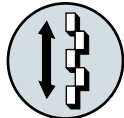


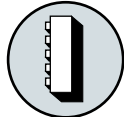
Reference Gages

Height Master SERIES 515

- Height Master is a best-selling product with a name that has become the industry standard for height reference instruments.



Staggered 20 mm blocks (movable)



Vertical orientation



Riser block

515-322

SPECIFICATIONS

Metric	
Order No.	515-322
Range (H)	5 < H ≤ 310 mm
Graduation (analog scale)	0.001 mm
Block step	20 mm (staggered)
Micrometer adjustment	20 mm
Micrometer feed	0.5 mm/rev
Block pitch accuracy	±1.5 μm
Parallelism of blocks	1.0 μm
Feed error	±1.0 μm
Retrace error	1.0 μm
Mass	23 kg

Note 1: The block accuracy and the parallelism of blocks are relative to the main unit installation surface.

Note 2: Supplied with a wooden storage case as standard.

Inch		
Order No.	515-310	515-311
Range (H)	0.2 in < H ≤ 12.2 in	0.2 in < H ≤ 12.2 in
Graduation (analog scale)	0.00001 in	
Block step	0.5 in (straight)	1 in (staggered)
Micrometer adjustment	1 in	
Micrometer feed	0.025 in/rev	
Block pitch accuracy	±50 μin	
Parallelism of blocks	40 μin	
Feed error	±40 μin	
Retrace error	40 μin	
Mass	23 kg	

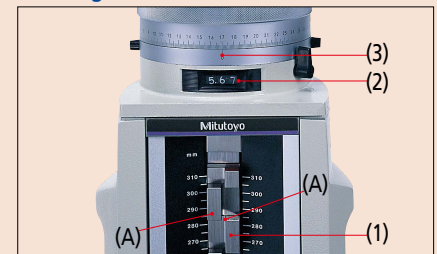
Note 1: The block accuracy and the parallelism of blocks are relative to the main unit installation surface.

Note 2: Supplied with a wooden storage case as standard.

Typical application



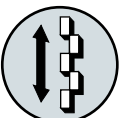
Reading



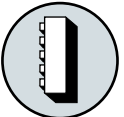
(A) Height A

(1) Scale	280. mm
(2) Counter	5.67 mm
(3) Thimble	0.000 mm
	285.670 mm

Digital Height Master SERIES 515



Staggered 20 mm blocks (movable)



Vertical orientation



Riser block

515-374

- Best-selling height reference standard.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems. (Refer to Page A-3 for details)



SPECIFICATIONS

Metric				
Order No.	515-374	515-376	515-378	
Range (H)	10 < H ≤ 310 mm	10 < H ≤ 460 mm	10 < H ≤ 610 mm	
Resolution (digital display)	0.001 mm			
Block step	20 mm (staggered)			
Micrometer adjustment	20 mm			
Micrometer feed	0.5 mm/rev			
	±1.5 μm			
Block pitch accuracy	0 < H ≤ 310 mm	—	±2.5 μm	
	310 < H ≤ 460 mm	—	—	
	460 < H ≤ 610 mm	—	±3.5 μm	
Parallelism of blocks	0 < H ≤ 310 mm	2.0 μm		
	310 < H ≤ 610 mm	2.5 μm		
Feed error	±2.0 μm		±2.5 μm	
Retrace error	2.0 μm		2.5 μm	
Mass	9.5 kg	13.6 kg	16 kg	

Note: The block accuracy and the parallelism of blocks are based on main unit installation surface, which does not include the retrace error.

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo



Technical Data

- Display: LCD 6 digits
- Battery: SR44 (2 pcs.)
- Battery life: Approx. 1.8 years under normal use

Function

Zero setting, Origin-setting, Origin restoration, Data hold, Auto power off, Data output

Optional Accessories

- 515-111: Auxiliary block kit for bore gage (mm)
- 515-120: Auxiliary block kit for bore gage (inch)
- : Riser block (see page E-36.)
- 959149: SPC cable (1 m)
- 959150: SPC cable (2 m)

Inch				
Order No.	515-375	515-377	515-379	
Range (H)	0.5 in < H ≤ 12 in	0.5 in < H ≤ 18 in	0.5 in < H ≤ 24 in	
Resolution (digital display)	0.0001 in			
Block step	1 in (staggered)			
Micrometer adjustment	1 in			
Micrometer feed	0.025 in/rev			
	±100 μin			
Block pitch accuracy	0 < H ≤ 12 in	—	±100 μin	
	12 in < H ≤ 18 in	—	—	
	18 in < H ≤ 24 in	—	±150 μin	
Parallelism of blocks	0 < H ≤ 12 in	50 μin		
	12 in < H ≤ 18 in	100 μin		
Feed error	±100 μin		±100 μin	
Retrace error	100 μin		100 μin	
Mass	9.5 kg	13.6 kg	16 kg	

Note: The block accuracy and the parallelism of blocks are based on main unit installation surface, which does not include the retrace error.



Typical application

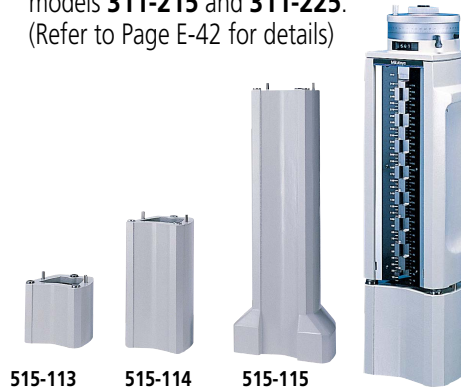


Bore gage zero-setting

**Height Master
SERIES 515 — Optional accessories**

**Riser Blocks
SERIES 515**

- These riser blocks are designed to increase the measurable height.
- They can also be used on Square Master models **311-215** and **311-225**. (Refer to Page E-42 for details)



**Auxiliary Block Kit
SERIES 515 – for Bore Gage**

- Enables efficient zero point adjustment of cylinder gages using the Height Master.
- Zero point adjustment range: 18 to 150 mm.



SPECIFICATIONS

Metric				
Order No.	Height (mm)	Accuracy (µm)	Variation in length (µm)	Mass (kg)
515-113	150	±0.6	0.6	5.7
515-114	300	±1.0	0.8	9.8
515-115	600	±2.0	1.0	26.8

Inch				
Order No.	Height (in)	Accuracy (µin)	Variation in length (µin)	Mass (kg)
515-116	6	±20	20	4.8
515-117	12	±40	30	11.3
515-118	24	±80	40	31

SPECIFICATIONS

Metric	
Order No.	Model
515-110	Universal Height Master
515-111	Digital Height Master (515-374/376/378)
515-112	Height Master (515-322)

Inch	
Order No.	Model
515-119	Universal Height Master, Height Master (515-310)
515-120	Digital Height Master (515-375/377/379)
515-121	Height Master (515-311)

Reference Gages

Universal Height Master SERIES 515 — Usable in Vertical and Horizontal Orientations

- The Universal Height Master is designed for both vertical and horizontal orientation, providing a wide range of applications such as accuracy checking of machine tool table movements.



515-520

- Analog display by the built-in counter – the appearance and specifications are the same as model **515-322**. (Refer to Page E-35 for details)

SPECIFICATIONS

Metric		
Order No.	515-520	515-523
Range (H)	$5 < H \leq 610$ mm	$5 < H \leq 1010$ mm
Graduation (analog scale)	0.001 mm	
Block step	10 mm (straight)	
Micrometer adjustment	20 mm	
Micrometer feed	0.5 mm/rev	
Block pitch accuracy	$H \leq 310$ mm	± 1.5 μ m
	$310 < H \leq 610$ mm	± 2.5 μ m
	$610 < H \leq 1010$ mm	± 3.5 μ m
Parallelism of blocks	$H \leq 610$ mm	1.5 μ m
	$610 < H \leq 1010$ mm	—
Feed error	± 1.2 μ m	± 1.5 μ m
Retrace error	1.2 μ m	1.5 μ m
Mass	42 kg	63.5 kg

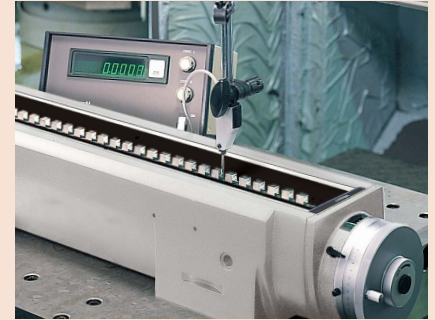
Note 1: The block accuracy and the parallelism of blocks are relative to the main unit installation surface.

Note 2: Supplied with a wooden storage case as standard.

Inch			
Order No.	515-512	515-510	515-513
Range (H)	0.2 in $< H \leq 18.2$ in	0.2 in $< H \leq 24.2$ in	0.2 in $< H \leq 40.2$ in
Graduation (analog scale)	0.00001 in		
Block step	0.5 in (straight)		
Micrometer adjustment	1 in		
Micrometer feed	0.025 in/rev		
Block pitch accuracy	$H \leq 12$ in	± 50 μ in	
	12 in $< H \leq 24$ in	—	± 100 μ in
	24 in $< H \leq 40$ in	—	± 150 μ in
Parallelism of blocks	$H \leq 24$ in	60 μ in	
	24 in $< H \leq 40$ in	—	80 μ in
Feed error	± 40 μ in	± 60 μ in	
Retrace error	40 μ in	60 μ in	
Mass	42 kg	63.5 kg	

Note 1: The block accuracy and the parallelism of blocks are relative to the main unit installation surface.

Note 2: Supplied with a wooden storage case as standard.



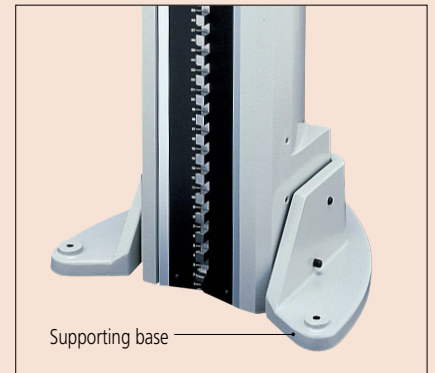
Typical application using in horizontal orientation

Optional Accessories

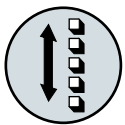
Supporting base

900574 (Dedicated for the Universal Height Master. Provided for **515-523** and **515-513** as standard.)

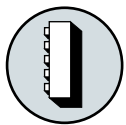
- Stable vertical orientation is available.



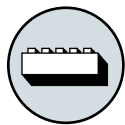
Supporting base



Single-row 10 mm blocks (movable)



Vertical orientation



Horizontal orientation

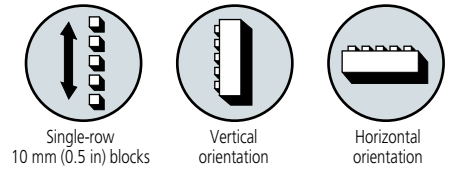


Riser block



Check Master SERIES 515

- Designed to check the accuracy of table movements of machine tools and calibrate CMMs.
- Can be used in either vertical or horizontal orientation.



SPECIFICATIONS

Metric		Order No.	515-720	515-721	515-722	515-723	515-724
Range (H)			310 mm	450 mm	610 mm	1010 mm	1510 mm
Block step			10 mm				
Block pitch accuracy	H ≤ 310 mm		±2.5 μm				
	310 < H ≤ 610 mm	—	±3.5 μm				
	610 < H ≤ 1010 mm	—	—	—	—	±5.0 μm	
	1010 < H ≤ 1510 mm	—	—	—	—	±8.0 μm	
Parallelism of blocks	H ≤ 310 mm		1.2 μm				
	310 < H ≤ 610 mm	—	1.5 μm				
	610 < H ≤ 1010 mm	—	—	—	—	2.0 μm	
	1010 < H ≤ 1510 mm	—	—	—	—	2.5 μm	
Mass			7 kg	10 kg	13 kg	22 kg	30 kg

Inch		Order No.	515-710	515-711	515-712	515-713
Range (H)			12.5 in	18.5 in	24.5 in	40.5 in
Block step			0.5 in			
Block pitch accuracy	H ≤ 12.5 in		±100 μm			
	12.5 in < H ≤ 24.5 in	—	±150 μm			
	24.5 in < H ≤ 40.5 in	—	—	—	—	±200 μm
Parallelism of blocks	H ≤ 12.5 in		50 μm			
	12.5 in < H ≤ 24.5 in	—	60 μm			
	24.5 in < H ≤ 40.5 in	—	—	—	—	80 μm
Mass			7 kg	10 kg	13 kg	22 kg

Note 1: The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
 Note 2: Supplied with a wooden storage case as standard.
 Note 3: High-accuracy type is available by special order.

Note 1: The block accuracy and the parallelism of blocks are relative to the main unit installation surface.
 Note 2: Supplied with a wooden storage case as standard.
 Note 3: High-accuracy type is available by special order.

Reference Gages

Standard Scales SERIES 182 — Made of Low Expansion Glass

- Standard scales can be used as a traceable standard of length for calibrating measuring instruments.
- These scales are manufactured using Mitutoyo's high-definition lithography technology in an underground scale manufacturing facility dedicated to the production of high-accuracy, high-quality line standards. They are considered top-grade length standards.



Technical Data

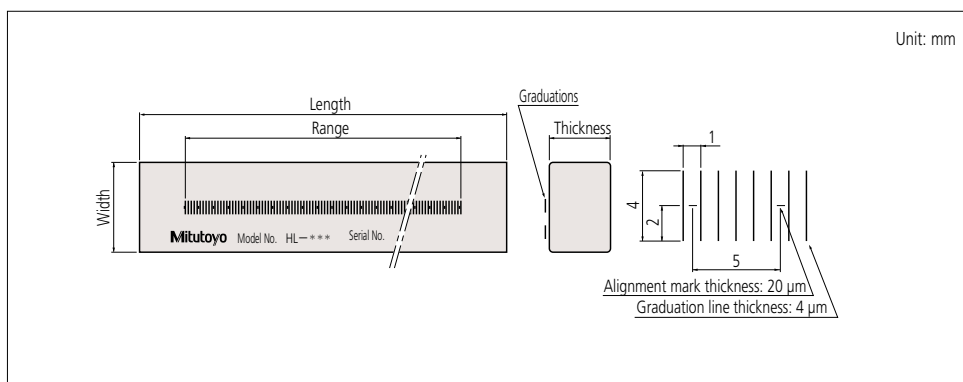
- Material: Low expansion glass
- Thermal expansion coefficient: $(0.00 \pm 0.02) \times 10^{-6}/K$
- Graduation line thickness: $4 \mu m$
- Graduation: 1 mm
- Accuracy (at 20 °C): $(0.5 + L/1000) \mu m$,
L=Measured length (mm)

SPECIFICATIONS

Metric				
Order No.	Range (mm)	Length (mm)	Width (mm)	Thickness (mm)
182-501-50	250	280	20	10
182-501-60*				
182-502-50	500	530	30	20
182-502-60*				

* With English JCSS certificate.

DIMENSIONS



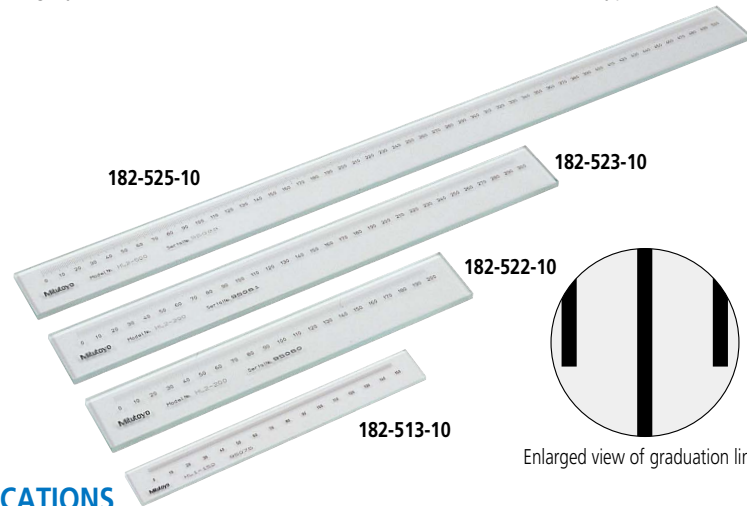


Technical Data

- Glass material: Soda-lime glass
- Thermal expansion coefficient: $8.5 \times 10^{-6}/K$
- Accuracy (at 20 °C): $(1.5 + 2L/1000) \mu m$,
L=Measured length (mm)

**Working Standard Scales
SERIES 182**

- These standard scales can be used to calibrate various measuring instruments and to confirm traceability to upper-level calibration devices and reference instruments. For example, they can be used in daily and periodic inspections of profile projector/microscope stages and of optical length measurement systems.
- These scales are manufactured using high-accuracy lithographic technologies. Mitutoyo has developed these technologies at the dedicated underground facility which was custom-built to produce highly accurate scales. Various sizes are available for each type to suit the application.

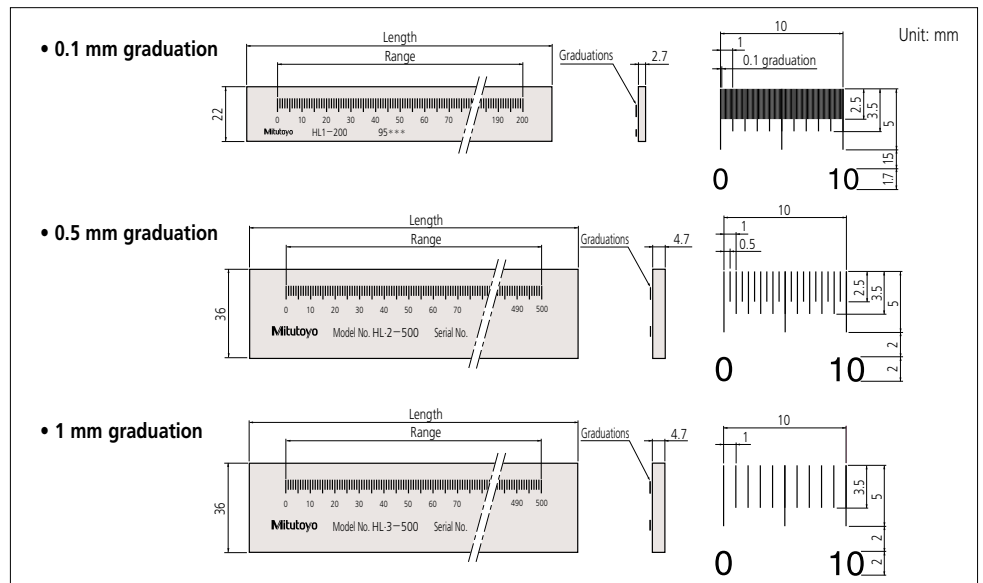


SPECIFICATIONS

Metric						
Order No.	Range (mm)	Graduation (mm)	Length (mm)	Inspection pitch (mm)	Graduation line thickness (μm)	Mass (kg)
182-511-10	50	0.1	75	5	20	0.23
182-512-10	100		125			0.24
182-513-10	150		175			0.25
182-514-10	200		225			0.26
182-521-10	100	0.5	130	20	50	0.27
182-522-10	200		230			0.32
182-523-10	300		330			0.57
182-524-10	400		430			0.71
182-525-10	500	530	0.86			
182-531-10	250	1	280	25	100	0.55
182-532-10	500		530			1.22
182-533-10	750		780			0.23
182-534-10	1000		1030			1.54

Note: An inspection certificate produced by a standard scale automatic calibration system is supplied as standard.

DIMENSIONS



Reference Gages

High Precision Square SERIES 311

- The High Precision Square is a gage used for inspecting the travel straightness and axial perpendicularity of moving elements on equipment such as machine tools, CMMs, form measuring machines and semiconductor-related equipment.
- All four surfaces, finished using ultra-precision technology built on our experience in gauge blocks and other products, can be used as reference surfaces.
- Better than 1 $\mu\text{m}/300\text{ mm}$ straightness and perpendicularity of each (four) reference surface. In addition, front and back faces are accurate to better than 5 $\mu\text{m}/300\text{ mm}$.
- Three nominal sizes are available (90×110, 160×210 and 260×310 mm) so that you can select the size that best suits the application.



311-111



311-112



311-113

SPECIFICATIONS

Metric		
Order No.	Dimension (W×L×T) (mm)	Mass (kg)
311-111	90×110×25	1.5
311-112	160×210×25	5.0
311-113*	260×310×30	14.0

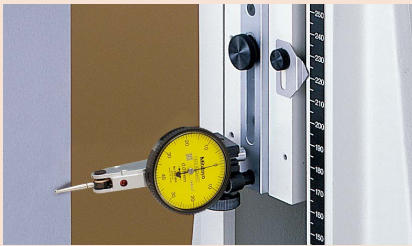
* Supplied with a removable handle.



Technical Data

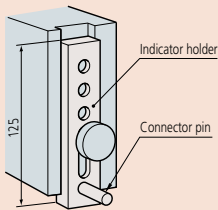
- Reference surface
Perpendicularity tolerance: 1 μm
Straightness tolerance: 1 μm
- Front/back faces
Perpendicularity tolerance: 5 μm
Straightness tolerance: 5 μm
- Dedicated wooden case is provided.

Typical application

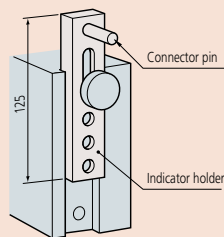


Mounting the Indicator Holder

Example 1



Example 2



Standard Accessories

- 513-401-10H (Metric)
- 902053: Clamp
- 601471: Indicator holder
- 538616: Hexagonal-head wrench (3 mm)

Note: Inspection certificate is not attached. Contact your local Mitutoyo sales office.

Optional Accessories

- 900565: Feeler
- 900571: Adjustable holder
- 900551: Extension holder

Square Master
SERIES 311 — Squareness/Straightness Measuring

- Squareness (perpendicularity) and straightness measurements can be performed accurately and efficiently by just moving a lever. Use the vertical motion handle on the rear of the main unit for operation.
- Sliding force: Approx. 2 to 5 N
- Highly accurate measurement of squareness and straightness is available by calibrating a square as a master using the built-in perpendicularity adjustment mechanism. Prepare a square to be used for accuracy check/adjustment separately.



311-215



311-225



311-245

SPECIFICATIONS

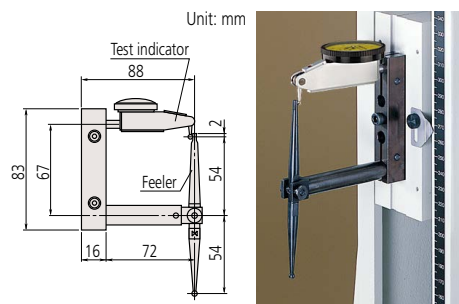
Order No.	Vertical travel (mm)	Squareness (μm)	Straightness (μm)	Dimension (mm)			Mass (kg)
				Width	Depth	Height	
311-215*	150	3	2	180	200	420	13.7
311-225*	250	6	2.5	180	200	520	16.2
311-245	450	9	3.5	220	220	720	24

* Riser blocks to extend the height of Square Masters can be used. (Refer to Page E-36 for details)

Optional accessories

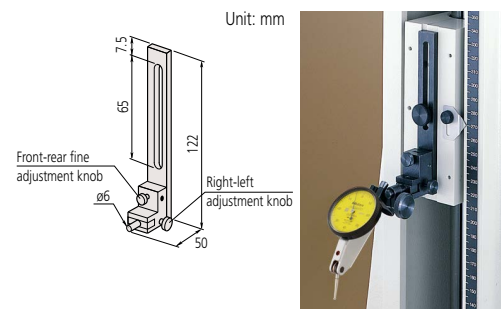
900565: Feeler

For probing surfaces that the contact point of a detector cannot reach.



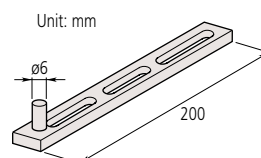
900571: Adjustable holder

Enables easy adjustment of indicator position.



900551: Extension holder

Measurement position can be extended by using this 200 mm length holder instead of the indicator holder.



Reference Gages

Steel Rules SERIES 182

- Clear graduations on satin-chrome finish.
- Stainless tempered.



182-101



182-102



182-103



182-105



182-201



182-202



182-205



182-302

SPECIFICATIONS

Metric Wide Rigid Rules			
Order No.	Graduations (mm)	Range (mm)	Width (mm)
182-111	1, 0.5 (on both faces)	150	19
182-131		300	25
182-151		450	30
182-171		600	30

Metric Fully-Flexible Rules			
Order No.	Graduations (mm)	Range (mm)	Width (mm)
182-211	1, 0.5 (on both faces)	150	12
182-231		300	12
182-251		450	19
182-271		600	19

Inch/Metric Semi-Flexible Rules			
Order No.	Graduations*	Range	Width (in)
182-302	1/16 in, 1/32 in, 1/64 in, 1 mm, 0.5 mm	6 in/150 mm	0.51
182-303		8 in/200 mm	0.51
182-305		12 in/300 mm	0.59
182-307		20 in/500 mm	0.59
182-309		40 in/1000 mm	0.59

* Engraved on the front side only.

Inch/Metric Wide Rigid Rules			
Order No.	Graduations	Range	Width (in)
182-105	1/32 in, 1/64 in, 1 mm, 0.5 mm	6 in/150 mm	0.75
182-125		12 in/300 mm	0.98
182-145		18 in/450 mm	1.18
182-165	24 in/600 mm	1.18	
182-106	1/50 in, 1/100 in, 1 mm, 0.5 mm	6 in/150 mm	0.75
182-126		12 in/300 mm	0.98
182-107	1/10 in, 1/100 in, 1 mm, 0.5 mm	6 in/150 mm	0.75
182-108	1/10 in, 1/50 in, 1 mm, 0.5 mm	6 in/150 mm	0.75

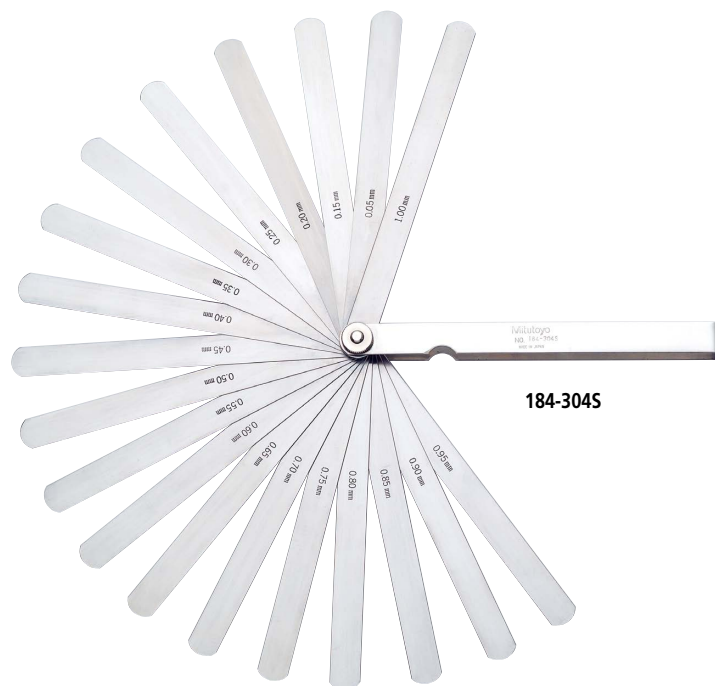
Inch/Metric Fully-Flexible Rules			
Order No.	Graduations	Range	Width (in)
182-205	1/32 in, 1/64 in, 1 mm, 0.5 mm	6 in/150 mm	0.47
182-225		12 in/300 mm	0.47
182-245		18 in/450 mm	0.75
182-265	24 in/600 mm	0.75	
182-206	1/50 in, 1/100 in, 1 mm, 0.5 mm	6 in/150 mm	0.47
182-226		12 in/300 mm	0.47
182-207	1/10 in, 1/100 in, 1 mm, 0.5 mm	6 in/150 mm	0.47
182-208	1/10 in, 1/50 in, 1 mm, 0.5 mm	6 in/150 mm	0.47

Inch Wide Rigid Rules			
Order No.	Graduations (in)	Range (in)	Width (in)
182-101	1/8, 1/16, 1/32, 1/64	6	0.75
182-121		12	0.98
182-141		18	0.71
182-161		24	1.18
182-102	1/50, 1/100, 1/32, 1/64	6	0.75
182-122		12	0.98
182-142		18	1.18
182-162		24	1.18
182-103	1/10, 1/100, 1/32, 1/64	6	0.75
182-123		12	0.98
182-143		18	1.18
182-163		24	1.18
182-104	1/10, 1/50, 1/32, 1/64	6	0.75
182-124		12	0.98

Inch Fully-Flexible Rules			
Order No.	Graduations (in)	Range (in)	Width (in)
182-201	1/8, 1/16, 1/32, 1/64	6	0.47
182-221		12	0.47
182-241		18	1.18
182-261		24	0.75
182-202	1/50, 1/100, 1/32, 1/64	6	0.47
182-222		12	0.47
182-242		18	0.75
182-262		24	0.75
182-203	1/10, 1/100, 1/32, 1/64	6	0.47
182-223		12	0.47
182-243		18	0.75
182-263		24	0.75
182-204	1/10, 1/50, 1/32, 1/64	6	0.47
182-224		12	0.47

Thickness Gages SERIES 184

- Metric thickness gages are available with tapered leaves.
- Each leaf is marked with its thickness.
- Each leaf is detachable if necessary.



SPECIFICATIONS

Metric			
Order No.	Range (mm)	Composition of leaves	Remarks
184-313S	0.05 - 1	28 leaves: 0.05 - 0.15 mm by 0.01 mm, 0.2 - 1 mm by 0.05 mm	—
184-303S		28 leaves: 0.05 - 0.15 mm by 0.01 mm, 0.2 - 1 mm by 0.05 mm	Long leaf
184-304S	0.05 - 1	20 leaves: 0.05 - 1 mm by 0.05 mm	Long leaf
184-305S	0.05 - 1	13 leaves: 0.05 - 0.3 mm by 0.05 mm, 0.4 - 1 mm by 0.1 mm	—
184-301S		13 leaves: 0.05 - 0.3 mm by 0.05 mm, 0.4 - 1 mm by 0.1 mm	Long leaf
184-306S	0.05 - 0.8	10 leaves: 0.05 - 0.2 mm by 0.05 mm, 0.3 - 0.8 mm by 0.1 mm	—
184-308S		10 leaves: 0.05 - 0.2 mm by 0.05 mm, 0.3 - 0.8 mm by 0.1 mm	Long leaf
184-307S	0.03 - 0.5	13 leaves: 0.03 - 0.1 mm by 0.01 mm, 0.2 - 0.5 mm by 0.1 mm, 0.15 mm	—
184-302S		13 leaves: 0.03 - 0.1 mm by 0.01 mm, 0.2 - 0.5 mm by 0.1 mm, 0.15 mm	Long leaf

DIMENSIONS

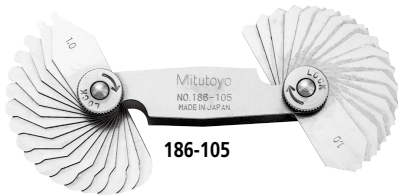
Unit: mm

Order No.	L1	L2
184-313S	100	106
184-303S	150	156
184-304S	150	156
184-305S	100	106
184-301S	150	156
184-306S	100	106
184-308S	150	156
184-307S	100	106
184-302S	150	156

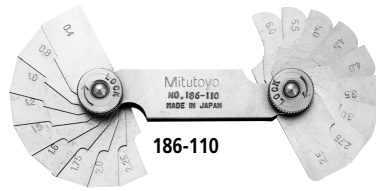
Reference Gages

Radius Gages SERIES 186

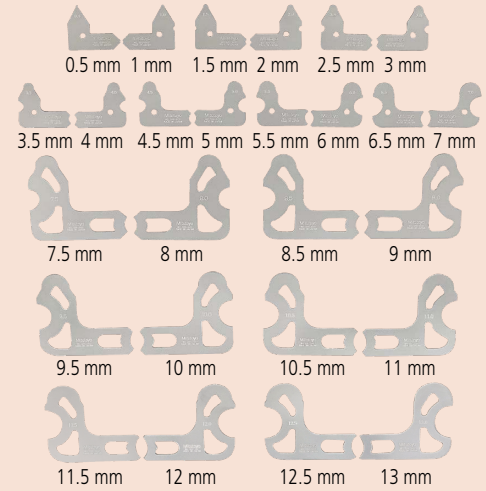
- Radius size is stamped on each gage leaf.
- Each leaf comprises an internal and an external radius gage of the same size.
- With locking clamp.



186-105



186-110



Composition of leaves for 186-902

SPECIFICATIONS

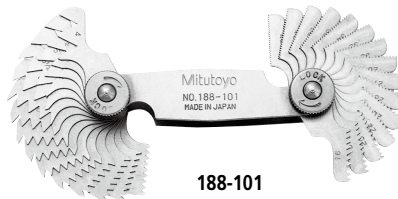
Metric				
Order No.	Range (mm)	Accuracy	Composition of leaves	Remarks
186-110	0.4 - 6	±0.04 mm	18 leaves: 0.4, 0.8, 1, 1.2, 1.5, 1.6 mm, 1.75 - 3 mm by 0.25 mm, 3.5 - 6 mm by 0.5 mm	90° arc
186-902	0.5 - 13		26 leaves: 0.5 - 13 mm by 0.5 mm	90° arc, separate part type
186-105	1 - 7		34 leaves: 1 - 3 mm by 0.25 mm, 3.5 - 7 mm by 0.5 mm	180° arc
186-106	7.5 - 15		32 leaves: 7.5 - 15 mm by 0.5 mm	180° arc
186-107	15.5 - 25		30 leaves: 15.5 - 20 mm by 0.5 mm, 21 - 25 mm by 1 mm	180° arc

Inch				
Order No.	Range (in)	Accuracy	Composition of leaves	Remarks
186-103	1/32 - 17/64	±0.002 in	16 leaves: 1/32 in - 17/64 in by 64ths	90° arc
186-101	1/32 - 1/4		30 leaves: 1/32 in - 1/4 in by 64ths	180° arc
186-102	17/64 - 1/2		32 leaves: 17/64 in - 1/2 in by 64ths	180° arc
186-104	9/32 - 33/64		16 leaves: 9/32 in - 33/64 in by 64ths	90° arc
186-901*	1/64 - 1/2		25 leaves: 1/64 in - 17/64 in by 64ths, 9/32 in - 1/2 in by 32nds	—

* Each gage has five measuring locations.

Thread Pitch Gages SERIES 188

- Thread pitch is stamped on each gage.
- Metric, Unified, and Whitworth screw pitch gages.



188-101

SPECIFICATIONS

Metric Screw Pitch Gages				
Order No.	Range (mm)	Integration pitch error	Composition of leaves	Remarks
188-130	0.35 - 6	±0.05 mm	22 leaves: 0.35, 0.4, 0.45, 0.5, 0.6, 0.7, 0.75, 0.8, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6 mm and 60° angle gage	
188-122	0.4 - 7		21 leaves: 0.4, 0.5, 0.7, 0.75, 0.8, 0.9, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7 mm	
188-121	0.4 - 7		18 leaves: 0.4, 0.5, 0.75, 1, 1.25, 1.5, 1.75, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7 mm	

Unified Screw Pitch Gages

Order No.	Range	Integration pitch error	Composition of leaves
188-111	4 - 42 TPI	±0.002 in	30 leaves: 4, 4 ^{1/2} , 5, 5 ^{1/2} , 6, 7, 8, 9, 10, 11, 11 ^{1/2} , 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI

Note: Metric and Unified Pitch Gage Set (188-151) is available.

Metric and Unified Screw Pitch Gage Set

Order No.	Range	Integration pitch error	Composition of leaves
188-151	0.4 - 7 mm/4 - 42 TPI	±0.05 mm/ ±0.002 in	51 leaves: Set of 188-122 and 188-111

Whitworth Screw Pitch Gages

Order No.	Range	Integration pitch error	Composition of leaves
188-101	4 - 42 TPI	±0.002 in	30 leaves: 4, 4 ^{1/2} , 5, 5 ^{1/2} , 6, 7, 8, 9, 10, 11, 11 ^{1/2} , 12, 13, 14, 15, 16, 18, 20, 22, 24, 26, 27, 28, 30, 32, 34, 36, 38, 40, 42 TPI
188-102	4 - 60 TPI		28 leaves: 4, 4 ^{1/2} , 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 22, 24, 25, 26, 28, 30, 32, 34, 36, 40, 48, 60 TPI

Technical Data

- Battery: Lithium Battery
- Battery life: 2,000 hours

Function

- Presetting

Digital Universal Protractor SERIES 187

- Data output function makes it easy to gather statistical data.
- Can be attached to height gages using a gage holder (**950750**, metric)
- Setting preset value.
- Removable blade.



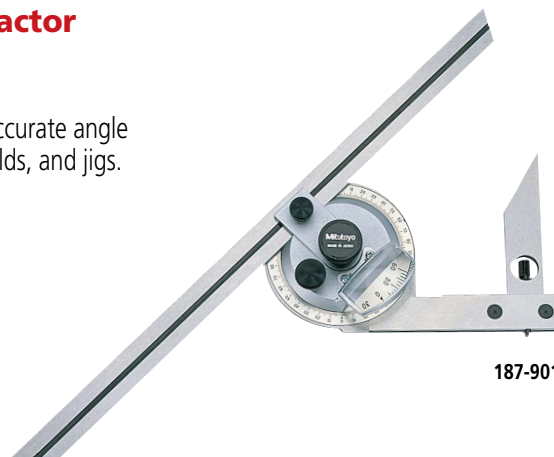
187-501

SPECIFICATIONS

Order No.	Blade length	Range	Resolution	Accuracy	Repeatability	Remarks (standard accessory)
187-501	150 mm	-360° to +360°	1' (0.01°)	±2' (±0.03°)	1'	Height gage holder (950750)
187-502	300 mm					Height gage holder (950750)
187-551	6 in					Height gage holder (950749)
187-552	12 in					Height gage holder (950749)

Universal Bevel Protractor SERIES 187

- High-precision instrument for accurate angle measurement on machines, molds, and jigs.
- Graduation: 5'



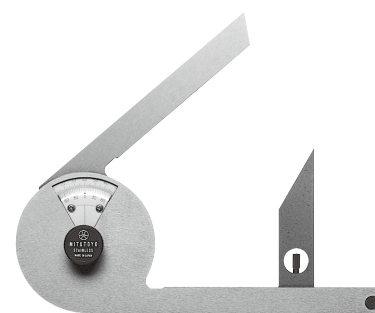
187-901

SPECIFICATIONS

Metric			Inch		
Order No.	Blade length (mm)	Remarks	Order No.	Blade length (in)	Remarks
187-901	150, 300	w/60°, 45°, 30° edges	187-902	6, 12	w/60°, 45°, 30° edges
187-907	150	w/60°, 45° edges	187-904	6	w/60°, 45° edges
187-908	300	w/60°, 45° edges	187-906	12	w/60°, 45° edges

Bevel Protractor SERIES 187

- Consists of three sheets of stainless steel, the middle one of which is made for angle measurements.



187-201

SPECIFICATIONS

Order No.	Blade length (mm)	Range	Graduation	Blade edge angle	Mass (g)	Remarks
187-201	137	90°x4 (360°)	5' (0° to 90° to 0°)	30° and 60°	260	w/60°, 30° edges