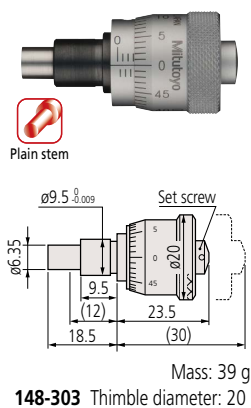
## Micrometer Heads SERIES 148 — Short Thimble with Choice of Diameter

- Short body design maintains measuring stroke for limited space applications.
- Available in three thimble diameters to provide ease-of-reading options.

### Plain Stem

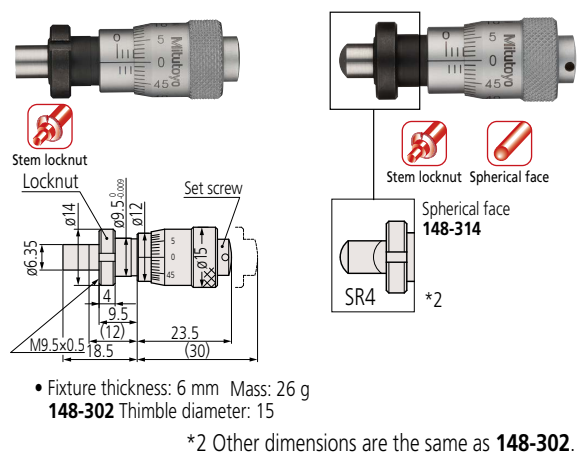


\*1 Other dimensions are the same as 148-301.

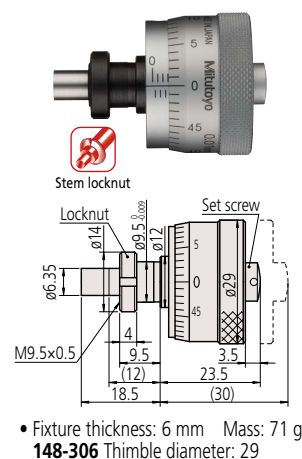
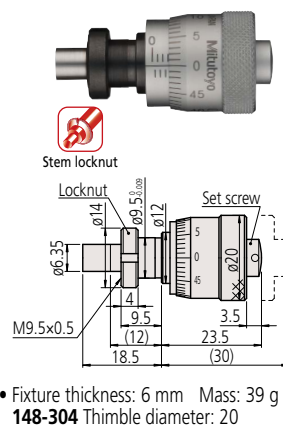


### Stem Locknut

Unit: mm



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



( ): with spindle fully retracted.

# Micrometer Head

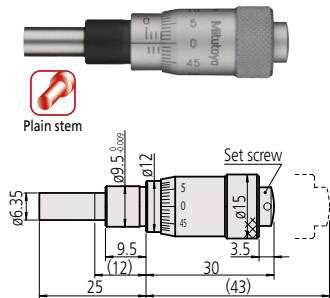
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## Micrometer Heads

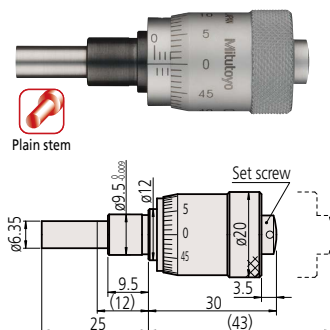
### SERIES 148 — Short Thimble with Choice of Diameter

#### DIMENSIONS

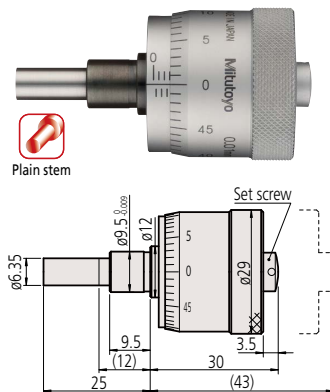
##### Plain Stem



Mass: 35 g  
**148-307** Thimble diameter: 15



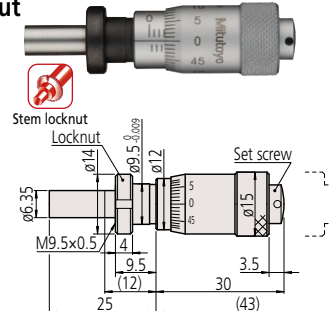
Mass: 55 g  
**148-309** Thimble diameter: 20



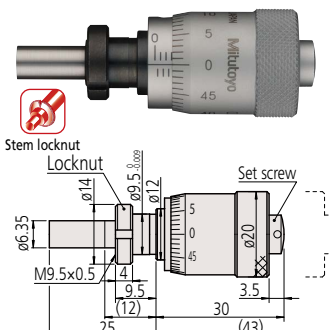
Mass: 103 g  
**148-311** Thimble diameter: 29

##### Stem Locknut

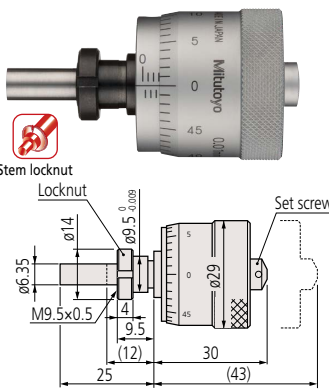
Unit: mm



• Fixture thickness: 6 mm Mass: 35 g  
**148-308** Thimble diameter: 15



• Fixture thickness: 6 mm Mass: 55 g  
**148-310** Thimble diameter: 20



• Fixture thickness: 6 mm Mass: 103 g  
**148-312** Thimble diameter: 29  
( ): with spindle fully retracted.

#### SPECIFICATIONS

Metric						
Order No.	Stroke (mm)	Maximum permissible error $J_{MPE}$ (μm)	Stem dia. (mm)	Stem	Spindle end	Special features
148-301	6.5	±2	9.5	Plain	Flat	15 mm thimble dia.
148-302				W/clamp nut		20 mm thimble dia.
148-303				Plain		29 mm thimble dia.
148-304				W/clamp nut	Spherical (SR4)	15 mm thimble dia.
148-305				Plain		20 mm thimble dia.
148-306				W/clamp nut		29 mm thimble dia.
148-313	13			Plain	Flat	15 mm thimble dia.
148-314				W/clamp nut		20 mm thimble dia.
148-307				Plain		29 mm thimble dia.
148-308				W/clamp nut	15 mm thimble dia.	
148-309				Plain	20 mm thimble dia.	
148-310				W/clamp nut	29 mm thimble dia.	
148-311				Plain		
148-312				W/clamp nut		

Inch								
Order No.	Stroke (in)	Maximum permissible error $J_{MPE}$ (in)	Stem dia. (in)	Stem	Spindle end	Special features		
148-351	0.25	±0.0001	0.375	Plain	Flat	0.59 in thimble dia		
148-352				W/clamp nut		0.79 in thimble dia		
148-353				Plain		1.14 in thimble dia		
148-354				W/clamp nut		0.59 in thimble dia		
148-355				Plain		0.79 in thimble dia		
148-356				W/clamp nut		1.14 in thimble dia		
148-357	0.5					Plain		0.59 in thimble dia
148-358				W/clamp nut		0.79 in thimble dia		
148-359				Plain		1.14 in thimble dia		
148-360				W/clamp nut		0.59 in thimble dia		
148-361				Plain		0.79 in thimble dia		
148-362				W/clamp nut		1.14 in thimble dia		

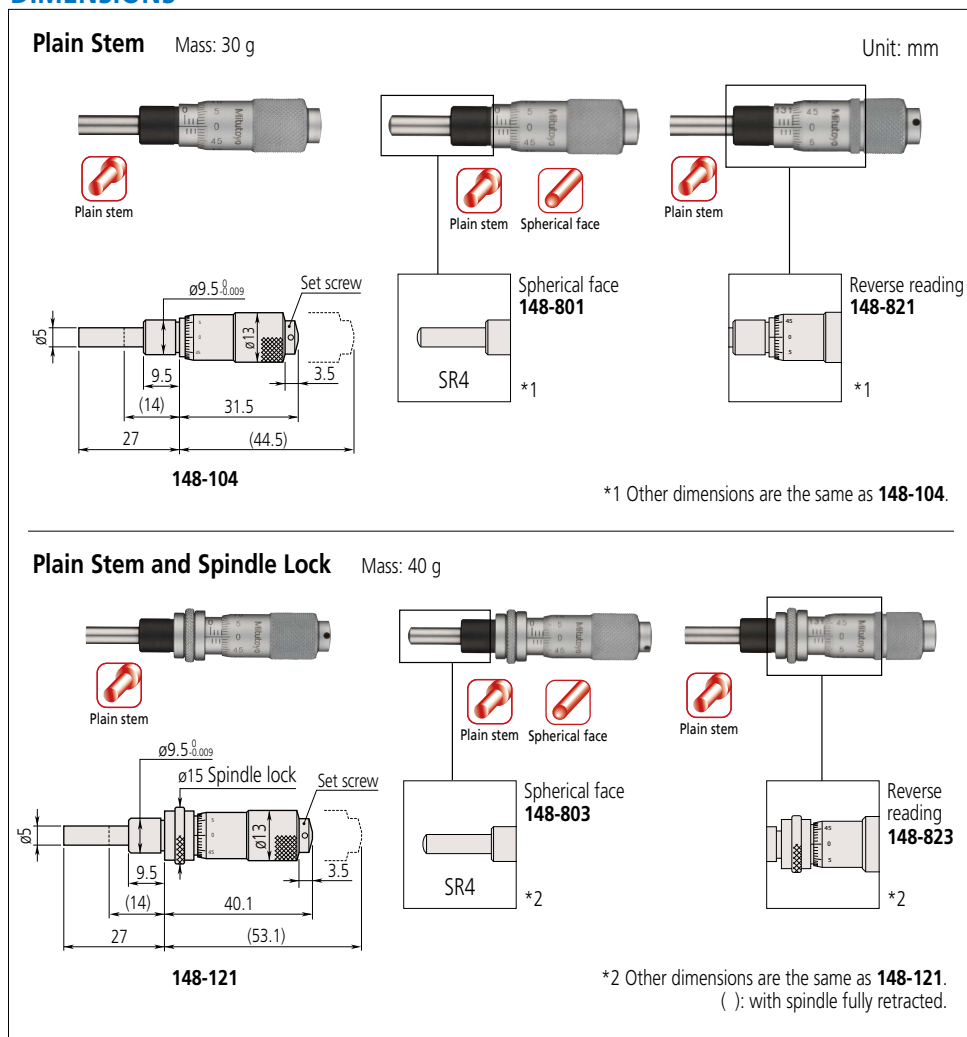
## Micrometer Heads SERIES 148 — Small Standard Type

### Technical Data

- Graduation: 0.01 mm or 0.001 in
- Spindle pitch: 0.5 mm or 0.025 in
- Measuring face  
Material: Alloy tool steel  
Hardness: 60 HRC or more  
Lapped
- Scale finishing:  
Satin-chrome plated

- Measuring stroke of 13 mm.

### DIMENSIONS



### SPECIFICATIONS

Metric						
Order No.	Stroke (mm)	Maximum permissible error <i>J<sub>MPE</sub></i> (μm)	Stem dia. (mm)	Stem	Spindle end	Graduation features
148-104	13	±2	9.5	Plain	Flat	Standard
148-103				W/clamp nut		
148-121				Plain*1		
148-120				W/clamp nut*1		
148-801				Plain	Spherical (SR4)	
148-802				W/clamp nut		
148-803				Plain*1		
148-804				W/clamp nut*1		
148-821				Plain	Flat	Reverse reading
148-822				W/clamp nut		
148-823				Plain*1		
148-824				W/clamp nut*1		

\*1 With spindle lock

Inch						
Order No.	Stroke (in)	Maximum permissible error <i>J<sub>MPE</sub></i> (in)	Stem dia. (in)	Stem	Spindle end	Graduation features
148-112	0.5	±0.0001	0.375	Plain	Flat	Standard
148-111* <sup>2</sup>				W/clamp nut		
148-123				Plain* <sup>1</sup>		
148-122				W/clamp nut* <sup>1</sup>		
148-811				Plain	Spherical (SR4)	
148-812				W/clamp nut		
148-813				Plain* <sup>1</sup>		
148-814				W/clamp nut* <sup>1</sup>		
148-831				Plain	Flat	Reverse reading
148-832				W/clamp nut		
148-833				Plain* <sup>1</sup>		
148-834				W/clamp nut* <sup>1</sup>		

\*1 With spindle lock

\*2 Made-to-order models



# Micrometer Head

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

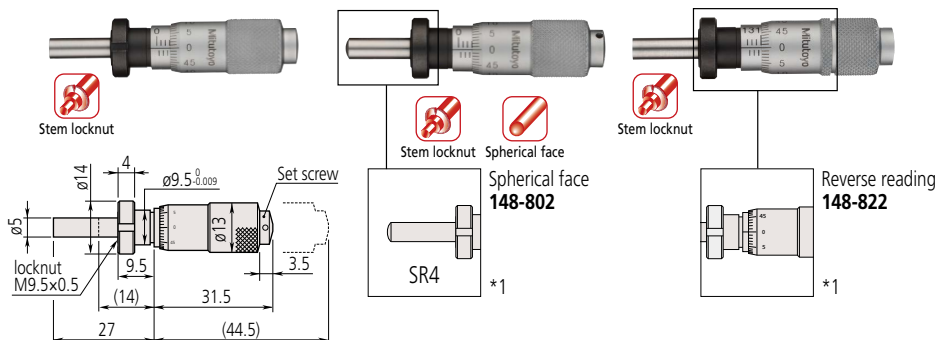
## Micrometer Heads SERIES 148 — Small Standard Type

### DIMENSIONS

#### Stem Locknut

Mass: 35 g

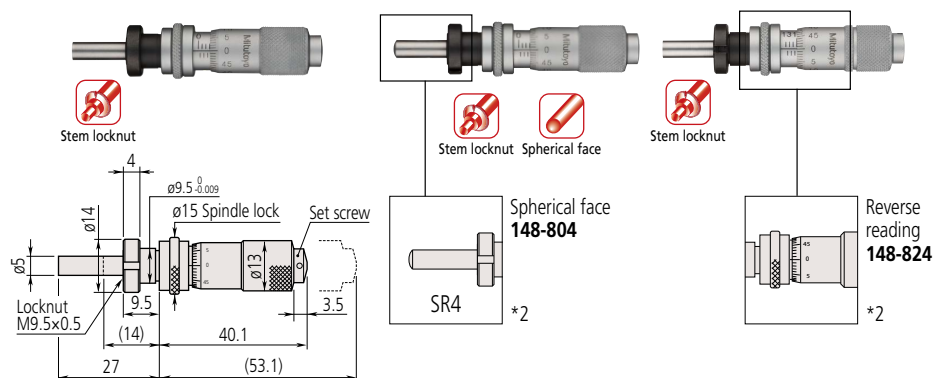
Unit: mm



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

#### Stem Locknut and Spindle Lock

Mass: 45 g



\*2 Other dimensions are the same as **148-120**.

( ): with spindle fully retracted.

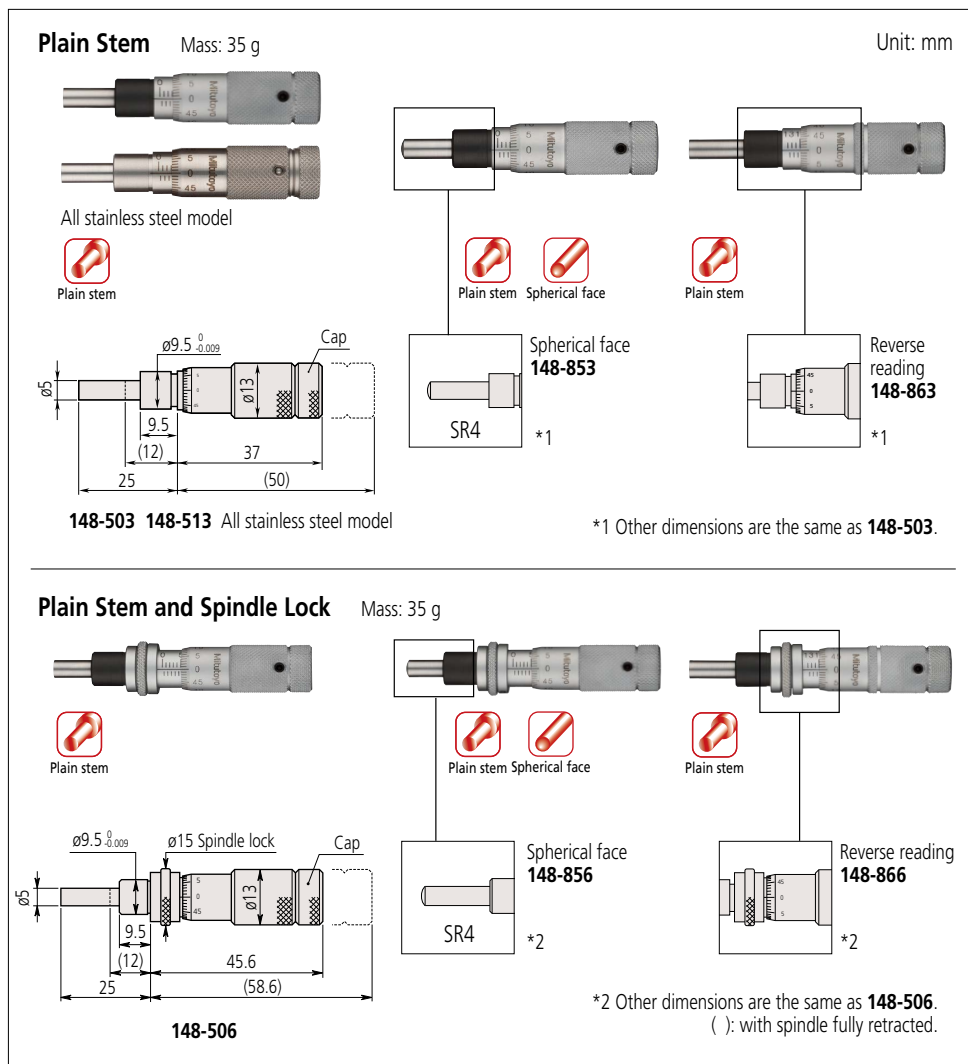
## Technical Data

- Graduation: 0.01 mm or 0.001 in
- Spindle pitch: 0.5 mm or 0.025 in
- Measuring face
- Material: Alloy tool steel
- Hardness: 60 HRC or more
- Lapped
- Scale finishing:
- Satin-chrome plated

## Micrometer Heads SERIES 148 — Small Thimble Diameter Standard Type

- Measuring stroke of 13 mm.
- The thimble can be set to zero at any position by loosening the setscrew.

## DIMENSIONS



## SPECIFICATIONS

Metric							Inch						
Order No.	Stroke (mm)	Maximum permissible error $J_{MPE}$ (μm)	Stem dia. (mm)	Stem	Spindle end	Special features	Order No.	Stroke (in)	Maximum permissible error $J_{MPE}$ (in)	Stem dia. (in)	Stem	Spindle end	Special features
<b>148-503</b>	13	±2	9.5	Plain	Flat	Standard	<b>148-501</b>	0.5	±0.0001	0.375	Plain	Flat	Standard
<b>148-513</b>				W/clamp nut		Stainless steel throughout	<b>148-511</b> *2				W/clamp nut		Stainless steel throughout
<b>148-508</b>				Plain*1	Spherical (SR4)	Standard	<b>148-507</b> *2				Plain*1	Spherical (SR4)	Standard
<b>148-506</b>				W/clamp nut*1			<b>148-505</b>				W/clamp nut*1		
<b>148-504</b>				Plain	Flat	Reverse reading	<b>148-502</b>				Plain	Flat	Reverse reading
<b>148-853</b>				W/clamp nut*1			<b>148-851</b>				W/clamp nut*1		
<b>148-854</b>				Plain	Spherical (SR4)	Standard	<b>148-852</b>				Plain	Spherical (SR4)	Standard
<b>148-863</b>				W/clamp nut*1			<b>148-861</b>				W/clamp nut*1		
<b>148-864</b>				Plain	Flat	Reverse reading	<b>148-862</b>				Plain	Flat	Reverse reading
<b>148-518</b> *2				W/clamp nut							W/clamp nut*1		
<b>148-858</b> *2				W/clamp nut	Spherical (SR4)	Standard							
<b>148-866</b> *2				Plain*1	Flat	Reverse reading							
<b>148-856</b> *2				Plain*1	Spherical (SR4)	Standard							
<b>148-868</b> *2				W/clamp nut	Flat	Reverse reading							

\*1 With spindle lock \*2 Made-to-order models

# Micrometer Head

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

## Micrometer Heads

### SERIES 148 — Small Thimble Diameter Standard Type

#### DIMENSIONS

##### Stem Locknut

Mass: 40 g

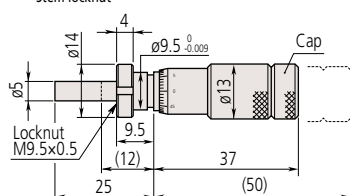
Unit: mm



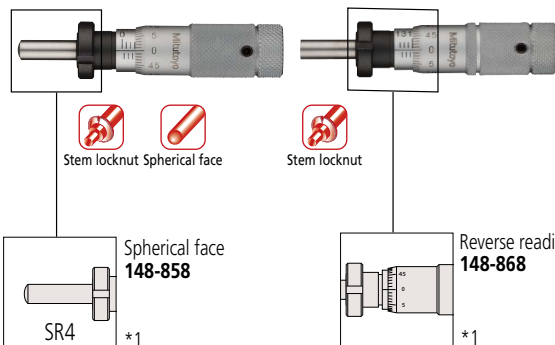
All stainless steel model



Stem locknut



• Fixture thickness: 6 mm  
**148-508 148-518** All stainless steel model



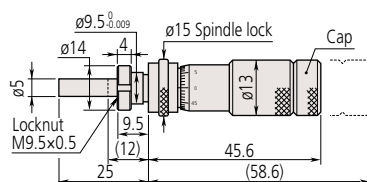
\*1 Other dimensions are the same as **148-508**.

##### Stem Locknut and Spindle Lock

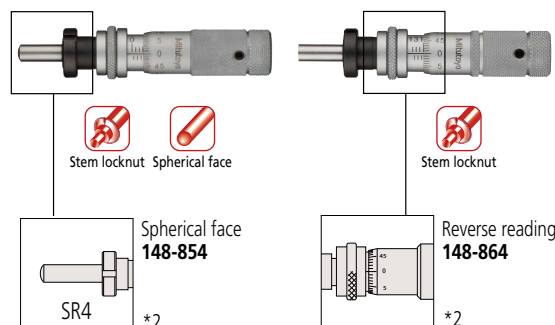
Mass: 40 g



Stem locknut



• Fixture thickness: 6 mm  
**148-504**



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



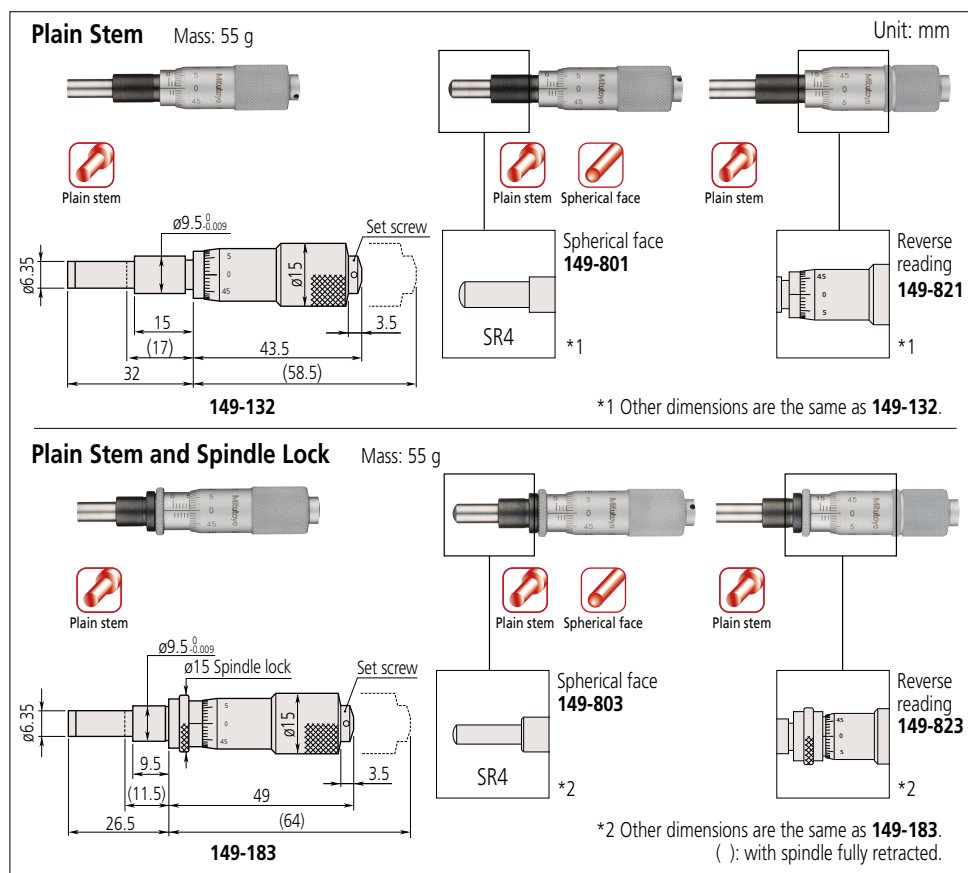
## Technical Data

- Graduation: 0.01 mm or 0.001 in
- Spindle pitch: 0.5 mm or 0.025 in
- Measuring face  
Material: Carbide  
Hardness: 90 HRA or more  
Lapped
- Scale finishing:  
Satin-chrome plated

## Micrometer Heads SERIES 149 — Small Standard Type with Carbide-Tipped Spindle

- Carbide-tipped spindle provides high abrasion resistance.

## DIMENSIONS



## SPECIFICATIONS

### Metric

Order No.	Stroke (mm)	Maximum permissible error $J_{MPE}$ (μm)	Stem dia. (mm)	Stem	Spindle end	Graduation features
<b>149-132</b>	15	±2	9.5	Plain	Flat (carbide tip)	Standard
<b>149-131</b>				W/clamp nut		
<b>149-183</b>				Plain* <sup>1</sup>		
<b>149-184</b>				W/clamp nut* <sup>1</sup>		
<b>149-801</b>				Plain	Spherical (SR4) (carbide tip)	Standard
<b>149-802</b>				W/clamp nut		
<b>149-821</b>				Plain	Flat (carbide tip)	Reverse reading
<b>149-822</b>				W/clamp nut	Spherical (SR4) (carbide tip)	Standard
<b>149-803*<sup>2</sup></b>				Plain* <sup>1</sup>		
<b>149-804*<sup>2</sup></b>				W/clamp nut* <sup>1</sup>	Flat (carbide tip)	Reverse reading
<b>149-823*<sup>2</sup></b>				Plain* <sup>1</sup>		
<b>149-824*<sup>2</sup></b>				W/clamp nut* <sup>1</sup>		

\*1 With spindle lock \*2 Made-to-order models

### Inch

Order No.	Stroke (in)	Maximum permissible error $J_{MPE}$ (in)	Stem dia. (in)	Stem	Spindle end	Graduation features
<b>149-148</b>	0.5	±0.0001	0.375	Plain	Flat (carbide tip)	Standard
<b>149-147</b>				W/clamp nut		
<b>149-185*<sup>3</sup></b>				Plain* <sup>1</sup>		
<b>149-182</b>				W/clamp nut* <sup>1</sup>		
<b>149-811</b>				Plain	Spherical (SR4) (carbide tip)	Standard
<b>149-812</b>				W/clamp nut		
<b>149-831*<sup>2</sup></b>				Plain	Flat (carbide tip)	Reverse reading
<b>149-832*<sup>2</sup></b>				W/clamp nut	Flat (carbide tip)	Standard
<b>149-181*<sup>2</sup></b>				Plain* <sup>1</sup>		

\*1 With spindle lock \*2 Made-to-order models \*3 W/ratchet (**149-181**) is available

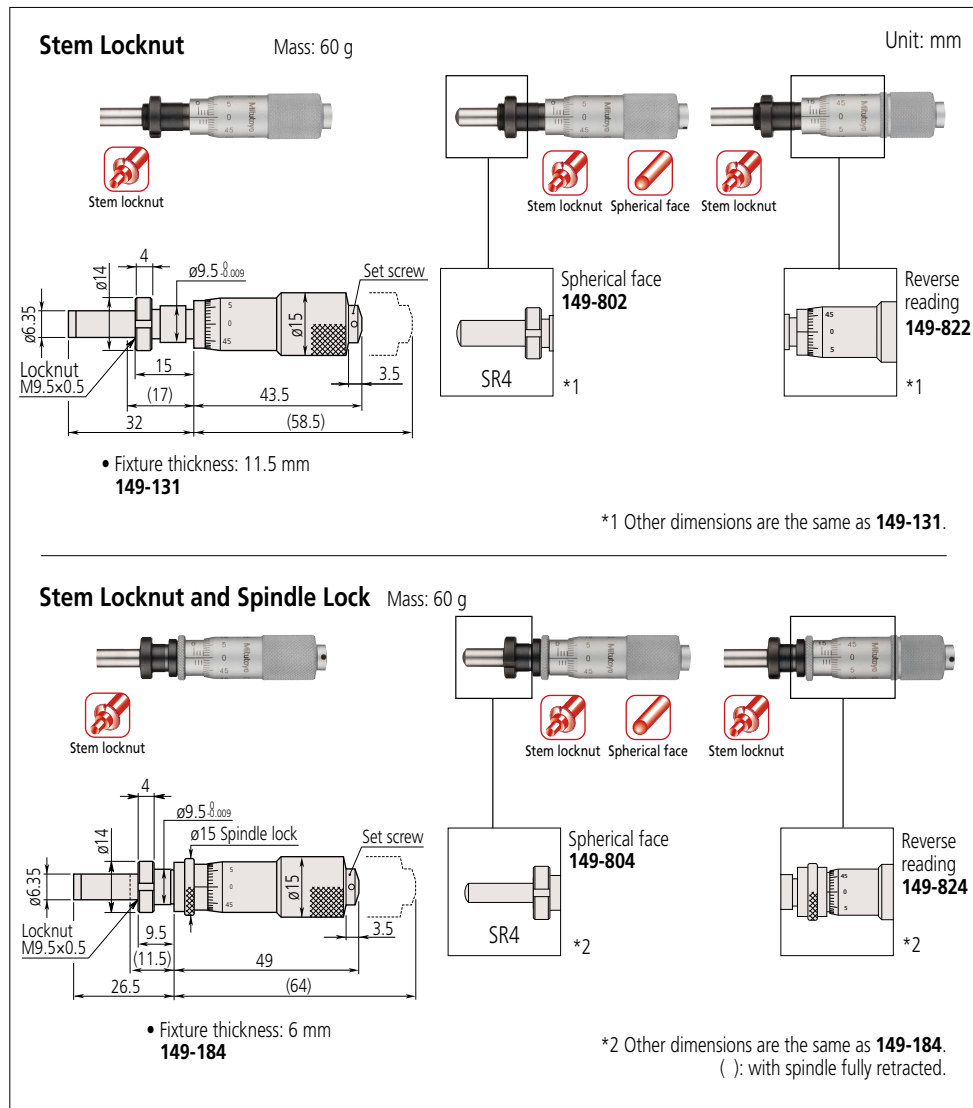
# Micrometer Head

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

## Micrometer Heads

### SERIES 149 — Small Standard Type with Carbide-Tipped Spindle

#### DIMENSIONS



## Technical Data

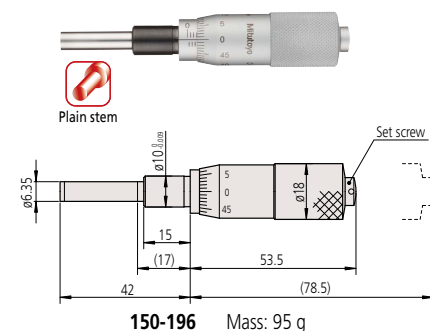
- Graduation: 0.01 mm, 0.001 mm (w/vernier), 0.001 in or 0.0001 in (w/vernier)
- Spindle pitch: 0.5 mm or 0.025 in
- Measuring face  
Material: Carbide  
(Only long spindle model is carbide tipped)
- Hardness: 90 HRA or more  
(Only long spindle model is 60 HRC or more)
- Lapped
- Scale finishing:  
Satin-chrome plated

## Micrometer Heads SERIES 150 — Medium-sized Standard Type

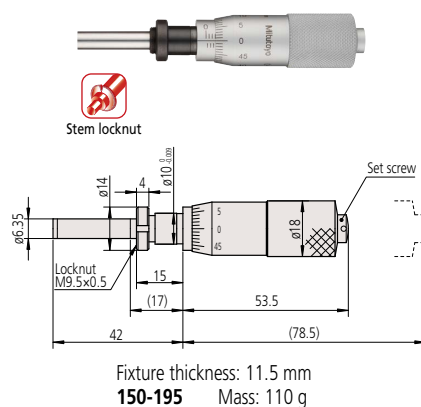
- Measuring stroke of 25 mm.

## DIMENSIONS

### Plain Stem

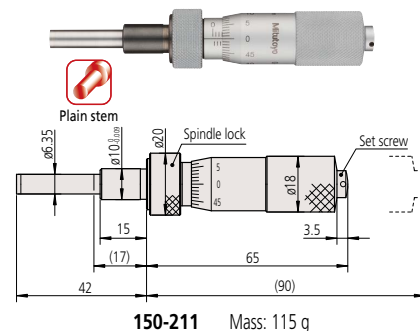


### Stem Locknut

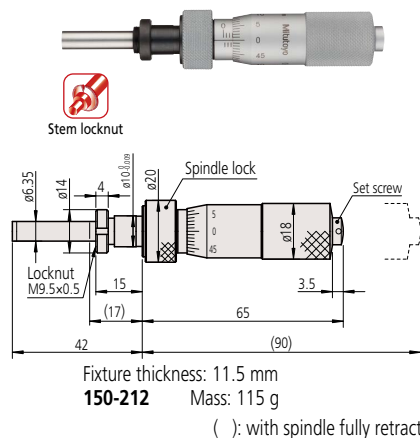


### Plain Stem and Spindle Lock

Unit: mm



### Stem Locknut and Spindle Lock



## SPECIFICATIONS

Metric						
Order No.	Stroke (mm)	Maximum permissible error $J_{MPE}$ (μm)	Stem dia. (mm)	Stem	Spindle end	Special features
150-192	25	±2	10	Plain	Flat (carbide tip)	Standard
150-191				W/clamp nut		
150-209				Plain*1		
150-210				W/clamp nut*1		
150-801				Plain	Spherical (SR4) (carbide tip)	Standard
150-802				W/clamp nut		
150-821				Plain		
150-822				W/clamp nut		
150-190				Plain	Flat (carbide tip)	Reverse reading
150-189				W/clamp nut		
150-183*2				Plain*1		
150-184				W/clamp nut*1		
150-196				Plain	Flat (carbide tip)	W/vernier (0.001 mm)
150-195				W/clamp nut		
150-211				Plain*1		
150-212				W/clamp nut*1		
150-219				Plain	Flat	W/o ratchet stop
150-220				W/clamp nut		
150-803*2				Plain*1		
150-804*2				W/clamp nut*1		
150-823*2				Plain*1	Spherical (SR4) (carbide tip)	Standard
150-824*2				W/clamp nut*1		
150-223*2				Plain*1		
150-224*2				W/clamp nut*1		

\*1 With spindle lock \*2 Made-to-order models

Inch						
Order No.	Stroke (in)	Maximum permissible error $J_{MPE}$ (in)	Stem dia. (in)	Stem	Spindle end	Special features
150-208	1	$\pm 0.0001$	0.375	Plain	Flat (carbide tip)	Standard
150-207				W/clamp nut		
150-213*2				Plain*1		
150-214*2				W/clamp nut*1		
150-811				Plain	Spherical (SR4) (carbide tip)	
150-812				W/clamp nut		
150-831				Plain		
150-832				W/clamp nut		
150-206				Plain	Flat (carbide tip)	Reverse graduation
150-205*2				W/clamp nut		
150-215*2				Plain*1		W/ vernier (0.0001 in)
150-216*2				W/clamp nut*1		
150-198				Plain	Flat (carbide tip)	W/ o ratchet stop
150-197				W/clamp nut		
150-217*2				Plain*1		
150-218*2				W/clamp nut*1		
150-221*2				Plain	Flat	Long spindle
150-222*2				W/clamp nut		

\*1 With spindle lock \*2 Made-to-order models

# Micrometer Head

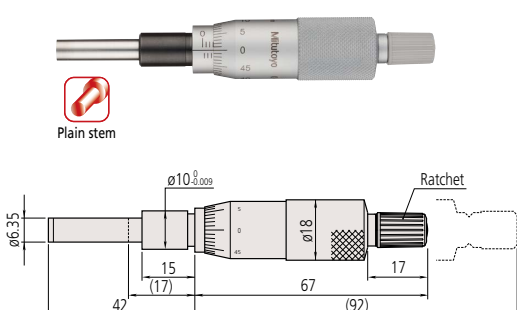
The origin of Mitutoyo's trustworthy brand of small tool instruments

## Micrometer Heads SERIES 150 — Medium-sized Standard Type

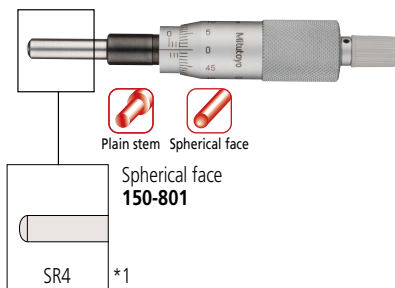
### DIMENSIONS

#### Plain Stem

Mass: 95 g

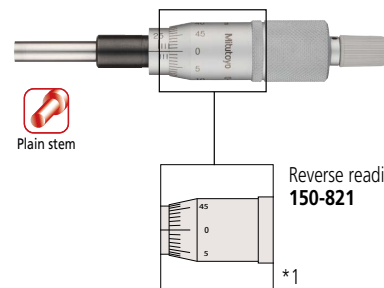


150-192

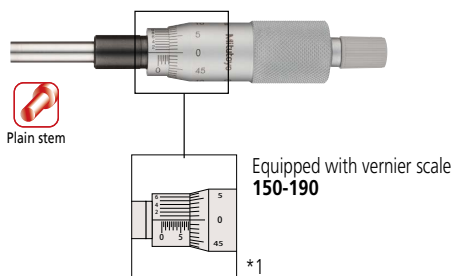


Spherical face  
150-801

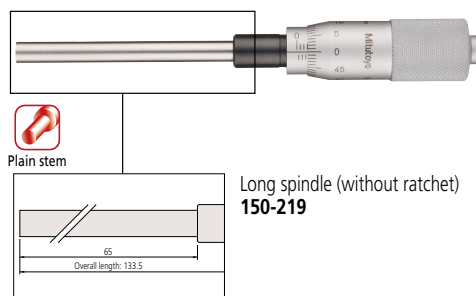
( ): with spindle fully retracted. Unit: mm



Reverse reading  
150-821



Equipped with vernier scale  
150-190

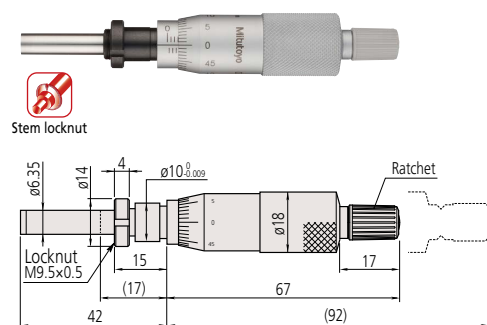


Long spindle (without ratchet)  
150-219

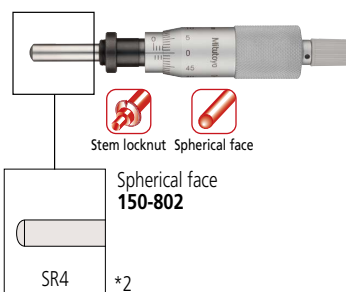
\*1 Other dimensions are the same as 150-192.

#### Stem Locknut

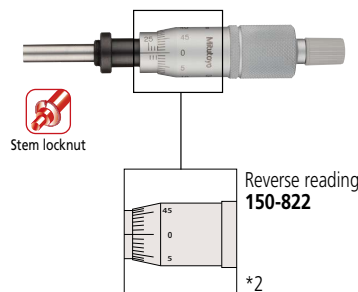
Mass: 100 g



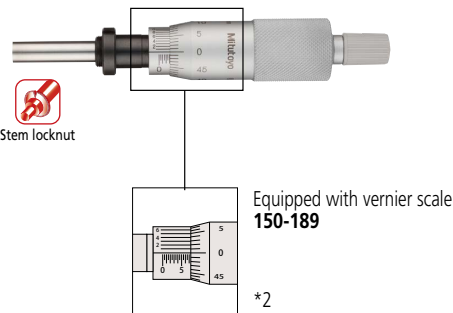
• Fixture thickness: 11.5 mm  
150-191



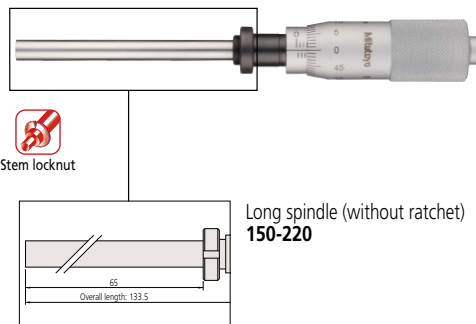
Spherical face  
150-802



Reverse reading  
150-822



Equipped with vernier scale  
150-189



Long spindle (without ratchet)  
150-220

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

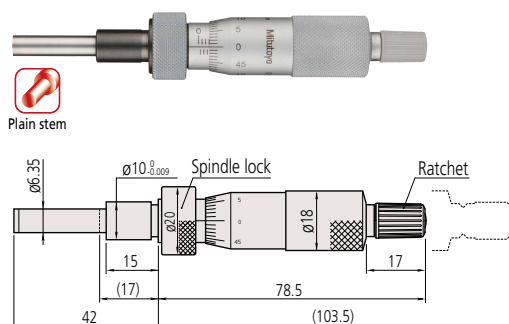
## Micrometer Heads SERIES 150 — Medium-sized Standard Type

### DIMENSIONS

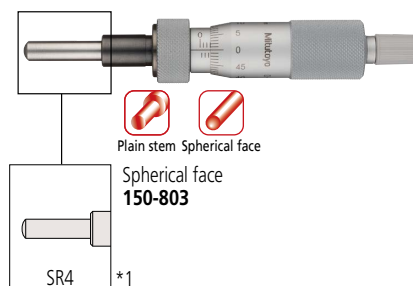
#### Plain Stem and Spindle Lock

Mass: 110 g

( ): with spindle fully retracted. Unit: mm

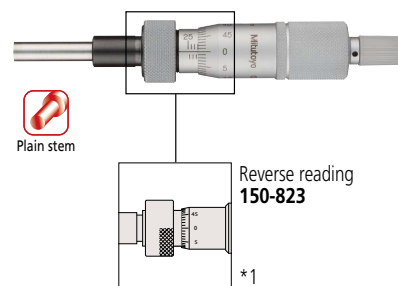


**150-209**



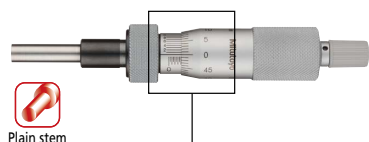
**Spherical face  
150-803**

\*1



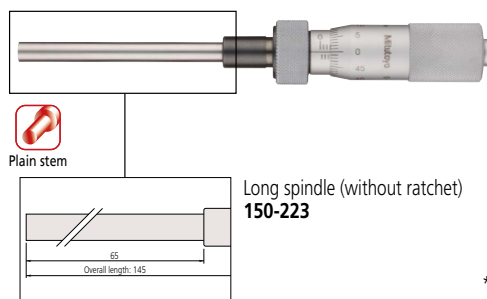
**Reverse reading  
150-823**

\*1



**Equipped with vernier scale  
150-183**

\*1

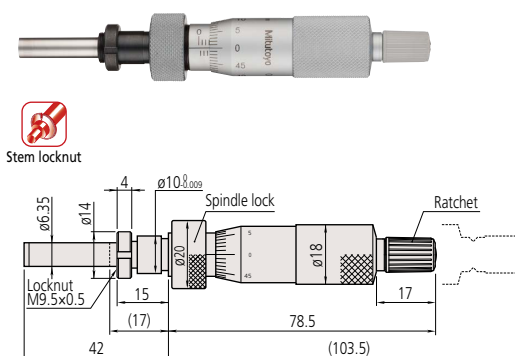


**Long spindle (without ratchet)  
150-223**

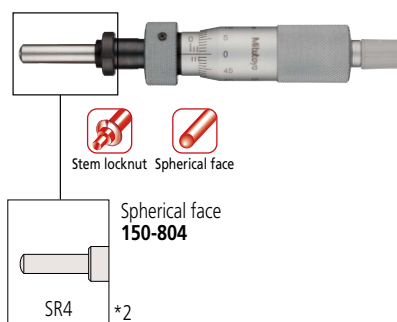
\*1 Other dimensions are the same as **150-209**.

#### Stem Locknut and Spindle Lock

Mass: 115 g

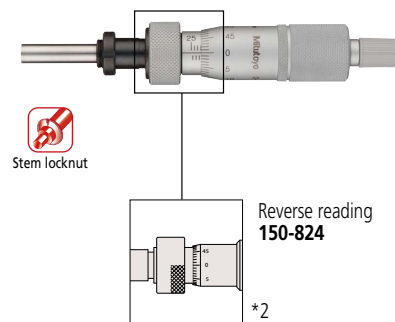


• Fixture thickness: 11.5 mm  
**150-210**



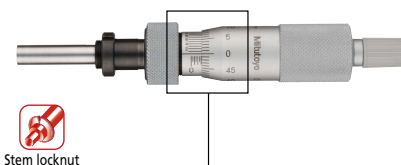
**Spherical face  
150-804**

\*2



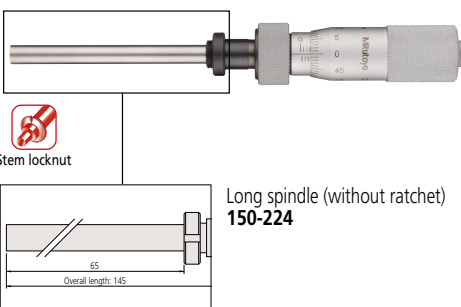
**Reverse reading  
150-824**

\*2



**Equipped with vernier scale  
150-184**

\*2



**Long spindle (without ratchet)  
150-224**

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

# Micrometer Head

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

## Micrometer Heads

### SERIES 151 — Medium-sized Standard Type with 8 mm Diameter Spindle

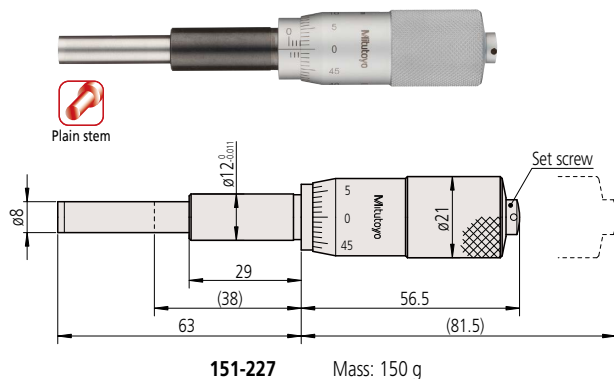
- Larger spindle (ø8 mm) for heavy-duty applications (normally ø6.35 mm).

## Technical Data

- Graduation: 0.01 mm, 0.001 mm (w/vernier), 0.001 in or 0.0001 in (w/vernier)
- Spindle pitch: 0.5 mm or 0.025 in
- Measuring face  
Material: Carbide  
Hardness: 90 HRA or more  
Lapped
- Scale finishing:  
Satin-chrome plated

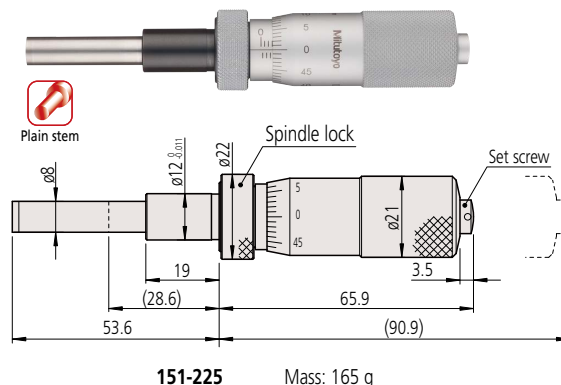
## DIMENSIONS

### Plain Stem

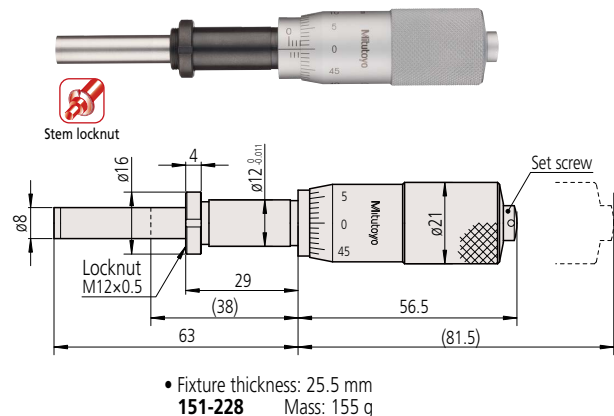


### Plain Stem and Spindle Lock

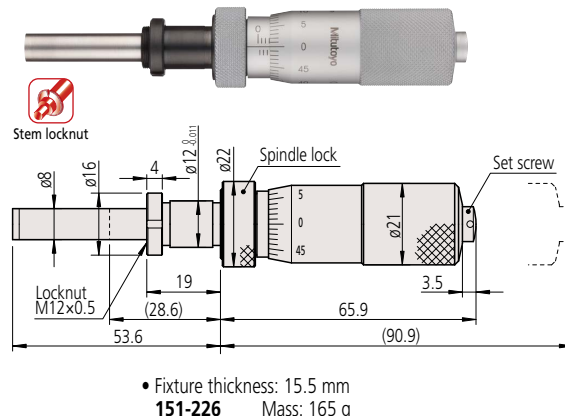
Unit: mm



### Stem Locknut



### Stem Locknut and Spindle Lock



( ): with spindle fully retracted.

## SPECIFICATIONS

Metric						
Order No.	Stroke (mm)	Maximum permissible error $J_{MPE}$ (μm)	Stem dia. (mm)	Stem	Spindle end	Special features
151-224	25	±2	12	Plain	Flat (carbide tip)	—
151-223				W/clamp nut		
151-214*2				Plain*1		
151-213*2				W/clamp nut*1		
151-222				Plain		W/vernier (0.001 mm)
151-221				W/clamp nut		
151-212*2				Plain*1		
151-211*2				W/clamp nut*1		
151-227				Plain		
151-228				W/clamp nut		
151-225	50	±4	12	Plain*1	Flat (carbide tip)	W/o ratchet stop
151-226				W/clamp nut*1		—
151-256				Plain		—
151-255				W/clamp nut		—
151-260				Plain		W/o ratchet stop
151-259				W/clamp nut		

\*1 With spindle lock \*2 Made-to-order models

Inch						
Order No.	Stroke (in)	Maximum permissible error $J_{MPE}$ (in)	Stem dia. (in)	Stem	Spindle end	Special features
151-240	0.1	±0.0001	0.5	Plain	Flat (carbide tip)	—
151-239				W/clamp nut		
151-238				Plain		
151-237				W/clamp nut		
151-241*2				Plain*1		W/o ratchet stop
151-242*2				W/clamp nut*1		
151-243*2				Plain*1		
151-244*2				W/clamp nut*1		
151-272				Plain		
151-271				W/clamp nut		
151-271	0.2	±0.0002		W/clamp nut		—

\*1 With spindle lock \*2 Made-to-order models

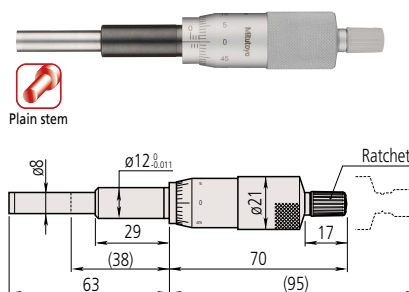


## Micrometer Heads

### SERIES 151 — Medium-sized Standard Type with 8 mm Diameter Spindle

#### DIMENSIONS

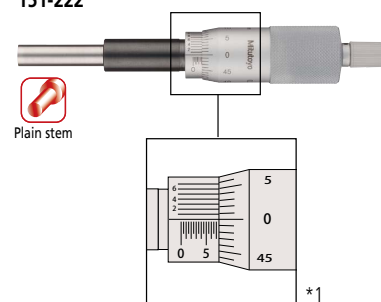
##### Plain Stem



**151-224** Mass: 150 g

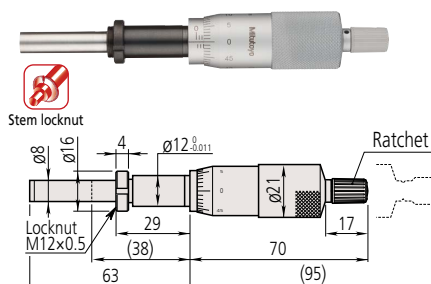
Equipped with vernier scale  
**151-222**

Unit: mm



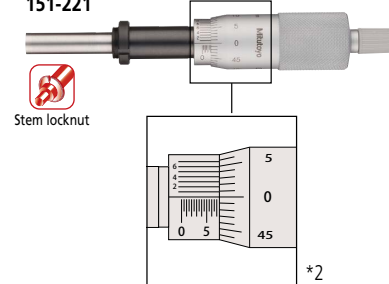
\*1 Other dimensions are the same as **151-224**.

##### Stem Locknut



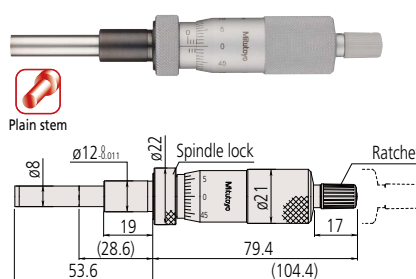
• Fixture thickness: 25.5 mm  
**151-223** Mass: 155 g

Equipped with vernier scale  
**151-221**



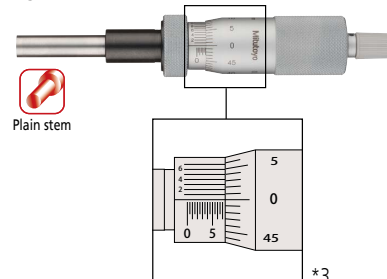
\*2 Other dimensions are the same as **151-223**.

##### Stem Locknut and Spindle Lock



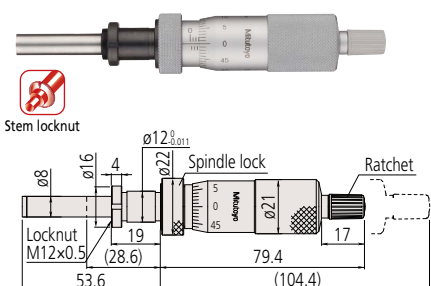
**151-214** Mass: 160 g

Equipped with vernier scale  
**151-212**



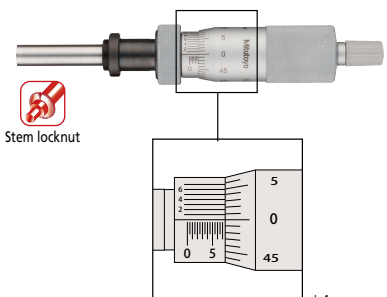
\*3 Other dimensions are the same as **151-214**.

##### Stem Locknut and Spindle Lock



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

Equipped with vernier scale  
**151-211**



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

# Micrometer Head

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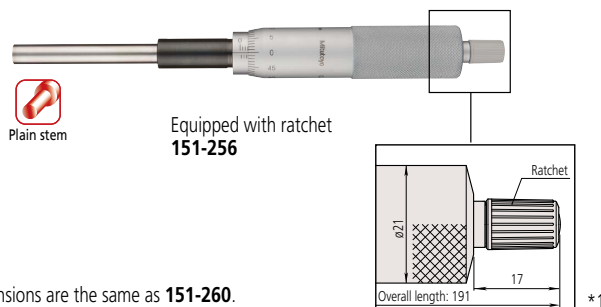
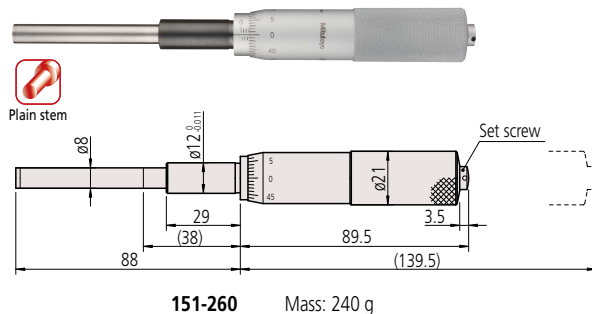
## Micrometer Heads

### SERIES 151 — Medium-sized Standard Type with 8 mm Diameter Spindle

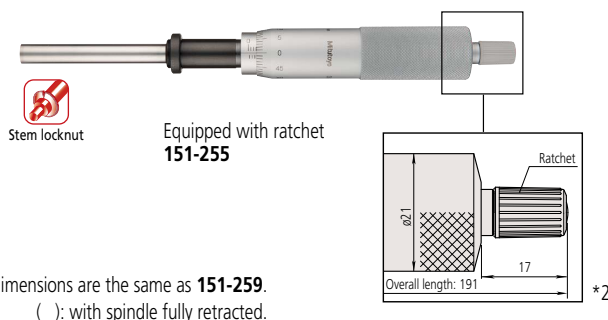
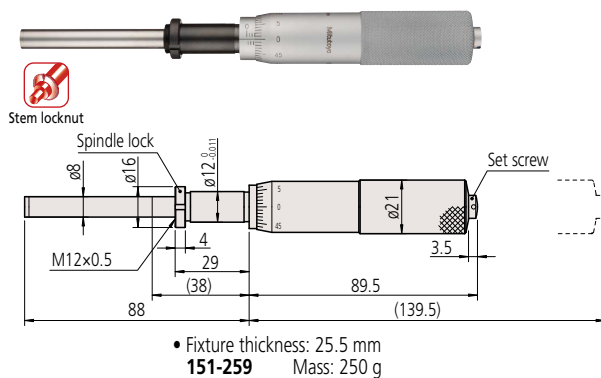
#### DIMENSIONS

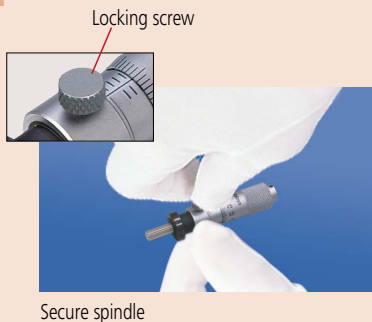
##### Plain Stem

Unit: mm



##### Stem Locknut



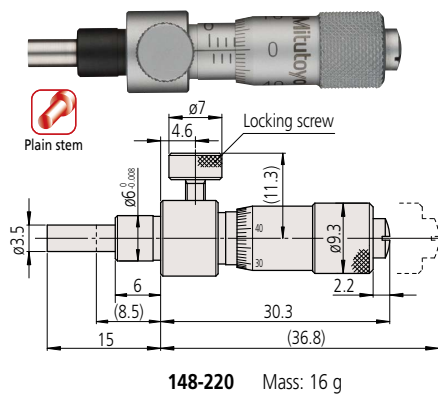


## Micrometer Heads SERIES 148 — Locking-screw Type

- Locking screw provides secure locking at any position of the spindle.
- Position of the locking screw is the same as the sleeve index line.

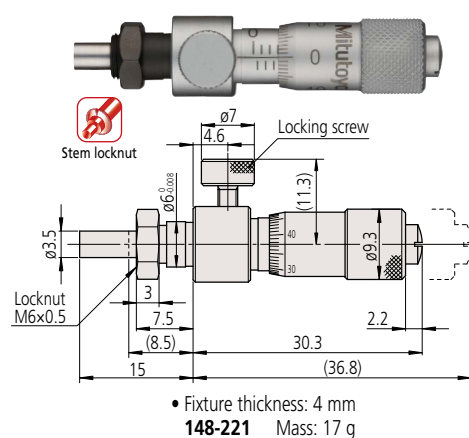
### DIMENSIONS

#### Plain Stem

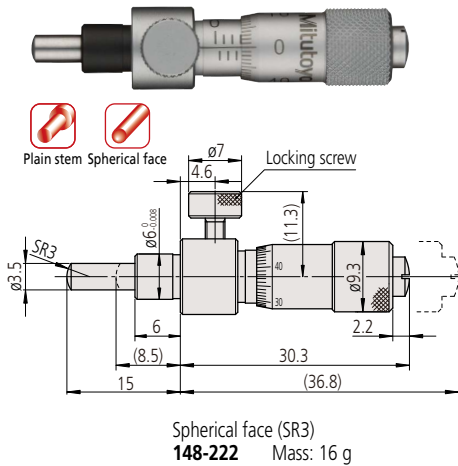


#### Stem Locknut

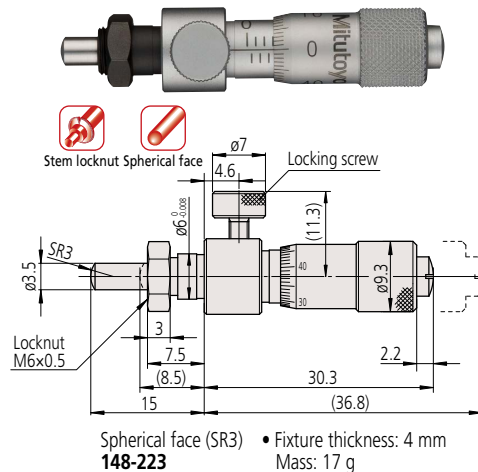
Unit: mm



#### Plain Stem



#### Stem Locknut



( ): with spindle fully retracted.

### SPECIFICATIONS

Metric							
Order No.	Stroke (mm)	Graduation (mm)	Stem dia. (mm)	Stem	Spindle end	Graduation features	Maximum permissible error $J_{MPE}$ (μm)
148-220	6.5	0.01	6	Plain	Flat	Standard	±5
148-221				W/clamp nut	Flat		
148-222				Plain	Spherical (SR3)		
148-150	13	0.01	9.5	W/clamp nut	Flat	Standard	±2
148-151				Plain	Flat		
148-152				W/clamp nut	Spherical (SR4)		
148-316	6.5	0.01	9.5	W/clamp nut	Flat	Standard	±2
148-317				Plain	Flat		
148-318				W/clamp nut	Spherical (SR4)		

Inch							
Order No.	Stroke (in)	Graduation (in)	Stem dia. (in)	Stem	Spindle end	Graduation features	Maximum permissible error $J_{MPE}$ (in)
148-230	0.25	0.001	0.25	Plain	Flat	Standard	±0.00025
148-231				W/clamp nut	Flat		
148-232				Plain	Spherical (SR3)		
148-160	0.5	0.001	0.375	W/clamp nut	Flat	Standard	±0.0001
148-161				Plain	Flat		
148-162				W/clamp nut	Spherical (SR4)		
148-326	0.25	0.001	0.375	W/clamp nut	Flat	Standard	±0.0001
148-327				Plain	Flat		
148-328				W/clamp nut	Spherical (SR4)		

# Micrometer Head

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

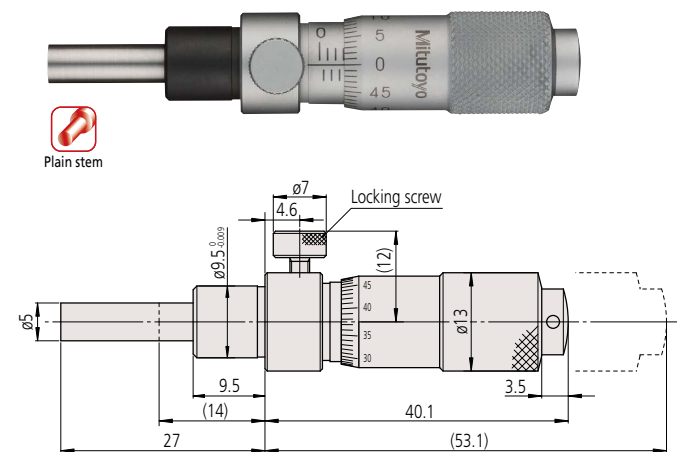
## Micrometer Heads SERIES 148 — Locking-screw Type

### Technical Data

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

### DIMENSIONS

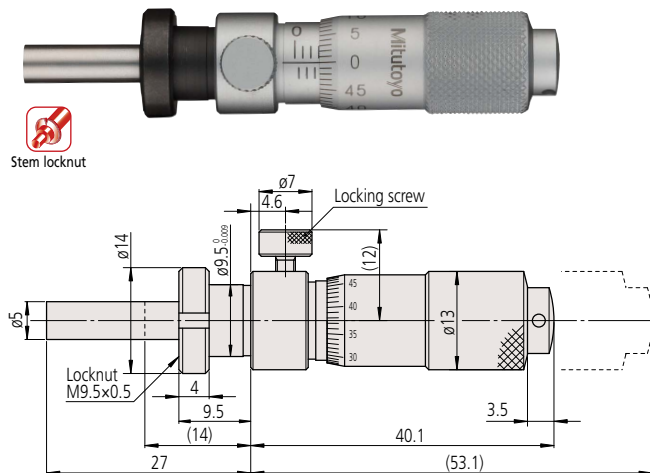
#### Plain Stem



**148-150** Mass: 40 g

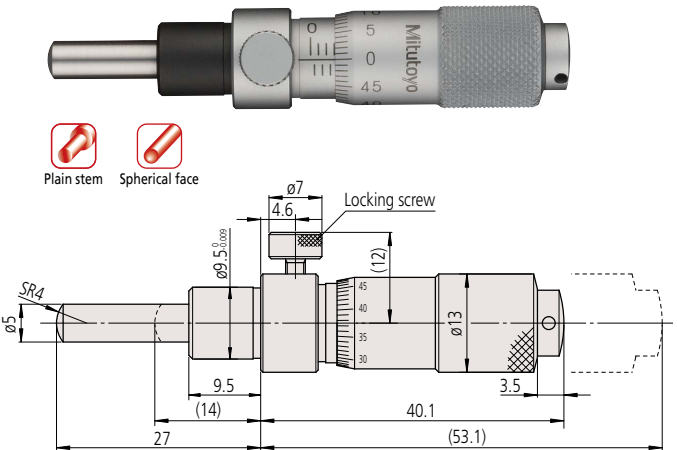
#### Stem Locknut

Unit: mm



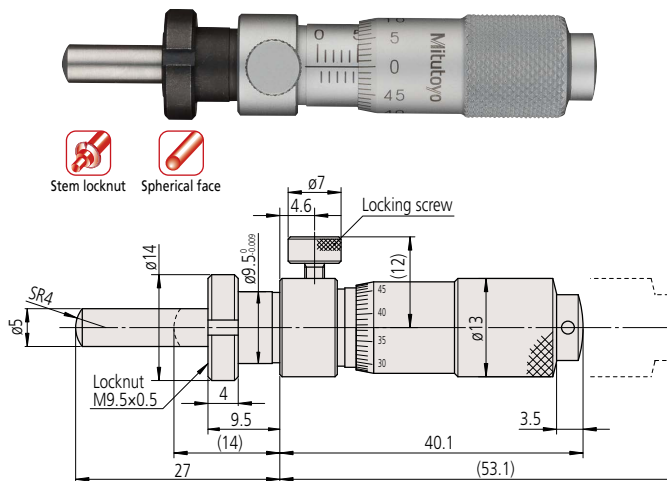
• Fixture thickness: 6 mm  
**148-151** Mass: 43 g

#### Plain Stem



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

#### Stem Locknut



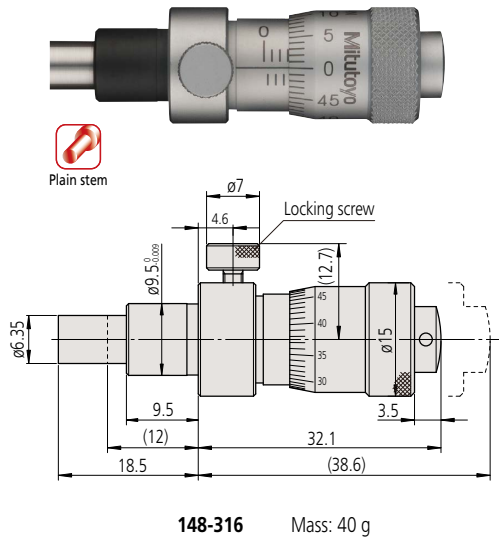
Spherical face (SR4) • Fixture thickness: 6 mm  
**148-153** Mass: 43 g

( ): with spindle fully retracted.

## Micrometer Heads SERIES 148 — Locking-screw Type

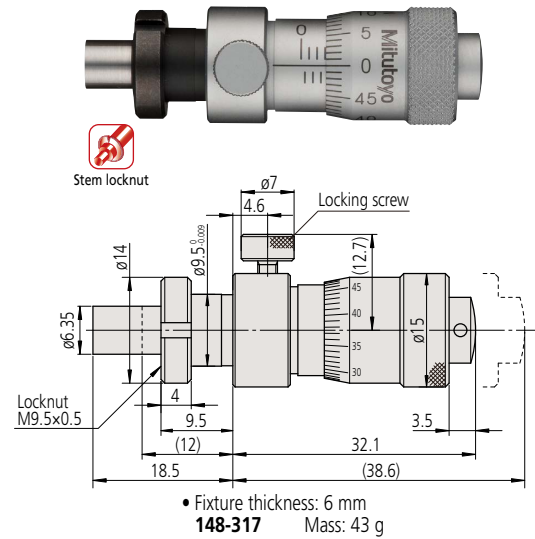
### DIMENSIONS

#### Plain Stem

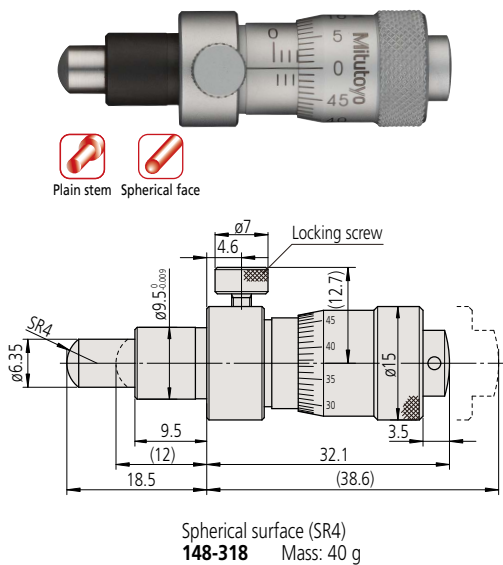


#### Stem Locknut

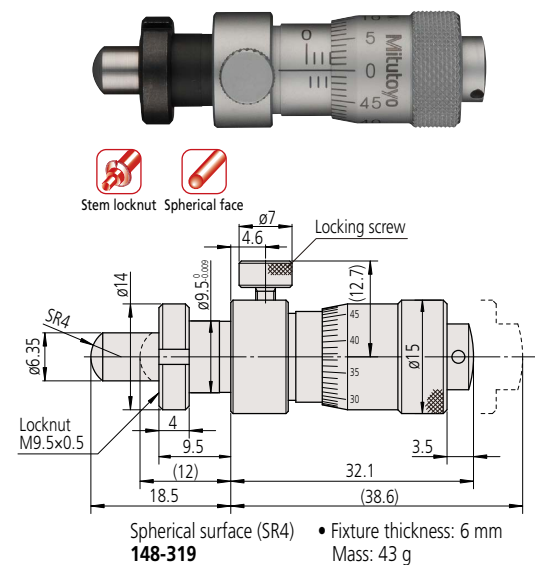
Unit: mm



#### Plain Stem



#### Stem Locknut



( ): with spindle fully retracted.

# Micrometer Head

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

## Micrometer Heads

### SERIES 153 — Non-rotating Spindle Type

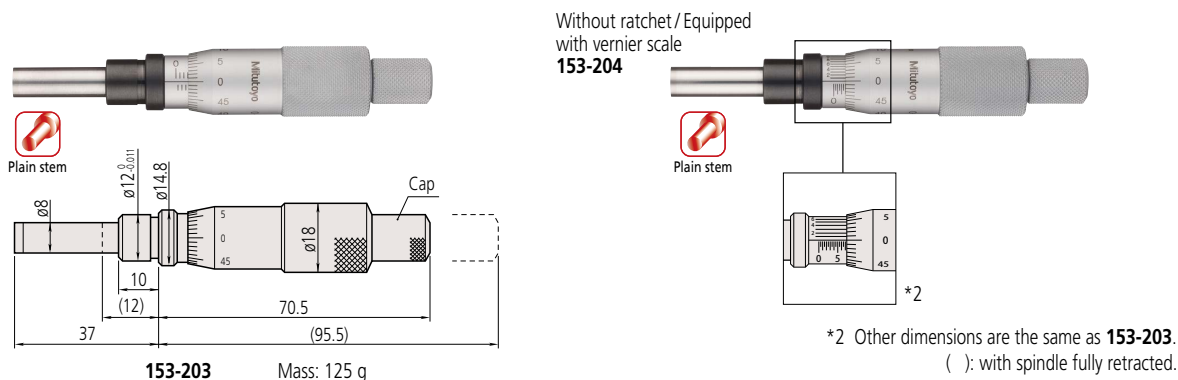
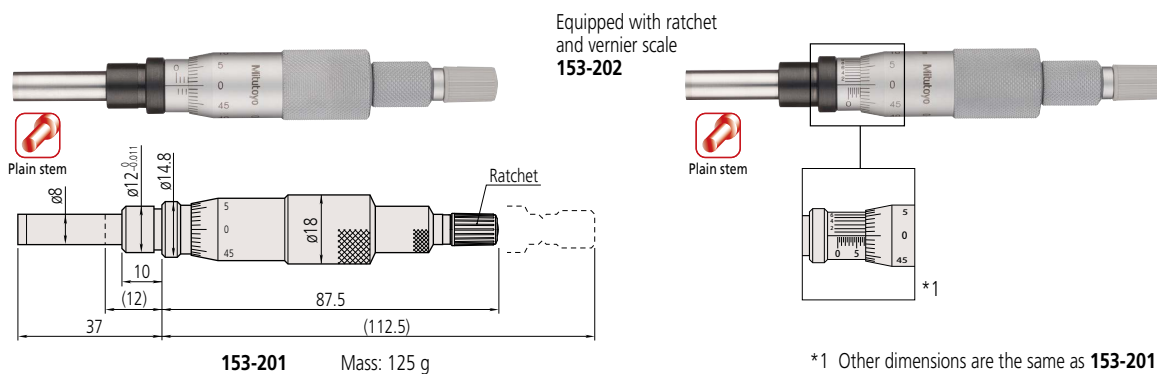
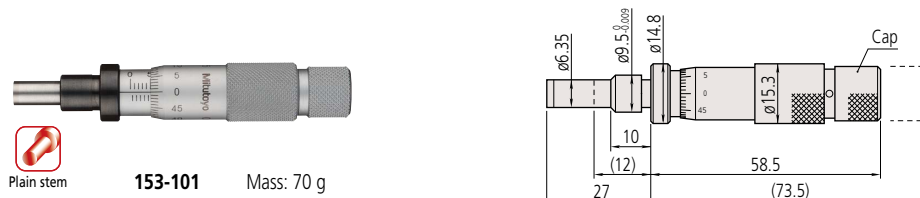
- Micrometer head with non-rotating spindle.
- Torsion-free feed reduces workpiece deformation and wear.

#### Technical Data

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

## DIMENSIONS

Unit: mm



## SPECIFICATIONS

### Metric

Order No.	Stroke (mm)	Graduation (mm)	Graduation features	Stem dia. (mm)	Stem	Spindle end	Spindle pitch (mm)	Maximum permissible error $J_{MPE}$ (μm)				
153-101	15	0.01	Standard	9.5	Plain	Flat (carbide tip)	0.5	±3				
153-201*1	25			0.001					W/vernier (0.001 mm)	12		
153-202*1											0.01	Standard
153-203												
153-204												

### Inch

Order No.	Stroke (in)	Graduation (in)	Special features	Stem dia. (in)	Stem	Spindle end	Spindle pitch (in)	Maximum permissible error $J_{MPE}$ (in)
153-108*2	0.5	1	W/vernier (0.0001 in)	0.375	Plain	Flat (carbide tip)	0.025	±0.00015
153-205*1	0.001		Standard	0.5				
153-206*1	0.0001		W/vernier (0.0001 in)					
153-207	0.001		Standard					
153-208	0.0001		W/vernier (0.0001 in)					

\*1 With ratchet stop \*2 Made-to-order model



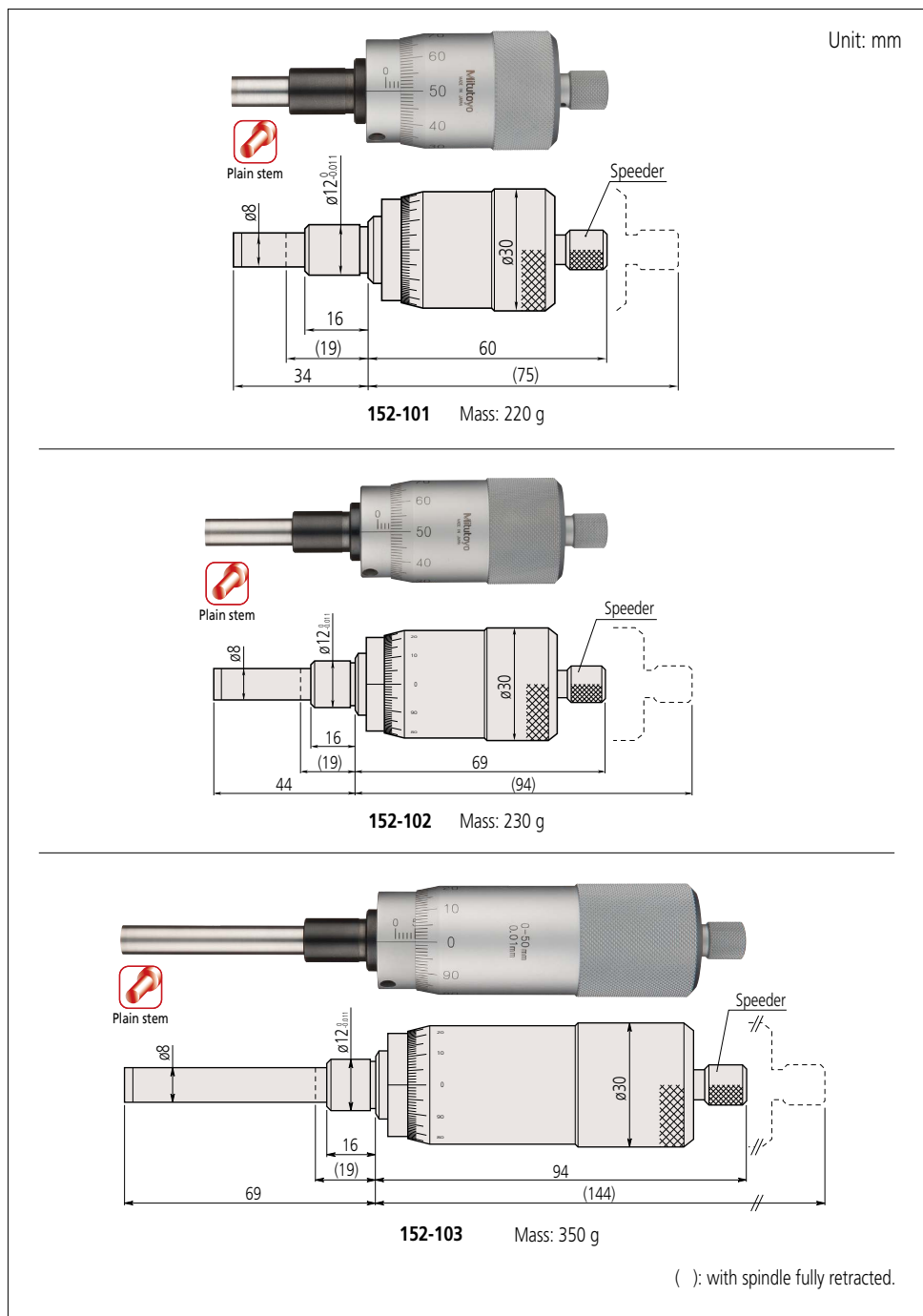
## Technical Data

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

## Micrometer Heads SERIES 152 — Quick Spindle Feed of 1 mm/rev

- Micrometer head with 1 mm spindle pitch enables quick feeding and positioning.
- The larger screw thread also provides greater load-bearing capacity than does a standard head.

## DIMENSIONS



## SPECIFICATIONS

Metric							
Order No.	Stroke (mm)	Graduation (mm)	Stem dia. (mm)	Stem	Spindle end	Spindle pitch (mm)	Maximum permissible error $J_{MPE}$ ( $\mu$ m)
152-101	15	0.01	12	Plain	Flat (carbide tip)	1	$\pm 2$
152-102	25						$\pm 4$
152-103	50						$\pm 4$

# Micrometer Head

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

## Micrometer Heads

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

- Highly accurate 0.1 mm pitch thread is only one-fifth of that used for a standard-pitch head (0.5 mm).
- External dimensions are compatible with standard 0.5 mm pitch heads.

### DIMENSIONS

#### Plain Stem

Unit: mm

Plain stem Spherical face

148-142 Mass: 31 g

#### Stem Locknut

Stem locknut Spherical face

• Fixture thickness: 6 mm  
148-143 Mass: 34 g

Sleeve marker

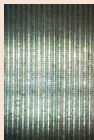
### SPECIFICATIONS

Metric								
Order No.	Stroke (mm)	Graduation (mm)	Stem dia. (mm)	Stem	Spindle end	Spindle pitch (mm)	Maximum permissible error $J_{MPE}$ (μm)	Special features
148-142	6.5	0.002	9.5	Plain	Spherical (SR4)	0.1	±2	—
148-143				W/clamp nut				
148-342				Plain				
148-343				W/clamp nut				
148-242	5	0.004	6	Plain	Spherical (SR3)		±5	Thicker & shorter thimble
148-243				W/clamp nut				
148-244				Plain				
148-245				W/clamp nut				

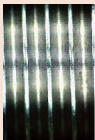
### Technical Data

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

### Spindle Pitch



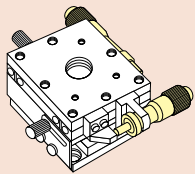
Pitch=0.1 mm



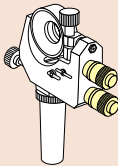
Pitch=0.5 mm

### Typical Applications

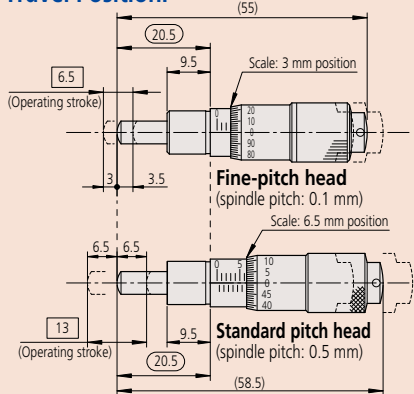
- Semiconductor-wafer positioning machinery and optical component alignment units, etc.
- Precision X-Y table positioning



- Precision adjustment of mirror in holder



### Comparison of Mounting Dimensions Between a Fine-pitch Head and a Standard-pitch Head at the Midstroke Travel Position.



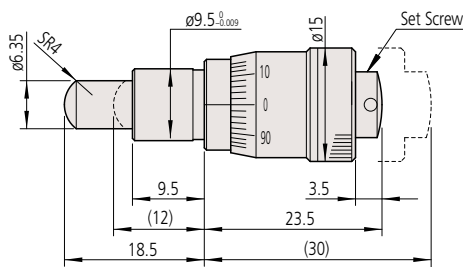
Note: While the fine-pitch micrometer head has a measuring stroke of 6.5 mm, the standard head has a larger range of 13 mm. When replacing a standard head, the fine-pitch type can use the common stroke in the middle of the spindle travel. The standard and compact types of fine-pitch head are otherwise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

## Micrometer Heads SERIES 148 — Fine Spindle Feed of 0.1 mm/rev

### DIMENSIONS

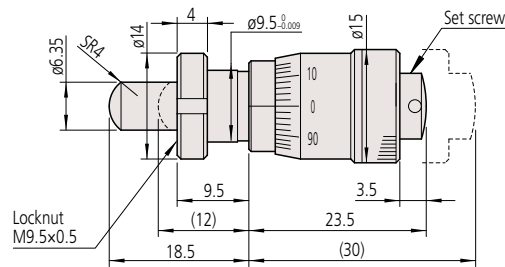
Unit: mm

#### Plain Stem

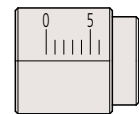


**148-342** Mass: 29 g

#### Stem Locknut

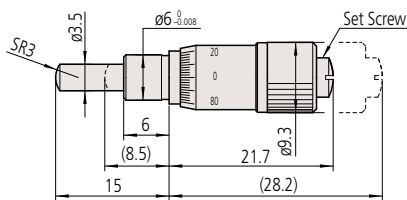


• Fixture thickness: 6 mm  
**148-343** Mass: 31 g



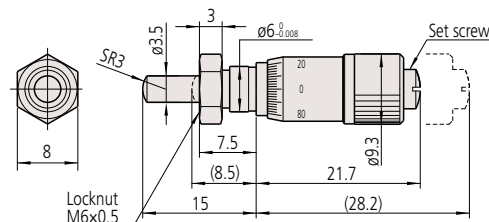
Sleeve marker

#### Plain Stem

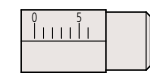


**148-242** Mass: 10 g

#### Stem Locknut

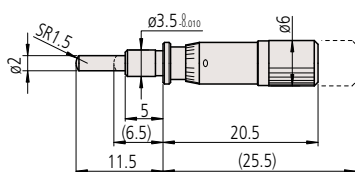


• Fixture thickness: 4 mm  
**148-243** Mass: 10 g



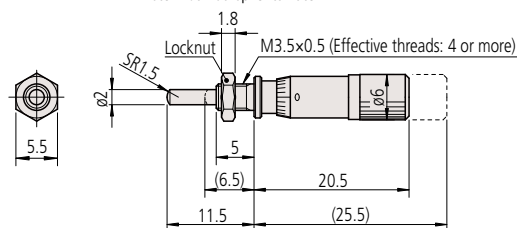
Sleeve marker

#### Plain Stem



**148-244** Mass: 4 g

#### Stem Locknut



• Fixture thickness: 3 mm  
**148-245** Mass: 5 g



Sleeve marker

( ): with spindle fully retracted.

# Micrometer Head

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

## Micrometer Heads SERIES 148 — Fine Spindle Feed of 0.25 mm/rev

- Micrometer head with 0.25 mm spindle pitch is convenient for fine-feed and fine-positioning applications.

### DIMENSIONS

#### Plain Stem

Unit: mm

148-132 Mass: 30 g

148-322 Mass: 30 g

#### Stem Locknut

148-133 Mass: 35 g

• Fixture thickness: 6 mm

148-323 Mass: 35 g

• Fixture thickness: 6 mm

( ) : with spindle fully retracted.

### SPECIFICATIONS

Metric									
Order No.	Stroke (mm)	Graduation (mm)	Stem dia. (mm)	Stem	Spindle end	Spindle pitch (mm)	Maximum permissible error $J_{MPE}$ (μm)		
148-132	13	0.01	9.5	Plain	Spherical (SR4)	0.25	±2		
148-133				W/clamp nut					
148-322	6.5			Plain					
148-323				W/clamp nut					

### Technical Data

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

## Technical Data

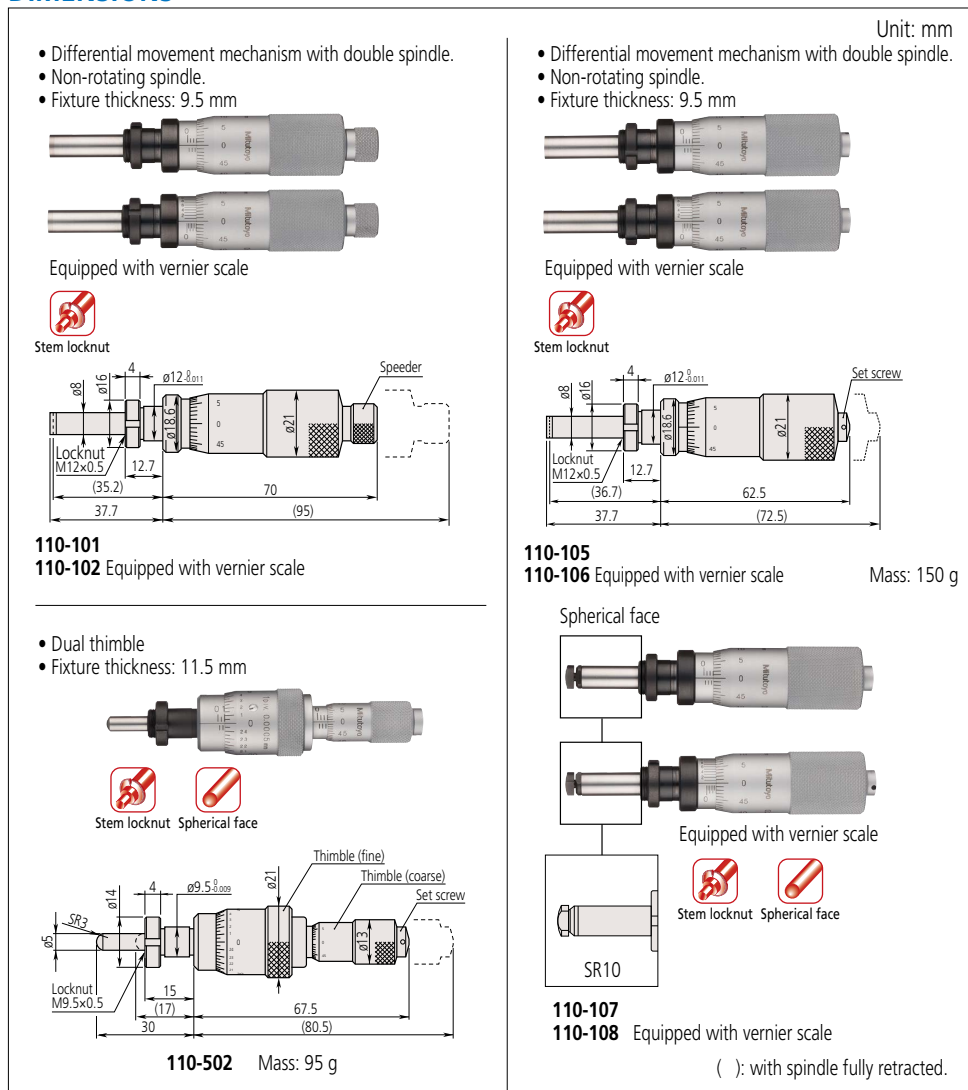
- Measuring face  
Material: Carbide  
(**110-502/504** are hardened tool steel)  
Hardness: 90 HRA or more  
(Only **110-502/504** are 60 HRC or more)  
Lapped
- Scale finishing:  
Satin-chrome plated

## Micrometer Heads

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

- The differential movement of spindle threads and nuts allows ultra-fine feeding.

## DIMENSIONS



## SPECIFICATIONS

Metric											
Order No.	Stroke (mm)		Graduation (mm)		Graduation features	Stem dia. (mm)	Stem	Spindle end	Maximum permissible error $J_{MPE}^{*2}$ (μm)		
110-101	2.5		0.001		Standard	12	W/clamp nut	Flat (carbide tip)	±5/±1.5		
0.0001			Fine								
110-105			1		0.001			Standard	Spherical (SR10) (carbide tip)	±3/±1.5	
0.0001					Fine						
0.001		Standard									
110-108			0.0001		Fine						
110-502	Thimble (fine)	0.2	Thimble (fine)	0.0005	Dual scales; 0.2 mm fine-feed stroke	9.5		Spherical	±3/±1.5		
	Thimble (coarse)	13	Thimble (coarse)	0.01							
Inch											
Order No.	Stroke (in)		Graduation (in)		Graduation features	Stem dia. (in)	Stem	Spindle end	Maximum permissible error $J_{MPE}^{*2}$ (in)		
110-111	0.05		0.00002		Standard	0.5	W/clamp nut	Flat (carbide tip)	±0.00025/±0.00006		
0.00005			Fine								
110-112			0.02		0.00002			Standard	Spherical (SR10) (carbide tip)	±0.00015/±0.00006	
0.00005					Fine						
110-115* <sup>1</sup>					0.00002			Standard			
110-116* <sup>1</sup>					0.00005			Fine			
110-117* <sup>1</sup>			0.00002		Standard						
110-118* <sup>1</sup>			0.00005		Fine						
110-504	Thimble (fine)	0.006	Thimble (fine)	0.00002	Dual scales; 0.2 mm/0.006 in fine-feed range	0.375		Spherical	±0.00015/±0.00006		
	Thimble (coarse)	0.5	Thimble (coarse)	0.001							

\*1 Made-to-order models \*2 Wide range/narrow range

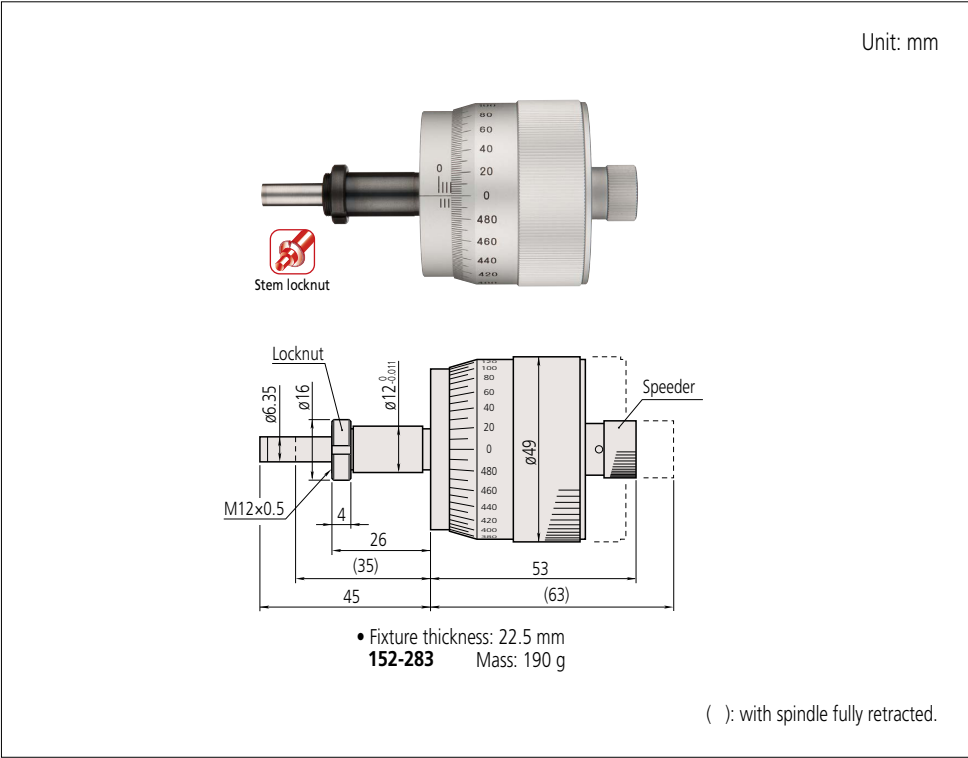
# Micrometer Head

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

## Micrometer Heads SERIES 152 — Large Thimble Type

- Large-diameter thimble for fine adjustment and positioning.

### DIMENSIONS



### SPECIFICATIONS

Metric								
Order No.	Stroke (mm)	Graduation (mm)	Graduation features	Stem dia. (mm)	Stem	Spindle end	Spindle pitch (mm)	Maximum permissible error $J_{MPE}$ (μm)
152-283	10	0.002	Standard	12	W/clamp nut	Flat (carbide tip)	0.5	±2
152-332	25		Bidirectional		Plain			
152-348	50							
152-380								±4
Inch								
Order No.	Stroke (in)	Graduation (in)	Graduation features	Stem dia. (in)	Stem	Spindle end	Spindle pitch (in)	Maximum permissible error $J_{MPE}$ (in)
152-372	1	0.0001	Bidirectional	0.5	W/clamp nut	Flat (carbide tip)	0.025	±0.0001
152-388	2							

### Technical Data

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



## DIMENSIONS

Unit: mm

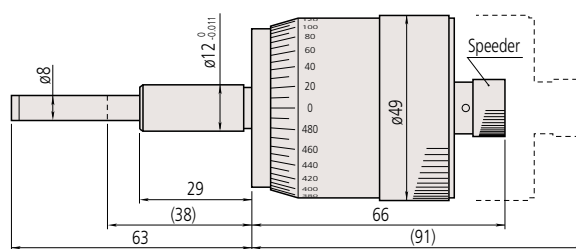


Plain stem



Plain stem

Bidirectional



152-332

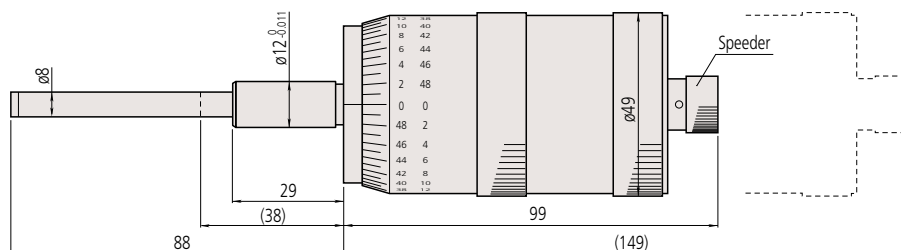
152-348

Bidirectional

Mass: 310 g



Plain stem



152-380

Mass: 460 g

( ): with spindle fully retracted.

# Micrometer Head

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

## Micrometer Heads SERIES 152 — XY-Stage Type

- Micrometer heads especially designed for accurate cross-travel stage translation in X and Y axes.

### DIMENSIONS

Unit: mm

152-390 Mass: 270 g

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

152-389

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

152-402 Mass: 460 g

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

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

152-401

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

### SPECIFICATIONS

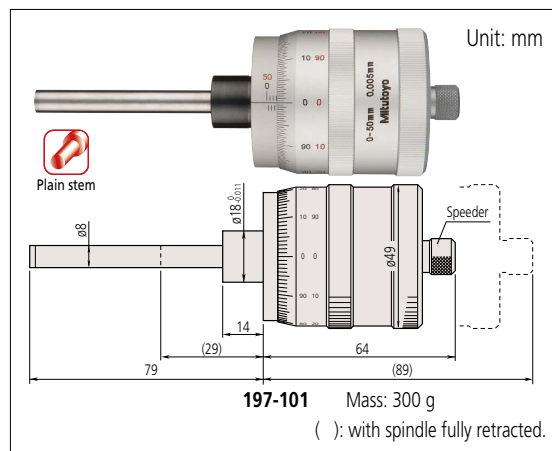
Metric							
Order No.	Stroke (mm)	Graduation (mm)	Graduation features	Stem dia. (mm)	Stem	Spindle pitch (mm)	Maximum permissible error $J_{MPE}$ (μm)
152-390	25	0.005	for Y axis, bidirectional	18	Plain	1	±2
152-389							
152-402		0.001 Vernier graduation	for Y axis, with Vernier				
152-401							
Inch							
Order No.	Stroke (in)	Graduation (in)	Graduation features	Stem dia. (in)	Stem	Spindle pitch (in)	Maximum permissible error $J_{MPE}$ (in)
152-392	1	0.0001	for Y axis, bidirectional	0.709	Plain	0.025	±0.0001
152-391							

## Technical Data

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

## Micrometer Heads SERIES 197 — Long Stroke Non-rotating Spindle

### DIMENSIONS



- Large thimble micrometer head with non-rotating spindle.
- Floating thimble allows easy zero setting at any spindle position.
- Dual-spindle mechanism for quick feed of 1 mm/rev (standard models: 0.5 mm/rev).

### SPECIFICATIONS

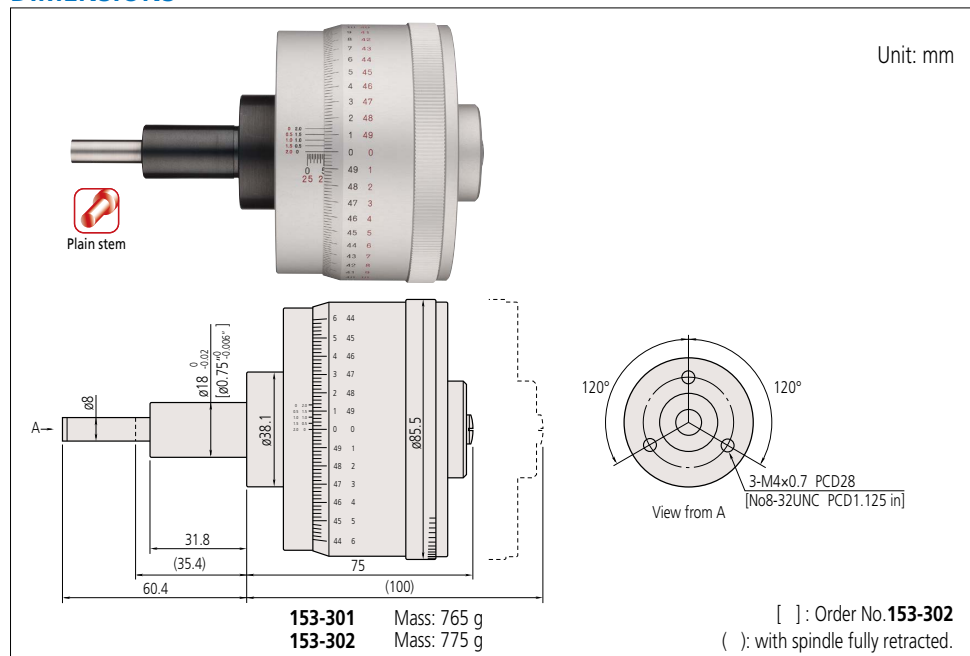
Metric								
Order No.	Stroke	Graduation	Graduation features	Stem dia.	Stem	Spindle end	Spindle pitch	Maximum permissible error $J_{MPE}$
197-101	50 mm	0.005 mm	Bidirectional	18 mm	Plain	Flat (carbide tip)	1 mm	$\pm 5 \mu m$

Inch								
Order No.	Stroke	Graduation	Graduation features	Stem dia.	Stem	Spindle end	Spindle pitch	Maximum permissible error $J_{MPE}$
197-201	2 in	0.0002 in	Bidirectional	0.709 in	Plain	Flat (carbide tip)	0.05 in	$\pm 0.0001$ in

## Micrometer Heads SERIES 153 — High Accuracy and Resolution

- Fine graduation and high resolution model.
- Non-rotating spindle type.

### DIMENSIONS



### SPECIFICATIONS

Metric								
Order No.	Stroke	Graduation	Graduation features	Stem dia.	Stem	Spindle end	Spindle pitch	Maximum permissible error $J_{MPE}$ *
153-301	25 mm	0.0005 mm (vernier)	Bidirectional	18 mm	Plain	Flat (carbide tip)	0.5 mm	$\pm 1 / \pm 0.5 \mu m$

Inch								
Order No.	Stroke	Graduation	Graduation features	Stem dia.	Stem	Spindle end	Spindle pitch	Maximum permissible error $J_{MPE}$ *
153-302	1 in	0.00001 in (vernier)	Bidirectional	0.75 in	Plain	Flat (carbide tip)	0.025 in	$\pm 0.00005$ in / $\pm 0.00003$ in

\* Wide range/narrow range

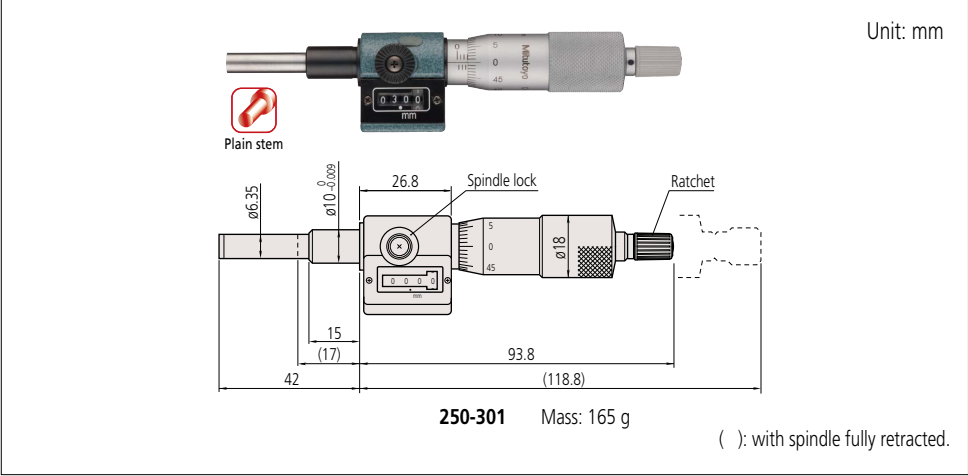
# Micrometer Head

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

## Micrometer Heads SERIES 250 — Digit Counter Type

- Digit counter for easy reading of spindle movement.

### DIMENSIONS



### SPECIFICATIONS

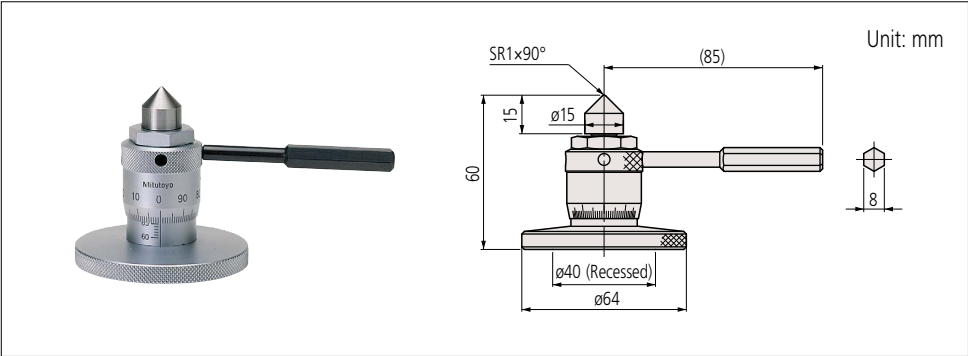
Metric								
Order No.	Stroke (mm)	Graduation (mm)	Stem dia. (mm)	Stem	Spindle end	Spindle pitch (mm)	Graduation features	Maximum permissible error $J_{MPE}$ (μm)
250-301	25	0.01	10	Plain	Flat (carbide tip)	0.5	—	±2

Inch								
Order No.	Stroke (in)	Graduation (in)	Stem dia. (in)	Stem	Spindle end	Spindle pitch (in)	Graduation features	Maximum permissible error $J_{MPE}$ (in)
250-312	1	0.0001	0.375	Plain	Flat (carbide tip)	0.025	Vernier scale	±.0001

## Micro Jack SERIES 7

- Used for accurate leveling of machines, surface plates, and other precision instruments.
- Zero-setting is possible at any position.
- Easy adjustment under heavy load.

### DIMENSIONS



### SPECIFICATIONS

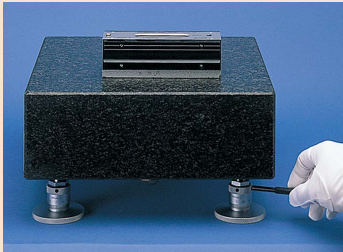
Metric				
Order No.	Stroke (mm)	Graduation (mm)	Remarks (kg)	Handle power at the max. loading (N)
7850	60 - 75	0.01	Max. load: 400	90

### Technical Data

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

### Technical Data

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



## 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.

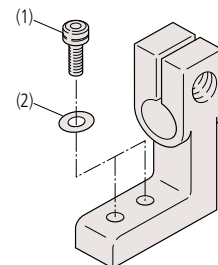
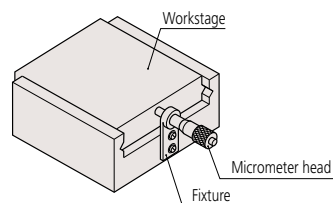


### SPECIFICATIONS

Mounting hole size

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

Note: Supplied with a socket head screw (M3×0.5×12) 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

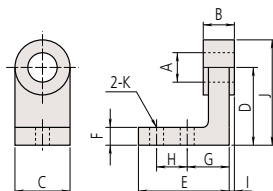
Fixtures (Order No.)	Socket head screw (1)	Washer (2)
<b>303559, 303560, 303561, 303562, 303563, 303564 303565, 303566</b>	M3×0.5×8 M3×0.5×12	Small, Nominal dia.: 3 Small, Nominal dia.: 3
<b>303568, 303569, 303570, 303571, 303572, 303573 303578, 303579, 303580, 303581, 303582, 303583</b>	M4×0.7×10	Small,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

# Micrometer Head

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

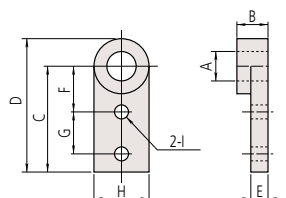
## Micrometer Heads Mounting Fixtures

Fixtures for micrometer heads with stem locknut



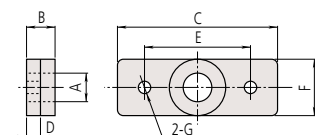
(Unit: mm)

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										



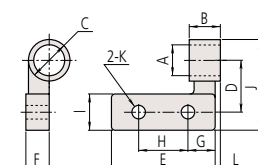
(Unit: mm)

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)

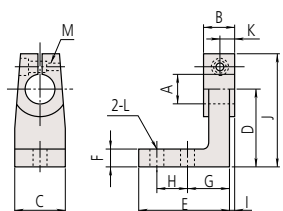
Order No.	A	B	C	D	E	F	G
303561	ø9.5	6	40	3.5	30	15	ø3.4
303570		11.5	60	5.5	40	20	ø4.5
303580	ø10						



(Unit: mm)

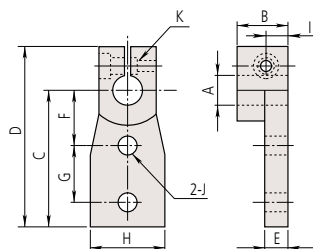
Order No.	A	B	C	D	E	F	G	H	I	J	K	L
303565	ø9.5	6		15	25		7.5	10	10	27.5	ø3.4	0.75
303574		11.5	ø15	20	40	8.5	10	20	15	35	ø4.5	1.25
303584	ø10											

Fixtures for plain stem type micrometer heads



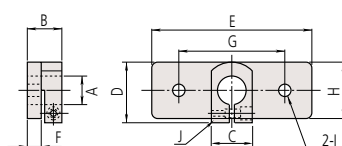
(Unit: mm)

Order No.	A	B	C	D	E	F	G	H	I	J	K	L	M
303560	ø9.5	9	15	20	23	5	11	8	1.5	3.25	4.5	ø3.4	
303569		14.5	20	30	35	7	16	12	3.25	4.25	7.25	ø4.5	M3×0.5
303579	ø10												



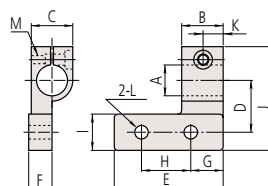
(Unit: mm)

Order No.	A	B	C	D	E	F	G	H	I	J	K
303564	ø9.5	9	30	42.5	4	15	10	15	4.5	ø3.4	
303573		14.5	40	52.5	6	18	15	20	7.25	ø4.5	M3×0.5
303583	ø10										



(Unit: mm)

Order No.	A	B	C	D	E	F	G	H	I	J
303562	ø9.5	9		20	40	3	30	15	ø3.4	
303571		14.5	15	22.5	60	5	40	20	ø4.5	M3×0.5
303581	ø10									



(Unit: mm)

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

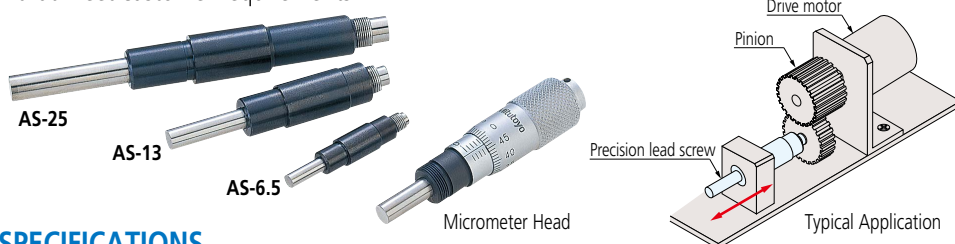


## Technical Data

- Measuring face
- Material: Alloy tool steel
- (AS-25 and BS-25 are carbide tipped)
- Hardness: 60 HRC or more
- (AS-25 and BS-25 are 90 HRA or more)
- Lapped

## 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 0.25 mm pitch, as well as those with the standard 0.5 mm feed pitch and with dimensions and forms that meet customer requirements.
- Durability: 100,000 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



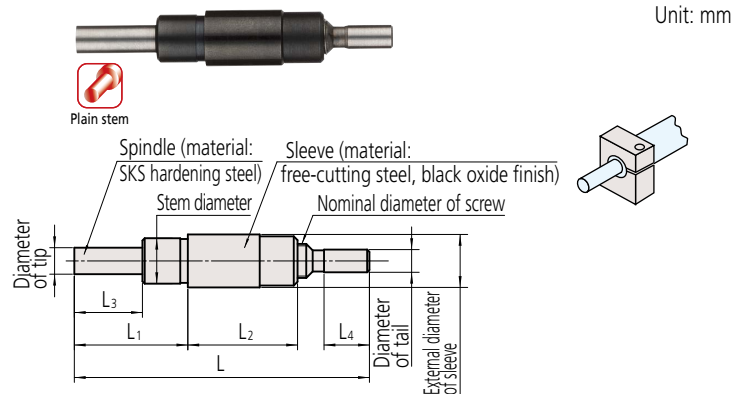
## SPECIFICATIONS

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 (g)
04AZA160	AS-6.5	6.5	0.5	±5	ø6 <sup>-0.008</sup>	ø3.5	ø3 <sup>-0.01</sup>	M4.5×0.5	ø7	Hardened	10
04AZA161	BS-6.5	6.5									11
04AZA162	AS-13	13		±2	ø9.5 <sup>-0.009</sup>	ø5	ø5 <sup>-0.012</sup>	M7.35×0.5	ø10.5	Carbide	27
04AZA163	BS-13	13									30
04AZA164	AS-25	25	0.5	±2	ø10 <sup>-0.009</sup>	ø6.35	ø6 <sup>-0.015</sup>	M7.35×0.5	ø12	Carbide	61
04AZA165	BS-25	25									64

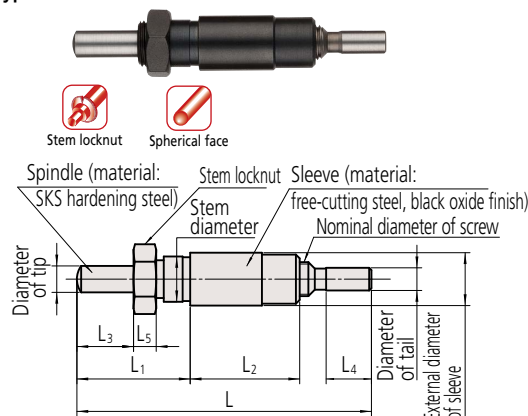
\* AS type: Flat spindle tip without nut  
BS type: Spherical spindle tip with nut

## DIMENSIONS

### Type AS: Plain Stem

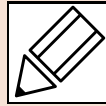


### Type BS: Stem with Locknut



Order No.	L	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	L <sub>4</sub>	L <sub>5</sub>
04AZA160	39	15	14.5	9	6	—
04AZA161	39	15	14.5	7.5	6	3
04AZA162	57.5	25	21.5	15.5	8	—
04AZA163	57.5	25	21.5	15.5	8	4
04AZA164	96.5	42	39.5	27	10	—
04AZA165	96.5	42	39.5	27	10	4

# Quick Guide to Precision Measuring Instruments



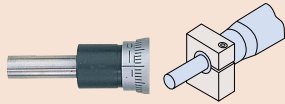
## Micrometer Heads

### Key Factors in Selection

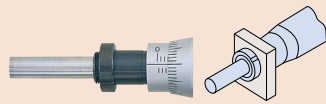
Key factors in selecting a micrometer head are the measuring stroke, spindle face, stem, graduations, thimble diameter, etc.

### Stem

Plain stem



Stem locknut type



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

### Measuring Face



Flat face



Spherical face



Anti-rotation device

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

Figure A

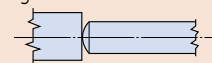


Figure C

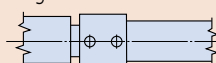
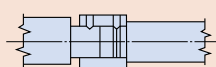
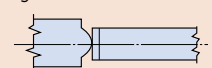


Figure B



### Non-Rotating Spindle

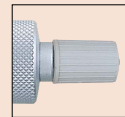
- A non-rotating spindle type head does not exert a twisting action on a workpiece, which may be an important factor in some applications.

### Spindle Thread Pitch

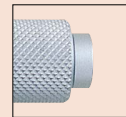
- The standard type head has 0.5 mm pitch.
- 1 mm-pitch type: quicker to set than standard type and avoids the possibility of a 0.5 mm reading error. Excellent load-bearing characteristics due to larger screw thread.
- 0.25 mm or 0.1 mm-pitch type  
This type is the best for fine-feed or fine-positioning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

### Constant-force Device

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



Micrometer head with constant-force device



Micrometer head without constant-force device (no ratchet)

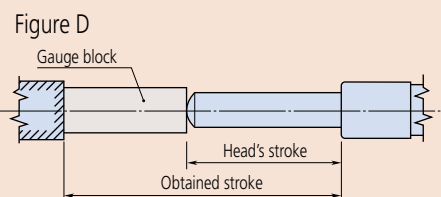
### Spindle Lock

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



### Measuring Range (Stroke)

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



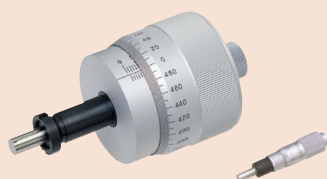
- In this guide, the range (or stroke end) of the thimble is indicated by a dashed line. For stroke ends, consider the thimble as moving to the position indicated by the line when designing the jig.

### Ultra-fine Feed Applications

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

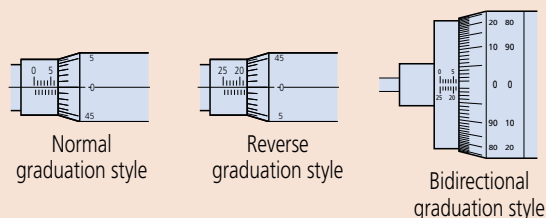
## Thimble Diameter

- 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.



## Graduation Styles

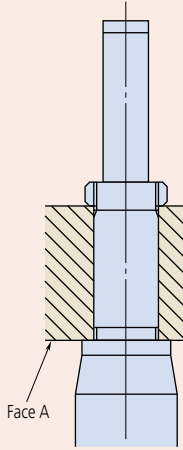
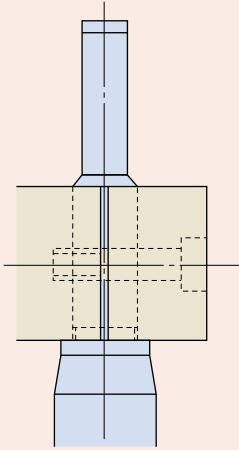
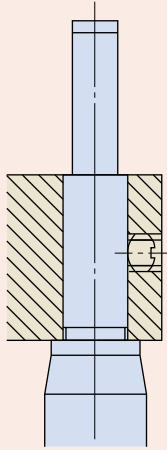
- Care is needed when taking a reading from a mechanical micrometer head, especially if the user is unfamiliar with the model.
- The "normal graduation" style, identical to that of an outside micrometer, is the standard. For this style, the reading increases as the spindle retracts into the body.
- On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



## 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)

Points to keep in mind	Mounting method	(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	G7		G7		G7		G7		H5		H5	
	Fitting tolerance	+0.005 to +0.020		+0.006 to +0.024		+0.005 to +0.020		+0.006 to +0.024		0 to +0.006		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.				M3×0.5 or M4×0.7 is an appropriate size for the setscrew. Limit countersinking into stem to 90°×0.5 and be careful not to damage the stem in the process.			

## Maximum Loading Capacity of 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 definitely specified. 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.

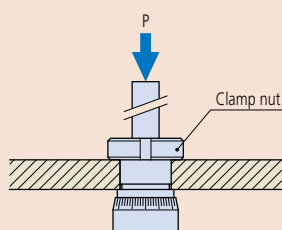
### 1. Recommended maximum loading limit

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

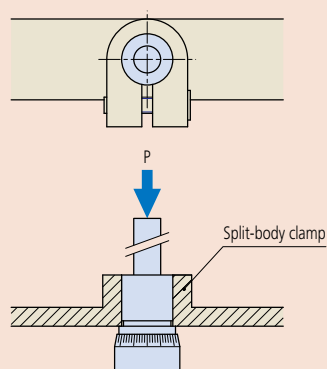
\* Up to approx. 19.6 N (2 kgf) only for Ultra small models

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

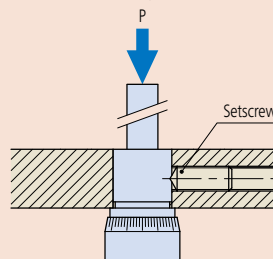
(1) Clamp nut



(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.)

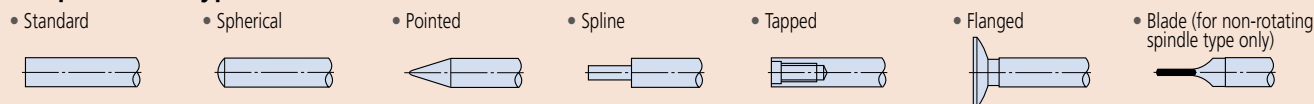
Mounting method	Damaging/dislodging load
(1) Clamp nut	Damage to the main unit will occur at 8.63 to 9.8 kN (880 to 1000 kgf).
(2) Split-body clamp	The main unit will be pushed out of the fixture at 0.69 to 0.98 kN (70 to 100 kgf).
(3) Setscrew clamp	Damage to the setscrew will occur at 0.69 to 1.08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

Note: 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.

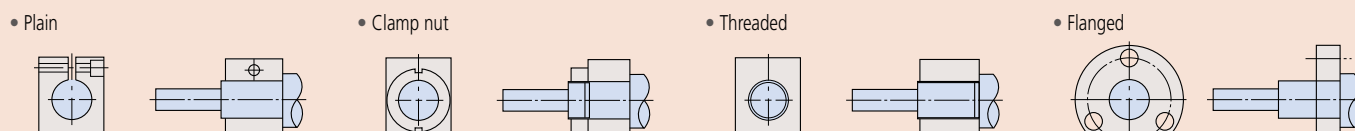
### 1. Spindle-end types



Note: Long spindle type is also available. Please consult Mitutoyo.

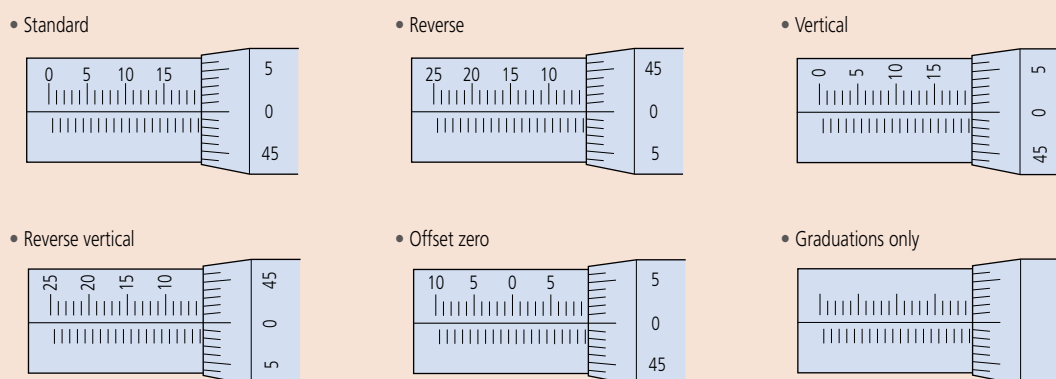
### 2. Stem types

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



### 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.

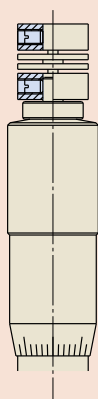


### 4. Logo engraving

A specific logo can be engraved as required.

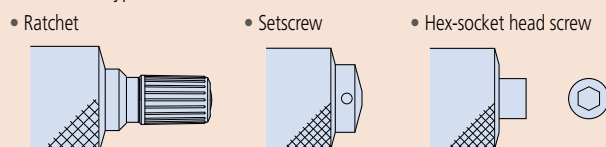
### 5. Motor Coupling

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.



### 7. Spindle-thread pitch

Pitches of 1 mm for fast-feed applications or 0.25 mm and 0.1 mm for fine-feed can be supplied as alternatives to the standard 0.5 mm. 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 lead screw)

The spindle can be used as a precision lead screw. The nut is machined in accordance with the specified dimensions. For details, refer to "Precision Leadscrews" on page B-112.

### 12. Accuracy inspection certificate

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