Micrometer Heads

CATALOG No. E1006

A common measuring, feeding, and positioning device to be mounted on measuring instruments and precise machines

Mitutoyo

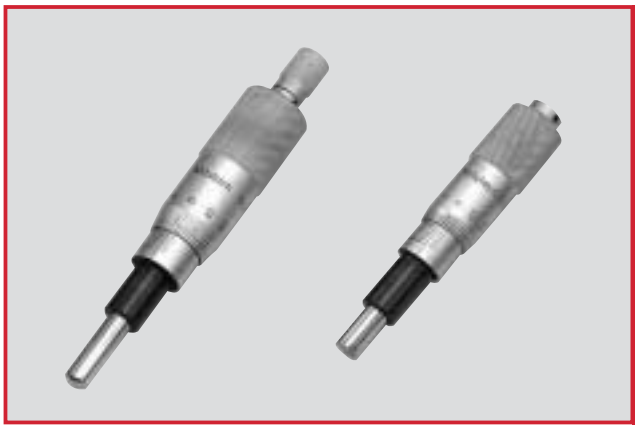
MICROMETER HEAD

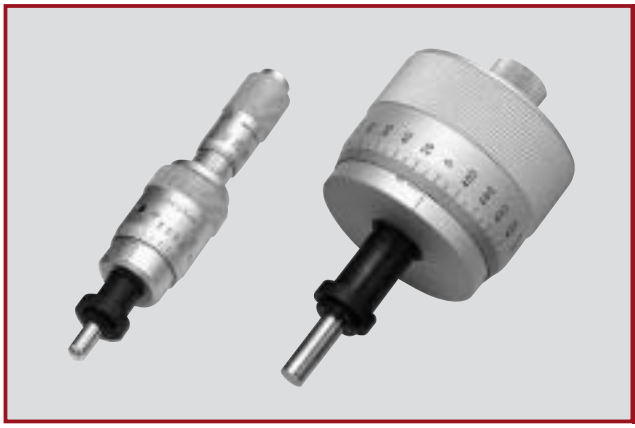
Mitutoyo was established in 1934 as a pioneer in the manufacture of micrometer in Japan. With over 70 years of dedication in the precision measurement of reliable and high-quality products Mitutoyo is now the name recognized worldwide.
The micrometer head production started from the initial commencement of the company and the factories specialized in its production were built in 1977 and 1979. The micrometer head become a common measuring, feeding and positioning device to be mounted on a measuring instrument and precise machine.
According to the recent technology development, the micrometer head becomes widely utilized in the precise feeding device, cross-travel stage of laser instrument and manipulator, not to mention measurement of jigs. In parallel with the application expansion, the customer's need is varied. To meet these customer's demands Mitutoyo provides the standard micrometer heads with different measuring range, stem type and body size. Furthermore, high-performance types of Digimatic Micrometer Head, 0.25mm spindle pitch model (standard 0.5mm), etc. are available for the new applications.
Mitutoyo also provides customization service for the customer special application. The micrometer head with customized spindle tip and precision lead screw produced with customer specifications can be offered even from 1 pc. onwards

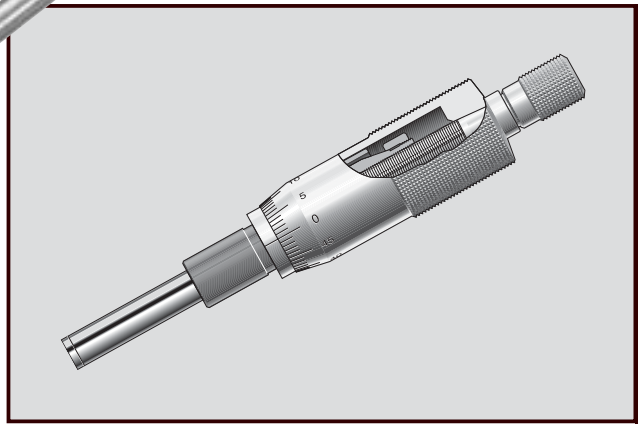
Shiwa Plant

Onomi Plant

Mitutoyo micrometer head is manufactured in the two main factories in Japan, Onomi Plant established in 1977 and Shiwa Plant established in 1979. With state-of-the-art production in technology and equipment, Mitutoyo micrometer head is renowned in the world for its finest quality.







Contents

Index (Series No.)

Series 148

Ultra-small size

Range: 5mm/.2"
Graduation: 0.02mm/.001"
Accuracy: ±0.005mm
Spindle face: SKS3(material)
More than HRC60
Lapped surface
Scale surface: Hard-Chrome plating

Unit: mm

ø6mm thimble and 4g weight, ultra-small size micrometer head for limited space applications.

Order No. (metric)

		Spherical face	Rev. reading
Plain stem	—	148-215	—
With clamp nut	—	148-216	—

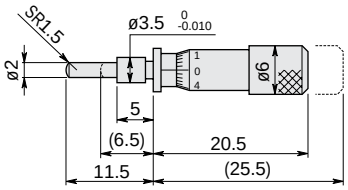
Order No. (inch)

		Spherical face	Rev. reading
Plain stem	—	148-217	—
With clamp nut	—	148-218	—

Plain stem

Spherical face

148-215, 148-217



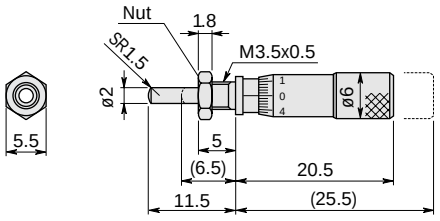
Mass (g): 4

Stem with clamp nut

Fixture thickness: 3mm

Spherical face

148-216, 148-218



Mass (g): 4

Series 148

Small size

Range: 6.5mm/.25"
Graduation: 0.01mm/.001"
Accuracy: ±0.005mm
Spindle face: SKS3(material)
More than HRC60
Lapped surface
Scale surface: Hard-Chrome plating

Unit: mm

37mm length small size micrometer head. It does not require large installation space.

Order No. (metric)

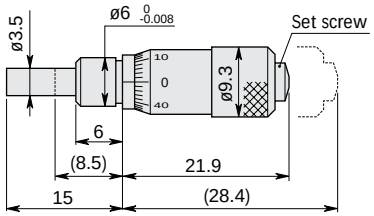
		Spherical face	Rev. reading
Plain stem	148-201	148-205	148-209
With clamp nut	148-203	148-207	148-211

Order No. (inch)

		Spherical face	Rev. reading
Plain stem	148-202	148-206	148-210
With clamp nut	148-204	148-208	148-212

Plain stem

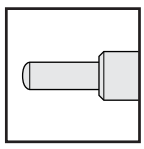
148-201, 148-202



Mass (g): 10

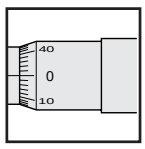
Spherical face

148-205, 148-206



Reverse reading

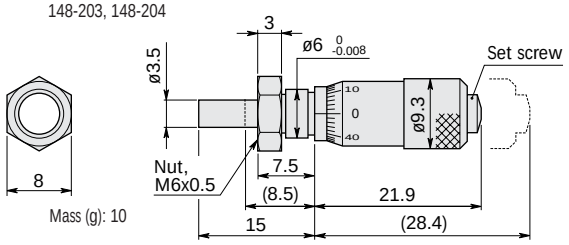
148-209, 148-210



Stem with clamp nut

Fixture thickness: 4mm

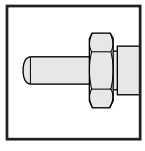
148-203, 148-204



Mass (g): 10

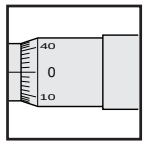
Spherical face

148-207, 148-208



Reverse reading

148-211, 148-212



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

Series 148

Standard

Range: 6.5mm/.25"
13mm/.5"
Graduation: 0.01mm/.001"
Accuracy: ±0.002mm
Spindle face: SKS3(material)
More than HRC60
Lapped surface
Scale surface: Hard-Chrome plating

Unit: mm

Short body design maintaining measuring range for limited space applications. Three choices of thimble diameter.

Order No. (metric)

	6.5mm range			13mm range		
	ø15mm thimble	ø20mm thimble	ø29mm thimble	ø15mm thimble	ø20mm thimble	ø29mm thimble
Plain stem	148-301	148-303	148-305	148-307	148-309	148-311
With clamp nut	148-302	148-304	148-306	148-308	148-310	148-312

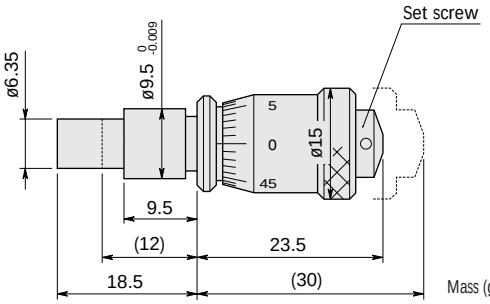
Order No. (inch)

	.25" range			.5" range		
	ø.59" thimble	ø.79" thimble	ø1.14" thimble	ø.59" thimble	ø.79" thimble	ø1.14" thimble
Plain stem	148-351	148-353	148-355	148-357	148-359	148-361
With clamp nut	148-352	148-354	148-356	148-358	148-360	148-362

Plain stem

Thimble diameter: 15mm
Range: 6.5mm

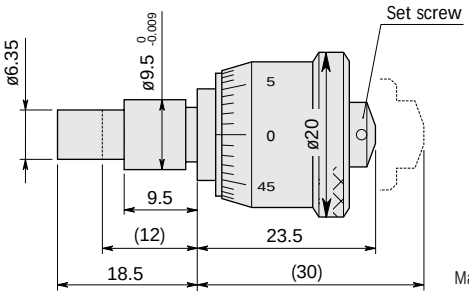
148-301, 148-351



Mass (g): 30

Thimble diameter: 20mm
Range: 6.5mm

148-303, 148-353



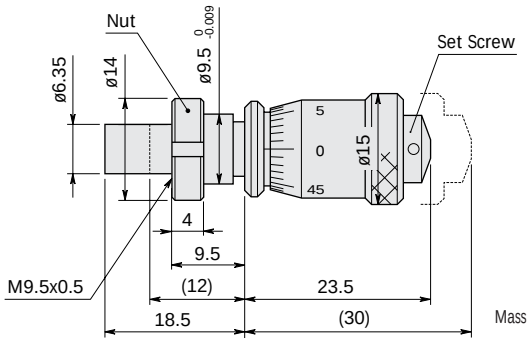
Mass (g): 45

Stem with clamp nut

Fixture thickness: 6mm

Thimble diameter: 15mm
Range: 6.5mm

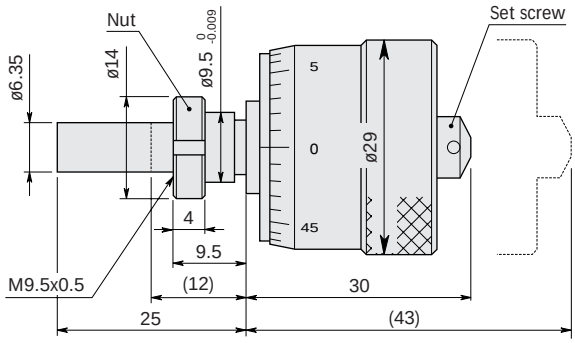
148-302, 148-352



Mass (g): 35

Thimble diameter: 29mm
Range: 6.5mm

148-312, 148-362



Mass (g): 103

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

Series 148

Standard

Range: 13mm/.5"
Graduation: 0.01mm/.001"
Accuracy: ±0.002mm
Spindle face: SKS3(material)
More than HRC60
Lapped surface
Scale surface: Hard-Chrome plating

Unit: mm

Common type in small size micrometer head with 13mm measuring range.

Order No. (metric)

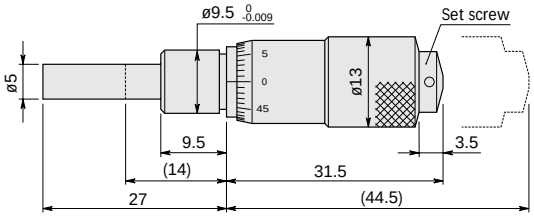
		Spherical face	Rev. reading
Plain stem	148-104	148-801	148-821
With clamp nut	148-103	148-802	148-822
With spindle lock	148-121	148-803	148-823
With c. nut, s. lock	148-120	148-804	148-824

Order No. (inch)

		Spherical face	Rev. reading
Plain stem	148-112	148-811	148-831
With clamp nut	148-111	148-812	148-832
With spindle lock	148-123	148-813	148-833
With c. nut, s. lock	148-122	148-814	148-834

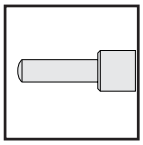
Plain stem

148-104, 148-112

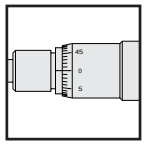


Mass (g): 30

Spherical face
148-801, 148-811



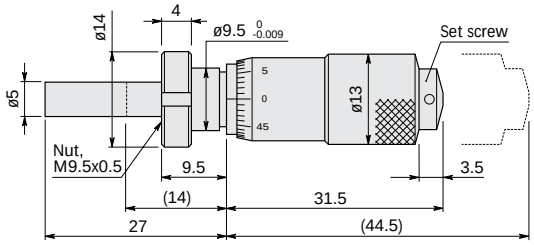
Reverse reading
148-821, 148-831



Stem with clamp nut

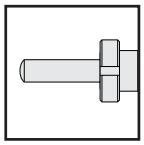
Fixture thickness: 6mm

148-103, 148-111

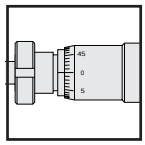


Mass (g): 30

Spherical face
148-802, 148-812

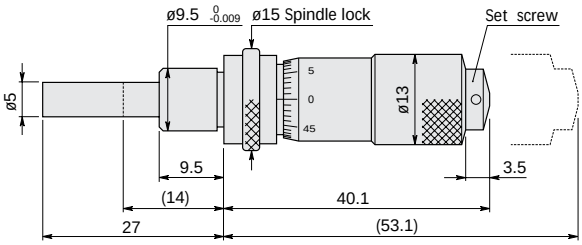


Reverse reading
148-822, 148-832



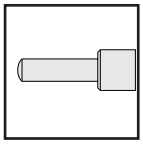
Plain stem and spindle lock

148-121, 148-123

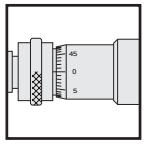


Mass (g): 30

Spherical face
148-803, 148-813



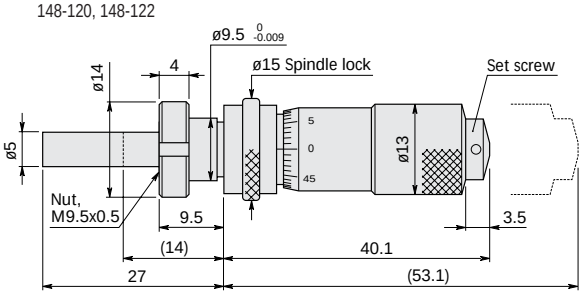
Reverse reading
148-823, 148-833



Stem with clamp nut and spindle lock

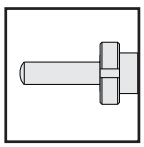
Fixture thickness: 6mm

148-120, 148-122

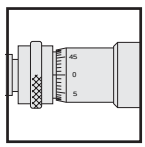


Mass (g): 45

Spherical face
148-804, 148-814



Reverse reading
148-824, 148-834



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

Series 148

Standard

Range: 13mm/.5"
Graduation: 0.01mm/.001"
Accuracy: ±0.002mm
Spindle face: SKS3(material)
More than HRC60
Lapped surface
Scale surface: Hard-Chrome plating

Small size micrometer head with 13mm measuring range. All-stainless steel model is available.

Unit: mm

Order No. (metric)

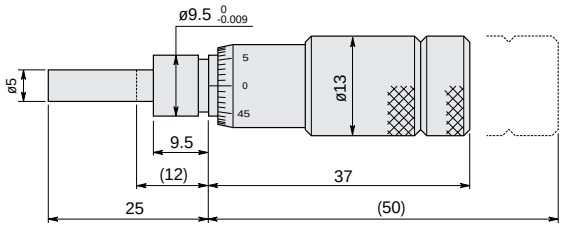
		Spherical face	Rev. reading	Stainless steel
Plain stem	148-503	148-853	148-863	148-513
With clamp nut	148-508	Call Mitutoyo	Call Mitutoyo	Call Mitutoyo
With spindle lock	148-506	Call Mitutoyo	Call Mitutoyo	–
With c. nut, s. lock	148-504	148-854	148-864	–

Order No. (inch)

		Spherical face	Rev. reading	Stainless steel
Plain stem	148-501	148-851	148-861	148-511
With clamp nut	148-507	Call Mitutoyo	Call Mitutoyo	Call Mitutoyo
With spindle lock	148-505	Call Mitutoyo	Call Mitutoyo	–
With c. nut, s. lock	148-502	148-852	148-862	–

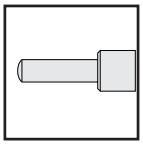
Plain stem

148-503, 148-513(stainless), 148-511(stainless)

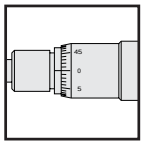


Mass (g): 35

Spherical face
148-853, 148-851



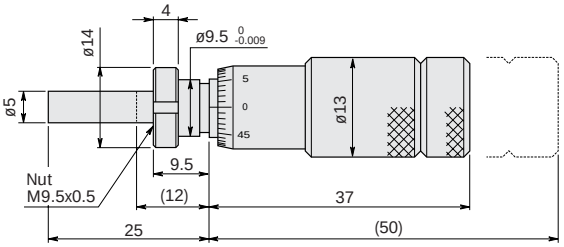
Reverse reading
148-863, 148-861



Stem with clamp nut

Fixture thickness: 6mm

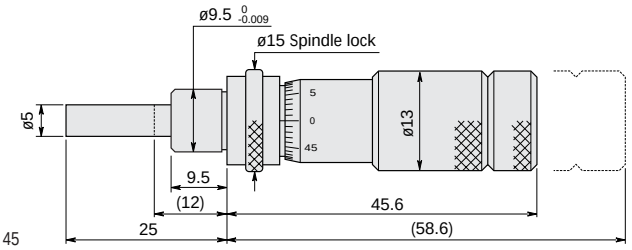
148-508



Mass (g): 40

Plain stem and spindle lock

148-506, 148-505

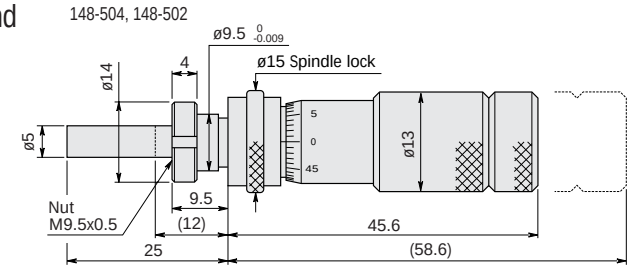


Mass (g): 45

Stem with clamp nut and spindle lock

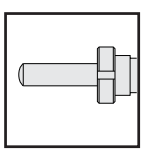
Fixture thickness: 6mm

148-504, 148-502

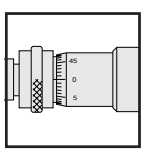


Mass (g): 50

Spherical face
148-854, 148-852



Reverse reading
148-864, 148-862



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

Series 149

Standard

Range: 15mm/.59"
Graduation: 0.01mm/.001"
Accuracy: ±0.002mm
Spindle face: SKS3(material)
More than HRC60
Lapped surface
Scale surface: Hard-Chrome plating

Small size micrometer head with 15mm measuring range.
Employing carbide tip spindle.

Unit: mm

Order No. (metric)

		Spherical face	Rev. reading
Plain stem	149-132	149-801	149-821
With clamp nut	149-131	149-802	149-822
With spindle lock	149-183	Call Mitutoyo	Call Mitutoyo
With c. nut, s. lock	149-184	Call Mitutoyo	Call Mitutoyo

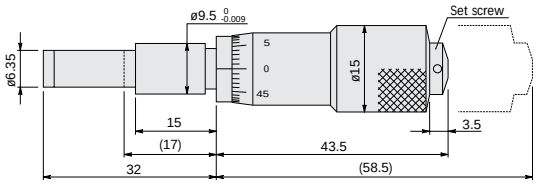
Order No. (inch)

		Spherical face	Rev. reading
Plain stem	149-148	149-811	149-831
With clamp nut	149-147	149-812	149-832
With spindle lock	149-185*	Call Mitutoyo	Call Mitutoyo
With c. nut, s. lock	149-182	Call Mitutoyo	Call Mitutoyo

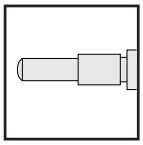
*With rachet model (**149-181**) is available.

Plain stem

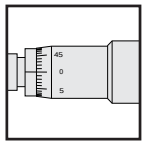
149-132, 149-148



Spherical face
149-801, 149-811



Reverse reading
149-821, 149-831

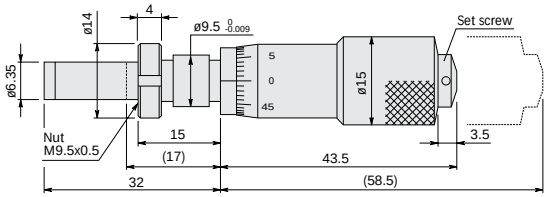


Mass (g): 55

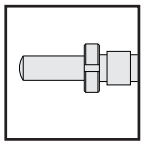
Stem with clamp nut

Fixture thickness: 11.5mm

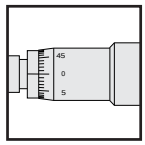
149-131, 149-147



Spherical face
149-802, 149-812



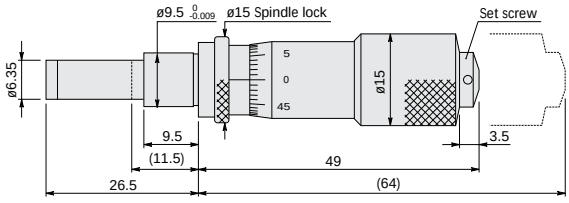
Reverse reading
149-822, 149-832



Mass (g): 60

Plain stem and spindle lock

149-183, 149-185

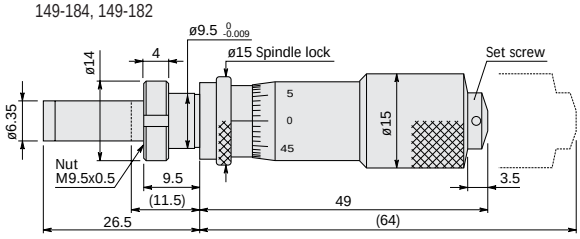


Mass (g): 55

Stem with clamp nut and spindle lock

Fixture thickness: 6mm

149-184, 149-182



Mass (g): 60

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

Series 150

Standard

Range: 25mm/ 1"
Graduation: 0.01mm/.001"
0.001mm/.0001" (vernier)
Accuracy: ±0.002mm
Spindle face: Carbide tip/SKS3*
More than HRC90/60*
Lapped surface
Scale surface: Hard-Chrome plating

*Long spindle model
Unit: mm

The most commom micrometer head with 25mm measuring range.

Order No. (metric)

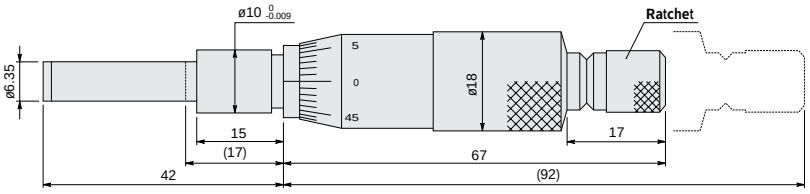
		Spherical face	Rev. reading	With vernier	Without ratchet	Long spindle
Plain stem	150-192	150-801	150-821	150-190	150-196	150-219
With clamp nut	150-191	150-802	150-822	150-189	150-195	150-220
With spindle lock	150-209	Call Mitutoyo	Call Mitutoyo	Call Mitutoyo	150-211	Call Mitutoyo
With c. nut, s. lock	150-210	Call Mitutoyo	Call Mitutoyo	Call Mitutoyo	150-212	Call Mitutoyo

Order No. (inch)

		Spherical face	Rev. reading	With vernier	Without ratchet	Long spindle
Plain stem	150-208	150-811	150-831	150-206	–	150-221
With clamp nut	150-207	150-812	150-832	150-205	–	150-222
With spindle lock	150-213	Call Mitutoyo	Call Mitutoyo	150-215	150-217	Call Mitutoyo
With c. nut, s. lock	150-214	Call Mitutoyo	Call Mitutoyo	150-216	150-218	Call Mitutoyo

Plain stem

150-192, 150-208

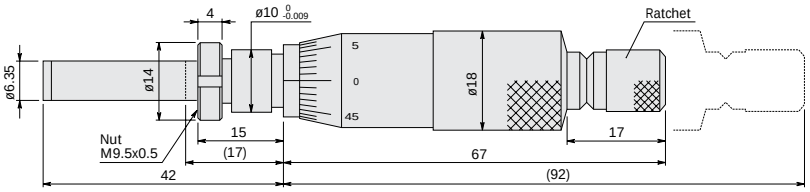


Mass (g): 95

Stem with clamp nut

Fixture thickness: 11.5mm

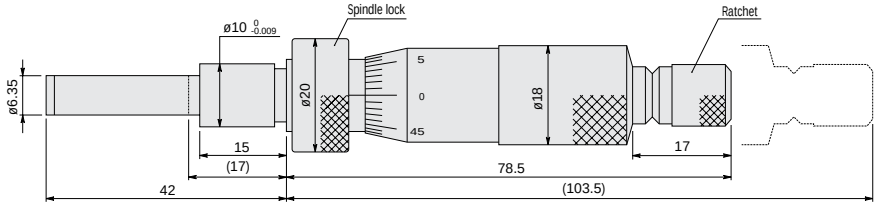
150-191, 150-207



Mass (g): 100

Plain stem and spindle lock

150-209, 150-213

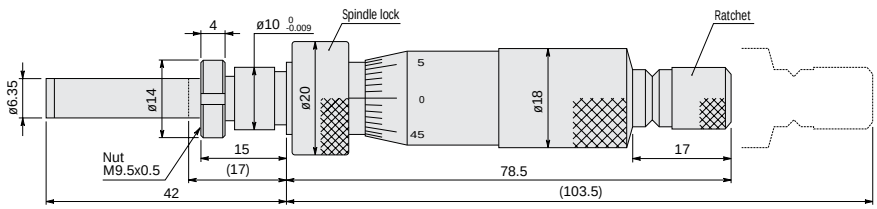


Mass (g): 110

Stem with clamp nut and spindle lock

Fixture thickness: 11.5mm

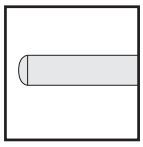
150-210, 150-214



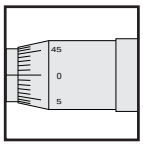
Mass (g): 115

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

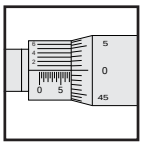
Spherical face
150-801, 150-811



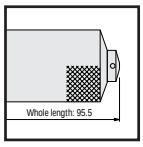
Reverse reading
150-821, 150-831



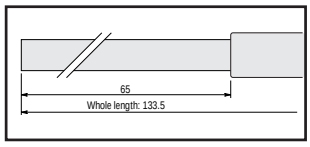
With vernier
150-190, 150-206



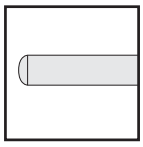
Without ratchet
150-196



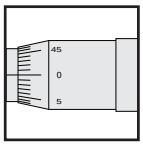
Long spindle (without ratchet)
150-219, 150-221



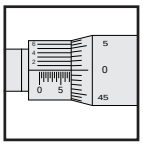
Spherical face
150-802, 150-812



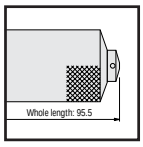
Reverse reading
150-822, 150-832



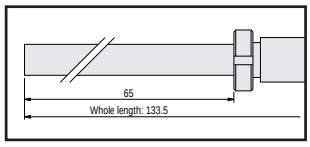
With vernier
150-189, 150-205



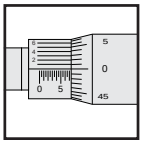
Without ratchet
150-195



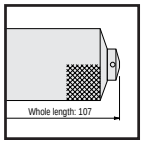
Long spindle (without ratchet)
150-220, 150-222



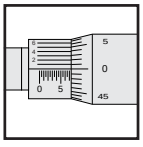
With vernier
150-215



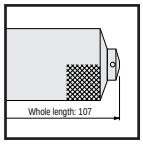
Without ratchet
150-211, 150-217



With vernier
150-216



Without ratchet
150-212, 150-218



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

Series 151

Standard

Range: 25mm/1", 50mm/2"
Graduation: 0.01mm/.001"
0.001mm/.0001"(vernier)
Accuracy: ±0.002mm
Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating

Unit: mm

The most Heavy-duty model(ø8mm spindle) in the standard micrometer heads for high-load application.

Order No. (metric)

	25mm range			50mm range	
		With vernier	Without ratchet		Without ratchet
Plain stem	151-224	151-222	Call Mitutoyo	151-256	151-260
With clamp nut	151-223	151-221	Call Mitutoyo	151-255	151-259
With spindle lock	Call Mitutoyo	Call Mitutoyo	151-225	–	–
With c. nut, s. lock	Call Mitutoyo	Call Mitutoyo	151-226	–	–

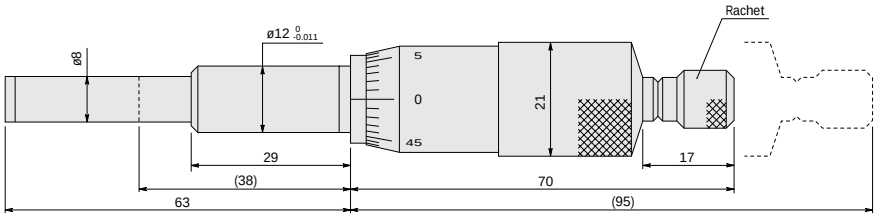
Order No. (inch)

	1"range			2"range	
		With vernier	Without ratchet		Without ratchet
Plain stem	151-240	151-238	Call Mitutoyo	151-272	–
With clamp nut	151-239	151-237	Call Mitutoyo	–	151-271
With spindle lock	Call Mitutoyo	151-243*	151-241	–	–
With c. nut, s. lock	Call Mitutoyo	151-244*	151-242	–	–

*Without ratchet

Plain stem

151-224, 151-240

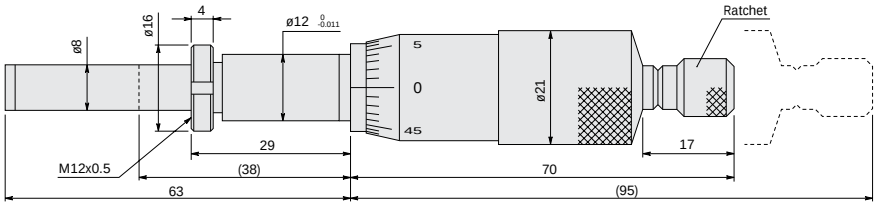


Mass (g): 150

Stem with clamp nut

Fixture thickness: 25.5mm

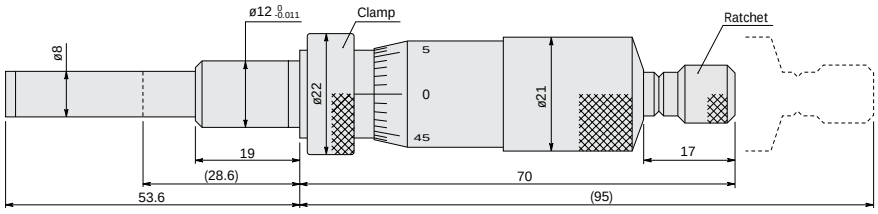
151-223, 151-239



Mass (g): 155

Plain stem and spindle lock

151-225, 151-241

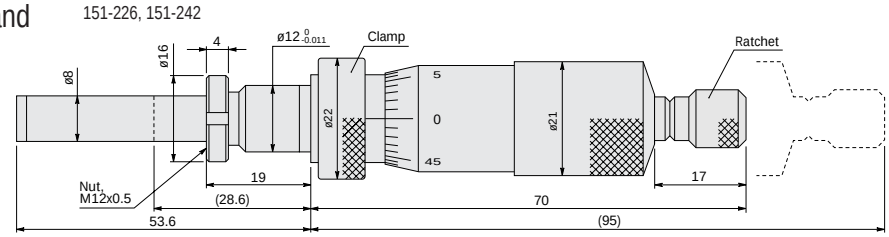


Mass (g): 160

Stem with clamp nut and spindle lock

Fixture thickness: 15.5mm

151-226, 151-242

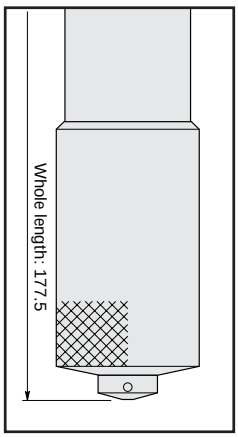


Mass (g): 165

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

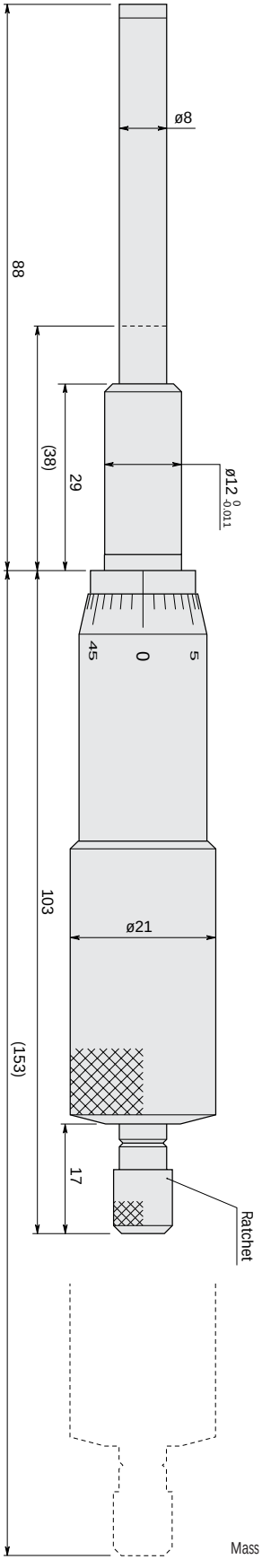
Wihtout ratchet

151-260



Plain stem

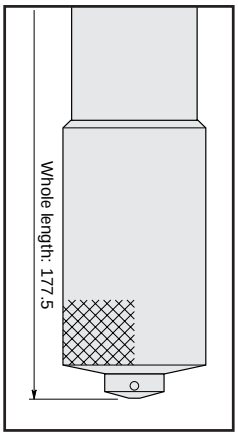
151-256, 151-272



Mass (g): 225

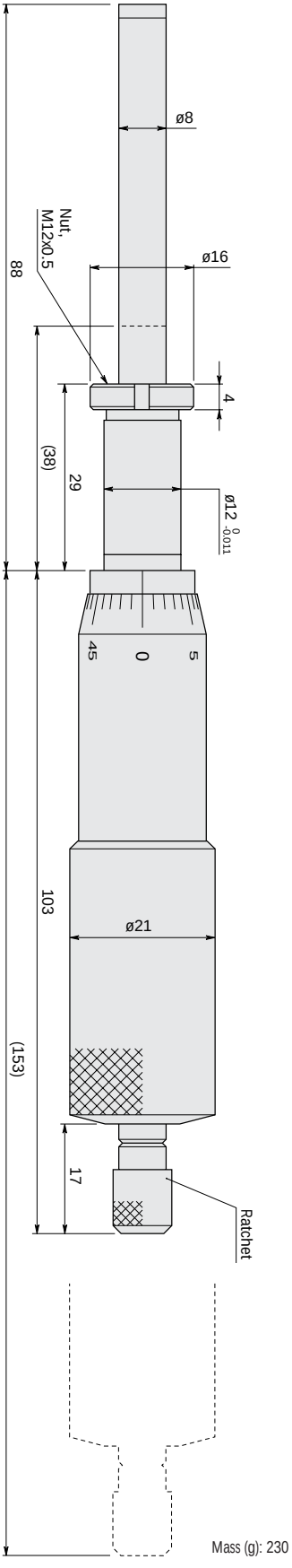
Wihtout ratchet

151-259, 151-271



Stem with clamp nut

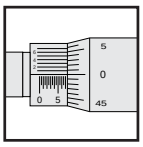
151-255



Mass (g): 230

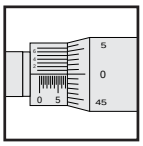
With vernier

151-222, 151-238



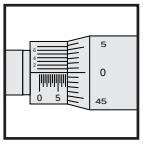
With vernier

151-221, 151-237



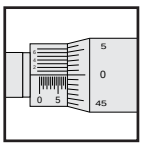
With vernier

151-243



With vernier

151-244



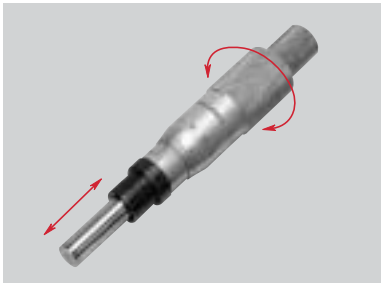
( ): When retracting the spindle until its stroke end.

Series 153

Non-rotating spindle

Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating

Non-rotating spindle model.

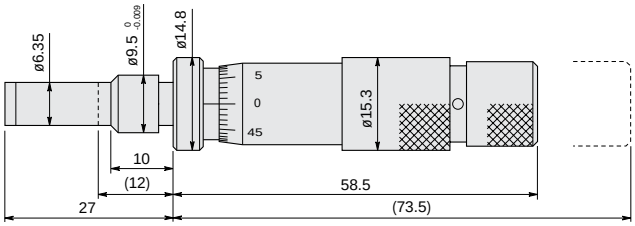


The spindle is fed straight without rotation. This avoids workpiece rotation for torsion-free feeding and reduces workpiece deformation and wear.

Unit: mm

Without Ratchet

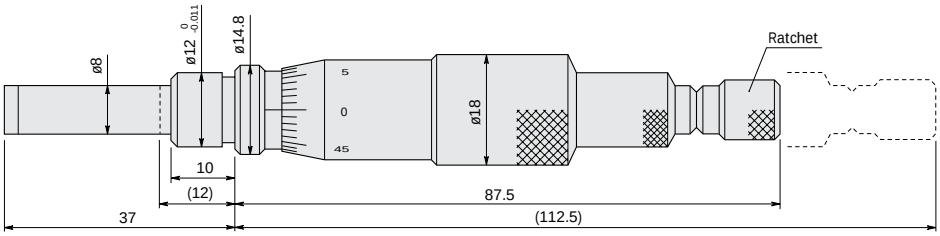
153-101



Mass (g): 70

With ratchet

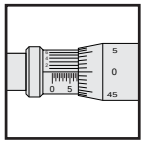
153-201, 153-205



Mass (g): 125

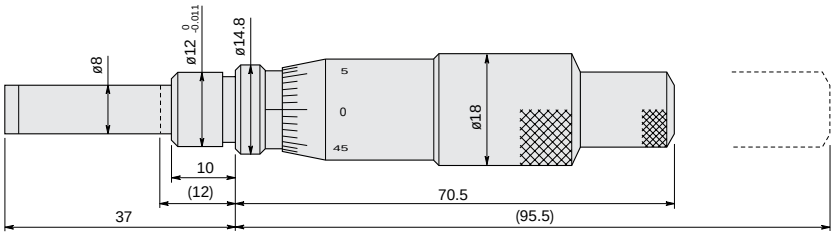
With vernier

153-202, 153-206



Without Ratchet

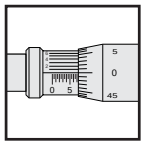
151-203, 153-207



Mass (g): 125

With vernier

153-204, 153-208



Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
153-101	15mm	0.01mm	153-108*	.5"	.0001"	Plain	Flat (with carbide tip)	±0.003mm	*With vernier
153-201	25mm	0.01mm	153-205	1"	.001"	Plain	Flat (with carbide tip)	±0.003mm	
153-202	25mm	0.001mm	153-206	1"	.0001"	Plain	Flat (with carbide tip)	±0.003mm	With vernier
153-203	25mm	0.01mm	153-207	1"	.001"	Plain	Flat (with carbide tip)	±0.003mm	Without ratchet
153-204	25mm	0.001mm	153-208	1"	.0001"	Plain	Flat (with carbide tip)	±0.003mm	Without ratchet, with vernier

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

Series 152

1mm(.025”) pitch

Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating

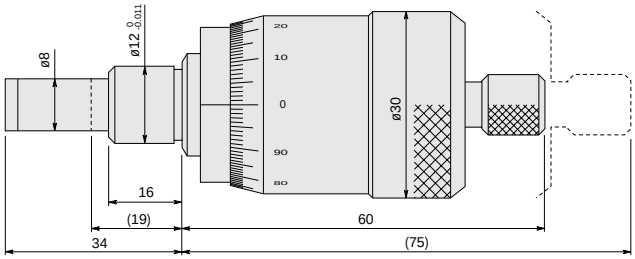
1mm pitch micrometer head.

1mm/rotation (standard: 0.5mm/rotation) spindle allows quick feeding and postitioning. This eliminates misreading of 0.5mm graduation on the sleeve.

Unit: mm

Plain stem

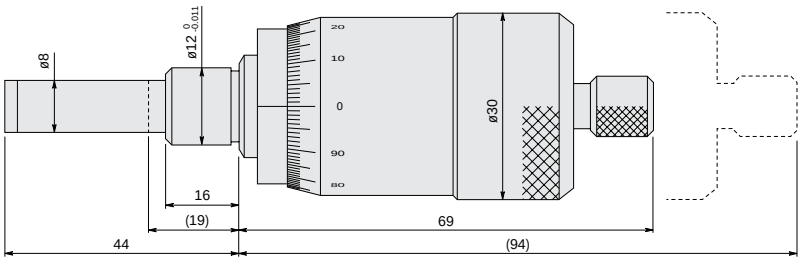
152-101, 152-110



Mass (g): 220

Plain stem

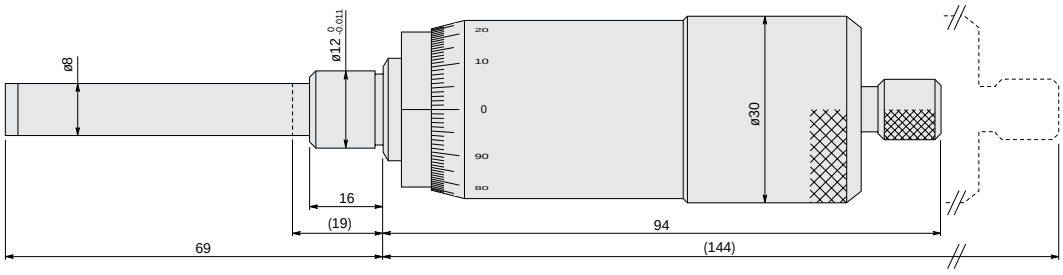
152-102, 152-111



Mass (g): 230

Plain stem

152-103, 152-112



Mass (g): 350

Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
152-101	15mm	0.01mm	152-110	.5”	.001”	Plain	Flat (with carbide tip)	±0.002mm	
152-102	25mm	0.01mm	152-111	1”	.001”	Plain	Flat (with carbide tip)	±0.002mm	
152-103	30mm	0.01mm	152-112	2”	.001”	Plain	Flat (with carbide tip)	±0.004mm	

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

Series 148

0.25mm pitch

Spindle face: SKS3
More than HRC60
Lapped surface
Scale surface: Hard-Chrome plating
Fixture thickness: 6mm

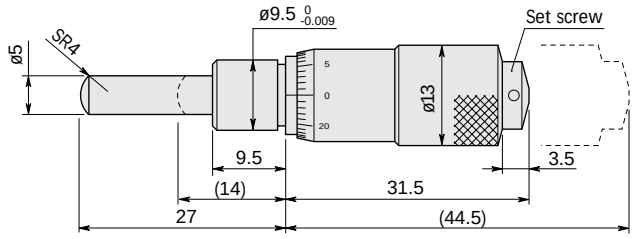
0.25mm pitch micrometer head.

0.25mm/rotation (standard: 0.5mm/rotation) spindle allows fine feeding and precise positioning.

Unit: mm

Plain stem

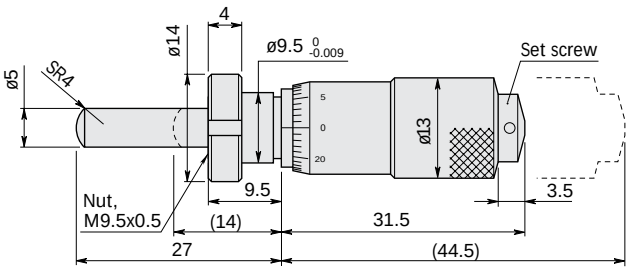
148-132



Mass (g): 30

Stem with clamp nut

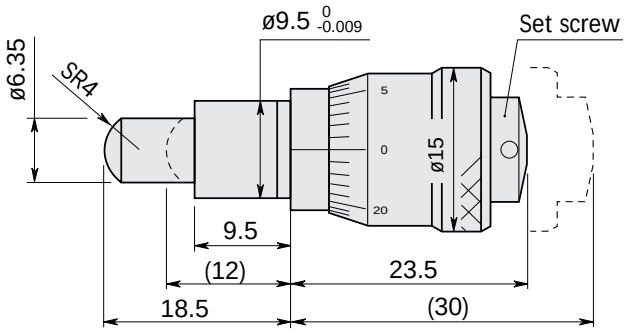
148-133



Mass (g): 35

Plain stem

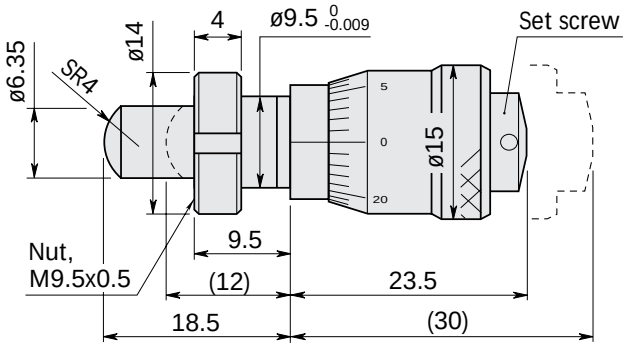
148-322



Mass (g): 30

Stem with clamp nut

148-323



Mass (g): 35

Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
148-132	13mm	0.01mm	–	–	–	Plain	Spindle (SR4)	±0.002mm	
148-133	13mm	0.01mm	–	–	–	With clamp nut	Spindle (SR4)	±0.002mm	
148-322	6.5mm	0.01mm	–	–	–	Plain	Spindle (SR4)	±0.002mm	
148-323	6.5mm	0.01mm	–	–	–	With clamp nut	Spindle (SR4)	±0.002mm	

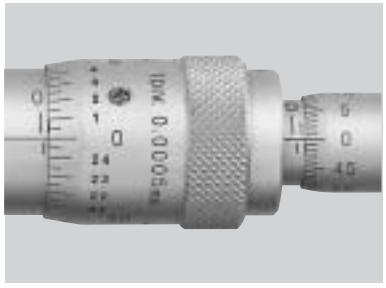
( ): When retracting the spindle until its stroke end.

Series 110

Fine feed

Spindle face: Carbide tip/SK$3*
More than HRC90/60*
Lapped surface
Scale surface: Hard-Chrome plating
Fixture thickness: 6mm/11.5mm*
*110-502, 110-504

Ultra-fine feed micrometer head.

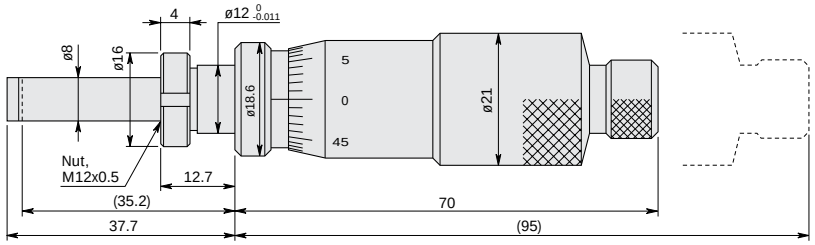


The differential movement of spindle threads and nuts allows ultra-fine feeding (1/20 resolution of standard type.)

Unit: mm

Stem with clamp nut

110-101, 110-111
With vernier: 110-102, 110-112

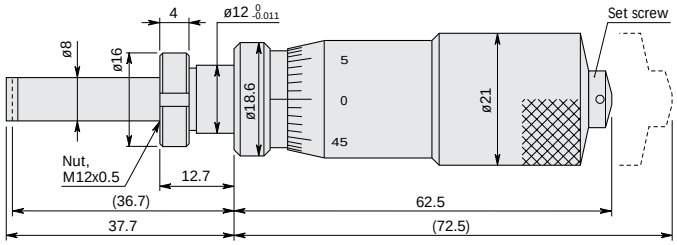


Mass (g): 150

- The differential movement mechanism with double-spindle achieves ultra-fine feeding of 0.05mm/rotation.
- Non-rotating spindle.

Stem with clamp nut

110-105, 110-115
With vernier: 110-106, 110-116



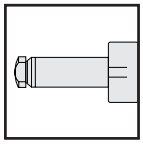
Mass (g): 150

Spherical face:

110-107, 110-117

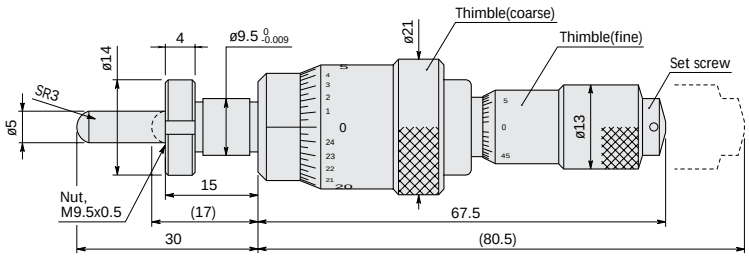
Spherical face, With vernier:

110-108, 110-118



Stem with clamp nut

110-502, 110-504



Mass (g): 95

- The dual-thimble mechanism allows independent operations of fine and coarse feeding.
- Fine feeding (0.025mm/rotation), coarse feeding (0.5mm/rotation).

Order No.

Metric			Inch			Stem	Spindle face	Accuracy
Order No.	Range	Graduation	Order No.	Range	Graduation			
110-101	2.5mm	0.001mm	110-111	.05”	.00005”	With clamp nut	Flat	Wide/Narrow range: ±0.005/0.0015mm
110-102	2.5mm	0.0001mm	110-112	.05”	.000005”	With clamp nut	Flat	Wide/Narrow range: ±0.005/0.0015mm
110-105	1mm	0.001mm	110-115	.02”	.00005”	With clamp nut	Flat	Wide/Narrow range: ±0.005/0.0015mm
110-106	1mm	0.0001mm	110-116	.02”	.000005”	With clamp nut	Flat	Wide/Narrow range: ±0.005/0.0015mm
110-107	1mm	0.001mm	110-117	.02”	.00005”	With clamp nut	Spherical (SR8)	Wide/Narrow range: ±0.005/0.0015mm
110-108	1mm	0.0001mm	110-118	.02”	.000005”	With clamp nut	Spherical (SR8)	Wide/Narrow range: ±0.005/0.0015mm
110-502*	13mm (0.2mm)	0.01mm (0.0005mm)	110-504*	.5” (.006”)	.001” (.00002”)	With clamp nut	Spherical	Wide range: ±0.003mm (Wide/Narrow range: ±0.003/0.0015mm)

*Fine feeding

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

Series 152

Large thimble

Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating
Fixture thickness: 22.5mm

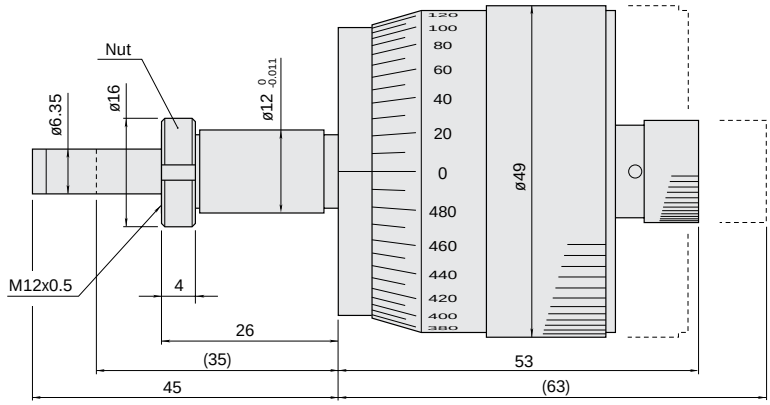
Micrometer head with large thimble.

The large thimble employment allows high resolution (1/5 of standard type) and very light of rotation. The spindle pitch is 0.5mm.

Unit: mm

Stem with clamp nut

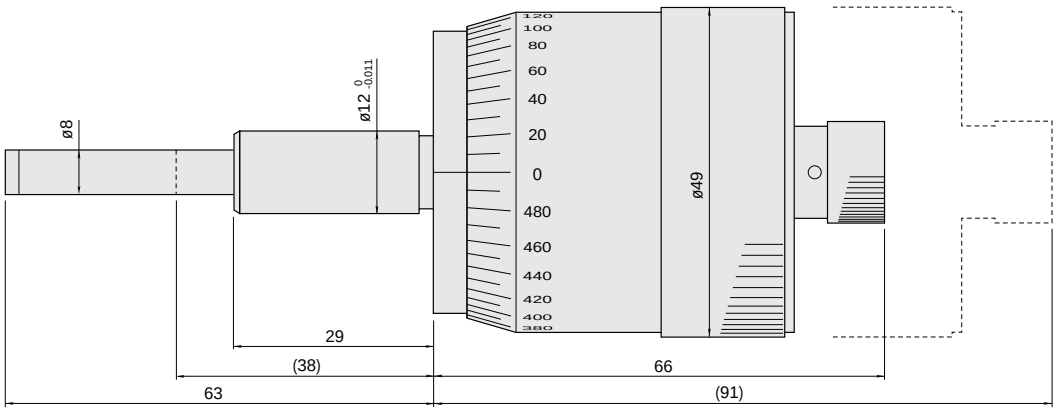
152-283



Mass (g): 190

Plain stem

152-332
Bidirectional graduation: 152-348, 152-372



Mass (g): 310

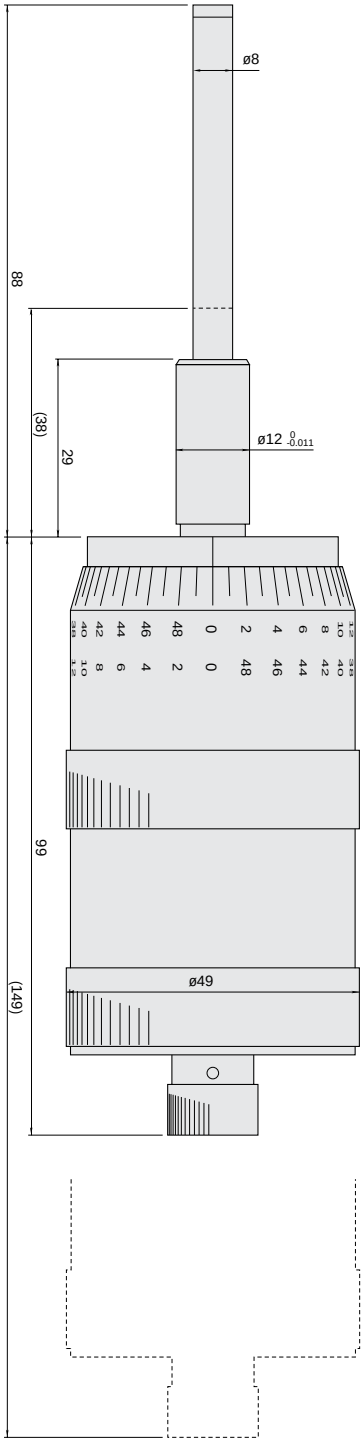
Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
152-283	10mm	0.002mm	–	–	–	With clamp nut	Flat (with carbide tip)	±0.002mm	
152-332	25mm	0.002mm	–	–	–	Plain	Flat (with carbide tip)	±0.002mm	
152-348	25mm	0.002mm	152-372	1”	.0001”	Plain	Flat (with carbide tip)	±0.002mm	Bidirectional graduation
152-380	50mm	0.002mm	152-388	2”	.0001”	Plain	Flat (with carbide tip)	±0.004mm	Bidirectional graduation

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

Plain stem

Bidirectional graduation: 152-380, 152-338



Mass (g): 460

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

Series 152

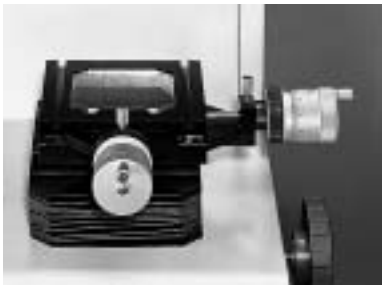
Large thimble 1mm (.025") pitch For XY stage

Spindle face: Carbide tip/SKS3*
More than HRC90/60*
Lapped surface
Scale surface: Hard-Chrome plating
Fixture thickness: 22.5mm

*152-389, 152-390, 152-391, 152-392

Unit: mm

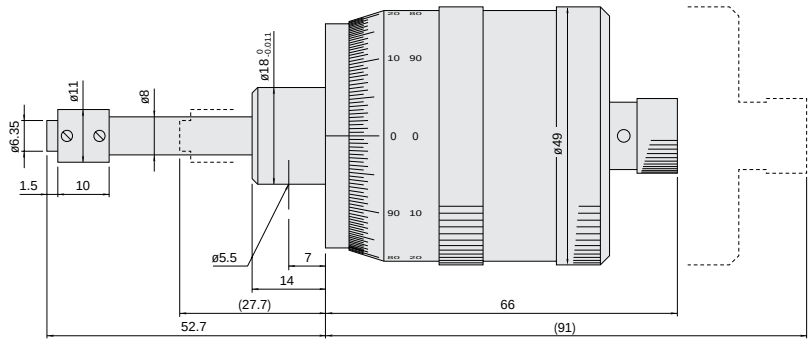
Micrometer head specially designed for cross-travel stage.



1mm spindle pitch allows quick feeding and positioning. Large thimble provides clear reading of thimble graduation and increases measurement efficiency. The thimble figures of Y-axis model are marked in the same direction of spindle feeding for easy reading.

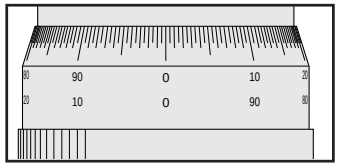
Plain stem

152-390, 152-392



Mass (g): 270

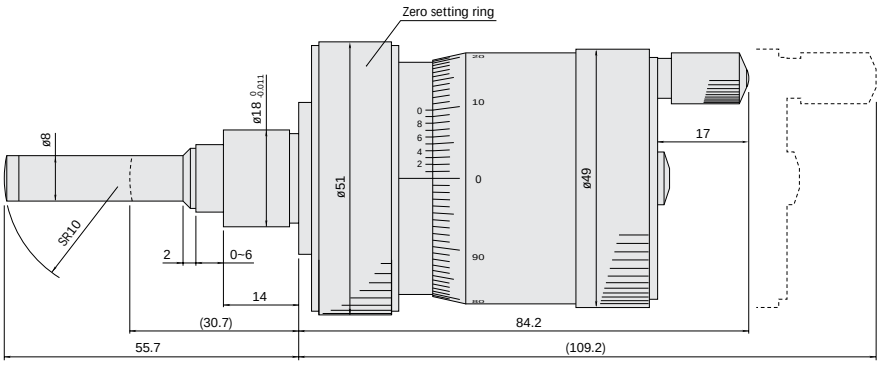
152-389, 152-391



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

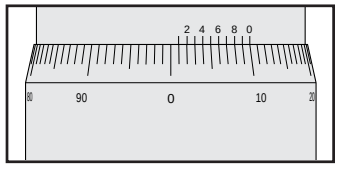
Plain stem

152-402



Mass (g): 460

152-401



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

Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
152-390	25mm	0.005mm	152-392	1"	.0001"	Plain	Flat (non-rotating device)	±0.002mm	Bidirectional graduation, For X-axis
152-389	25mm	0.005mm	152-391	1"	.0001"	Plain	Flat (non-rotating device)	±0.002mm	Bidirectional graduation, For Y-axis
152-402*	25mm	0.001mm	152-404	1"	.0001"	Plain	Spherical (SR20 carbide tip)	±0.002mm	*With vernier, For X-axis
152-401*	25mm	0.001mm	152-403	1"	.0001"	Plain	Spherical (SR20 carbide tip)	±0.002mm	*With vernier, For Y-axis

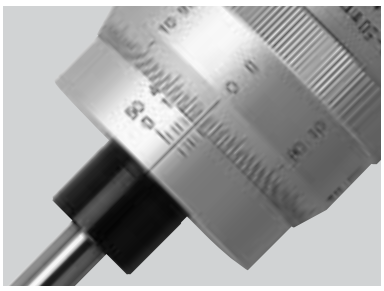
( ): When retracting the spindle until its stroke end.

Series 197

Large thimble 1mm (.025") pitch Non-rotating spindle

Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating
Fixture thickness: 22.5mm

Non-rotating spindle micrometer head with large thimble.

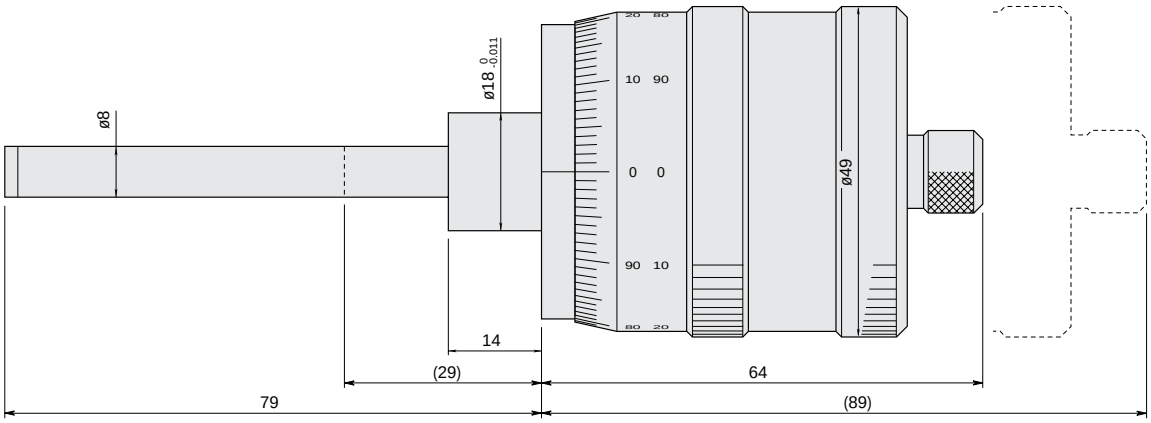


1mm spindle pitch allows quick feeding and positioning. Large thimble provides clear reading of thimble graduation and increases measurement efficiency. Non-rotating spindle avoids workpiece rotation for torsion-free feeding and reduces workpiece deformation and wear.

Unit: mm

Plain stem

197-101, 197-201



Mass (g): 300

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

Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
197-101	50mm	0.005mm	197-201	2"	.0002"	Plain	Flat (carbide tip)	±0.005mm	Bidirectional graduation

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

Series 153

High-accuracy

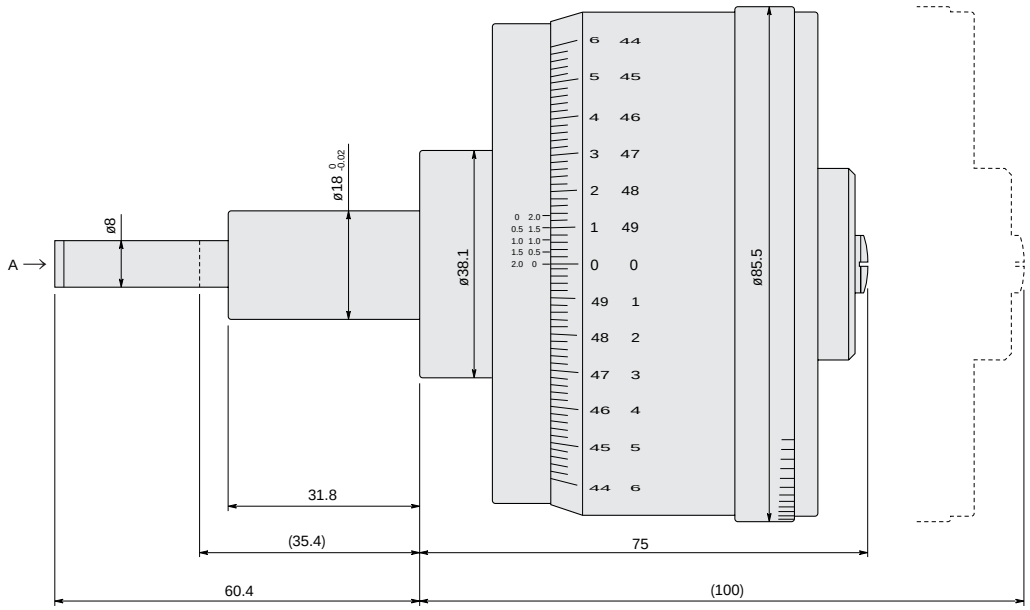
Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating

High-resolution, high-accuracy micrometer head.

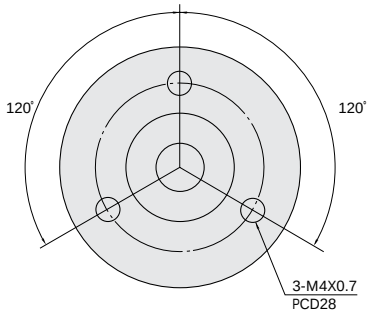
Unit: mm

Plain stem

Bidirectional graduation 153-301, 153-302



Mass (g): 750



View from A

Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
153-301	25mm	0.0005mm	153-302	1"	.00001"	Plain	Flat (carbide tip)	±0.001mm/ ±0.0005mm	Bidirectional graduation, With vernier

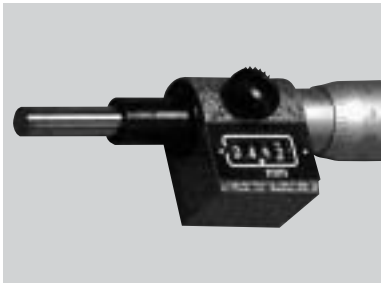
( ): When retracting the spindle until its stroke end.

Series 250

Digit counter

Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating
Fixture thickness: 11.5mm

Micrometer head with digit counter

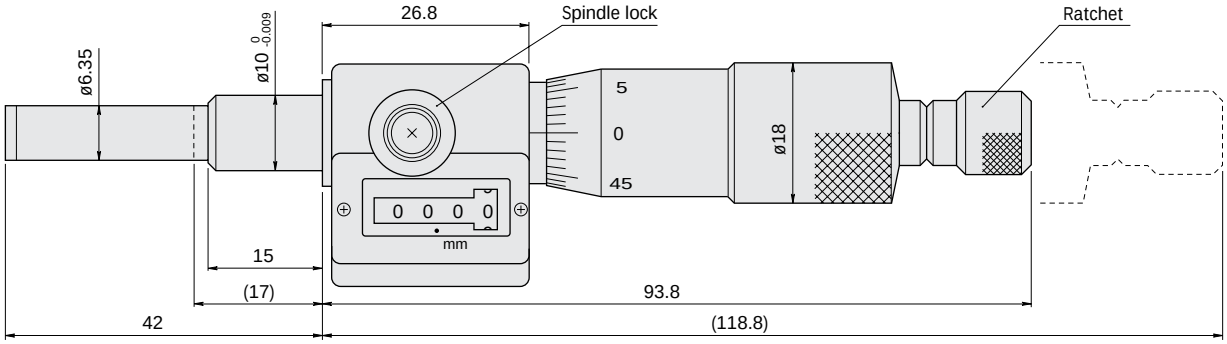


The digit counter gives 0.01mm reading of spindle movement. This eliminates operator's misreading. The spindle pitch is 0.5mm.

Unit: mm

Plain stem

250-301, 250-312



Mass (g): 165

Order No.

Metric			Inch			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
250-301	25mm	0.01mm	250-312*	1"	.0001"	Plain	Flat (carbide tip)	±0.002mm	*With vernier

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

Series 350

Digimatic micrometer head

Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: Hard-Chrome plating
Fixture thickness: 11.5mm

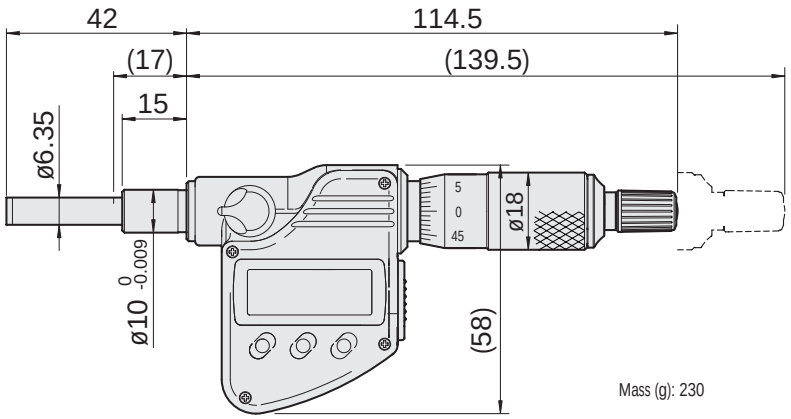
Digimatic micrometer head enhanced by use of LCD digital readout

Mitutoyo's lineup of Digimatic micrometer heads, that anyone can read without fail with a minimum digital reading of 0.001mm, offers a waterproof type of protection level IP65.

Unit: mm

Plain stem

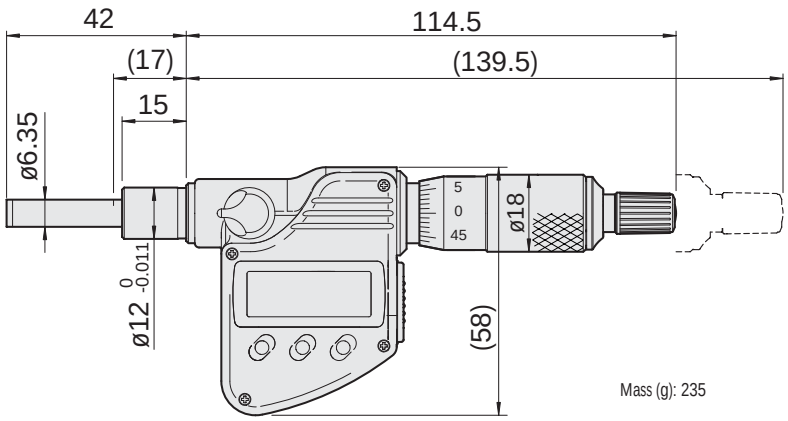
350-251, 350-351



Mass (g): 230

Plain stem

350-271, 350-381



Mass (g): 235

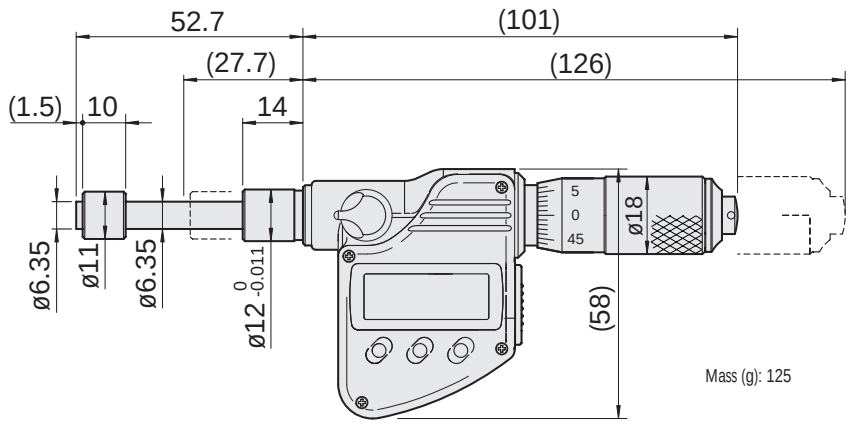
Order No.

Metric			Inch			Stem	Spindle face	Accuracy
Order No.	Range	Resolution	Order No.	Range	Resolution			
350-251	25mm	0.001mm	350-351	1”	.00005”	Plain	Flat (carbide tip)	±0.002mm/ ±.0001”
350-252	25mm	0.001mm	350-352	1”	.00005”	With clamp nut	Flat (carbide tip)	±0.002mm/ ±.0001”
350-253	25mm	0.001mm	350-353	1”	.00005”	Plain	Spherical (SR4)	±0.002mm/ ±.0001”
350-254	25mm	0.001mm	350-354	1”	.00005”	With clamp nut	Spherical (SR4)	±0.002mm/ ±.0001”
350-271	25mm	0.001mm	350-381	1”	.00005”	Plain	Flat (carbide tip)	±0.002mm/ ±.0001”
350-272	25mm	0.001mm	350-382	1”	.00005”	With clamp nut	Flat (carbide tip)	±0.002mm/ ±.0001”
350-273	25mm	0.001mm	350-383	1”	.00005”	Plain	Spherical (SR4)	±0.002mm/ ±.0001”
350-274	25mm	0.001mm	350-384	1”	.00005”	With clamp nut	Spherical (SR4)	±0.002mm/ ±.0001”
350-261	25mm	0.001mm	350-361	1”	.00005”	Plain	Flat (non-rotating device)	±0.002mm/ ±.0001”

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

Stem with clamp nut

350-261, 350-361



Mass (g): 125

Functions

- Origin Setup function (ABS measuring system)
  Stores the minimum value in the measuring range as the origin. An origin value can be set up according to each size of micrometer heads.
- Zero-set function (INC measuring system)
  Can clear (zero-set) a display value at any position, allowing comparison measurement with ease. Even after zero-setting an absolute value from the origin (ABS measuring system) can be restored.
- Hold function
  Can hold a display value. Resetting this function restores the most recent zero-set position or measured value from the origin. The function is convenient to perform measurement at a position where a display value is hard to read.
- Measurement Data Output function
  Allows the configuration of a statistical process control system or an instrumentation system with the measurement data output terminal. In this case the optional connecting cable is separately necessary. Optional connecting cable for coolant proof type: 05CZA662 (1m/40") or 05CZA663 (2m/80"), for standard type: 937387 (1m/40") or 965013 (2m/80")
- Auto-power ON/OFF function
  Turns off the LCD if the micrometer head is not in use for about 20 minutes. The origin (preset value) in the ABS measuring system still remains in memory and the display is recovered by rotating the spindle again.
- Error Alarm function
  Displays an error message on the LCD and stops the measuring function if an overflow or calculation error occurs. No measurement can be continued while the error message is displayed. The function also lights the B mark to indicate that the battery is used up when its voltage becomes low before disabling measurement.

Specifications

- IP65 protection level:

Category	Level	Definition
Protection against human contact and foreign matters	6: Hermetically sealed from dust and dirt	Protects the head from incoming of dust and dirt and absolutely protects it from human contact.
Protection against water	5: Splash-proof type	There should be no harmful effect even if the head is subject to direct water splash *1 from any direction.

*1: Description of direct water splash
Water with a pressure of 30kPa and a flow rate of 12.5 L/min is splashed onto the external surface of 1 m^2 for a total of 3 minutes or more using a nozzle of I.D. 6.3mm.

- Power supply: SR44 (1 pc.)
- Battery life: Approximately 8 months in normal use
- Quantizing error: ±1 count

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

Digimatic data processor

Mitutoyo Digimatic data processors are able to collect data from Digimatic micrometer head and print out statistical information, control charts and histograms using built-in printer.

DP-1VR

Series 164

Digimatic micrometer head

Spindle face: Carbide tip
More than HRC90
Lapped surface
Body material: Plastic (Black)

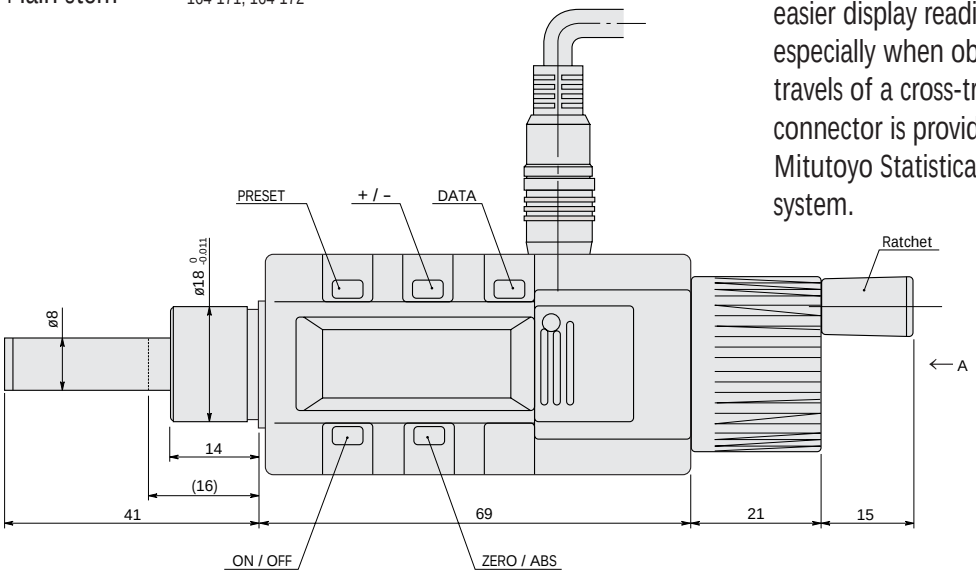
Digimatic micrometer with LCD display for digital readout

- 25mm/1" type with non-rotating spindle
  Thanks to the compact body design, this Digimatic micrometer head is able to be installed into small size microscopes and precision instruments. One data output connector is provided to be linked to the Mitutoyo Statistical Process Control (M-SPC) system.
- 50mm/2" type with non-rotating spindle
  The LCD panel can be rotated within 330° for easier display reading. This is very convenient especially when obtaining X- and Y-axis linear travels of a cross-travel stage. One data output connector is provided to be linked to the Mitutoyo Statistical Process Control (M-SPC) system.

Unit: mm

Plain stem

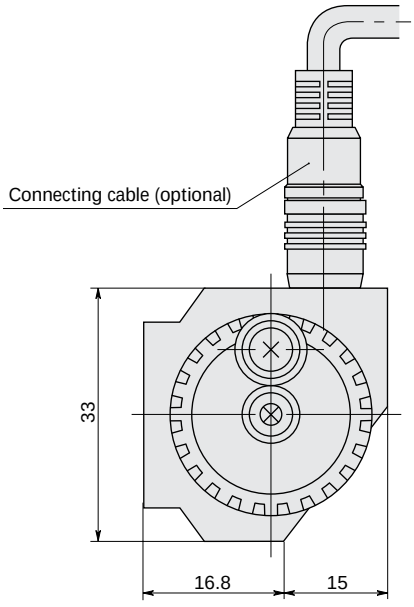
164-171, 164-172



Mass (g): 750

Functions

- PRESET button (origin point setting)
  Any value from +999.999 to -999.999 can be set as an origin point in ABS mode.
- ZERO/ABS button
  The measurement mode is changed from ABS to INC mode and the display indication is set to zero by clicking on the button.
  The measurement mode is changed from INC to ABS mode and the display indication is restored to the current spindle position in ABS mode by holding down the button.
- +/- button
  The counting direction can be changed.
- Data output function
  One data output connector is provided to be linked to the Mitutoyo Statistical Process Control (M-SPC) system as well as remote display counter SD-D1/D2. Optional connecting cable: 937387 (1m/40"), 965013(2m/80")



View from A

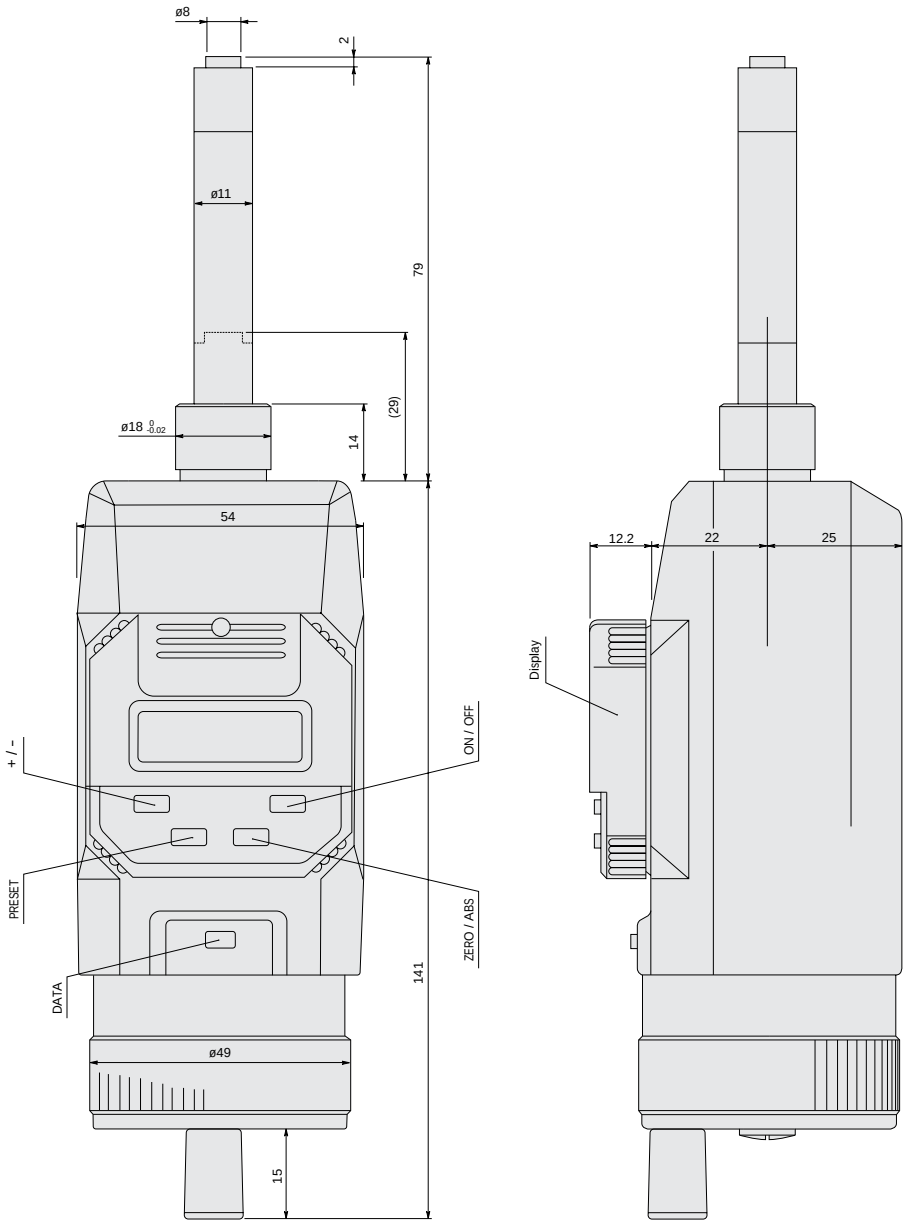
Order No.

Metric			Inch/metric			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
164-171	25mm	0.001mm	164-172	1"	.00005"/0.001mm	Plain	Flat (carbide tip)	±0.002mm	Non-rotating spindle

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

Plain stem

164-161, 164-162



The LCD panel can be rotated within 330˚ for easier display reading.

Mass (g): 500

Specifications (electronic/display part)

- Power supply: SR44 (1pc.) /SR44(2pcs.)*
- Battery life (20˚C): Approximately 1.2 years/1.8 years* in normal use
- Operation temperature: 5˚C to 40˚C
- Storage temperature: -10˚C to 60˚C
- Quantizing error: ±1 count

*164-161, 164-162

Metric			Inch/metric			Stem	Spindle face	Accuracy	Remarks
Order No.	Range	Graduation	Order No.	Range	Graduation				
164-161	50mm	0.001mm	164-162	2”	.00005”/0.001mm	Plain	Flat (carbide tip)	±0.003mm	Non-rotating spindle

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

Series 164

Electronic micrometer head

Spindle face: Carbide tip
More than HRC90
Lapped surface
Scale surface: White anodized aluminium
(164-141: Black anodized aluminium)

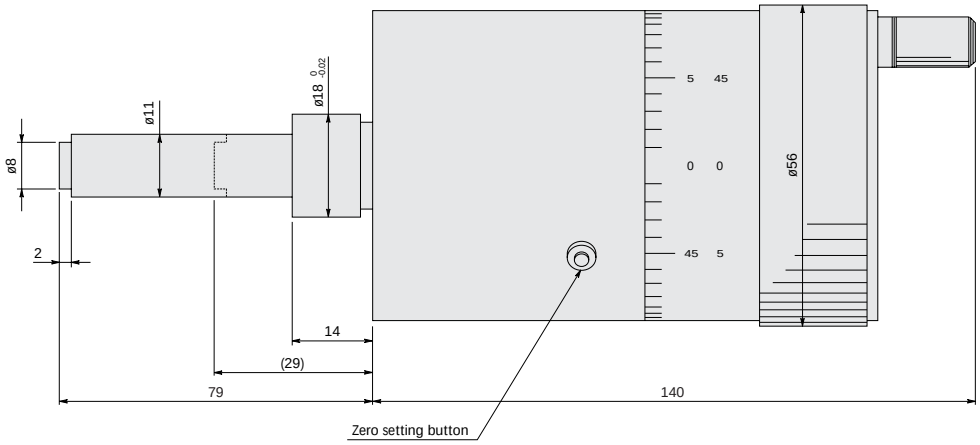
Electronic micrometer head and remote display counter.

The spindle displacement can be read from the remote display counter with large indication panel. 2-axis display counter can present 2-axis spindle displacements derived from two electronic micrometer heads.

Unit: mm

Plain stem

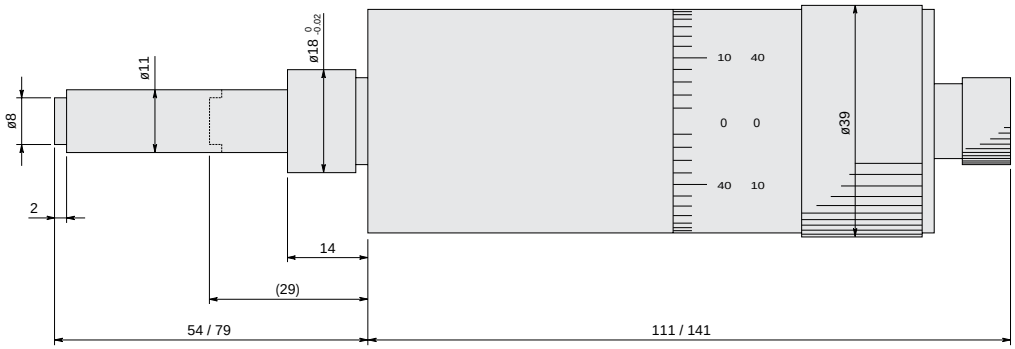
164-111, 164-113, 164-114



Mass (g): 860

Plain stem

164-108, 164-118



Mass (g): 370/ 500

Order No. (metric)

Order No.	Range	Resolution	Stem	Spindle face	Accuracy	Remarks	Applicable display unit**
164-101	25mm	0.001mm	Plain	Flat (carbide tip)	±0.002mm	Non-rotating spindle	
164-111	50mm	0.001mm	Plain	Flat (carbide tip)	±0.003mm	Non-rotating spindle	
164-108	25mm	0.001mm	Plain	Flat (carbide tip)	±0.002mm	Compact body	
164-118	50mm	0.001mm	Plain	Flat (carbide tip)	±0.003mm	Compact body	174-173
164-121	25mm	0.001mm	Plain	Spherical (SR8 carbide tip)	±0.001mm		
164-122	50mm	0.001mm	Plain	Spherical (SR8 carbide tip)	±0.002mm		
164-141	25mm	0.0001mm	Plain	Flat (carbide tip)	±0.001mm/±0.0005mm*	High accuracy model	

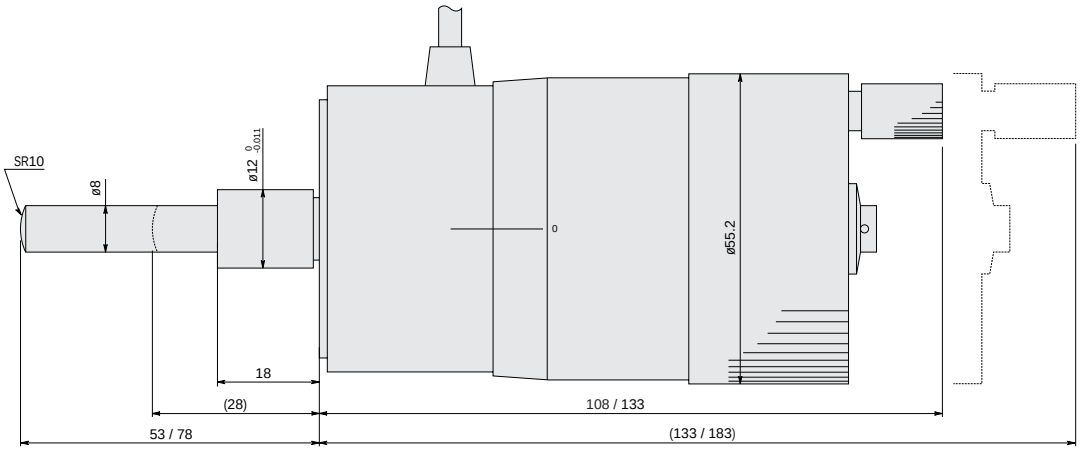
*Wide range/Narrow range

**When ordering, add a suffix to order number according to your AC line voltage (e.g. 174-173). A for 120V, D for 220V, (F for models destined for Australia), E for 240/220V. No suffix is required for 100V.

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

Plain stem

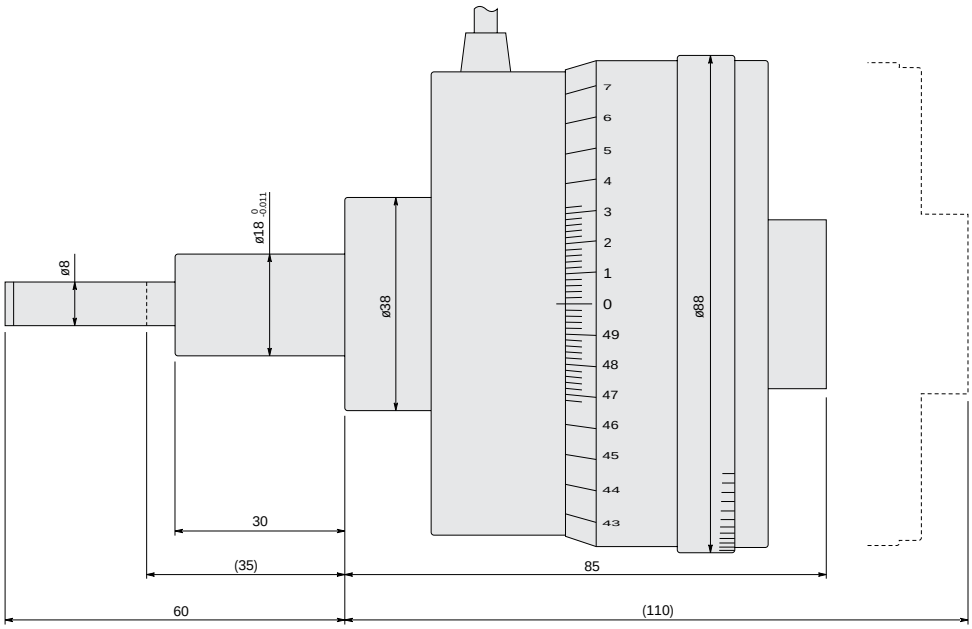
164-121, 164-122



Mass (g): 640/ 760

Plain stem

164-141



Mass (g): 850

Order No. (inch)

Order No.	Range	Resolution	Stem	Spindle face	Accuracy	Remarks	Applicable display unit**
164-103	1"	.00005"	Plain	Flat (carbide tip)	±0.002mm	Non-rotating spindle	174-173
164-113	2"	.00005"	Plain	Flat (carbide tip)	±0.003mm	Non-rotating spindle	

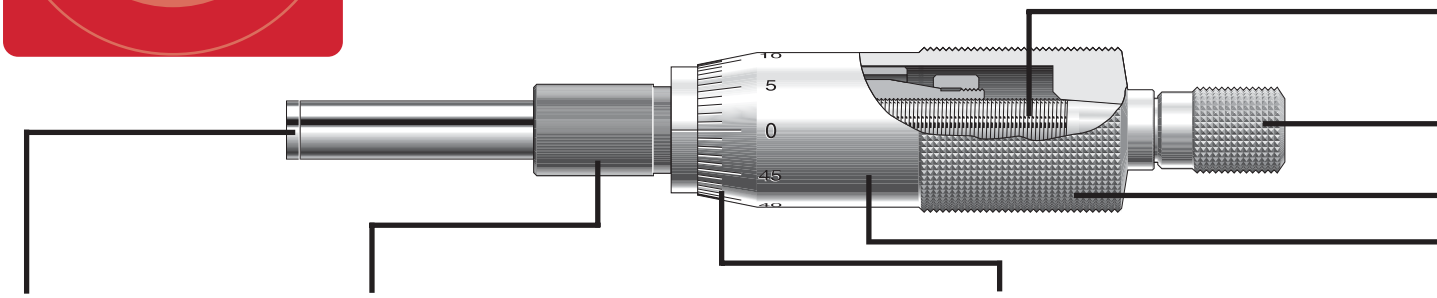
Order No. (metric/inch)

Order No.	Range	Resolution	Stem	Spindle face	Accuracy	Remarks	Applicable display unit**
164-104	25mm	0.001mm/.00005"	Plain	Flat (carbide tip)	±0.002mm	Non-rotating spindle	174-173
164-114	50mm	0.001mm/.00005"	Plain	Flat (carbide tip)	±0.003mm	Non-rotating spindle	
164-131	25mm	0.001mm/.00005"	Plain	Spherical (SR8 carbide tip)	±0.001mm		
164-132	50mm	0.001mm/.00005"	Plain	Spherical (SR8 carbide tip)	±0.002mm		

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

Made-to-order micrometers

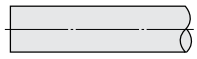
Mitutoyo micrometer heads are used in various application fields. Although various ready-made micrometer heads are provided to meet various customer demands, customization is still required to meet more suitable specification.
Mitutoyo offers such “made-to-order” micrometer head even from one piece production onwards.



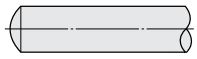
1. Spindle

Long spindle is also available.

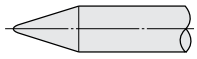
- Standard (flat)



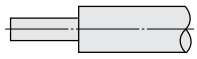
- Spherical



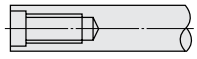
- Point



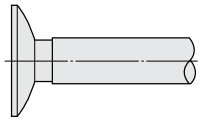
- Spline



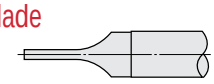
- Internal screw thread



- Flange



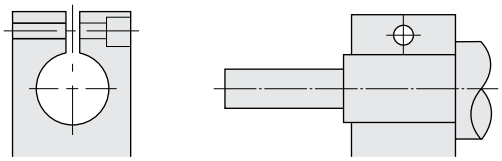
- Blade



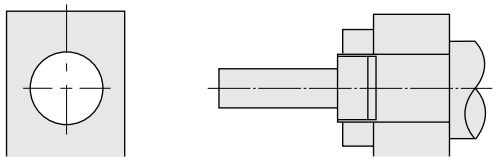
2. Stem

Various stem types are available according to your fixing specification.

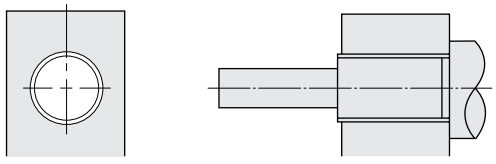
- Plain



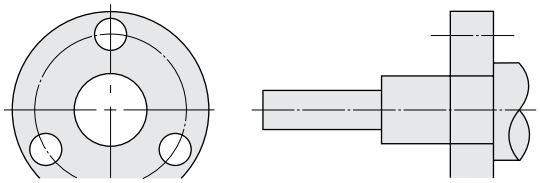
- With clamp nut



- Whole screw thread



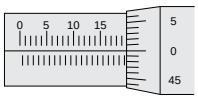
- Flange



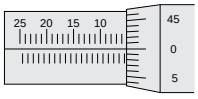
3. Graduation

Reverse graduation, vertical graduation, etc. are available. The color of figure and graduation on the thimble can be changed from normal black to red.

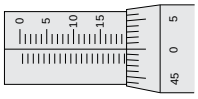
- Standard



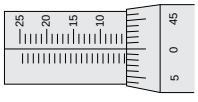
- Reverse



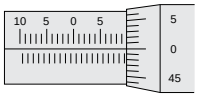
- Vertical



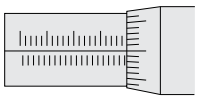
- Vertical & reverse



- Specified zero point



- Graduation only

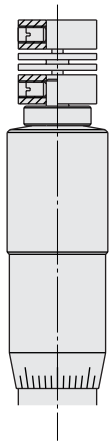


4. Special logotype

Your company logotype can be marked on the thimble.

5. Thimble attachment for motor drive operation

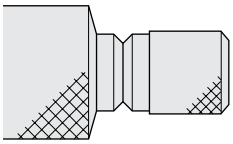
Several thimble attachments for motor drive operation by gear, round-belt, flat-belt, timing-belt, etc. are available. Solid-constructed thimble and attachment is available.



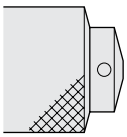
6. Thimble setting

Ratchet, set screw and hex-socket head screw are available for thimble setting.

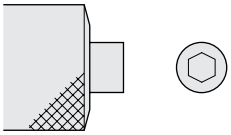
•Ratchet



•Set screw



•Hex-socket head



7. Spindle pitch

The standard spindle pitch is 0.5mm. 1mm pitch for quick feeding and 0.25mm pitch for fine feeding are available. Inch pitch is also available.

8. Screw lubricant

Screw lubricant can be specified for your application.

9. All-stainless steel model

All-stainless steel micrometer head is available.

10. Simple packing

Simplified packing is available for large quantity like an OEM purpose.

11. Precision lead screw

Precision lead screw (lead screw and nut) is available for your application.
Refer to page 32 and 33.

12. Accuracy inspection certificate

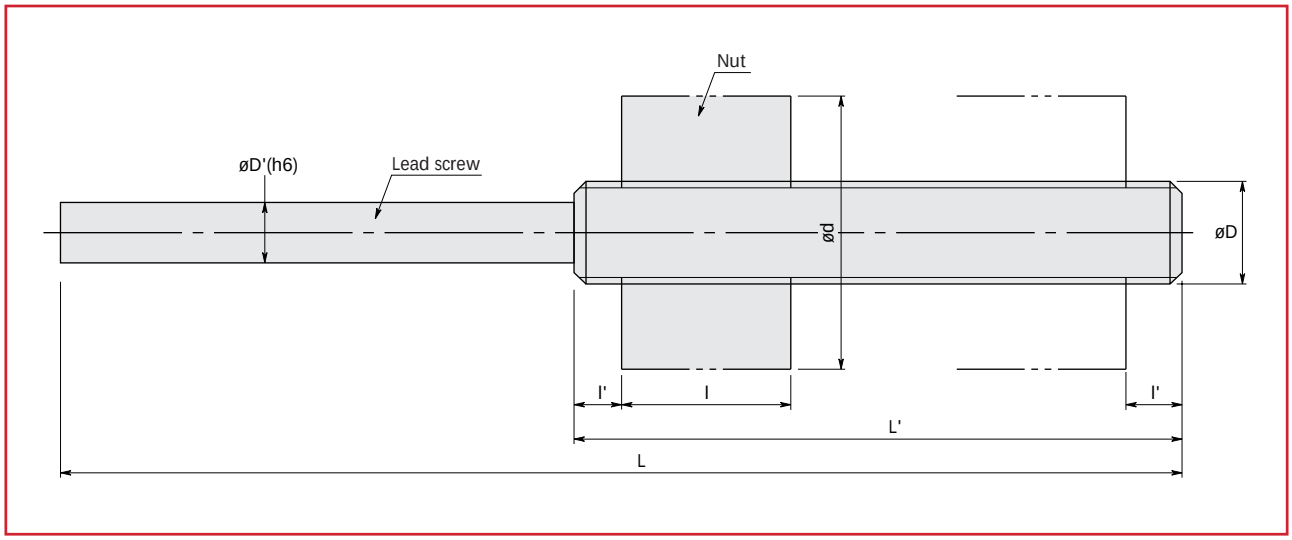
Mitutoyo is able to supply a micrometer head together with its accuracy inspection certification, at a nominal rate.

Precision lead screw

Mitutoyo offers “made-to-order” precision lead screw which is produced according to your specification under precise and accurate screw machining technology backed by long experience in micrometer production.

Type A

l’=P (pitch) x 5 (mm)
E.g.: If P is 0.5mm, must design “l’ = 2.5mm” and “Stroke ≤ L’ - (l + 2l’)”



Material

•Lead screw: SKS3 or equivalence (harder than HRC60.5)
•Nut: Easy-cutting steel (Brass is available.)

Accuracy

•Feeding accuracy: 0.002mm
•Screw/nut clearance: 0.005mm
•Feeding deflection (lead screw): Less than 0.003mm
•Feeding deflection (nut mounting surface): Less than 0.005mm

Remarks for order

•Lead screw
1. Specify øD, øD’, L, L’ and P dimensions.
2. Specify both end machining whether there is a need or not and the shape of each end if it is necessary.

•Nut
1. Specify external shape, length and mounting specification.
2. Specify a material to be used

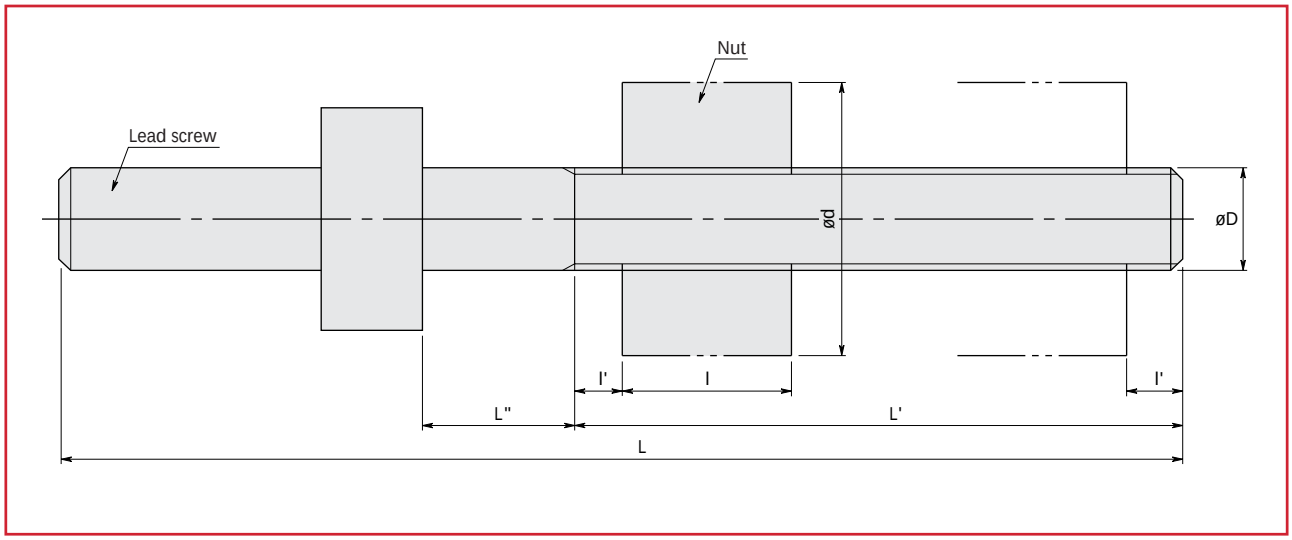
Specifications

(Unit: mm)

Screw dia. øD	Screw pitch P		Stem dia. øD’(max.)		Screw length L (max.)	Thread portion length L’ (max.)	Nut dia. øD (min.)
3	0.5		2		30	20	4.3
4.5	0.5		3.5		35	20	6.5
7.35	0.5		5		60	40	10
7.35	0.5		6.35		90	70	10
9	0.5		8		120	70	12
10	0.5	1	9	8	120	70	13
15	0.5	1	14	13	120	70	18

Type B

If the lead screw has a step on the external surface, L" dimension must be designed over 10mm.
l'=P (pitch) x 5 (mm)
E.g.: If P is 0.5mm, must design "l' = 2.5mm" and "Stroke ≤ L' - (l + 2l')"



Material

- Lead screw: SKS3 or equivalence (harder than HRC60.5)
- Nut: Easy-cutting steel (Brass is available.)

Accuracy

- Feeding accuracy: 0.003mm
- Screw/nut clearance: 0.005mm
- Feeding deflection (lead screw): Less than 0.003mm
- Feeding deflection (nut mounting surface): Less than 0.005mm

Remarks for order

- Lead screw
  1. Specify øD, L, L' and P dimensions.
  2. Specify both end machining whether there is a need or not and the shape of each end if it is necessary.
- Nut
  1. Specify external shape, length and mounting specification.
  2. Specify a material to be used

Specifications

(Unit: mm)

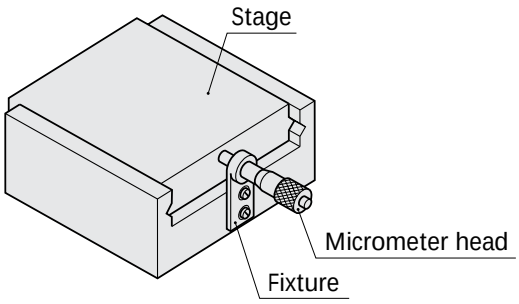
Screw dia. øD	Screw pitch P		Screw length L (max.)	Thread portion length L' (max.)	Nut dia. øD (min.)
5	0.5		90	70	6.5
6	0.5		140	120	10
8	0.5		160	140	10
10	0.5	1	230	210	12
12	0.5	1	250	230	13
15	0.5	1	280	250	18
20	0.5	1	300	280	23

Micrometer head fixtures

Do you spend money on troublesome production of micrometer head fixture? Mitutoyo offers various fixtures which are well designed for customer convenience. All fixtures are made of cast iron (FC45 with nickel plating).

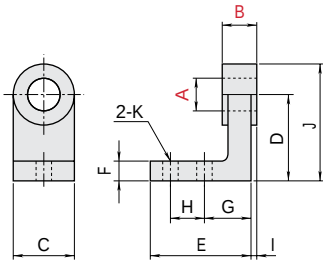
Micrometer head / Fixture reference table

Micrometer head	Fixture	Applicable stem specifications
Series 148 (Page 8, 16)	303560, 303562, 303564, 303566	ø9.5 X 9.5mm plain stem
	303559, 303561, 303563, 303565	ø9.5 X 9.5mm stem with clamp nut
Series 149 (Page 9)	303569, 303571, 303573, 303575	ø9.5 X 15mm plain stem
	303568, 303570, 303572, 303574	ø9.5 X 15mm stem with clamp nut
Series 150 (Page 10, 11)	303579, 303581, 303583, 303585	ø10 X 15mm plain stem
	303578, 303580, 303582, 303584	ø10 X 15mm stem with clamp nut

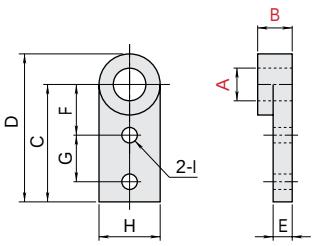


For micrometers with clamp nut

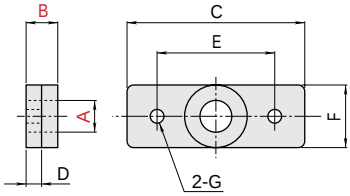
(Unit: mm)



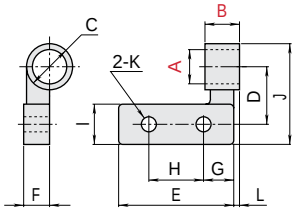
Order No.	303559	303568	303578
A	ø9.5	ø9.5	ø10
B	6	11.5	11.5
C	15	20	20
D	20	30	30
E	24	35	35
F	2	7	7
G	11	16	6
H	8	12	12
I	I0.5	1.75	1.75
J	27.5	40	40
K	ø3.4	ø4.5	ø4.5



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



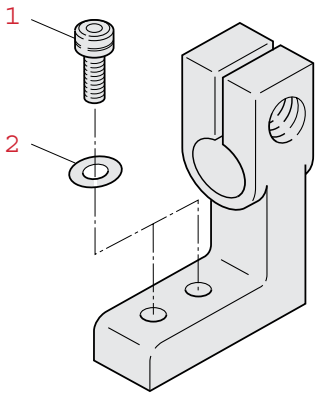
Order No.	303561	303570	303580
A	ø9.5	ø9.5	ø10
B	6	11.5	11.5
C	40	60	60
D	3.5	5.5	5.5
E	30	40	40
F	15	20	20
G	ø3.4	ø4.5	ø4.5



Order No.	030565	303574	303584
A	ø9.5	ø9.5	ø10
B	6	11.5	11.5
C	ø15	ø15	ø15
D	15	20	20
E	25	40	40
F	8.5	8.5	8.5
G	7.5	10	10
H	10	20	20
I	10	15	15
J	27.5	35	35
K	ø3.4	ø4.5	ø4.5
L	0.75	1.25	1.25

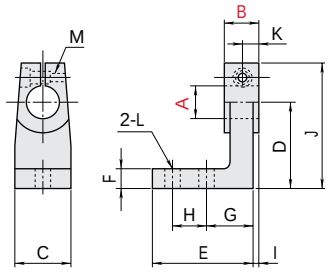
Recommended fixing screws

Fixture	Hex-socket screw 1	Washer 2
303559, 303560, 303561, 303562, 303563, 303564	M3X0.5X8	Size 3, round type
303565, 303566	M3X0.5X12	Size 3, round type
303568, 303569, 303570, 303571, 303572, 303573, 303578, 303579, 303580, 303581, 303582, 303583	M4X0.7X10	Size 4, round type
303574, 303575, 303584, 303585	M3X0.7X12	Size 4, round type

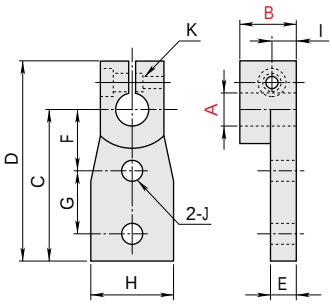


For plain stem micrometers

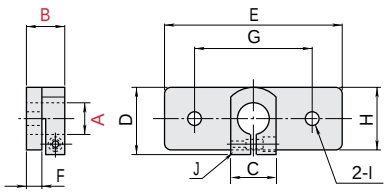
(Unit: mm)



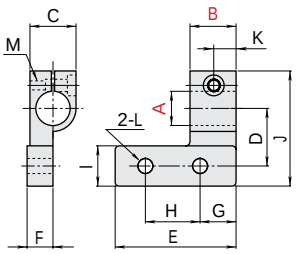
Order No.	303560	303569	303579
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	15	20	20
D	20	30	30
E	23	35	35
F	5	7	7
G	11	16	16
H	8	12	12
I	1.5	3.25	3.25
J	32.5	42.5	42.5
K	4.5	7.25	7.25



Order No.	303564	303573	303583
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	30	40	40
D	42.5	52.5	52.5
E	4	6	6
F	15	18	18
G	10	15	15
H	15	20	20
I	4.5	7.25	7.25
J	ø3.4	ø4.5	ø4.5
K	M3X05	M3X05	M3X05



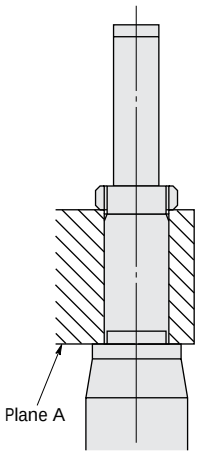
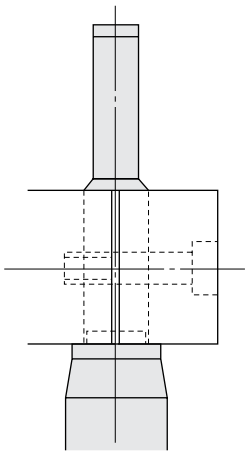
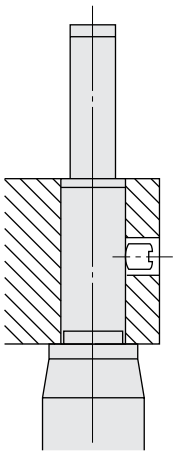
Order No.	303562	303571	303581
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	15	15	15
D	20	22.5	22.5
E	40	60	60
F	3	5	5
G	30	40	40
H	15	20	20
I	ø3.4	ø4.5	ø4.5
J	M3X0.5	M3X0.5	M3X0.5



Order No.	303566	303575	303585
A	ø9.5	ø9.5	ø10
B	9	14.5	14.5
C	15	15	15
D	15	20	20
E	25	40	40
F	8.5	8.5	8.5
G	7.5	10	10
H	10	20	20
I	10	15	15
J	32.5	40	40
K	4.5	7.25	7.25
L	ø3.4	ø4.5	ø4.5
M	M3X0.5	M3X0.5	M3X0.5

Fixture self-production guide

When mounting the micrometer head, it is fixed with its stem. Therefore the secured stem clamping method without affecting inside mechanism must be chosen for accuracy. Although the most popular three clamping methods are introduced below, Mitutoyo recommends the use of “Clamp nut” or “Slotted fixture” method.

Fixing method	Using clamping unt	Using slotted fixture	Using set screw
			
Mounting hole fitting tolerance value (mm)	ø9.5, ø10mm stem: G7 (+0.005 to +0.020) ø12, ø18mm stem: G7 (+0.006 to +0.024)	ø9.5, ø10mm stem: G7 (+0.005 to +0.020) ø12, ø18mm stem: G7 (+0.006 to +0.024)	ø9.5, ø10mm stem: H5 (+0.000 to +0.006) ø12, ø18mm stem: H5 (+0.000 to +0.008)
Remarks	•Take care the perpendicularity of the plane A against the setting hole. •Tolerance of perpendicularity: Less than 0.16/6.5 (same as that of grade 2 screw center tolerance value)	•Remove carefully burr on the slot.	•Suitable set screw size: M3X0.5 or M4X0.7 •Countersink on the stem: Less than 90°X0.5 When countersinking, take care not to cause stem deformation.

Maximum load of micrometer head

The maximum loading capacity of micrometer head cannot be quantified since it varies according to the clamping method, type of the load applied (statistic load or active load) and operating conditions (used as a feeding device or stopper). Mitutoyo recommended loading limit value is as follows when the micrometer head is used as a measuring instrument within its accuracy guaranteed stroke (within 1 million manual rotations). The static load test result carried out by using a small size micrometer head is also mentioned below.

1. Maximum loading capacity

	Micrometer head	Maximum load
Standard type:	0.5mm spindle pitch models	Up to 4kg/2kg*
Other types:	0.25mm spindle pitch models	Up to 1kg
	0.5mm spindle pitch models	Up to 4kg
	1.0mm spindle pitch models	Up to 6kg
	Ultra-small/Small size models	Up to 2kg
	Non-rotating spindle models	Up to 2kg
	Fine feed models	Up to 2kg

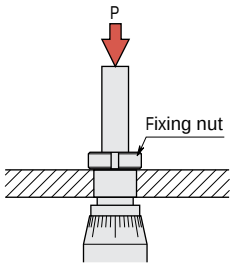
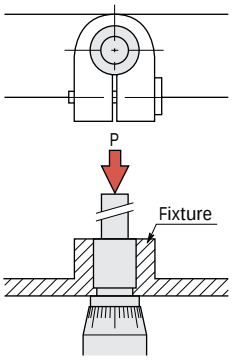
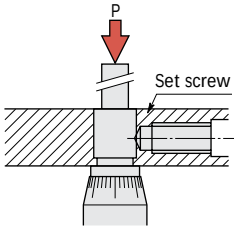
*Ulta-small and small size models

2. Static loading tast

(148-104, 148-103 used)

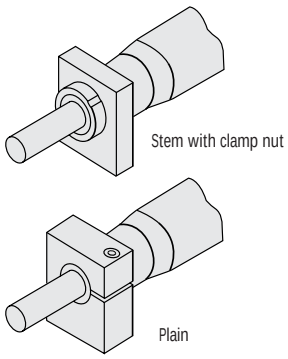
Test conditions

After setting each micrometer head as shown below, apply the test load from "P" direction by using a material testing machine. In increasing the test load, measure the test load at the time when the mirometer is borken or dropped out from the fixture.

		
Using clamp nut	Using slotted fixture	Using set screw
The micrometer heads are broken at 880kg to 1000kg load.	The micrometer heads are dropped from the fixture at 70kg to 100kg load.	The set screw are broken at 70kg to 110kg load.

Micrometer head selection guide

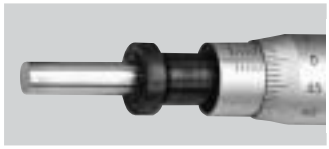
The measuring range, spindle face, stem type, graduation, thimble diameter, etc. must be considered for the selection of the most suitable micrometer head for your application. Mitutoyo provides "Micrometer Head Selection Guide" for your reference as below.



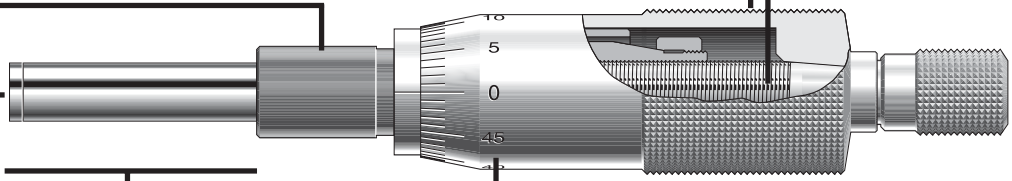
Stem

Plain stem

Stem with clamp nut



- The stem is a part to be used for micrometer head clamping. It is classified into "Plain stem" or "Stem with clamp nut". The stem diameter is designed according to the size of the micrometer head itself. The upper and lower tolerance limit values are mentioned on the catalog with h6 specification.
- The micrometer head with clamp nut can be fixed to the stage easily and firmly. While additional preparation of slotting or adhesive bonding is necessary for the plain stem type. However, the plain stem type has a wider applicable range and allows stem position tuning in forward/backward direction.
- Mitutoyo offers various optional fixtures for general use. Refer to page 34.



Spindle face


Flat spindle


Spherical spindle


Non-rotating spindle

- The micrometer head with a flat spindle is generally used for a measuring instrument.
- The micrometer head with a spherical spindle is suitable for a feeding device since the feeding error caused by the inclined installation can be minimized. (Fig A) The combination of a carbide ball and flat spindle (Fig B) provides the same effect as Fig A.
- Mitutoyo recommends the use of the non-rotating spindle type micrometer head when it is used for the delicate or high-accuracy application. (Fig C)
- The flat spindle and flat contact surface combination is recommended for high-durable applications.

Figure A

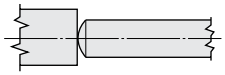


Figure B

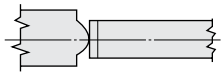
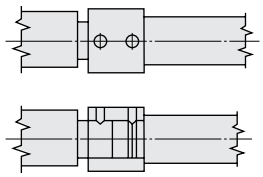
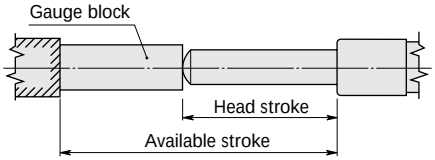


Figure C



Measuring range (spindle stroke)

- Six measuring ranges from 5 to 50mm are available for standard type micrometer head. Choose the suitable range by considering some allowance for spindle movement.
- Even though the required measuring range is 2 or 3mm, choice of 25mm range model is more economical if there is enough space for installation.
- The measuring range can be extended by using a gauge block. (Fig D)
- The broken line on each micrometer head drawing shows the thimble position at the stroke end. Carefully consider this point for your jig design.



Spindle lock

When using the micrometer head as a stopper, Mitutoyo recommends to use a micrometer head with spindle clamp to avoid problem due to a loose spindle. Special clamping mechanism is employed to eliminate spindle displacement at clamping.

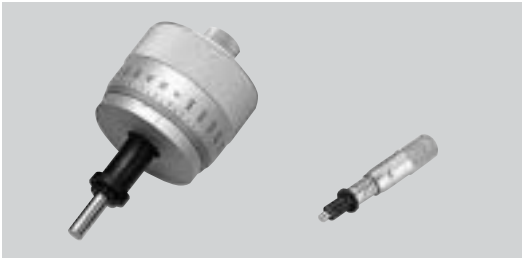
Non-rotating spindle

The spindle is fed straight without rotation. This avoids workpiece rotation for torsion-free feeding and reduces workpiece deformation and wear.

Ultra-fine feed

Ultra-fine feed micrometer heads employ the differential movement mechanism which are available for the applications requiring ultra-fine feeding like a manipulator.

Thimble diameter

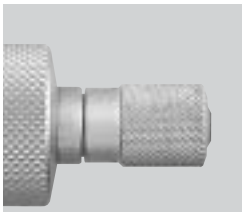


Thimble diameter is closely related with thimble graduation and operation efficiency. Small thimble allows quick positioning, while large thimble allows fine graduation. The large thimble type with a feeding knob provides both advantages.

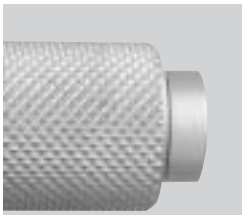
Spindle pitch

1mm spindle pitch

- 0.5mm: Standard
- 1mm (.25”): 1mm/rotation spindle allows quick feeding and positioning and high-loading capacity. This eliminates misreading of 0.5mm graduation on the sleeve.
- 0.25mm: 0.25mm/rotation spindle allows fine feeding and precise positoning.



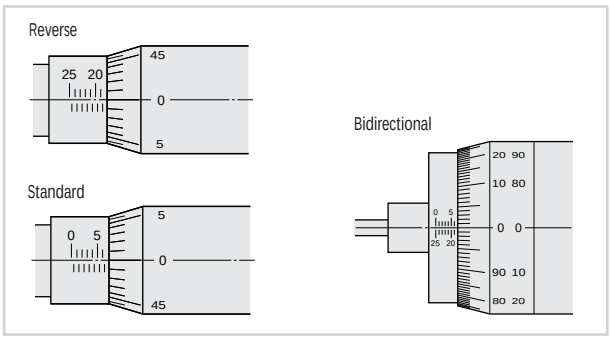
With constant force device (ratchet)



Without constant force device

Constant force device

- Mitutoyo recommends to choose a micrometer head with a constant force device (ratchet) when it is used as a measuring tool.
- Micrometer head without constant force device is suitable for a stopper and space priority applications.



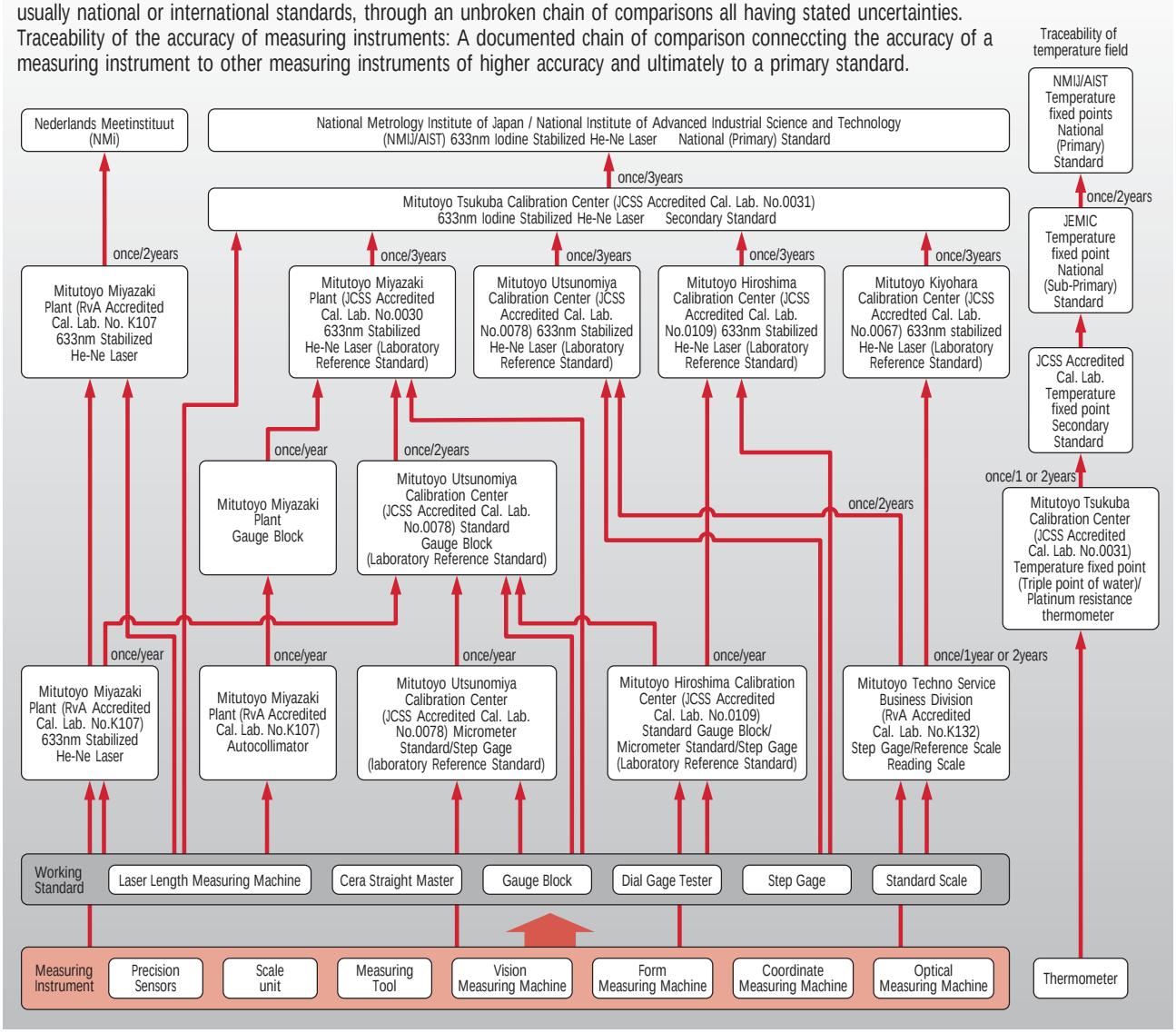
Graduation

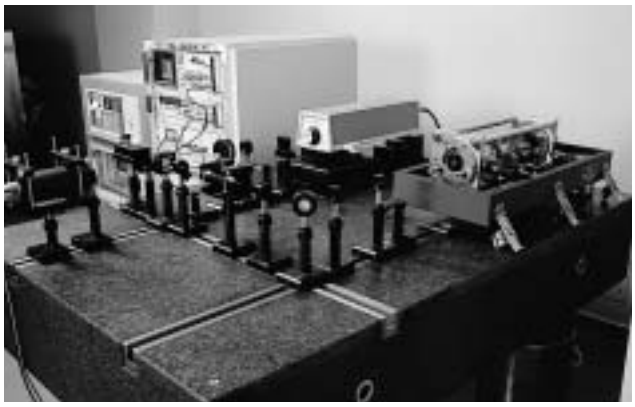
- If you want to obtain (read) the spindle displacement, pay attention to the specifications of the thimble/sleeve graduation.
- ”Standard” graduation is the same graduation as an outside micrometer. When retracting the spindle, positive counting is provided.
- ”Reverse” graduation provides positive counting when projecting the spindle.
- ”Bidirectional” graduation provides both positive and negative counting. The figures on thimble and sleeve are specified by color (black and red) for clear reading.
- Digimatic and electronic micrometer heads which have an internal or external display counter are available for direct reading. These micrometer heads can be linked to the Mitutoyo Statistical Process Control (M-SPC) system.

Traceability System to National Standard

Traceability system of length standard

Traceability: Property of the result of a measurement or the value of a standard whereby it can be related to stated reference, usually national or international standards, through an unbroken chain of comparisons all having stated uncertainties.
Traceability of the accuracy of measuring instruments: A documented chain of comparison connecting the accuracy of a measuring instrument to other measuring instruments of higher accuracy and ultimately to a primary standard.

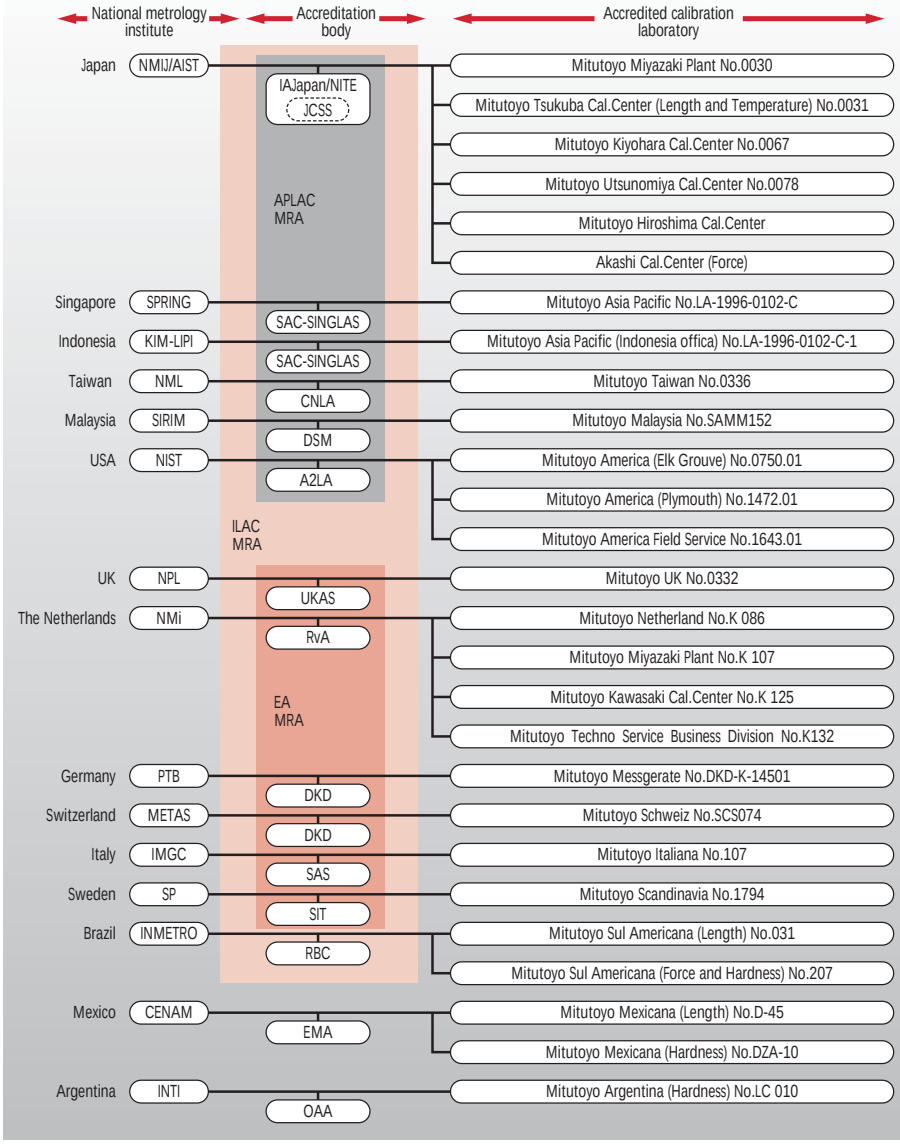




Iodine Absorption Stabilized He-Ne Laser as the standard for length measurement (At Tsukuba Calibration Center)

Interferometer as the standard for Gauge Blockcalibration (At Miyazaki Plant)

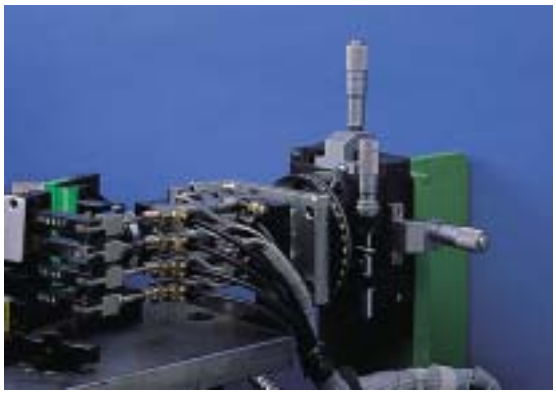
Mitutoyo Group Accredited Calibration Laboratories



AIST: National Institute of Advanced Industrial Science and Technology
NMIJ: National Metrology Institute of Japan
JCSS: Japan Calibration Service System
NITE: National Institute of Technology and Evaluation
IAJapan: International Accreditation Japan
SPRING: Standards, Productivity and Innovation Board
SAC: Singapore Accreditation Council
KIM-LIPI: Indonesian Institute of Sciences
NML: National Measurement Laboratory
CNLA: Chinese National Laboratory Accreditation
SIRIM: Standards and Industrial Research Institute of Malaysia
DSM: Department of Standards Malaysia
NIST: National Institute of Standards and Technology
A2LA: American Association for Laboratory Accreditation
NPL: National Physical Laboratory
UKAS: United Kingdom Accreditation Service
NMi: Nederlands Meetinstituut RvA:Raad voor Accreditatie
PTB: Physikalisch-Technische Bundesanstalt
DKD: Deutscher Kalibrierdienst
METAS: The Swiss Federal Office of Metrology and Accreditation
SAS: Swiss Accreditation Service
IMGC: Istituto di Metrologia "GUSTAVO COLONNETTI"
SIT: Servizio di Taratura in Italia
SP: Swedish National Testing and Research Institute
SWEDAC: Swedish Board for Accreditation and Conformity Assessment
INMETRO: Instituto Nacional de Metrologia Normalizaçao e Qualidade Industrial
RBC: Rede Brasileira de Calibraçao
CENAM: Centro Nacional de Metrologia
EMA: Entidad Mexicana de Acreditacion, a.c.
INTI: Instituto Nacional de Tecnologia Industrial
OAA: Organismo Argentino de Acreditaci
(ILAC): International Laboratory Accreditation Cooperation
(APLAC): Asia Pacific Laboratory Accreditation Cooperation
(EA): European Accreditation cooperation
(MRA): Mutual Recognition Agreement
#: Accreditation No.

Interferometer as the standard for Linear Scalecalibration (At Kiyohara Plant)

Mitutoyo comprises 24 accredited calibration laboratories posted worldwide as illustrated schematically above, where each of the labs has established and implemented traceability of their reference standards through calibration to nationally or internationally recognized standards. It is with such a traceability system implemented within Mitutoyo that it can contribute to industries worldwide in helping customers implement the base for their quality management and quality assurance program.



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