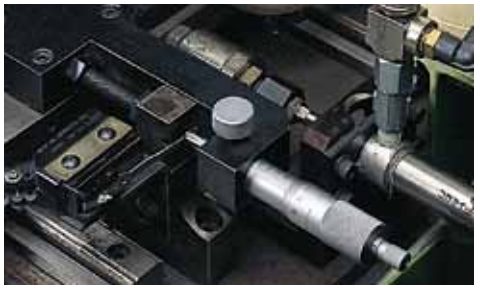
Micrometer Heads

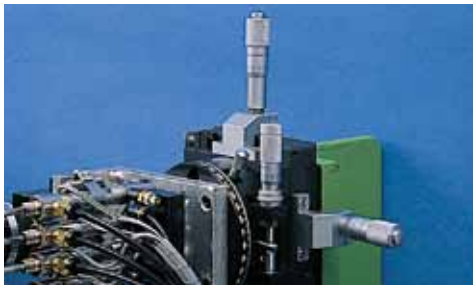
SELECTION GUIDE

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.

Measuring range	Main feature of head		Series	Page
0 - 2.5 mm	High-function	Fine spindle feed of 0.25 mm/rev	110	B-84
0 - 6.5 mm	Standard	Locking-screw type	148	B-89
	Standard	Small type	148	B-85
		Short body	148	B-86
0 - 13 mm	High-function	Fine spindle feed of 0.25 mm/rev	110	B-84
	Standard	Short body	148	B-86
		Small standard type	148	B-87
		Small standard type with zero-adjustable thimble	148	B-88
0 - 15 mm	High-function	Non-rotating spindle type	153	B-95
	Standard	Small standard type with carbide-tipped spindle	149	B-90
0 - 25 mm	Digimatic		350	B-83
	High-function	Non-rotating spindle type	153	B-95
		Large thimble type for fine feed	152	B-93
		XY-stage type	152	B-94
		Fine graduation and high accuracy	153	B-96
	Standard	Medium-sized standard type	150	B-91
		Medium-sized standard type with 8 mm diameter spindle	151	B-92
0 - 50 mm	Digimatic		164	B-82
		Large thimble type for fine feed	152	B-93
		Non-rotating spindle and large thimble	197	B-97
		Medium-sized standard type with 8 mm diameter spindle	151	B-92
60 - 75 mm	Micro Jack		7	B-98

Note: Also refer to *Quick Guide to Precision Measuring Instruments* from page B-99.





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.

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.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Optional Accessories

959149: SPC data cable with pushbutton(1 m)
£34.60

959150: SPC data cable with pushbutton (2 m)
£39.40

06ADV380C: USB Input Tool Direct USB-ITN-C (2 m)
£90.80

02AZD790C: SPC data cable for U-WAVE-T (160 mm)
£52.20

02AZE140C: SPC data cable for U-WAVE-T and footswitch (160/500 mm)
£119.00

SERIES 164 – Digimatic Rotatable Display Micrometer Head

- The display is rotatable to enable easy reading from practically any direction. This feature is especially useful in XY-table applications.
- The Digimatic output port enables inclusion in a statistical process control or networked measurement system.

164-164

SPECIFICATIONS

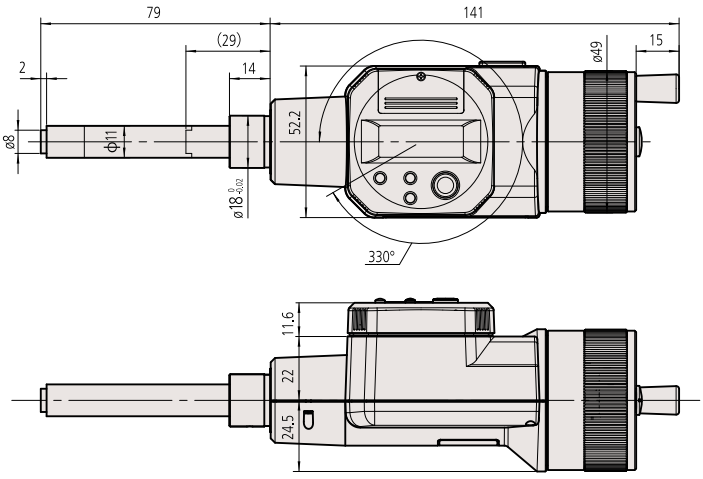
Inch/Metric

Code No.	Range	Resolution	Accuracy*	Price
164-164	0 - 50 mm (0 - 2")	0.001 mm (.00005")	±3 µm (±.00015")	**£632.00**

* Excluding quantizing error.

DIMENSIONS

Unit: mm



Micrometer Heads

SERIES 350 – Digimatic Micrometer Head

- The Digimatic output port enables inclusion in a statistical process control or networked measurement system.

350-351-10

350-352-10

SPECIFICATIONS

Inch/Metric

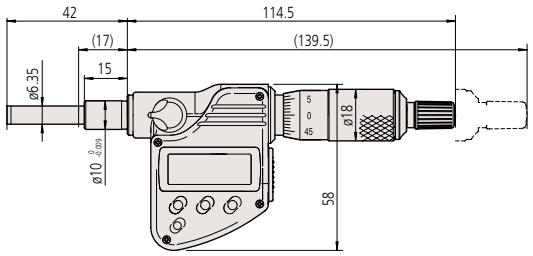
Code No.	Range	Resolution	Accuracy*	Stem type	Price
350-351-10	0 - 25 mm (0 - 1")	0.001 mm (.00005")	±2 µm (±.0001")	Plain	£220.00
350-352-10				Locknut	£260.00

* Excluding quantizing error.

DIMENSIONS

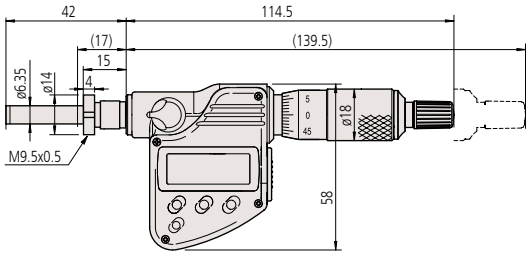
Unit: mm

350-351-10



( ): when retracting the spindle until its stroke end.

350-352-10



( ): when retracting the spindle until its stroke end.

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.

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.

Data output:
Models equipped with this function have an output port for transferring measurement data to a Statistical Process Control (SPC) system.

Error alarm:
In the unlikely event of a display overflow or calculation error, an error message is displayed and measurement stops. Measurement cannot continue until the error is corrected. Also, if the battery voltage drops below a certain point, the battery indicator will turn on before measurement becomes impossible, warning the user that the battery needs to be replaced.

Optional Accessories

05CZA662: SPC data cable with pushbutton (1 m)
£58.50

05CZA663: SPC data cable with pushbutton (2 m)
£70.40

06ADV380B: USB Input Tool Direct USB-ITN-B (2 m)
£106.00

02AZD790B: SPC data cable for U-WAVE-T (160 mm)
£52.20

02AZE140B: SPC data cable for U-WAVE-T and footswitch (160/500 mm)
£119.00

SERIES 110 – Differential Screw Micrometer Head

- The differential movement of spindle threads and nuts allows ultra-fine feed.
- Especially useful in precision translation type applications such as found in electronics component manufacture, optical alignment, etc.

110-102

110-502

SPECIFICATIONS

Metric

Code No.	Range	Graduation	Accuracy*	Stem dia.	Stem type	Spindle end	Graduation features	Price
110-101	0 - 2.5 mm	0.001 mm	±5 µm / ±1.5 µm	12 mm	Locknut	Flat (carbide tip)	Standard	**£219.00**
110-102		0.0001 mm					Fine	**£242.00**
Double thimble type								
110-502	Thimble (fine) 0 - 0.2 mm	Thimble (fine) 0.0005 mm	±3 µm / ±1.5 µm	9.5 mm	Locknut	Spherical (SR3)	Dual scales; 0.2 mm fine-feed range	**£346.00**
	Thimble (coarse) 0 - 13 mm	Thimble (coarse) 0.01 mm						

Inch

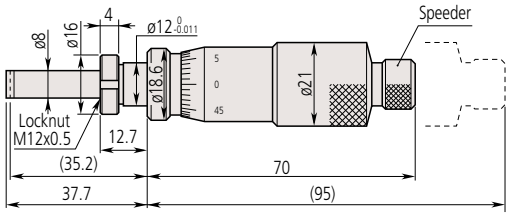
Code No.	Range	Graduation	Accuracy*	Stem dia.	Stem type	Spindle end	Graduation features	Price
Double thimble type								
110-504	Thimble (fine) 0 - .006"	Thimble (fine) .00002"	±.00015" / ±.00006"	.375"	Locknut	Spherical (SR3)	Dual scales; 0.2 mm/.006" fine-feed range	**£346.00**
	Thimble (coarse) 0 - .5"	Thimble (coarse) .001"						

* Wide range / narrow range

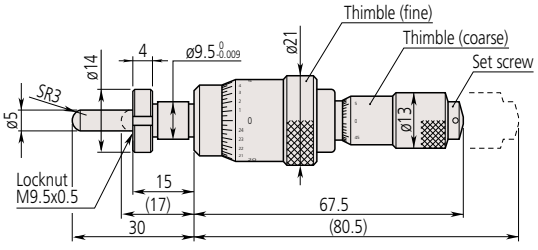
DIMENSIONS

Unit: mm

110-101
110-102



110-502



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Micrometer Heads

SERIES 148 – Short Range Small Micrometer Head

• Miniature micrometer heads for ease of incorporating into machines, jigs and fixtures.

148-201

148-203

Technical Data

Graduation: 0.01 mm / .001"

SPECIFICATIONS

Metric

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Price
148-201	0 - 6.5 mm	±5 µm	6 mm	Plain	Flat	£39.00
148-203				Locknut		£44.20
148-205				Plain	Spherical (SR3)	£44.50

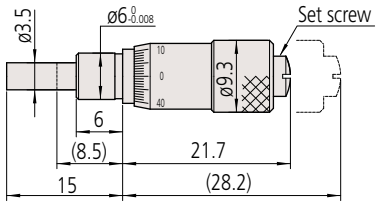
Inch

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Price
148-202	0 - .25"	±.00025"	.25"	Plain	Flat	£39.00

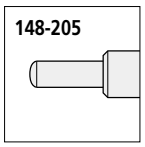
DIMENSIONS

Unit: mm

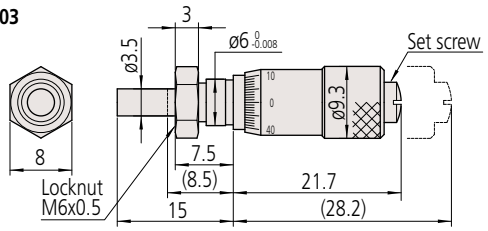
148-201



148-205



148-203



Technical Data

Graduation: 0.01 mm
Spindle pitch: 0.5 mm

SERIES 148 – Short Body Micrometer Head

- Short body design maintains measuring range for limited space applications.

148-303

148-308

SPECIFICATIONS

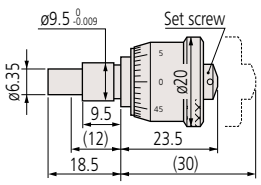
Metric

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Thimble dia.	Price
148-303	0 - 6.5 mm	±2 µm	9.5 mm	Plain	Flat	20 mm	**£59.60**
148-308	0 - 13 mm			Locknut		15 mm	**£59.60**

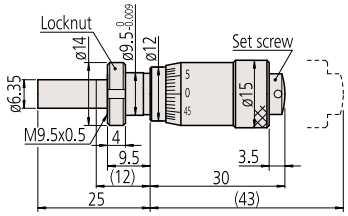
DIMENSIONS

Unit: mm

148-303



148-308



Micrometer Heads

SERIES 148 – Small Standard Micrometer Head

• Measuring range 13 mm/.5".

148-104

148-801

Technical Data

Graduation:	0.01 mm/.001"
Spindle pitch:	0.5 mm/.025"
Spindle end:	Flat or spherical form, SKS-3 tool steel (more than HRC60), lapped surface
Scale:	Satin-chrome plated

SPECIFICATIONS

Metric

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Graduation features	Price
148-104	0 - 13 mm	±2 µm	9.5 mm	Plain	Flat	Standard	**£39.70**
148-801					Spherical (SR4)		**£40.60**
148-821					Flat	Reverse reading	**£40.20**

Inch

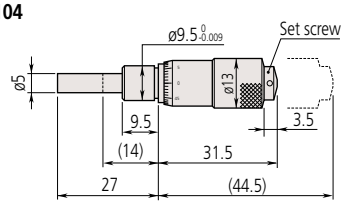
Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Graduation features	Price
148-112	0 - .5"	±.0001"	.375"	Plain	Flat	Standard	**£39.70**
148-811				Plain	Spherical (SR4)		**£40.60**
148-814*				Locknut			**£56.50**
148-831				Plain	Flat	Reverse reading	**£40.20**

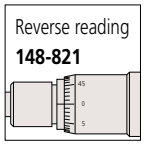
* with spindle lock

DIMENSIONS

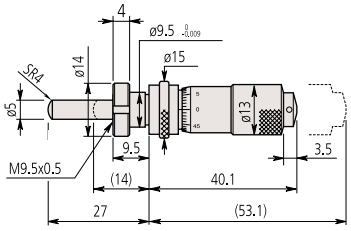
Unit: mm

148-104





148-814



( ): with spindle fully retracted

Technical Data

Graduation: 0.01 mm / .001"
Spindle pitch: 0.5 mm / .025"

SERIES 148 – Adjustable Thimble Small Standard Micrometer Head

- Measuring range 13 mm / .5".
- The thimble can be set to zero at any position by loosening the setscrew.

148-503

148-504

SPECIFICATIONS

Metric

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
148-503	0 - 13 mm	±2 µm	9.5 mm	Plain	Flat	Standard	**£40.80**
148-504*				Locknut			**£47.40**
148-853				Plain	Spherical (SR4)		**£42.80**
148-854*				Locknut			**£49.00**
148-863				Plain	Flat	Reverse reading	**£51.10**
148-864*				Locknut			**£49.90**

Inch

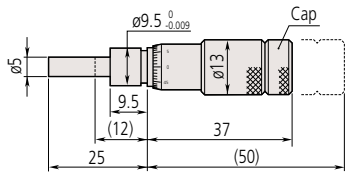
Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
148-501	0 - .5"	±.0001"	.375"	Plain	Flat	Standard	**£40.80**
148-502*				Locknut			**£47.40**
148-851				Plain	Spherical (SR4)		**£42.80**
148-852*				Locknut			**£49.00**
148-861				Plain	Flat	Reverse reading	**£51.10**
148-862*				Locknut			**£49.90**

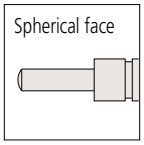
* with spindle lock

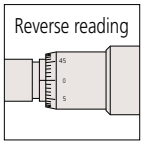
DIMENSIONS

Unit: mm

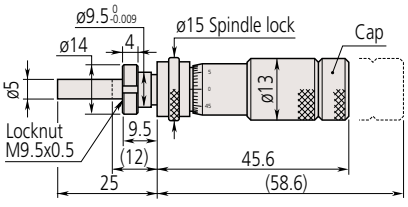
Plain stem type

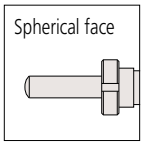


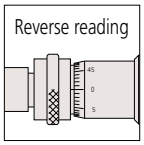




Stem locknut and spindle lock type







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Micrometer Heads

SERIES 148 – Locking Screw Micrometer Head

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

148-220

Technical Data

Graduation:	0.01 mm / .001"
Spindle pitch:	0.5 mm / .025"

Secure spindle

SPECIFICATIONS

Metric

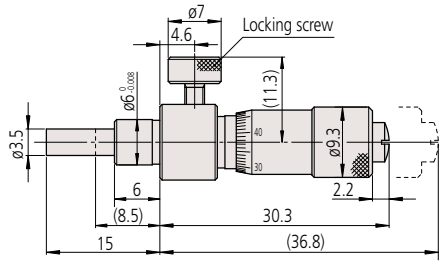
Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Price
148-220	0 - 6.5 mm	±5 µm	6 mm	Plain	Flat	**£39.00**

Inch

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Price
148-230	0 - .25"	±.00025"	.25"	Plain	Flat	**£39.00**

DIMENSIONS

Unit: mm



Technical Data

Graduation: 0.01 mm/.001"
Spindle pitch: 0.5 mm/.025"

SERIES 149 – Carbide Tipped Spindle Small Standard Micrometer Head

- Carbide-tipped spindle provides high abrasion resistance.

149-131

149-801

SPECIFICATIONS

Metric

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Price
149-132	0 - 15 mm	±2 µm	9.5 mm	Plain	Flat	£39.70
149-131				Locknut		£42.80
149-801				Plain	Spherical (SR4)	£40.60
149-802				Locknut		£44.30

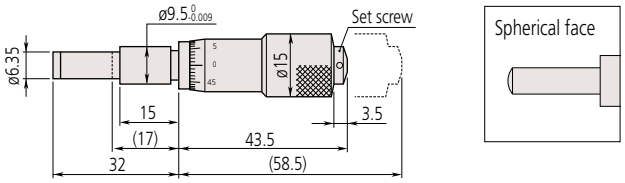
Inch

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Price
149-811	0 - .5"	±.0001"	.375"	Plain	Spherical (SR4)	£40.60
149-812				Locknut		£44.30

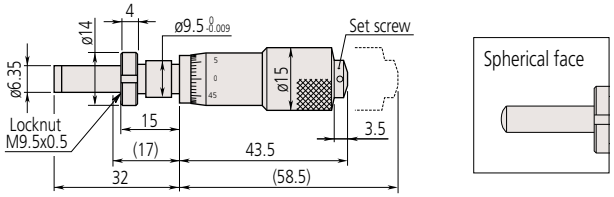
DIMENSIONS

Unit: mm

Plain stem type



Stem locknut type



Mitutoyo

Micrometer Heads

SERIES 150 – Carbide Tipped Spindle Medium Standard Micrometer Head

• Measuring range of 25 mm.

150-801

150-191

Technical Data

Spindle pitch: 0.5 mm / .025"

SPECIFICATIONS

Metric

Code No.	Range	Graduation	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
150-190	0 - 25 mm	0.001 mm	±2 µm	10 mm	Plain	Flat	With vernier	£56.20
150-192		0.01 mm					Standard	£38.30
150-191					Locknut			£38.30
150-801					Plain	Spherical (SR4)		£39.00
150-802					Locknut			£40.60
150-821					Plain	Flat	Reverse graduation	£40.60
150-822					Locknut			£43.70

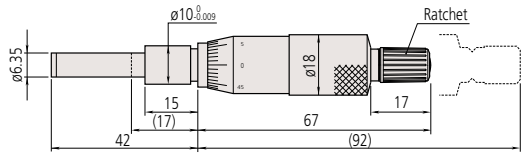
Inch

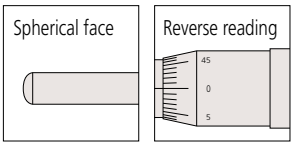
Code No.	Range	Graduation	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
150-206	0 - 1"	.0001"	±.0001"	.375"	Plain	Flat	With vernier	£56.20
150-208		.001"					Standard	£38.30
150-207					Locknut			£38.30
150-811					Plain	Spherical (SR4)		£39.00
150-812					Locknut			£40.60
150-831					Plain	Flat	Reverse graduation	£40.60
150-832					Locknut			£43.70

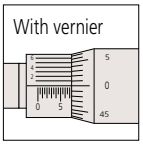
DIMENSIONS

Unit: mm

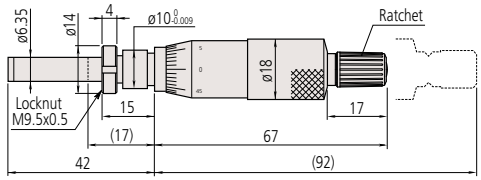
Plain stem type

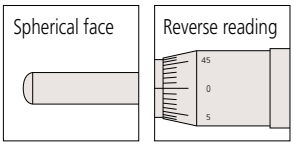






Stem locknut type





Technical Data

Spindle pitch: 0.5 mm / .025"

SERIES 151 – ø8 mm Spindle Medium Standard Micrometer Head

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

151-224

151-223

151-255

SPECIFICATIONS

Metric

Code No.	Range	Graduation	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
151-224	0 - 25 mm	0.01 mm	±2 µm	12 mm	Plain	Flat (carbide tip)	—	£56.20
151-223					Locknut			£56.20
151-222		0.001 mm			Plain		With vernier	£56.20
151-221					Locknut			£57.50
151-256	0 - 50 mm	0.01 mm	±4 µm		Plain		—	£111.00
151-255					Locknut			£111.00

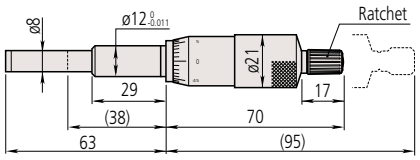
Inch

Code No.	Range	Graduation	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
151-240	0 - 1"	.001"	±.0001"	.5"	Plain	Flat (carbide tip)	—	£56.20
151-239					Locknut			£56.20
151-238		.0001"			Plain		With vernier	£56.20
151-237					Locknut			£57.50
151-272	0 - 2"	.001"	±.0002"		Plain		—	£111.00
151-271					Locknut			£111.00

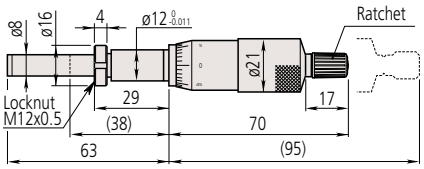
DIMENSIONS

Unit: mm

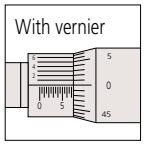
Plain stem type



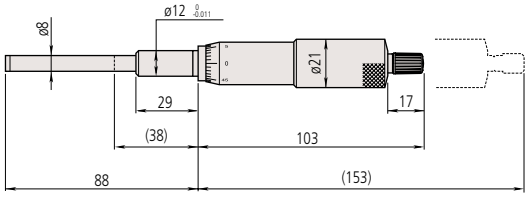
Stem locknut type



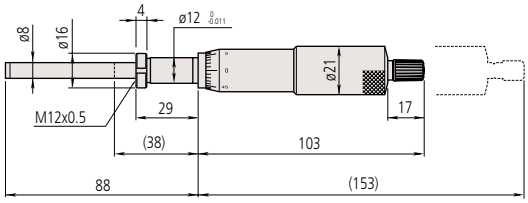
With vernier



Plain stem type (0 - 50 mm range)



Stem locknut type (0 - 50 mm range)



Micrometer Heads

SERIES 152 – Large Diameter Thimble Micrometer Head

- Large-diameter thimble provides high discrimination without the need for a vernier scale on standard-range heads.
- Bidirectional graduations for use in either direction.

152-348

Technical Data

Graduation: 0.002 mm/.0001"
Spindle pitch: 0.5 mm/.025"

SPECIFICATIONS

Metric

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
152-348	0-25 mm	±2 µm	12 mm	Plain	Flat (carbide tip)	Bidirectional	**£267.00**
152-380	0-50 mm	±4 µm					**£337.00**

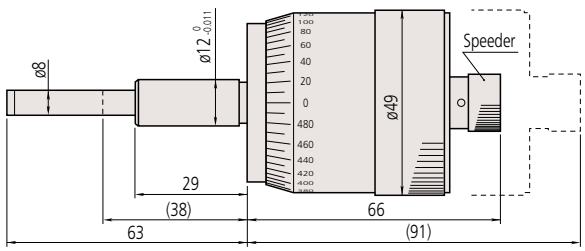
Inch

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
152-372	0-1"	±.0001"	.5"	Locknut	Flat (carbide tip)	Bidirectional	**£267.00**
152-388	0-2"						**£337.00**

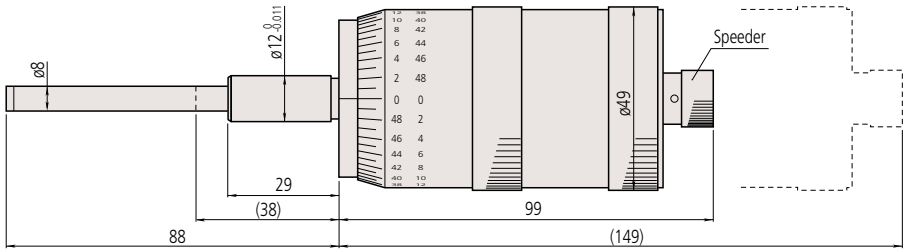
DIMENSIONS

Unit: mm

152-348



152-380



Technical Data

Graduation: 0.005 mm/.0001"
Spindle pitch: 1 mm/.025"

SERIES 152 – XY-Stage Micrometer Head

- Bidirectional graduations for use in either direction, suitable for cross-travel stage translation in X and Y.
- Spindle end: Flat form and hardened, or spherical with carbide tip (more than HRA90), lapped surface.
- Rotating collar on thimble enables zero setting at any position.
- Non-rotating device on spindle reduces workpiece deformation and wear.

152-390

SPECIFICATIONS

Metric

Code No.	Range	Accuracy	Stem dia.	Stem type	Special features	Price
152-390	0 - 25 mm	±2 µm	18 mm	Plain	For X-axis, bidirectional	£154.00
152-389					For Y-axis, bidirectional	£154.00

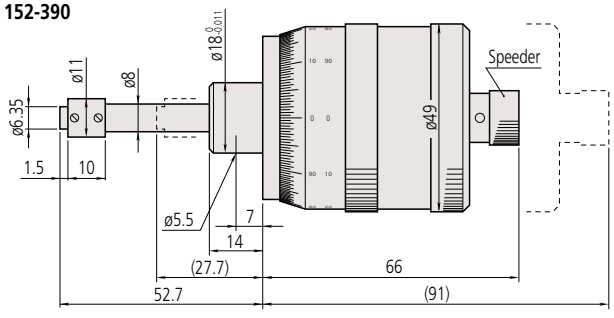
Inch

Code No.	Range	Accuracy	Stem dia.	Stem type	Special features	Price
152-392	0 - 1"	±.0001"	.709"	Plain	For X-axis, bidirectional	£154.00
152-391					For Y-axis, bidirectional	£154.00

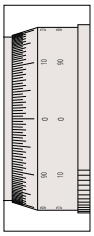
DIMENSIONS

Unit: mm

152-390



152-389



Mitutoyo

Micrometer Heads

SERIES 153 – Non-Rotating Spindle Micrometer Head

• Torsion-free feed reduces workpiece deformation and wear.

B

153-101

153-202

Technical Data

Spindle pitch: 0.5 mm / .025"

SPECIFICATIONS

Metric

Code No.	Range	Graduation	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
153-101	0 - 15 mm	0.01 mm	±3 µm	9.5 mm	Plain	Flat (carbide tip)	—	**£79.20**
153-201*	0 - 25 mm			12 mm				**£86.10**
153-202*		0.001 mm					With vernier	**£86.50**

Inch

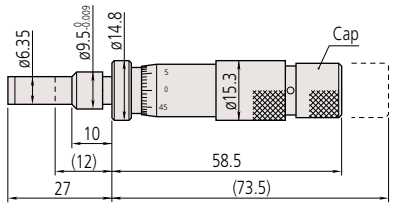
Code No.	Range	Graduation	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
153-205*	0 - 1"	.001"	±.00015"	.5"	Plain	Flat (carbide tip)	—	**£86.10**
153-206*		.0001"					With vernier	**£86.50**

* with ratchet stop

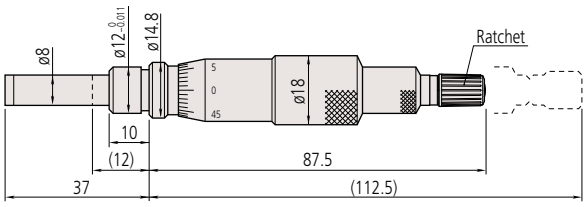
DIMENSIONS

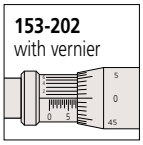
Unit: mm

153-101



153-201





Technical Data

Graduation: 0.0005 mm / .00001"
Spindle pitch: 0.5 mm / .025"

SERIES 153 – Large Diameter Thimble High Accuracy Micrometer Head

- Fine graduation and high accuracy model.
- Non-rotating spindle reduces workpiece deformation and wear.
- Bidirectional graduations for use in either direction.

153-301

B

SPECIFICATIONS

Metric

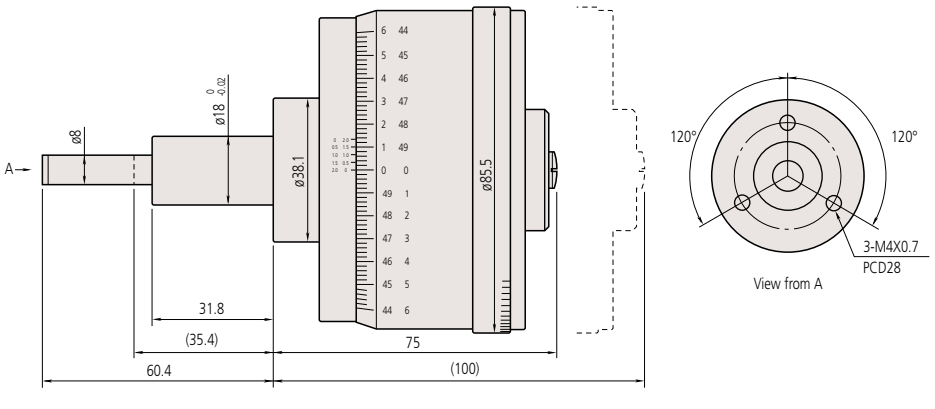
Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
153-301	0 - 25 mm	±1 µm / ±0.5 µm	18 mm	Plain	Flat (carbide tip)	Bidirectional	**£789.00**

Inch

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
153-302	0 - 1"	±.00005" / ±.00003"	.709"	Plain	Flat (carbide tip)	Bidirectional	**£789.00**

DIMENSIONS

Unit: mm



( ): With spindle fully retracted.

Mitutoyo

Micrometer Heads

SERIES 197 – Large Diameter Thimble Non-Rotating Spindle Micrometer Head

- 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).

Technical Data

Graduation: 0.005 mm/.0002"
Spindle pitch: 1 mm/.05"

197-101

SPECIFICATIONS

Metric

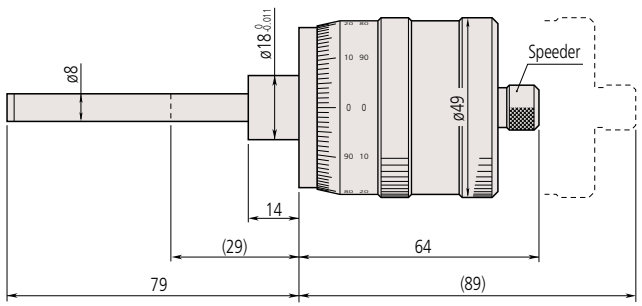
Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
197-101	0 - 50 mm	±5 µm	18 mm	Plain	Flat (carbide tip)	Bidirectional	**£302.00**

Inch

Code No.	Range	Accuracy	Stem dia.	Stem type	Spindle end	Special features	Price
197-201	0 - 2"	±.0001"	.709"	Plain	Flat (carbide tip)	Bidirectional	**£302.00**

DIMENSIONS

Unit: mm



( ): With spindle fully retracted.

Technical Data

Graduation: 0.01 mm

SERIES 7 – Micro Jack

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

7850

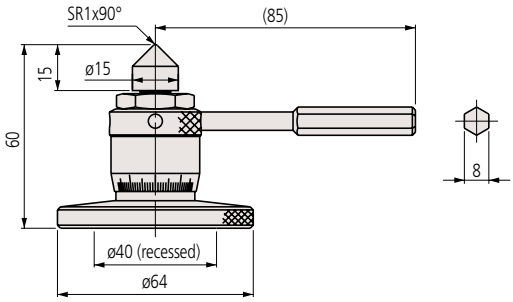
SPECIFICATIONS

Metric

Code No.	Range	Handle force at max. loading	Remarks	Price
7850	60 - 75 mm	90 N	Max. load: 400 kg	**£292.00**

DIMENSIONS

Unit: mm



Quick Guide to Precision Measuring Instruments

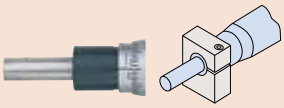
Micrometer Heads

Key Factors in Selection

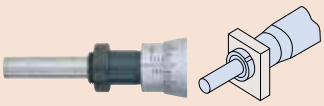
Key factors in selecting a micrometer head are the measuring range, spindle face material and shape, accuracy, stem type, graduation style and thimble diameter.

Stem

Plain stem

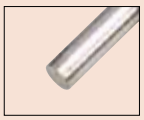


Stem locknut type

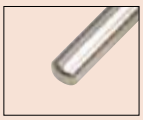


- The stem used to mount a micrometer head is classified as a *plain* or *locknut* type as illustrated above. The stem diameter is manufactured to a nominal Metric or Imperial size with an h6 tolerance.
- The clamp nut stem allows fast and secure clamping of the micrometer head. The plain stem has the 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.

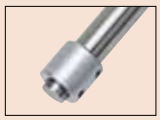
Measuring Face



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 object it contacts provides durability.

Figure A

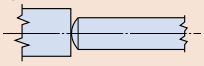


Figure B

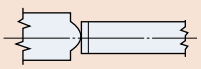
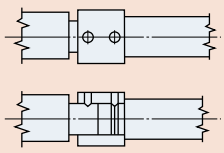


Figure C



Non-Rotating Spindle

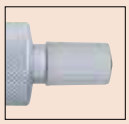
- A non-rotating spindle type head does not exert a twisting action on a workpiece, which may be an important factor in some applications.

Spindle Thread Pitch

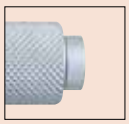
- The standard type head has 0.5 mm pitch.
- 1 mm-pitch type: quicker to set than standard type and avoids the possibility of a 0.5 mm reading error. Excellent load-bearing characteristics due to larger screw thread.
- 0.25 mm or 0.1 mm-pitch type
  This type is the best for fine-feed or fine-positioning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

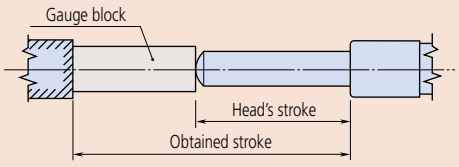
Spindle Lock

- 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 to 50 mm, are available for standard micrometer heads.
- Even if an 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)

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

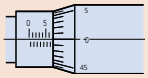
- Dedicated micrometer heads are available for manipulator applications, etc., which require ultra-fine feed or adjustment of spindle.

Thimble Diameter

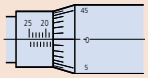
- The diameter of a thimble greatly affects its usability and the *fineness* of positioning. A small-diameter thimble allows quick positioning whereas a large-diameter thimble allows fine positioning and easy reading of the graduations. Some models combine the advantages of both features by mounting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

Graduation Styles

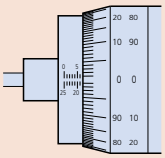
- Care is needed when taking a reading from a mechanical micrometer head, especially if the user is unfamiliar with the model.
- The *normal graduation* style, identical to that of an outside micrometer, is the standard. For this style the reading increases as the spindle retracts into the body.
- On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



Normal graduation style



Reverse graduation style

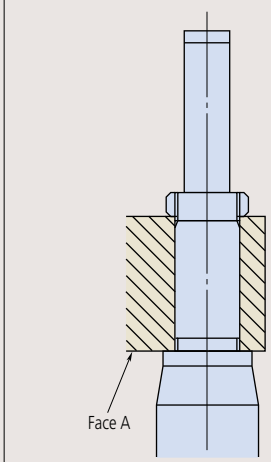
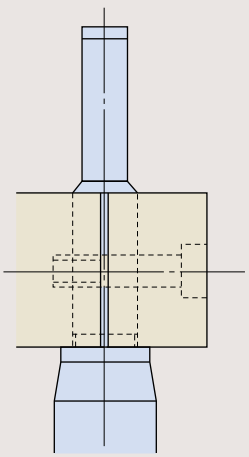
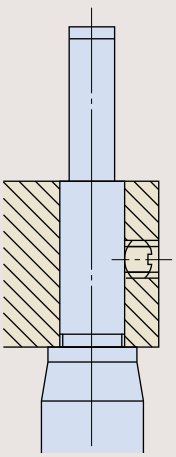


Bidirectional graduation style

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			
	 Face A											
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. 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.

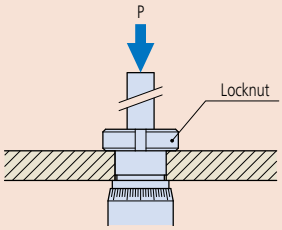
1. Recommended maximum loading limit

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

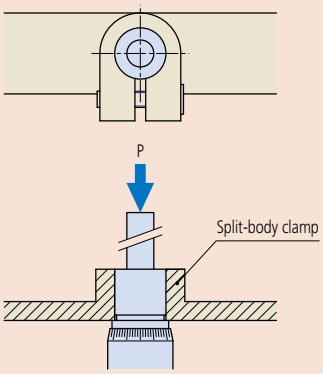
* Up to approx. 2 kgf only for MHT

2. Static load test for micrometer heads (using MHS for this test)

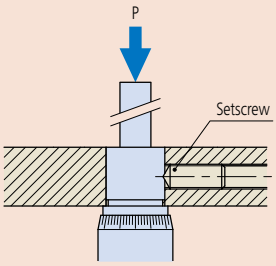
(1) Locknut



(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) Locknut	Damage to the main unit will occur at 8.63 to 9.8kN (880 to 1000 kgf).
(2) Split-body clamp	The main unit will be pushed out of the fixture at 0.69 to 0.98kN (70 to 100 kgf).
(3) Setscrew clamp	Damage to the setscrew will occur at 0.69 to 1.08kN (70 to 110 kgf).

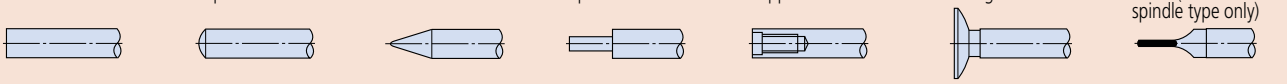
* These load values should only be used as an approximate guide.

Custom-Built Products (examples)

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)

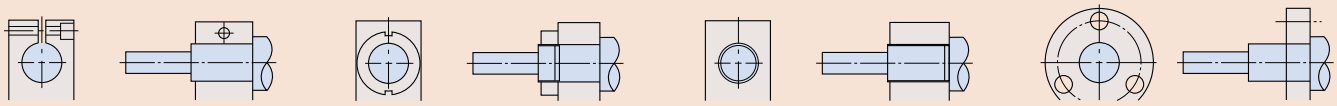


● Long spindle type is also available. Please consult Mitutoyo.

2. Stem types

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

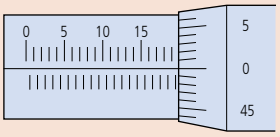
● Plain ● Locknut ● Threaded ● Flanged



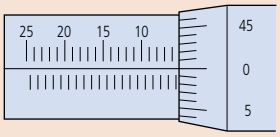
3. Scale graduation schemes

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.

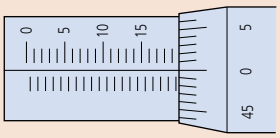
● Standard



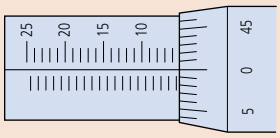
● Reverse



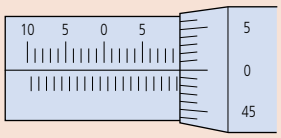
● Vertical



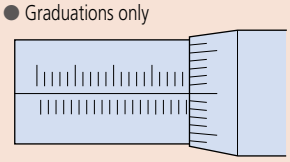
● Reverse vertical



● Offset zero



● Graduations only

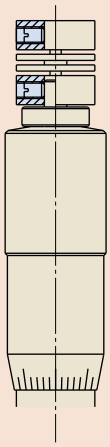


4. Logo engraving

A specific logo can be engraved as required.

5. Motor coupling

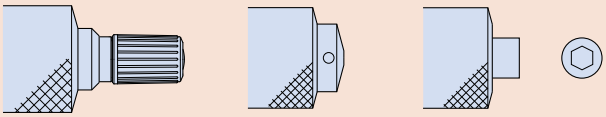
Couplings for providing motor drive to a head can be designed.



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 1 mm for fast-feed applications or 0.25 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.