

Bore Gages

Bore Gages SERIES 526 — for Extra Small Holes

- This bore gage is designed to measure small holes of 1 to 7 mm diameter.
- The dial indicator is optional. Refer to page 08-52 for recommended indicators.
- Optional stand (215-120-10) is available for efficient measurement of multiple small holes.



526-170-11

Note: The dial indicator and the dial protection cover are optional.
Refer to page 08-52 for details.

SPECIFICATIONS

Metric							
Code No.	Range (mm)	Accuracy* (μm)	Repeatability* (μm)	Bore gage	Dial indicator	Dial protection cover	Setting ring
526-170-10	0.95 - 1.55	4	1	526-170-10	Not supplied	Not supplied	Not supplied
526-160-10	1.50 - 3.95	4		526-160-10			
526-150-10	3.70 - 7.30	6		526-150-10			
526-172-20	0.95 - 1.55	4		526-170-10	2109AB-10 (Graduation: 0.001 mm)	21DZA000	
526-162-20	1.50 - 3.95	4		526-160-10			
526-152-20	3.70 - 7.30	6		526-150-10	2046AB (Graduation: 0.01 mm)	21DZA000	
526-173-20	0.95 - 1.55	4		526-170-10			
526-163-20	1.50 - 3.95	4		526-160-10	Not supplied	Not supplied	
526-153-20	3.70 - 7.30	6		526-150-10			
526-170-11	0.95 - 1.55	4		526-170-10			
526-160-11	1.50 - 3.95	4		526-160-10	Not supplied	Not supplied	
526-150-11	3.70 - 7.30	6		526-150-10			
526-172-21	0.95 - 1.55	4		526-170-10	2109AB-10 (Graduation: 0.001 mm)	21DZA000	Supplied
526-162-21	1.50 - 3.95	4		526-160-10			
526-152-21	3.70 - 7.30	6		526-150-10	2046AB (Graduation: 0.01 mm)	21DZA000	
526-173-21	0.95 - 1.55	4		526-170-10			
526-163-21	1.50 - 3.95	4		526-160-10			
526-153-21	3.70 - 7.30	6		526-150-10			

Inch							
Code No.	Range (in)	Accuracy* (in)	Repeatability* (in)	Bore gage	Dial indicator	Dial protection cover	Setting ring
526-175-10	0.037 - 0.061	0.00016	0.00004	526-175-10	Not supplied	Not supplied	Not supplied
526-165-10	0.059 - 0.156	0.00016		526-165-10			
526-155-10	0.146 - 0.287	0.00024		526-155-10			
526-176-20	0.037 - 0.061	0.00016		526-175-10	2923AB-10 (Graduation: 0.0001 in)	21DZA000	
526-166-20	0.059 - 0.156	0.00016		526-165-10			
526-156-20	0.146 - 0.287	0.00024		526-155-10	Not supplied	Not supplied	
526-175-11	0.037 - 0.061	0.00016		526-175-10			
526-165-11	0.059 - 0.156	0.00016		526-165-10	2923AB-10 (Graduation: 0.0001 in)	21DZA000	Supplied
526-155-11	0.146 - 0.287	0.00024		526-155-10			
526-176-21	0.037 - 0.061	0.00016		526-175-10			
526-166-21	0.059 - 0.156	0.00016		526-165-10			
526-156-21	0.146 - 0.287	0.00024		526-155-10			

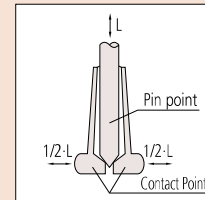
* Accuracy of the bore gage alone.

Note: Setting rings are not supplied with some models. Please purchase them separately if necessary. For details of setting rings, refer to page 08-53.

Measurement example



Measurement Principle



Setting Rings (Metric)

Nominal size

- Code No. 526-170-11 etc.

177-220: 1.0 mm

177-222: 1.1 mm

177-225: 1.2 mm

177-227: 1.3 mm

177-230: 1.4 mm

- Code No. 526-160-11 etc.

177-236: 1.75 mm

177-239: 2.00 mm

177-242: 2.25 mm

177-208: 2.50 mm

177-246: 2.75 mm

177-248: 3.00 mm

177-250: 3.25 mm

177-252: 3.50 mm

177-255: 3.75 mm

- Code No. 526-150-11 etc.

177-204: 4.0 mm

177-257: 4.5 mm

177-205: 5.0 mm

177-263: 5.5 mm

177-267: 6.0 mm

177-271: 6.5 mm

177-275: 7.0 mm

Setting Rings (Inch)

Nominal size

- Code No. 526-175-11 etc.

177-350: 0.040 in

177-351: 0.045 in

177-352: 0.050 in

177-353: 0.055 in

177-354: 0.060 in

- Code No. 526-165-11 etc.

177-355: 0.07 in

177-356: 0.08 in

177-357: 0.09 in

177-358: 0.10 in

177-359: 0.11 in

177-360: 0.12 in

177-361: 0.13 in

177-362: 0.14 in

177-363: 0.15 in

- Code No. 526-155-11 etc.

177-364: 0.16 in

177-365: 0.18 in

177-366: 0.20 in

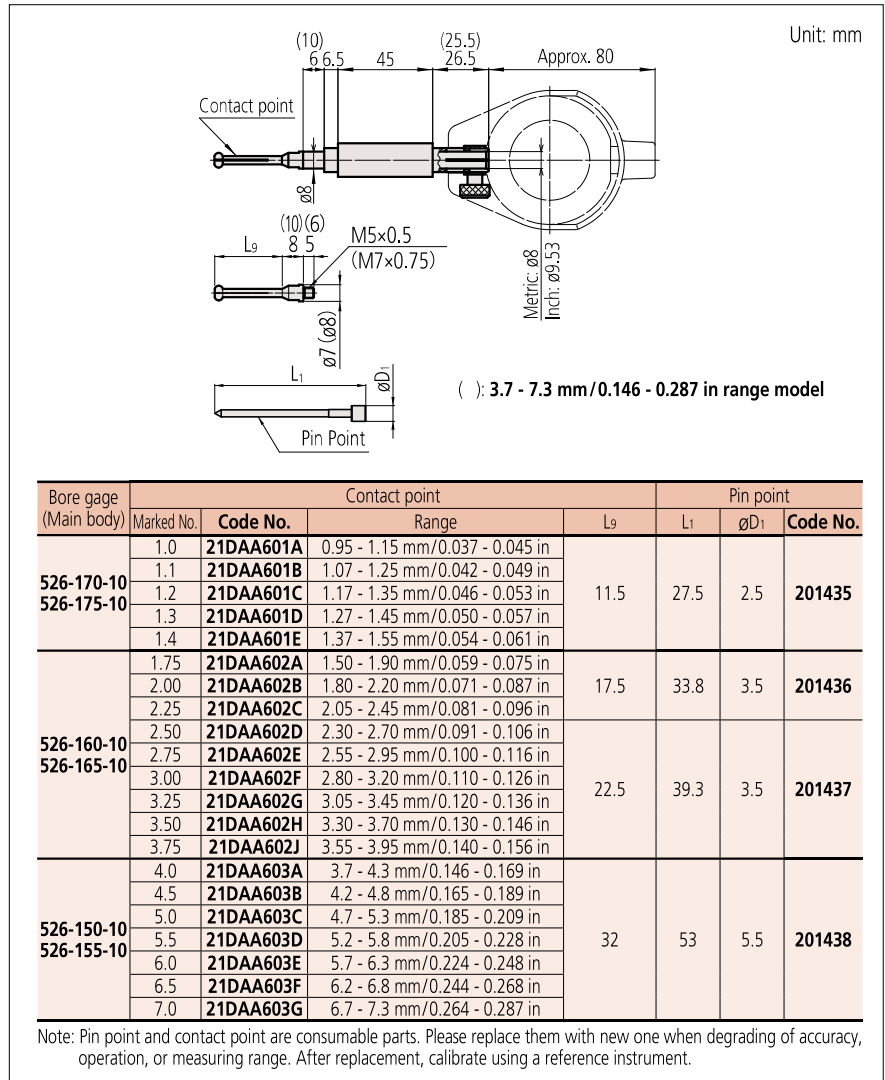
177-367: 0.22 in

177-368: 0.24 in

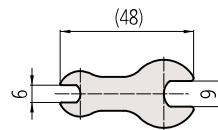
177-369: 0.26 in

177-370: 0.28 in

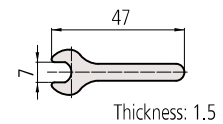
DIMENSIONS



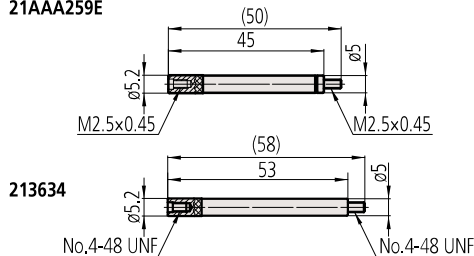
Spanner
210188



102148



Extension rod
21AAA259E



Bore gage	Spanner	Extension rod
526-170-10 526-160-10	210188	21AAA259E
526-150-10 526-175-10 526-165-10	102148	213634
526-155-10	210188	

() : 3.7 - 7.3 mm / 0.146 - 0.287 in range model

Note: This is not a component for extending the probing depth. (Standard Accessory)

Bore Gages

Bore Gages SERIES 526 — for Extra Small Holes

- This bore gage is designed to measure small holes of 7 to 18 mm diameter.
- The dial indicator is optional. Refer to page 08-52 for recommended indicators.
- Optional stand (215-120-10) is available for efficient measurement of multiple small holes.



526-101

Note: The dial indicator and the dial protection cover are optional.
Refer to page 08-52 for details.

SPECIFICATIONS

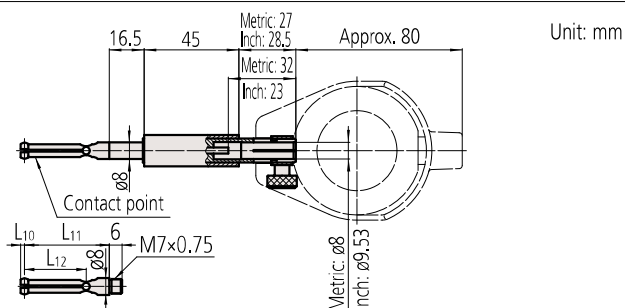
Metric				Refer to page 08-32 for details.				
Code No.	Range (mm)	Accuracy* (μm)	Repeatability* (μm)	Bore gage	Dial indicator	Dial protection cover	Setting ring	
526-101	7 - 10	4	2	526-101	Not supplied	Not supplied	Not supplied	
526-102	10 - 18	6		526-102				
526-124-20	7 - 10	4		526-101	2109AB-10 (Graduation: 0.001 mm)	21DZA000		
526-125-20	10 - 18	6		526-102				
526-126-20	7 - 10	4		526-101	2046AB (Graduation: 0.01 mm)			
526-127-20	10 - 18	6		526-102				
Inch								
Code No.	Range (in)	Accuracy* (in)	Repeatability* (in)	Bore gage	Dial indicator	Dial protection cover	Setting ring	
526-103	0.3 - 0.4	0.00016	0.00008	526-103	Not supplied	Not supplied	Not supplied	
526-104	0.4 - 0.7	0.00024		526-104				
526-122-20	0.3 - 0.4	0.00016		526-103	2923AB-10 (Graduation: 0.0001 in)	21DZA000		
526-123-20	0.4 - 0.7	0.00024		526-104				
526-119-20	0.3 - 0.4	0.00016		526-103	2922AB (Graduation: 0.0005 in)			21DZA000
526-120-20	0.4 - 0.7	0.00024		526-104				

* Accuracy of the bore gage alone.

Note: Setting rings are not supplied.

Please purchase them separately if necessary. For details of the setting rings, refer to page 08-53.

DIMENSIONS



STANDARD ACCESSORIES

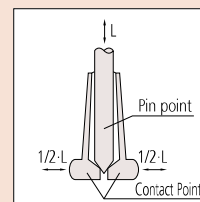
Bore gage (Main body)	Contact point						Spanner Code No.
	Marked No.	Code No.	Range	L ₁₀	L ₁₁	L ₁₂	
526-101 526-103	1	102469	7.0 - 7.5 mm/0.28 - 0.30 in	1.8	40	29.2	102148
	2	102470	7.5 - 8.0 mm/0.30 - 0.32 in				
	3	102471	8.0 - 8.5 mm/0.32 - 0.34 in				
	4	102472	8.5 - 9.0 mm/0.34 - 0.36 in				
	5	102473	9.0 - 9.5 mm/0.36 - 0.38 in				
	6	102474	9.5 - 10.0 mm/0.38 - 0.40 in				
526-102 526-104	1	102454	10 - 11 mm/0.40 - 0.44 in	2.7	46	38	102148
	2	102455	11 - 12 mm/0.44 - 0.48 in				
	3	102456	12 - 13 mm/0.48 - 0.52 in				
	4	102457	13 - 14 mm/0.52 - 0.56 in				
	5	102458	14 - 15 mm/0.56 - 0.60 in				
	6	102459	15 - 16 mm/0.60 - 0.64 in				
	7	102460	16 - 17 mm/0.64 - 0.68 in				
	8	102461	17 - 18 mm/0.68 - 0.72 in				

Note: Contact point is consumable part. Please replace it with new one when degrading of accuracy, operation, or measuring range.

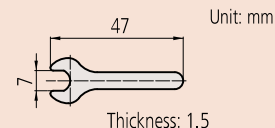
Measurement example



Measurement Principle



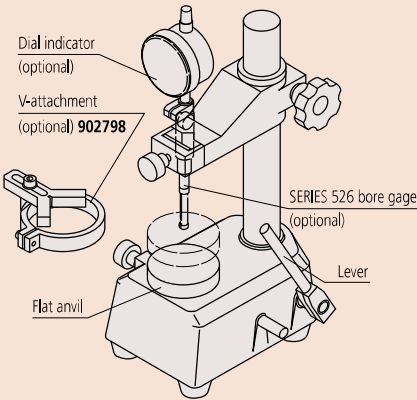
Spanner
102148



Bore Gage Stand
SERIES 215

Operating Method

- Pulling the lever forwards moves the platen upwards and the instrument goes into measurement mode.
- The V-attachment (optional) aids positioning the workpiece on the platen and is useful when measuring a large number of the same size of workpiece.



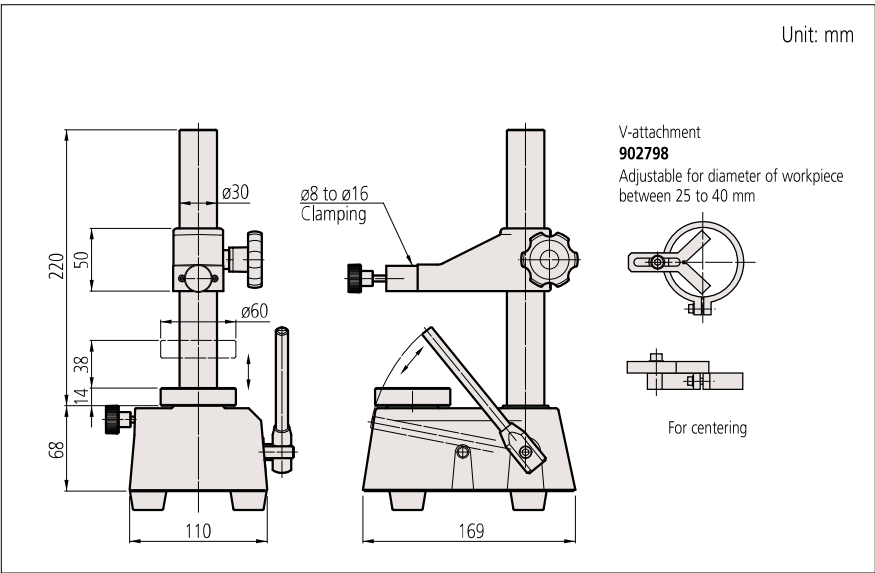
- Optimal for efficient measurement of multiple small holes with a bore gage. (SERIES 526)



SPECIFICATIONS

Code No.	Measuring table displacement (mm)	Measuring table
215-120-10	38	Anvil (ø60 mm)

DIMENSIONS



Bore Gages

Bore Gages SERIES 511 — for Small Holes

- This bore gage is designed to measure the diameters of very small holes.
- The dial indicator is optional. Refer to page 08-52 for recommended indicators.
- Customized products with a longer rod below the grip or with a carbide anvil are available upon request.
- An optional setting ring is available for accurately setting the gage before measuring. Refer to pages 08-53 to 08-55.



511-201

Note: The dial indicator and the dial protection cover are optional.
Refer to page 08-52 for details.

SPECIFICATIONS

Metric							
Code No.	Range (mm)	Stroke of contact point (mm)	Accuracy* (μm)	Repeatability* (μm)	Adjacent error* (μm)	Measuring force (N)	Guide force (N)
511-209	6 - 10	0.5	5	2	2	2 or less	—
511-201	10 - 18.5	0.6					6 or less
511-210-20	6 - 10	0.5	5	2	2	2 or less	—
511-203-20	10 - 18.5	0.6					6 or less
511-211-20	6 - 10	0.5	5	2	2	2 or less	—
511-204-20	10 - 18.5	0.6					6 or less

Code No.	Content of set					Probing depth (mm)
	Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	
511-209	511-209	Not supplied	Not supplied	9 pcs.	Not supplied	50
511-201	511-201				1 pc.	100
511-210-20	511-209	2109AB-10 (Graduation: 0.001 mm)	21DZA000	9 pcs.	Not supplied	50
511-203-20	511-201				1 pc.	100
511-211-20	511-209	2046AB (Graduation: 0.01 mm)	21DZA000	9 pcs.	Not supplied	50
511-204-20	511-201				1 pc.	100

Inch							
Code No.	Range (in)	Stroke of contact point (in)	Accuracy* (in)	Repeatability* (in)	Adjacent error* (in)	Measuring force (N)	Guide force (N)
511-214	0.24 - 0.4	0.020	0.0002	0.00008	0.00008	2 or less	—
511-205	0.4 - 0.74	0.024					6 or less
511-212-20	0.24 - 0.4	0.020	0.0002	0.00008	0.00008	2 or less	—
511-206-20	0.4 - 0.74	0.024					6 or less
511-213-20	0.24 - 0.4	0.020	0.0002	0.00008	0.00008	2 or less	—
511-207-20	0.4 - 0.74	0.024					6 or less

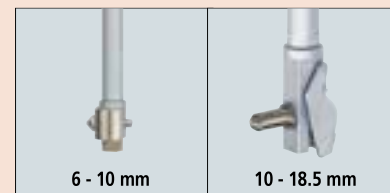
Code No.	Content of set					Probing depth (in)
	Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	
511-214	511-214	Not supplied	Not supplied	9 pcs.	Not supplied	2
511-205	511-205				1 pc.	4
511-212-20	511-214	2923AB-10 (Graduation: 0.0001 in)	21DZA000	9 pcs.	Not supplied	2
511-206-20	511-205				1 pc.	4
511-213-20	511-214	2922AB (Graduation: 0.0005 in)	21DZA000	9 pcs.	Not supplied	2
511-207-20	511-205				1 pc.	4

* Accuracy of the bore gage alone.

Measurement example



Contact Points

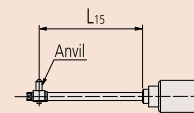


The dial protection cover, recommended indicators

Refer to page 08-52.

Special sizes and specifications other than standard can be custom-made by special order. Please contact your local Mitutoyo Sales Office for more information.

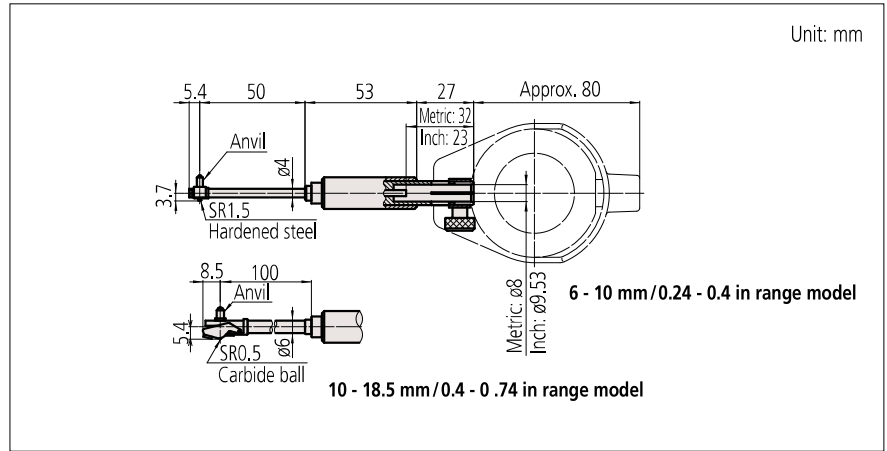
Example



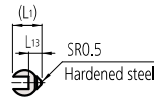
Length below the grip

Model	L15 (mm)
511-209	100, 150, 200, 250
511-201	50, 150, 200, 250, 300

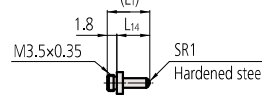
DIMENSIONS



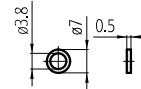
511-209/511-214
Anvil



511-201/511-205
Anvil



Interchangeable washer
(Supplied only with 511-201/511-205)



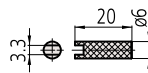
204355

STANDARD ACCESSORIES

Bore gage (Main body)	Anvil					Interchangeable Washer	Spanner
	Marked No.	Code No.	Indication of measuring size	L ₁	L ₁₃	Code No.	Code No.
511-209 511-214	1	952168	6.0 mm/0.24 in	4.7	1.2	Not supplied	206709
	2	952169	6.5 mm/0.26 in	5.3	1.7		
	3	952170	7.0 mm/0.28 in	5.8	2.2		
	4	952414	7.5 mm/0.30 in	6.3	2.7		
	5	952415	8.0 mm/0.32 in	6.8	3.2		
	6	952416	8.5 mm/0.34 in	7.3	3.7		
	7	952417	9.0 mm/0.36 in	7.8	4.2		
	8	952418	9.5 mm/0.38 in	8.3	4.7		
	9	952419	10.0 mm/0.40 in	8.8	5.2		

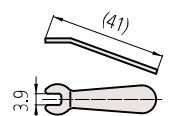
Bore gage (Main body)	Anvil					Interchangeable Washer	Spanner
	Marked No.	Code No.	Indication of measuring size	L ₁	L ₁₄	Code No.	Code No.
511-201 511-205	1	204356	10 mm/0.40 in	3.8	2	204355	204354
	2	204357	11 mm/0.44 in	4.8	3		
	3	204358	12 mm/0.48 in	5.8	4		
	4	204359	13 mm/0.52 in	6.8	5		
	5	204360	14 mm/0.56 in	7.8	6		
	6	204361	15 mm/0.60 in	8.8	7		
	7	204362	16 mm/0.64 in	9.8	8		
	8	204363	17 mm/0.68 in	10.8	9		
	9	204364	18 mm/0.72 in	11.8	10		

Spanner
206709



204354

Unit: mm



Thickness: 1.5

Bore Gages

Bore Gages SERIES 511

- This is a bore gage for measuring 18 to 400 mm inside diameter. It is suitable for highly accurate measurements.
- Carbide-tipped contact point and anvil for durability and wear resistance.
- Optional extension rods can be attached for measuring deep holes.



511-702

Note: The dial indicator and the dial protection cover are optional. Refer to page 08-52 for details.

SPECIFICATIONS

Metric							
Code No.	Range (mm)	Stroke of contact point (mm)	Accuracy* (μm)	Repeatability* (μm)	Adjacent error* (μm)	Measuring force (N)	Guide force (N)
511-701	18 - 35	1.2	2	0.5	1	4 or less	6 or less
511-702	35 - 60						
511-703	50 - 150	1.6	2	0.5	1	5 or less	10 or less
511-704	100 - 160						
511-705	160 - 250					6 or less	15 or less
511-706	250 - 400						
511-721-20	18 - 35	1.2	2	0.5	1	4 or less	6 or less
511-722-20	35 - 60						
511-723-20	50 - 150	1.6	2	0.5	1	5 or less	10 or less
511-724-20	100 - 160						
511-725-20	160 - 250					6 or less	15 or less
511-726-20	250 - 400						
511-711-20	18 - 35	1.2	2	0.5	1	4 or less	6 or less
511-712-20	35 - 60						
511-713-20	50 - 150	1.6	2	0.5	1	5 or less	10 or less
511-714-20	100 - 160						
511-715-20	160 - 250					6 or less	15 or less
511-716-20	250 - 400						
511-921-20		See SPECIFICATIONS of 511-701/702/703					
511-922-20	18 - 150						
511-925-10							

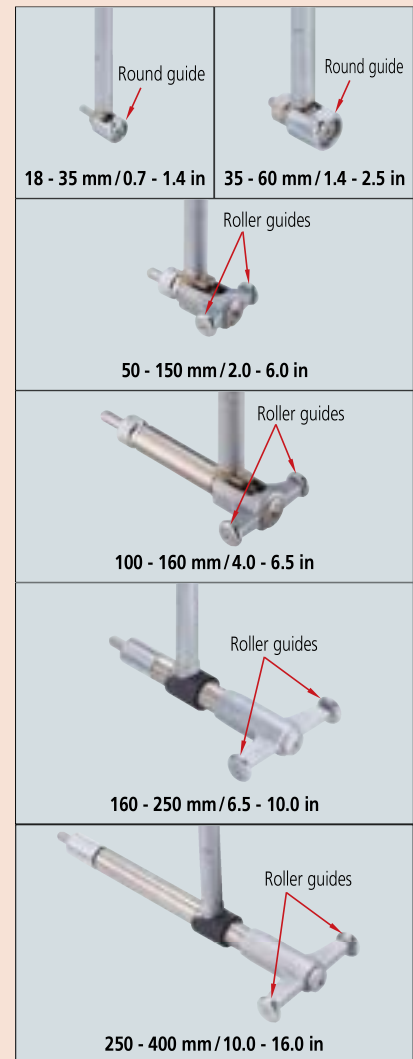
Code No.		Content of set						Probing depth (mm)	
Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner			
511-701	511-701	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	100	
511-702	511-702			6 pcs.	4 pcs.	Not supplied	Not supplied	150	
511-703	511-703			11 pcs.					1 pc.
511-704	511-704			13 pcs.					
511-705	511-705			6 pcs.	7 pcs.	Not supplied	Not supplied	250	
511-706	511-706			5 pcs.					1 pc.
511-721-20	511-701	2109AB-10 (Graduation: 0.001 mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100	
511-722-20	511-702			6 pcs.	4 pcs.	Not supplied	Not supplied	150	
511-723-20	511-703			11 pcs.					1 pc.
511-724-20	511-704			13 pcs.					
511-725-20	511-705			6 pcs.	7 pcs.	Not supplied	Not supplied	250	
511-726-20	511-706			5 pcs.					1 pc.
511-711-20	511-701	2046AB (Graduation: 0.01 mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100	
511-712-20	511-702			6 pcs.	4 pcs.	Not supplied	Not supplied	150	
511-713-20	511-703			11 pcs.					1 pc.
511-714-20	511-704			13 pcs.					
511-715-20	511-705			6 pcs.	7 pcs.	Not supplied	Not supplied	250	
511-716-20	511-706			5 pcs.					1 pc.
511-921-20	Set of	2046AB	21DZA000	See SPECIFICATIONS of 511-701/702/703					
511-922-20	511-701/	2109AB-10							
511-925-10	702/703	543-310B							

* Accuracy of the bore gage alone.

Note 1: A 50 mm sub-anvil is supplied with 511-703, and a 75 mm sub-anvil is supplied with 511-706.

Note 2: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

Contact Points



Extension Rod

Refer to page 08-51.

The dial protection cover, recommended indicators

Refer to page 08-52.

Setting rings

Refer to pages 08-53 to 08-56.

- Metric type: **543-310B-10** (0.001 mm)
- Inch type: **543-312B-10** (0.001 mm/0.00005 in)



- The ID measurement can be performed easily since the minimum value is detected automatically.
- Up to three combinations of master value and tolerance value can be set.
- Nine measurement results (maximum) can be saved and recalled from memory (when no external device is connected). Refer to page 07-15 for details.

- Metric type: **543-700B** (0.0005 mm)
- Inch type: **543-702B** (0.0005 mm/0.00002 in)



- When using with **543-700B** or **543-702B**, modification of the setting is required.
Refer to page 07-5 for details.

A carbide ball is used for the contact point. It is more abrasion resistant than a hardened steel ball and, as its surface is smoother than that of a carbide tip, the workpiece is less liable to be marked.

Hardened steel ball (conventional model)	Carbide ball (current model)
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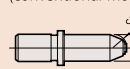
Abrasion depth: 0.1 mm
750 HV or more



Abrasion depth: 0.001 mm
1350 HV or more

- Load a 0.5 N weight on the anvil, and slide for 1,000 m on abrasive paper of 9 μm (#2000) particle size.

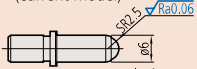
Carbide tip (conventional model)	Carbide ball (current model)



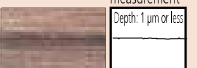
Result of contour measurement



Vertical magnification: 2,000



Result of contour measurement



Vertical magnification: 2,00

- Load a 4 N weight on the anvil, and slide on the aluminum plate back and forth for 20 times.

Inch							
Code No.	Range (in)	Stroke of contact point (in)	Accuracy* (in)	Repeatability* (in)	Adjacent error* (in)	Measuring force (N)	Guide force (N)
511-731	0.7 - 1.4	0.047	0.00008	0.00002	0.00004	4 or less	6 or less
511-732	1.4 - 2.5						
511-733	2.0 - 6.0					0.063	
511-734	4.0 - 6.5						
511-735	6.5 - 10.0						
511-736	10.0 - 16.0						
511-751-20	0.7 - 1.4	0.047	0.00008	0.00002	0.00004	4 or less	6 or less
511-752-20	1.4 - 2.5						
511-753-20	2.0 - 6.0					0.063	
511-754-20	4.0 - 6.5						
511-755-20	6.5 - 10.0						
511-756-20	10.0 - 16.0						
511-741-20	0.7 - 1.4	0.047	0.00008	0.00002	0.00004	4 or less	6 or less
511-742-20	1.4 - 2.5						
511-743-20	2.0 - 6.0					0.063	
511-744-20	4.0 - 6.5						
511-745-20	6.5 - 10.0						
511-746-20	10.0 - 16.0						
511-931-20	0.7 - 6.0	See SPECIFICATIONS of 511-731/732/733					
511-932-20							
511-935-10							

[illegible]

Note 2: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

100 123 Approx. 80 Unit: mm

Metric 32
Inch: 23

Anvil

Contact point
SR0.75 Carbide ball

11.9 4.3 6.4 12.7

18 - 35 mm / 0.7 - 1.4 in

Metric: $\phi 8$
Inch: $\phi 3.53$

Bore gage (Main body)	Anvil				
	Marked No.	Code No.	Indication of measuring size	L ₁	L ₁₄
511-701 511-731	1	21DZA213A	18 mm/0.71 in	5.5	2.5
	2	21DZA213B	20 mm/0.79 in	7.5	4.5
	3	21DZA213C	22 mm/0.87 in	9.5	6.5
	4	21DZA213D	24 mm/0.94 in	11.5	8.5
	5	21DZA213E	26 mm/1.02 in	13.5	10.5
	6	21DZA213F	28 mm/1.10 in	15.5	12.5
	7	21DZA213G	30 mm/1.18 in	17.5	14.5
	8	21DZA213H	32 mm/1.26 in	19.5	16.5
	9	21DZA213J	34 mm/1.34 in	21.5	18.5

Anvil

SR1.5
Carbide ball

M5x0.5

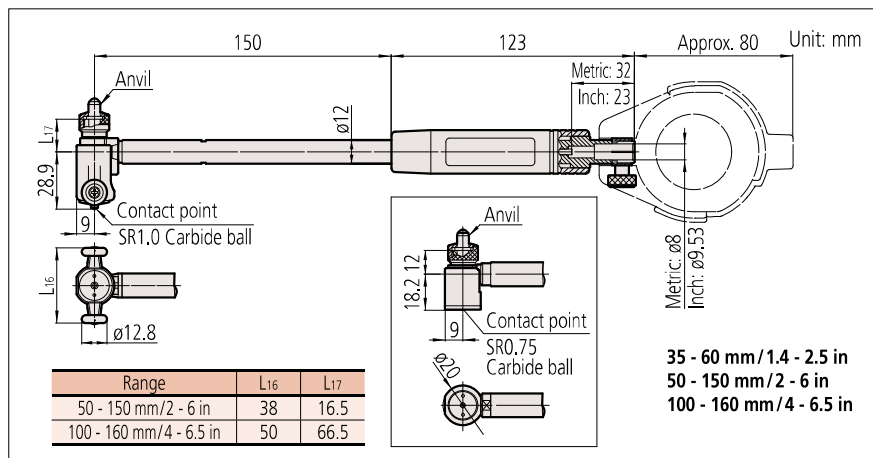
(L1)
L14
3

t (mm)	Code No.
0.5	205623
1	205624

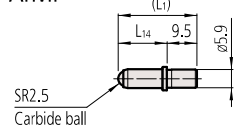
Bore Gages

Bore Gages SERIES 511

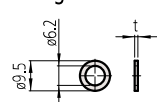
DIMENSIONS



Anvil



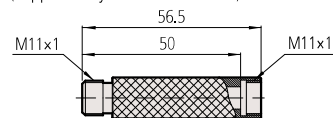
Interchangeable washer



t (mm)	Code No.
0.5	205457
1	205458
2	205459
3	205460

Sub-anvil

(Supplied only for 511-703/733)



102178

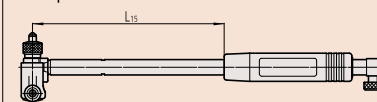
Note: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

STANDARD ACCESSORIES

Bore gage (Main body)	Anvil				
	Marked No.	Code No.	Indication of measuring size	L1	L14
511-702 511-732	1	21DZA232A	35 mm / 1.38 in	15	5.5
	2	21DZA232B	40 mm / 1.57 in	20	10.5
	3	21DZA232C	45 mm / 1.77 in	25	15.5
	4	21DZA232D	50 mm / 1.97 in	30	20.5
	5	21DZA232E	55 mm / 2.17 in	35	25.5
	6	21DZA232F	60 mm / 2.36 in	40	30.5
511-703 511-733 () Using 50 mm / 2 in Sub-Anvil	1	21DZA232A	50 mm (100 mm) / 1.97 in (3.94 in)	15	5.5
	2	21DZA232B	55 mm (105 mm) / 2.17 in (4.13 in)	20	10.5
	3	21DZA232C	60 mm (110 mm) / 2.36 in (4.33 in)	25	15.5
	4	21DZA232D	65 mm (115 mm) / 2.55 in (4.53 in)	30	20.5
	5	21DZA232E	70 mm (120 mm) / 2.74 in (4.72 in)	35	25.5
	6	21DZA232F	75 mm (125 mm) / 2.93 in (4.92 in)	40	30.5
	7	21DZA232G	80 mm (130 mm) / 3.12 in (5.12 in)	45	35.5
	8	21DZA232H	85 mm (135 mm) / 3.31 in (5.31 in)	50	40.5
	9	21DZA232J	90 mm (140 mm) / 3.50 in (5.51 in)	55	45.5
	10	21DZA232L	95 mm (145 mm) / 3.69 in (5.71 in)	60	50.5
	11	21DZA232M	100 mm (150 mm) / 3.88 in (5.91 in)	65	55.5
511-704 511-734	1	21DZA232A	100 mm / 3.94 in	15	5.5
	2	21DZA232B	105 mm / 4.13 in	20	10.5
	3	21DZA232C	110 mm / 4.33 in	25	15.5
	4	21DZA232D	115 mm / 4.53 in	30	20.5
	5	21DZA232E	120 mm / 4.72 in	35	25.5
	6	21DZA232F	125 mm / 4.92 in	40	30.5
	7	21DZA232G	130 mm / 5.12 in	45	35.5
	8	21DZA232H	135 mm / 5.31 in	50	40.5
	9	21DZA232J	140 mm / 5.51 in	55	45.5
	10	21DZA232L	145 mm / 5.71 in	60	50.5
	11	21DZA232M	150 mm / 5.91 in	65	55.5
	12	21DZA232N	155 mm / 6.10 in	70	60.5
	13	21DZA232P	160 mm / 6.30 in	75	65.5

Special sizes and specifications other than standard can be custom-made by special order. Please contact your local Mitutoyo Sales Office for more information.

Example



Length below the grip

Model	L15 (mm)
511-701	150, 200, 250, 300, 400, 500
511-702/703/704	100, 200, 250, 300, 400, 500, 600, 700, 800, 900, 1000
511-705/706	100, 150, 200, 300, 400, 500, 600, 700, 800, 900, 1000

Note: The length over listed above is not available.

Bore Gages

Bore Gages SERIES 511 — Short Leg Type

- This is a bore gage for measuring 18 to 160 mm inside diameter.
- With a short length below the grip, a lightweight and easy-to-handle body makes it easier to insert the gage in a narrow space or perform measurements on a table.
- Carbide-tipped contact point and anvil for durability and wear resistance.



511-761

Note: The dial indicator and the dial protection cover are optional.
Refer to page 08-52 for details.

SPECIFICATIONS

Metric							
Code No.	Range (mm)	Stroke of contact point (mm)	Accuracy* (μm)	Repeatability* (μm)	Adjacent error* (μm)	Measuring force (N)	Guide force (N)
511-761	18 - 35	1.2	2	0.5	1	4 or less	6 or less
511-762	35 - 60					5 or less	10 or less
511-763	50 - 150	1.6	2	0.5	1	4 or less	6 or less
511-764	100 - 160					5 or less	10 or less
511-771-20	18 - 35	1.2	2	0.5	1	4 or less	6 or less
511-772-20	35 - 60					5 or less	10 or less
511-773-20	50 - 150	1.6	2	0.5	1	4 or less	6 or less
511-774-20	100 - 160					5 or less	10 or less
511-766-20	18 - 35	1.2	2	0.5	1	4 or less	6 or less
511-767-20	35 - 60					5 or less	10 or less
511-768-20	50 - 150	1.6	2	0.5	1	4 or less	6 or less
511-769-20	100 - 160					5 or less	10 or less

Code No.	Content of set							Probing depth (mm)
	Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner	
511-761	511-761	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	50
511-762	511-762			6 pcs.	4 pcs.	1 pc.	Not supplied	
511-763	511-763			11 pcs.	4 pcs.	Not supplied	Not supplied	
511-764	511-764			13 pcs.	4 pcs.	Not supplied	Not supplied	
511-771-20	511-761	2109AB-10 (Graduation: 0.001 mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	50
511-772-20	511-762			6 pcs.	4 pcs.	1 pc.	Not supplied	
511-773-20	511-763			11 pcs.	4 pcs.	Not supplied	Not supplied	
511-774-20	511-764			13 pcs.	4 pcs.	Not supplied	Not supplied	
511-766-20	511-761	2046AB (Graduation: 0.01 mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	50
511-767-20	511-762			6 pcs.	4 pcs.	1 pc.	Not supplied	
511-768-20	511-763			11 pcs.	4 pcs.	Not supplied	Not supplied	
511-769-20	511-764			13 pcs.	4 pcs.	Not supplied	Not supplied	

* Accuracy of the bore gage alone.

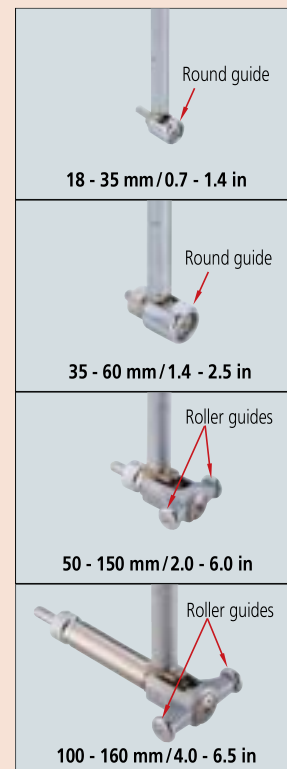
Note 1: A 50 mm sub-anvil is supplied with 511-763.

Note 2: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

Measurement example



Contact Points



The dial protection cover, recommended indicators

Refer to page 08-52.

SPECIFICATIONS

Inch							
Code No.	Range (in)	Stroke of contact point (in)	Accuracy* (in)	Repeatability* (in)	Adjacent error* (in)	Measuring force (N)	Guide force (N)
511-781	0.7 - 1.4	0.047	0.00008	0.00002	0.00004	4 or less	6 or less
511-782	1.4 - 2.5					5 or less	10 or less
511-783	2.0 - 6.0						
511-784	4.0 - 6.5	0.063	0.00008	0.00002	0.00004	4 or less	6 or less
511-791-20	0.7 - 1.4	0.047				5 or less	10 or less
511-792-20	1.4 - 2.5						
511-793-20	2.0 - 6.0					0.063	4 or less
511-794-20	4.0 - 6.5	0.047	5 or less	10 or less			
511-786-20	0.7 - 1.4						
511-787-20	1.4 - 2.5		0.00008	0.00002	0.00004	4 or less	6 or less
511-788-20	2.0 - 6.0	5 or less				10 or less	
511-789-20	4.0 - 6.5						

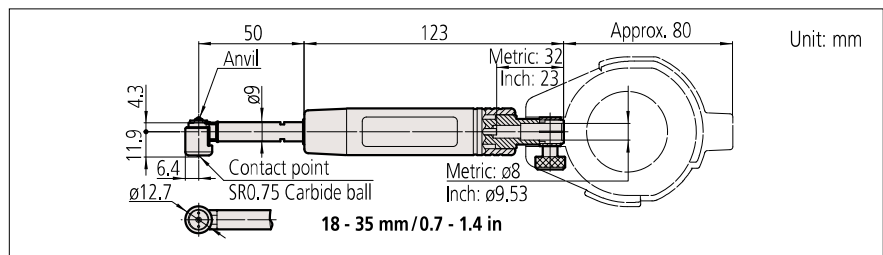
Code No.	Content of set							Probing depth (in)
	Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner	
511-781	511-781	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	2
511-782	511-782			6 pcs.	4 pcs.	1 pc.	Not supplied	
511-783	511-783			11 pcs.		Not supplied	Not supplied	
511-784	511-784			13 pcs.		Not supplied	Not supplied	
511-791-20	511-781	2923AB-10 (Graduation: 0.0001 in)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	2
511-792-20	511-782			6 pcs.	4 pcs.	1 pc.	Not supplied	
511-793-20	511-783			11 pcs.		Not supplied	Not supplied	
511-794-20	511-784			13 pcs.		Not supplied	Not supplied	
511-786-20	511-781	2922AB (Graduation: 0.0005 in)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	2
511-787-20	511-782			6 pcs.	4 pcs.	1 pc.	Not supplied	
511-788-20	511-783			11 pcs.		Not supplied	Not supplied	
511-789-20	511-784			13 pcs.		Not supplied	Not supplied	

* Accuracy of the bore gage alone.

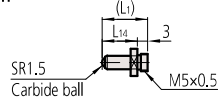
Note 1: A 2" sub-anvil is supplied with 511-783.

Note 2: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

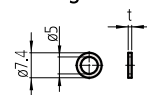
DIMENSIONS



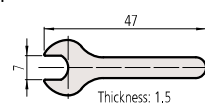
Anvil



Interchangeable washer



Spanner 102148



t (mm)	Code No.
0.5	205623
1	205624

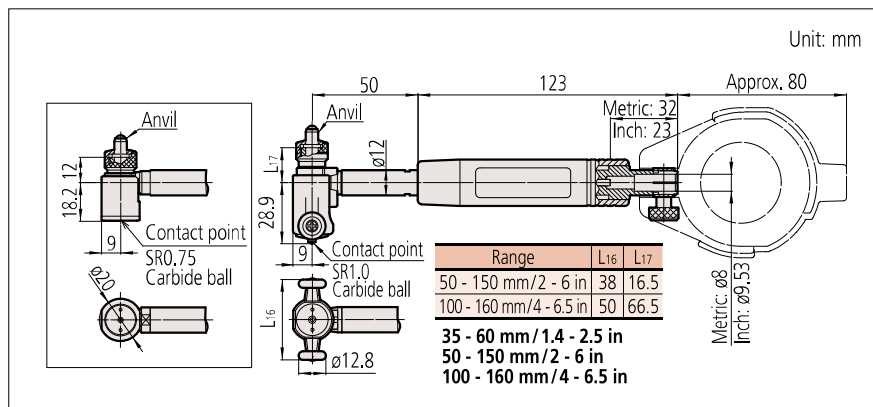
STANDARD ACCESSORIES

Bore gage (Main body)	Anvil				
	Marked No.	Code No.	Indication of measuring size	L1	L14
511-761 511-781	1	21DZA213A	18 mm/0.71 in	5.5 mm/0.22 in	2.5 mm/0.10 in
	2	21DZA213B	20 mm/0.79 in	7.5 mm/0.30 in	4.5 mm/0.18 in
	3	21DZA213C	22 mm/0.87 in	9.5 mm/0.37 in	6.5 mm/0.26 in
	4	21DZA213D	24 mm/0.94 in	11.5 mm/0.45 in	8.5 mm/0.33 in
	5	21DZA213E	26 mm/1.02 in	13.5 mm/0.53 in	10.5 mm/0.41 in
	6	21DZA213F	28 mm/1.10 in	15.5 mm/0.61 in	12.5 mm/0.49 in
	7	21DZA213G	30 mm/1.18 in	17.5 mm/0.69 in	14.5 mm/0.57 in
	8	21DZA213H	32 mm/1.26 in	19.5 mm/0.77 in	16.5 mm/0.65 in
	9	21DZA213J	34 mm/1.34 in	21.5 mm/0.85 in	18.5 mm/0.73 in

Bore Gages

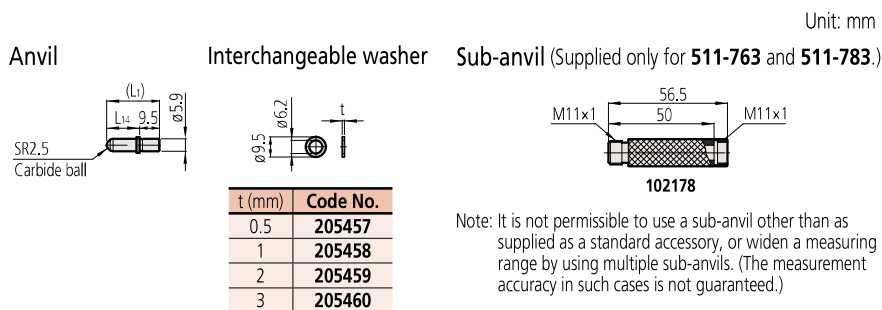
Bore Gages SERIES 511 — Short Leg Type

DIMENSIONS



Recommended Digimatic Indicators

Refer to page 08-38.



STANDARD ACCESSORIES

Bore gage (Main body)	Anvil				
	Marked No.	Code No.	Indication of measuring size	L1	L14
511-762 511-782	1	21DZA232A	35 mm / 1.38 in	15	5.5
	2	21DZA232B	40 mm / 1.57 in	20	10.5
	3	21DZA232C	45 mm / 1.77 in	25	15.5
	4	21DZA232D	50 mm / 1.97 in	30	20.5
	5	21DZA232E	55 mm / 2.17 in	35	25.5
	6	21DZA232F	60 mm / 2.36 in	40	30.5
511-763 511-783 () Using 50 mm / 2 in Sub-Anvil	1	21DZA232A	50 mm (100 mm) / 1.97 in (3.94 in)	15	5.5
	2	21DZA232B	55 mm (105 mm) / 2.17 in (4.13 in)	20	10.5
	3	21DZA232C	60 mm (110 mm) / 2.36 in (4.33 in)	25	15.5
	4	21DZA232D	65 mm (115 mm) / 2.55 in (4.53 in)	30	20.5
	5	21DZA232E	70 mm (120 mm) / 2.74 in (4.72 in)	35	25.5
	6	21DZA232F	75 mm (125 mm) / 2.93 in (4.92 in)	40	30.5
	7	21DZA232G	80 mm (130 mm) / 3.12 in (5.12 in)	45	35.5
	8	21DZA232H	85 mm (135 mm) / 3.31 in (5.31 in)	50	40.5
	9	21DZA232J	90 mm (140 mm) / 3.50 in (5.51 in)	55	45.5
	10	21DZA232L	95 mm (145 mm) / 3.69 in (5.71 in)	60	50.5
	11	21DZA232M	100 mm (150 mm) / 3.88 in (5.91 in)	65	55.5
511-764 511-784	1	21DZA232A	100 mm / 3.94 in	15	5.5
	2	21DZA232B	105 mm / 4.13 in	20	10.5
	3	21DZA232C	110 mm / 4.33 in	25	15.5
	4	21DZA232D	115 mm / 4.53 in	30	20.5
	5	21DZA232E	120 mm / 4.72 in	35	25.5
	6	21DZA232F	125 mm / 4.92 in	40	30.5
	7	21DZA232G	130 mm / 5.12 in	45	35.5
	8	21DZA232H	135 mm / 5.31 in	50	40.5
	9	21DZA232J	140 mm / 5.51 in	55	45.5
	10	21DZA232L	145 mm / 5.71 in	60	50.5
	11	21DZA232M	150 mm / 5.91 in	65	55.5
	12	21DZA232N	155 mm / 6.10 in	70	60.5
	13	21DZA232P	160 mm / 6.30 in	75	65.5

Measurement example



The dial protection cover, recommended indicators

Refer to page 08-52.

Bore Gages
SERIES 511 — with Micrometer Head

- Micrometer head is attached to the anvil for convenient and accurate dimensional measurements.
- Carbide-tipped contact point for durability and wear resistance.



511-803

Note: The dial indicator and the dial protection cover are optional. Refer to page 08-52 for details.

SPECIFICATIONS

Metric							
Code No.	Range (mm)	Stroke of contact point (mm)	Accuracy* (μm)	Repeatability* (μm)	Adjacent error* (μm)	Measuring force (N)	Guide force (N)
511-803	60 - 100	1.6	2	0.5	1	5 or less	10 or less
511-804	100 - 160					6 or less	15 or less
511-805	150 - 250						
511-806	250 - 400						
511-807	400 - 600						
511-808	600 - 800	1.6	2	0.5	1	5 or less	10 or less
511-823-20	60 - 100					6 or less	15 or less
511-824-20	100 - 160						
511-825-20	150 - 250						
511-826-20	250 - 400						
511-827-20	400 - 600					6 or less	20 or less
511-828-20	600 - 800						
511-813-20	60 - 100	1.6	2	0.5	1	5 or less	10 or less
511-814-20	100 - 160					6 or less	15 or less
511-815-20	150 - 250						
511-816-20	250 - 400						
511-817-20	400 - 600						
511-818-20	600 - 800					6 or less	20 or less

Code No.	Content of set						Probing depth (mm)	
	Bore gage	Dial indicator	Dial protection cover	Micrometer head	Sub-Anvil	Spanner		
511-803	511-803	Not supplied	Not supplied	1 pc.	2 pcs.	3 pcs.	150	
511-804	511-804				3 pcs.	2 pcs.		
511-805	511-805				4 pcs.			
511-806	511-806				3 pcs.			
511-807	511-807				2 pcs.			
511-808	511-808				2 pcs.	250		
511-823-20	511-803	2109AB-10 (Graduation: 0.001 mm)	21DZA000	1 pc.	2 pcs.		3 pcs.	150
511-824-20	511-804				3 pcs.		2 pcs.	
511-825-20	511-805				4 pcs.			
511-826-20	511-806				3 pcs.	250		
511-827-20	511-807				2 pcs.			
511-828-20	511-808				2 pcs.			
511-813-20	511-803	2046AB (Graduation: 0.01 mm)	21DZA000	1 pc.	2 pcs.	3 pcs.	150	
511-814-20	511-804				3 pcs.	2 pcs.		
511-815-20	511-805				4 pcs.			
511-816-20	511-806				3 pcs.		250	
511-817-20	511-807				2 pcs.			
511-818-20	511-808				2 pcs.			

* Accuracy of the bore gage alone.

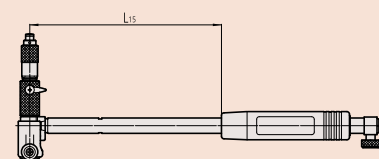
Note 1: Storage boxes for 511-807/808 models are made of wood. The boxes of other models are made of plastic.

Note 2: It is not permissible to expand measuring range using sub-anvils other than as supplied as standard accessories.

(The measurement accuracy in such cases is not guaranteed.)

Special sizes and specifications other than standard can be custom-made by special order. Please contact your local Mitutoyo Sales Office for more information.

Example



Length below the grip

Model	L15 (mm)
511-803/804	50, 100, 200, 250, 300, 400, 500, 600, 700, 800, 900, 1000
511-805/806/807/808	50, 100, 150, 200, 300, 400, 500, 600, 700, 800, 900, 1000

Note: The length over listed above is not available.

Bore Gages

Bore Gages SERIES 511 — with Micrometer Head

SPECIFICATIONS

Inch							
Code No.	Range (in)	Stroke of contact point (in)	Accuracy* (in)	Repeatability* (in)	Adjacent error* (in)	Measuring force (N)	Guide force (N)
511-833	2.4 - 4.0	0.063	0.00008	0.00002	0.00004	5 or less	10 or less
511-834	4.0 - 6.4					6 or less	15 or less
511-835	6.0 - 10.0						20 or less
511-836	10.0 - 16.0						
511-837	16.0 - 24.0						
511-838	24.0 - 32.0	0.063	0.00008	0.00002	0.00004	5 or less	10 or less
511-853-20	2.4 - 4.0					6 or less	15 or less
511-854-20	4.0 - 6.4						20 or less
511-855-20	6.0 - 10.0						
511-856-20	10.0 - 16.0						
511-857-20	16.0 - 24.0	0.063	0.00008	0.00002	0.00004	5 or less	10 or less
511-858-20	24.0 - 32.0					6 or less	15 or less
511-843-20	2.4 - 4.0						20 or less
511-844-20	4.0 - 6.4						
511-845-20	6.0 - 10.0						
511-846-20	10.0 - 16.0	0.063	0.00008	0.00002	0.00004	5 or less	10 or less
511-847-20	16.0 - 24.0					6 or less	15 or less
511-848-20	24.0 - 32.0						20 or less

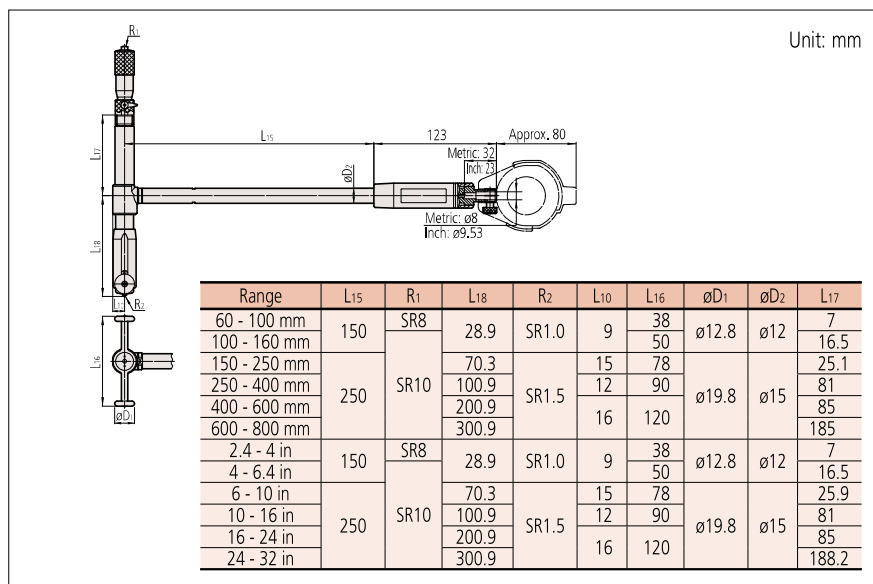
Code No.	Content of set					Probing depth (in)	
	Bore gage	Dial indicator	Dial protection cover	Micrometer head	Sub-Anvil	Spanner	
511-833	511-833	Not supplied	Not supplied	1 pc.	2 pcs.	3 pcs.	6
511-834	511-834				3 pcs.	2 pcs.	10
511-835	511-835				4 pcs.		
511-836	511-836				3 pcs.		
511-837	511-837				2 pcs.		
511-838	511-838	2923AB-10 (Graduation: 0.0001 in)	21DZA000	1 pc.	2 pcs.	3 pcs.	4
511-853-20	511-833				3 pcs.	2 pcs.	6
511-854-20	511-834				4 pcs.		
511-855-20	511-835				3 pcs.		
511-856-20	511-836				2 pcs.		
511-857-20	511-837	2922AB (Graduation: 0.0005 in)	21DZA000	1 pc.	2 pcs.	3 pcs.	4
511-858-20	511-838				2 pcs.	2 pcs.	6
511-843-20	511-833				3 pcs.		
511-844-20	511-834				4 pcs.		
511-845-20	511-835				3 pcs.		
511-846-20	511-836	2922AB (Graduation: 0.0005 in)	21DZA000	1 pc.	2 pcs.	3 pcs.	4
511-847-20	511-837				2 pcs.	2 pcs.	10
511-848-20	511-838				2 pcs.		

* Accuracy of the bore gage alone.

Note 1: Storage boxes for 511-837/838 models are made of wood. The boxes of other models are made of plastic.

Note 2: It is not permissible to expand measuring range using sub-anvils other than as supplied as standard accessories.
(The measurement accuracy in such cases is not guaranteed.)

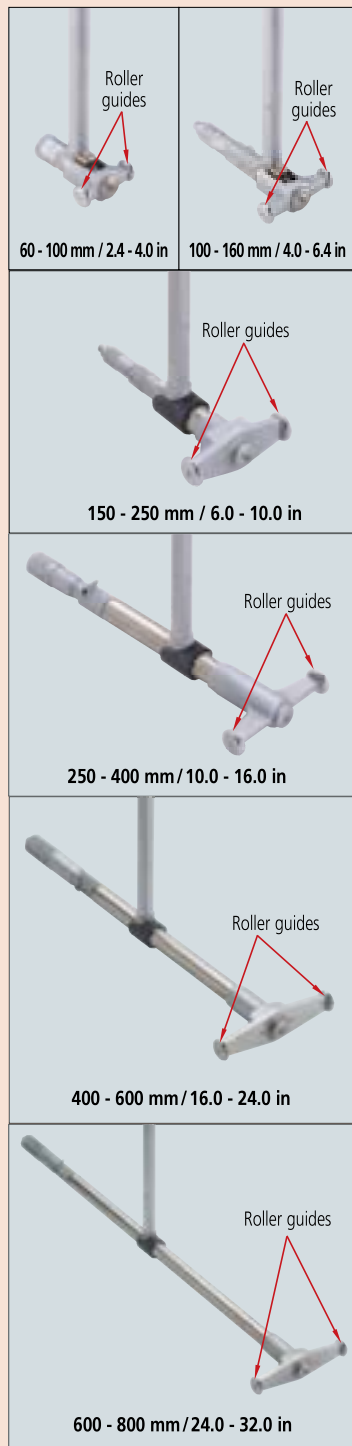
DIMENSIONS



Recommended Digimatic Indicators

Refer to page 08-38.

Contact Points



Sub-anvil

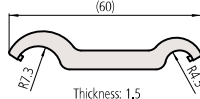
Unit: mm



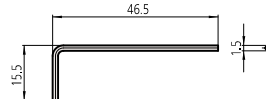
Note: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

Spanner

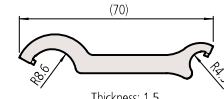
301336



202863



200154



STANDARD ACCESSORIES

Metric								
Bore gage (Main body)	Micrometer head			Sub-Anvil				Spanner
	Code No.	Stroke (mm)	Screw size	Marked No. (mm)	Code No.	L ₁ (mm)	L ₁₉ (mm)	Code No.
511-803	21DZA267	10	M11x1	10	208892	15	10	301336 (2 pcs.)
				20	208894	25	20	202863 (1 pc.)
511-804	21DZA268	13	M11x1	10	208892	15	10	301336 (2 pcs.)
				20	208894 (2 pcs.)	25	20	
511-805	21DZA268	13	M11x1	10	208892	15	10	301336 (2 pcs.)
				20	208894 (2 pcs.)	25	20	
				50	21DAA492	55	50	
511-806	953118	25	M16x1	25	208926	35	25	200154 (2 pcs.)
				50	208928 (2 pcs.)	60	50	
				100	208932	110	100	
511-807	953120	50	M16x1	50	208928	60	50	200154 (2 pcs.)
				100	208932	110	100	200154 (2 pcs.)
511-808	953120	50	M16x1	50	208928	60	50	200154 (2 pcs.)
				100	208932	110	100	200154 (2 pcs.)

Inch								
Bore gage (Main body)	Micrometer head			Sub-Anvil				Spanner
	Code No.	Stroke (in)	Screw size	Marked No. (in)	Code No.	L ₁ (in)	L ₁₉ (in)	Code No.
511-833	21DZA272	0.4	M11x1	0.4	208893	0.6	0.4	301336 (2 pcs.)
				0.8	208895	1.0	0.8	202863 (1 pc.)
511-834	21DZA273	0.5	M11x1	0.4	208893	0.6	0.4	301336 (2 pcs.)
				0.8	208895 (2 pcs.)	1.0	0.8	
511-835	21DZA273	0.5	M11x1	0.4	208893	0.6	0.4	301336 (2 pcs.)
				0.8	208895 (2 pcs.)	1.0	0.8	
				2	21DAA493	2.2	2	
511-836	21DZA275	1.0	M16x1	1	208927	1.4	1	200154 (2 pcs.)
				2	208929 (2 pcs.)	2.4	2	
511-837	902313	2.0	M16x1	2	208929	2.4	2	200154 (2 pcs.)
				4	208933	4.4	4	200154 (2 pcs.)
511-838	902313	2.0	M16x1	2	208929	2.4	2	200154 (2 pcs.)
				4	208933	4.4	4	200154 (2 pcs.)

Bore Gages

Bore Gages SERIES 511 — for Blind Holes

- This is a bore gage for measuring diameters near the bottom of a hole.
- Carbide-tipped contact point and anvil for durability and wear resistance.
- Optional extension rods can be attached for measuring deep holes.



511-415

Note: The dial indicator and the dial protection cover are optional.
Refer to page 08-52 for details.

SPECIFICATIONS

Metric											
Code No.	Range (mm)	Stroke of contact point (mm)	Accuracy* (μm)	Repeatability* (μm)	Adjacent error* (μm)	Measuring force (N)	Guide force (N)	Content of set			
								Bore gage	Dial indicator	Dial protection cover	Probing depth (mm)
511-415	15 - 35	1.2	4	1	1	4 or less	6 or less	511-415	Not supplied	Not supplied	11 pcs.
511-416	35 - 60					5 or less	10 or less	511-416			1 pc.
511-417	50 - 150					5 or less	10 or less	511-417			4 pcs.
511-425-20	15 - 35	1.2	4	1	1	4 or less	6 or less	511-415	2046AB (Graduation: 0.01 mm)	21DZA000	11 pcs.
511-426-20	35 - 60					5 or less	10 or less	511-416			1 pc.
511-427-20	50 - 150					5 or less	10 or less	511-417			4 pcs.
511-435-20	15 - 35	1.2	4	1	1	4 or less	6 or less	511-415	2109AB-10 (Graduation: 0.001 mm)	21DZA000	11 pcs.
511-436-20	35 - 60					5 or less	10 or less	511-416			1 pc.
511-437-20	50 - 150					5 or less	10 or less	511-417			4 pcs.

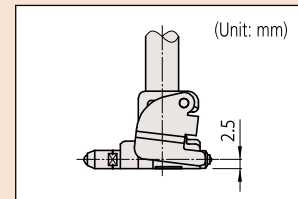
Inch											
Code No.	Range (in)	Stroke of contact point (in)	Accuracy* (in)	Repeatability* (in)	Adjacent error* (in)	Measuring force (N)	Guide force (N)	Content of set			
								Bore gage	Dial indicator	Dial protection cover	Probing depth (in)
511-418	0.6 - 1.4	0.047	0.00016	0.00004	0.00004	4 or less	6 or less	511-418	Not supplied	Not supplied	11 pcs.
511-419	1.4 - 2.4					5 or less	10 or less	511-419			1 pc.
511-420	2.0 - 6.0					5 or less	10 or less	511-420			4 pcs.
511-428-20	0.6 - 1.4	0.047	0.00016	0.00004	0.00004	4 or less	6 or less	511-418	2922AB (Graduation: 0.0005 in)	21DZA000	11 pcs.
511-429-20	1.4 - 2.4					5 or less	10 or less	511-419			1 pc.
511-430-20	2.0 - 6.0					5 or less	10 or less	511-420			4 pcs.
511-438-20	0.6 - 1.4	0.047	0.00016	0.00004	0.00004	4 or less	6 or less	511-418	2923AB-10 (Graduation: 0.0001 in)	21DZA000	11 pcs.
511-439-20	1.4 - 2.4					5 or less	10 or less	511-419			1 pc.
511-440-20	2.0 - 6.0					5 or less	10 or less	511-420			4 pcs.

* Accuracy of the bore gage alone.

Note 1: A 10 mm (0.4 in) sub-anvil is supplied with 511-415/425-20/435-20/418/428-20/438-20 and a 50 mm (2 in) sub-anvil is supplied with 511-417/427-20/437-20/420/430-20/440-20.

Note 2: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

Measurement example



Extension Rod

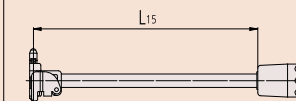
Refer to page 08-51.

The dial protection cover, recommended indicators

Refer to page 08-52.

Special sizes and specifications other than standard can be custom-made by special order. Please contact your local Mitutoyo Sales Office for more information.

Example



Length below the grip

Model	L15 (mm)
511-415/416/417	50, 150, 200, 250, 300, 400, 500

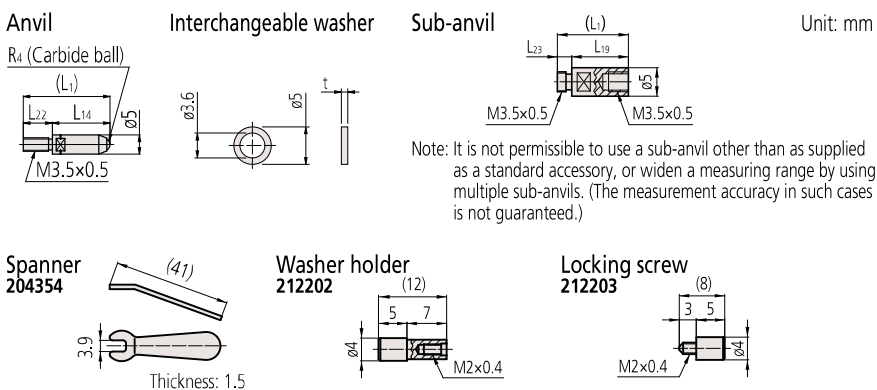
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Refer to page 08-38.

Unit: mm

Technical drawing of the SRO.75 Cartridge showing dimensions and specifications. The drawing includes a side view with dimensions: 150, 123, and Approx. 80. A detail view shows the anvil and contact point with dimensions L17, L21, and 2.5. The contact point is labeled 'SRO.75 Cartridge ball'. The drawing also shows the metric and inch dimensions for the cartridge body: Metric: 32, Inch: 23. The drawing also shows the metric and inch dimensions for the cartridge body: Metric: 32, Inch: 23. The drawing also shows the metric and inch dimensions for the cartridge body: Metric: 32, Inch: 23.

Range	L21	L16	L17
15 - 35 mm/0.6 - 1.4 in	9.9	10.6	3.8
35 - 60 mm/1.4 - 2.4 in	14.3	18	11.4
50 - 150 mm/2.0 - 6.0 in	22.7	22	18



Bore gage (Main body)	Anvil							Interchangeable washer		Sub-Anvil		
	Marked No.	Code No.	Indication of measuring size	L ₁	L ₂₂	R ₄	L ₁₄	Code No.	t	Code No.	L ₂₃	L ₁₉
511-415 511-418 () Using 10 mm/0.4 in Sub-Anvil	1	21DZA376A	15 mm (25 mm)/0.59 in (0.98 in)	4.5			2	212127	0.5 mm/0.02 in	21DAA563	2.5	10 mm 0.4 in
	2	21DZA376B	16 mm (26 mm)/0.63 in (1.02 in)	5.5			3					
	3	21DZA376C	17 mm (27 mm)/0.67 in (1.06 in)	6.5			4					
	4	21DZA376D	18 mm (28 mm)/0.71 in (1.10 in)	7.5			5					
	5	21DZA376E	19 mm (29 mm)/0.75 in (1.14 in)	8.5			6					
	6	21DZA376F	20 mm (30 mm)/0.79 in (1.18 in)	9.5	2.5		7					
	7	21DZA376G	21 mm (31 mm)/0.83 in (1.22 in)	10.5			8					
	8	21DZA376H	22 mm (32 mm)/0.87 in (1.26 in)	11.5			9					
	9	21DZA376I	23 mm (33 mm)/0.91 in (1.30 in)	12.5			10					
	10	21DZA376L	24 mm (34 mm)/0.94 in (1.34 in)	13.5			11					
	11	21DZA376M	25 mm (35 mm)/0.98 in (1.38 in)	14.5			12					
511-416 511-419	1	21DZA404A	35 mm/1.38 in	17.5			10	212127 212128 212129 212130	0.5 mm/0.02 in 1.0 mm/0.04 in 2.0 mm/0.08 in 3.0 mm/0.12 in			
	2	21DZA404B	40 mm/1.57 in	22.5			15					
	3	21DZA404C	45 mm/1.77 in	27.5			20					
	4	21DZA404D	50 mm/1.97 in	32.5	7.5		25					
	5	21DZA404E	55 mm/2.17 in	37.5			30					
	6	21DZA404F	60 mm/2.36 in	42.5			35					
511-417 511-420 () Using 50 mm/2 in Sub-Anvil	1	21DZA404A	50 mm (100 mm)/1.97 in (3.94 in)	17.5			10	212127 212128 212129 212130	0.5 mm/0.02 in 1.0 mm/0.04 in 2.0 mm/0.08 in 3.0 mm/0.12 in	21DAA596	7.5	50 mm 2 in
	2	21DZA404B	55 mm (105 mm)/2.17 in (4.13 in)	22.5			15					
	3	21DZA404C	60 mm (110 mm)/2.36 in (4.33 in)	27.5			20					
	4	21DZA404D	65 mm (115 mm)/2.56 in (4.53 in)	32.5			25					
	5	21DZA404E	70 mm (120 mm)/2.76 in (4.72 in)	37.5			30					
	6	21DZA404F	75 mm (125 mm)/2.95 in (4.92 in)	42.5	7.5		35					
	7	21DZA404G	80 mm (130 mm)/3.15 in (5.12 in)	47.5			40					
	8	21DZA404H	85 mm (135 mm)/3.35 in (5.31 in)	52.5			45					
	9	21DZA404J	90 mm (140 mm)/3.54 in (5.51 in)	57.5			50					
	10	21DZA404L	95 mm (145 mm)/3.74 in (5.71 in)	62.5			55					
	11	21DZA404M	100 mm (150 mm)/3.94 in (5.91 in)	67.5			60					

Bore Gages

MeasurLink ENABLED
Data Management Software by Mitutoyo

ABSOLUTE™

Bore Gages SERIES 511 — ABSOLUTE Digimatic Bore Gages

- An easy-to-use digital bore gage with preset and data output functions not available on analog models for use in various applications. Analog bar indicator allows for fast Go/No-go judgements.
- The minimum value holding function provides easy measurement of hole diameters.
- ABS (ABSOLUTE) type bore gages are not subject to overspeed error.
- The display and grip can be rotated up to 320° and the display can be inclined up to 90°, so that it is easily readable from any direction.
- Up to four extension rods (optional) can be used for measuring at the bottom of a hole 2 m deep.



511-501

SPECIFICATIONS

Metric		
Code No.	511-501	511-502
Range	45 - 100 mm	100 - 160 mm
Stroke of contact point	1.2 mm	
Resolution	0.001 mm	
Wide range accuracy*1	0.003 mm or less	
Adjacent error	0.002 mm or less	
Repeatability	0.002 mm or less	
Measuring force	5 N or less	
Guide force	10 N or less	
Power source	SR44 battery (2 pcs.), 938882 included as standard (for operational checks)	
Battery life*2	Approx. 2,000 hours under normal use.	
Position detection method	ABSOLUTE electrostatic linear encoder	
Sampling frequency*3	50 times/s	
Dust / Water protection level*4	IP53 (IEC 60529, JIS C 0920)	
Display	• 7 segments 6 digits decimal numeric with minus sign, Unit (mm) • Tolerance judge indication • Analog indication	
Net weight	500 g	570 g

Inch		
Code No.	511-521	511-522
Range	1.8 - 4.0 in	4.0 - 6.5 in
Stroke of contact point	0.048 in/1.2 mm	
Resolution	0.00005 in/0.001 mm	
Wide range accuracy*1	0.0001 in/0.003 mm or less	
Adjacent error	0.00008 in/0.002 mm or less	
Repeatability	0.0001 in/0.002 mm or less	
Measuring force	5 N or less	
Guide force	10 N or less	
Power source	SR44 battery (2 pcs.), 938882 included as standard (for operational checks)	
Battery life*2	Approx. 2,000 hours under normal use.	
Position detection method	ABSOLUTE electrostatic linear encoder	
Sampling frequency*3	50 times/s	
Dust / Water protection level*4	IP53 (IEC 60529, JIS C 0920)	
Display	• 7 segments 6 digits decimal numeric with minus sign, Unit (in/mm) • Tolerance judge indication • Analog indication	
Net weight	500 g	570 g

*1 A quantizing error is excluded.

*2 When the usage time per day is eight hours.

*3 If the contact point detecting speed is over 50 µm/s, the peak value may not be displayed correctly.

*4 The level indicated is valid only if the output connector cap is installed.

Measurement example



Function

- Preset function
- Master value registration (3 values maximum)
- Tolerance judgment
- Upper/lower limit registration (3 values maximum)
- Minimum value holding
- Data output
- Display rotation (320°)
- Display inclination (90°, 7 steps)
- Low battery alarm display
- Error display

Extension Rod (optional)

250 mm (10 in): **21DZA089**

500 mm (20 in): **21DZA081**

Up to four extension rods can be joined, and a maximum length of 2 m is allowed.

Optional Accessories

Code No.	Type	description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type IT-020U
905338	F	Connection cable (1 m)
905409	F	Connection cable (2 m)
06AFM380F	F	USB Input Tool Direct (2 m)
02AZD730*	IP67	U-WAVE-T
02AZD880*	Buzzer	U-WAVE-T
02AZD790F	F	Connection cable for U-WAVE-T (160 mm)
02AZE140F	F	Connection cable for U-WAVE-T For foot switch
02AZD810D	—	U-WAVE-R

* Add suffix to Code No.; **G** for Asia, Europe and the Americas, **H** for Brazil and **J** for Korea.

- Typical application



- | Description* | | Code No. | Qty |
|---------------------------------|----|-------------------|-----------------|
| Nominal length
(mm) | 1 | 611611-021 | 1 |
| | 2 | 611612-021 | 1 |
| | 3 | 611613-021 | 1 |
| | 5 | 611615-021 | 1 |
| | 10 | 611671-021 | 1 |
| | 20 | 611672-021 | 1 |
| | 30 | 611673-021 | 1 |
| | 40 | 611674-021 | 1 |
| Flat jaw | | 630030 | 1 pair (2 pcs.) |
| Holder 160 mm | | 619004 | 1 |
| Inspection certificate (8 pcs.) | | — | 1 |

- | Description* | Code No. | Qty | |
|---------------------------------|-------------------|-------------------|---|
| Nominal length
(mm) | 1 | 614611-021 | 1 |
| | 2 | 614612-021 | 1 |
| | 3 | 614613-021 | 1 |
| | 5 | 614615-021 | 1 |
| | 10 | 614671-021 | 1 |
| | 20 | 614672-021 | 1 |
| | 30 | 614673-021 | 1 |
| 40 | 614674-021 | 1 | |
| Flat jaw | 619072 | 1 pair (2 pcs.) | |
| Tie rod 3 in | 619062 | 1 | |
| Tie rod 2 1/4 in | 619063 | 1 | |
| Tie rod 1 1/2 in | 619064 | 1 | |
| Flat head screw 1 1/4 in | 619057 | 2 | |
| Flat head screw 5/8 in | 619058 | 2 | |
| Inspection certificate (8 pcs.) | — | 1 | |

* Equivalent to JIS B 7506 Grade 0

511-501 and 511-521

Unit: mm

320° rotation

150

100

320° rotation

30

150

9

SR2 Hardened steel

22

28

34

29.4

90° inclination

511-502 and 511-522

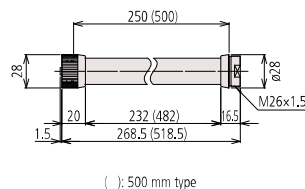
SR2 Hardened steel

39

55.5

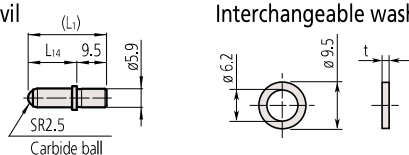
46.4

Unit: mm



Bore gage		Anvil				Interchangeable washer	
(Main body)	Marked No.	Code No.	Indication of measuring size	L ₁ (mm)	L ₁₄ (mm)	Code No.	t
511-501 511-521	1	21DZA232A	45 mm/1.8 in	15	5.5	205457 205458 205459 205460	0.5 mm/0.02 in 1.0 mm/0.04 in 2.0 mm/0.08 in 3.0 mm/0.12 in
	2	21DZA232B	50 mm/2.0 in	20	10.5		
	3	21DZA232C	55 mm/2.2 in	25	15.5		
	4	21DZA232D	60 mm/2.4 in	30	20.5		
	5	21DZA232E	65 mm/2.6 in	35	25.5		
	6	21DZA232F	70 mm/2.8 in	40	30.5		
	7	21DZA232G	75 mm/3.0 in	45	35.5		
	8	21DZA232H	80 mm/3.2 in	50	40.5		
	9	21DZA232J	85 mm/3.4 in	55	45.5		
	10	21DZA232L	90 mm/3.6 in	60	50.5		
	11	21DZA232M	95 mm/3.8 in	65	55.5		
511-502 511-522	12	21DZA232N	100 mm/4.0 in	70	60.5		
	1	21DZA232A	100 mm/4.0 in	15	5.5	205457 205458 205459 205460	0.5 mm/0.02 in 1.0 mm/0.04 in 2.0 mm/0.08 in 3.0 mm/0.12 in
	2	21DZA232B	105 mm/4.2 in	20	10.5		
	3	21DZA232C	110 mm/4.4 in	25	15.5		
	4	21DZA232D	115 mm/4.6 in	30	20.5		
	5	21DZA232E	120 mm/4.8 in	35	25.5		
	6	21DZA232F	125 mm/5.0 in	40	30.5		
	7	21DZA232G	130 mm/5.2 in	45	35.5		
	8	21DZA232H	135 mm/5.4 in	50	40.5		
	9	21DZA232J	140 mm/5.6 in	55	45.5		
	10	21DZA232L	145 mm/5.8 in	60	50.5		
	11	21DZA232M	150 mm/6.0 in	65	55.5		
	12	21DZA232N	155 mm/6.2 in	70	60.5		
13	21DZA232P	160 mm/6.4 in	75	65.5			

Unit: mm

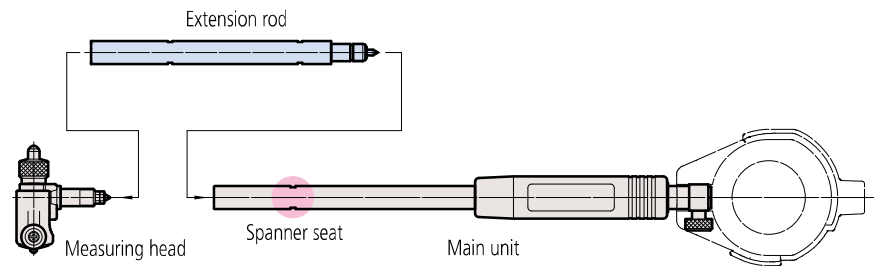


Bore Gages

Extension Rod
SERIES 511 — Accessories for Bore Gages

- Extension rods are available to assist in deep-hole measurement. (For applicable combination with bore gages, see the table below)

Note 1: When using a 500 mm (or longer) extension rod, use the bore gage in an upright position.
Note 2: Only one extension rod can be attached to a bore gage. It is not possible to use more than one extension rod.
Note 3: The extension rod cannot be used for products with a custom size or custom specifications.



SPECIFICATIONS

Applicable model	Extension rod length (mm)					Extension rod diameter (mm)	Spanner code No.
Code No.	125	250	500	750	1000		
511-701/511-731	953549	953550	953551	—	—	ø9	102148 (2 pcs.)
511-415/511-418							
511-416/511-419							
511-417/511-420							
511-702/511-732	953552	953553	953554	953555	953556	ø12	212556 (2 pcs.)
511-703/511-733							
511-704/511-734							
511-803/511-833							
511-804/511-834	953557	952361	953558	953559	953560	ø15	212556 (2 pcs.)
511-705/511-735							
511-706/511-736							
511-805/511-835							
511-806/511-836							
511-807/511-837							
511-808/511-838							

Note 1: If an extension rod is attached, the measuring accuracy may degrade due to factors such as rod deflection.
Note 2: Spanner is supplied as standard.

Bore Gages

Setting Rings

SERIES 177 — Accessories for Inside Micrometers, Holtest and Dial Bore Gages

- Used for quick and accurate setting of dial bore gages, Holtest, and inside micrometers.
- Actual diameter is marked in 0.001 mm increments. (Measuring position of dimension is the center of the height T.)

Steel Setting Rings



177-300

CERA Setting Rings

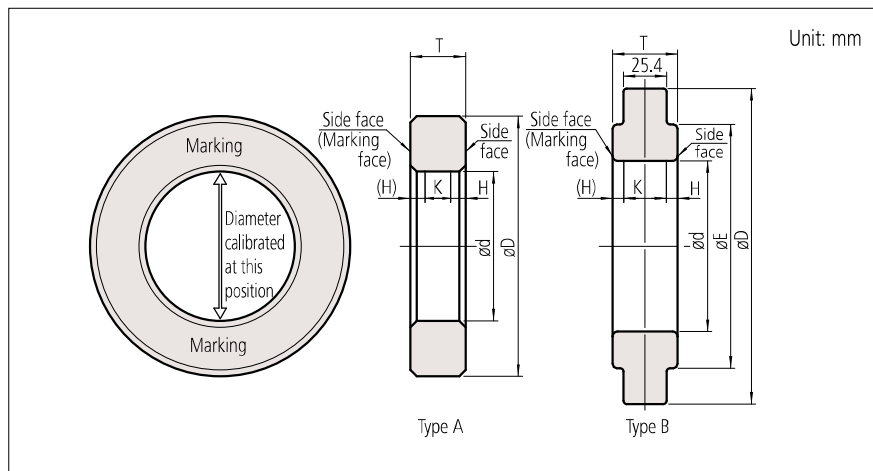


177-432

Made-to-order

- Custom-made setting rings
Mitutoyo can manufacture settings rings to the size and design you need.
- Nominal size range
1 mm to 305 mm/0.04 in to 12 in (steel)
4 mm to 50 mm/0.16 in to 2 in (ceramic)
- Nominal size increment
0.01 mm (up to 45 mm)
0.02 mm (over 45 mm)
0.0001 in (inch)

DIMENSIONS



Suffix

177-*-62:** With Inspection Certificate (provides a record of the calibrated diameter) and Calibration Certificate

177-*-82:** With Inspection Certificate (provides a record of the calibrated diameter), Calibration Certificate, and Traceability System Chart

Note 1: The Inspection Certificate is not a substitute for a calibration certificate as it is undated.

Note 2: A more detailed inspection certificate describing roundness and cylindricity is available on request.

SPECIFICATIONS

Steel Setting Rings

Metric										
Code No.	Nominal size ϕ D (mm)	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (μ m)	Uncertainty of marked diameter value*1 (μ m)	Roundness/Cylindricity*2 (μ m)	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-220	1	20	—	4	A	± 10	1.5	1.0	1.6	0.8
177-222	1.1	20	—	4	A	± 10	1.5	1.0	1.6	0.8
177-225	1.2	20	—	4	A	± 10	1.5	1.0	1.6	0.8
177-227	1.3	20	—	4	A	± 10	1.5	1.0	1.6	0.8
177-230	1.4	20	—	4	A	± 10	1.5	1.0	1.6	0.8
177-236	1.75	25	—	5	A	± 10	1.5	1.0	1.6	1.8
177-239	2	25	—	5	A	± 10	1.5	1.0	1.6	1.8
177-242	2.25	25	—	5	A	± 10	1.5	1.0	1.6	1.8
177-208	2.5	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-246	2.75	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-248	3	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-250	3.25	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-252	3.5	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-255	3.75	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-204	4	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-257	4.5	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-205	5	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-263	5.5	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-267	6	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-271	6.5	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-275	7	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-125	8	32	—	10	A	± 10	1.5	1.0	2.0	6.0
177-279	9	32	—	10	A	± 10	1.5	1.0	2.0	6.0
177-126	10	32	—	10	A	± 10	1.5	1.0	2.0	6.0
177-284	12	32	—	10	A	± 10	1.5	1.0	2.0	6.0
177-132	14	38	—	10	A	± 10	1.5	1.0	2.0	6.0
177-177	16	45	—	10	A	± 10	1.5	1.0	2.0	6.0
177-133	17	45	—	10	A	± 10	1.5	1.0	2.0	6.0
177-285	18	45	—	10	A	± 10	1.5	1.0	2.0	6.0
177-286	20	45	—	10	A	± 10	1.5	1.0	2.0	6.0
177-139	25	53	—	15	A	± 10	1.5	1.0	3.2	8.6
177-288	30	71	—	15	A	± 10	1.5	1.0	3.2	8.6
177-140	35	71	—	15	A	± 10	1.5	1.0	3.2	8.6
177-290	40	71	—	15	A	± 10	1.5	1.0	3.2	8.6
177-178	45	85	—	15	A	± 10	1.5	1.0	3.7	7.6
177-146	50	85	—	20	A	± 20	1.5	1.0	3.7	12.6
177-292	60	112	—	20	A	± 20	1.5	1.0	3.7	12.6
177-314	62	112	—	20	A	± 20	1.5	1.5	3.7	12.6
177-147	70	112	—	20	A	± 20	1.5	1.5	3.7	12.6
177-316	75	125	—	25	A	± 20	1.5	1.5	4.2	16.6
177-294	80	125	—	25	A	± 20	1.5	1.5	4.2	16.6
177-318	87	140	—	25	A	± 20	1.5	1.5	4.2	16.6
177-148	90	140	—	25	A	± 20	1.5	1.5	4.2	16.6
177-296	100	160	—	25	A	± 20	1.5	2.0	4.2	16.6
177-298	125	210	168	38.1 (25.4)	B	± 20	2.5	2.0	5.3	27.5
177-300	150	235	187		B	± 20	2.5	2.0	5.3	27.5
177-302	175	260	215		B	± 20	2.5	2.5	5.3	27.5
177-304	200	311	244		B	± 20	2.5	2.5	5.3	27.5
177-306	225	337	264		B	± 20	2.5	2.5	5.3	27.5
177-308	250	362	290		B	± 20	2.5	3.0	5.3	27.5
177-310	275	413	321		B	± 20	2.5	3.0	5.3	27.5
177-312	300	438	340		B	± 20	2.5	3.0	5.3	27.5

*1 Actual diameter is marked in 0.001 mm increments. (Dimension measuring position is the center of the height T.)

*2 Cylindricity is defined as per JIS B 0621 Definitions and designations of geometrical deviations, Section 4.4 "Cylindricity."

Cylindricity is measured using three cross-sections between the top and bottom face of a ring, namely, close to the face near each side and the center.

Bore Gages

Setting Rings

SERIES 177 — Accessories for Inside Micrometers, Holtest and Dial Bore Gages

Code No.	Nominal size ϕD (in)	Dimensions (mm)			Type	Accuracy				
		ϕD	ϕE	T		Tolerance between the nominal size and the actual diameter (in)	Uncertainty of marked diameter value*1 (in)	Roundness/Cylindricity*2 (in)	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-209	0.1	25	—	7	A	± 0.0004	0.00006	0.00004	1.7	3.6
177-206	0.16	25	—	7	A	± 0.0004	0.00006	0.00004	1.7	3.6
177-207	0.24	25	—	7	A	± 0.0004	0.00006	0.00004	1.7	3.6
177-281	0.275	25	—	7	A	± 0.0004	0.00006	0.00004	2.0	3.0
177-179	0.35	32	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-283	0.425	32	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-180	0.5	32	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-181	0.6	38	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-182	0.65	45	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-183	0.7	45	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-287	0.8	45	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-184	1	53	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-289	1.2	71	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-185	1.4	71	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-291	1.6	71	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-186	1.8	85	—	15	A	± 0.0004	0.00006	0.00004	3.7	7.6
177-187	2	85	—	20	A	± 0.0008	0.00006	0.00004	3.7	12.6
177-293	2.4	112	—	20	A	± 0.0008	0.00006	0.00004	3.7	12.6
177-315	2.5	112	—	20	A	± 0.0008	0.00006	0.00006	4.2	11.6
177-188	2.8	112	—	20	A	± 0.0008	0.00006	0.00006	4.2	11.6
177-317	3	125	—	25	A	± 0.0008	0.00006	0.00006	4.2	16.6
177-295	3.2	125	—	25	A	± 0.0008	0.00006	0.00006	4.2	16.6
177-319	3.5	140	—	25	A	± 0.0008	0.00006	0.00006	4.2	16.6
177-189	3.6	140	—	25	A	± 0.0008	0.00006	0.00006	4.2	16.6
177-297	4	160	—	25	A	± 0.0008	0.00006	0.00008	4.2	16.6
177-299	5	210	168	38.1	B	± 0.0008	0.00010	0.00008	5.3	27.5
177-301	6	235	187	38.1	B	± 0.0008	0.00010	0.00008	5.3	27.5
177-303	7	260	215	38.1	B	± 0.0008	0.00010	0.00010	5.3	27.5
177-305	8	311	244	38.1	B	± 0.0008	0.00010	0.00010	5.3	27.5
177-307	9	337	264	38.1	B	± 0.0008	0.00010	0.00010	5.3	27.5
177-309	10	362	290	38.1	B	± 0.0008	0.00010	0.00012	5.3	27.5
177-311	11	413	321	38.1	B	± 0.0008	0.00010	0.00012	5.3	27.5
177-313	12	438	340	38.1	B	± 0.0008	0.00010	0.00012	5.3	27.5

*1 Actual diameter is marked in 0.001 mm increments. (Dimension measuring position is the center of the height T.)

*2 Cylindricity is defined as per JIS B 0621 Definitions and designations of geometrical deviations, Section 4.4 "Cylindricity."

Cylindricity is measured using three cross-sections between the top and bottom face of a ring, namely, close to the face near each side and the center.

SPECIFICATIONS

CERA Setting Rings

Metric

Code No.	Nominal size ϕ D (mm)	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (μ m)	Uncertainty of marked diameter value* ¹ (μ m)	Roundness/Cylindricity* ² (μ m)	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-418	4	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-420	6	25	—	7	A	± 10	1.5	1.0	1.7	3.6
177-423	8	32	—	10	A	± 10	1.5	1.0	2.0	6.0
177-424	10	32	—	10	A	± 10	1.5	1.0	2.0	6.0
177-425	12	32	—	10	A	± 10	1.5	1.0	2.0	6.0
177-427	16	45	—	10	A	± 10	1.5	1.0	2.0	6.0
177-429	20	45	—	10	A	± 10	1.5	1.0	2.0	6.0
177-430	25	53	—	15	A	± 10	1.5	1.0	3.2	8.6
177-431	30	71	—	15	A	± 10	1.5	1.0	3.2	8.6
177-432	35	71	—	15	A	± 10	1.5	1.0	3.2	8.6
177-433	40	71	—	15	A	± 10	1.5	1.0	3.2	8.6
177-434	45	85	—	15	A	± 10	1.5	1.0	3.7	7.6

Inch

Code No.	Nominal size ϕ D (in)	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (in)	Uncertainty of marked diameter value* ¹ (in)	Roundness/Cylindricity* ² (in)	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-518	0.16	25	—	7	A	± 0.0004	0.00006	0.00004	1.7	3.6
177-520	0.24	25	—	7	A	± 0.0004	0.00006	0.00004	1.7	3.6
177-522	0.275	25	—	7	A	± 0.0004	0.00006	0.00004	1.7	3.6
177-523	0.35	32	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-524	0.425	32	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-525	0.5	32	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-527	0.65	45	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-529	0.8	45	—	10	A	± 0.0004	0.00006	0.00004	2.0	6.0
177-530	1	53	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-531	1.2	71	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-532	1.4	71	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-533	1.6	71	—	15	A	± 0.0004	0.00006	0.00004	3.2	8.6
177-534	1.8	85	—	15	A	± 0.0004	0.00006	0.00004	3.7	7.6

*1 Actual diameter is marked in 0.001 mm increments. (Dimension measuring position is the center of the height T.)

*2 Cylindricity is defined as per JIS B 0621 Definitions and designations of geometrical deviations, Section 4.4 "Cylindricity."
Cylindricity is measured using three cross-sections between the top and bottom face of a ring, namely, close to the face near each side and the center.

Bore Gages

Bore Gage Checker
SERIES 515

- The Bore Gage Checker allows easy setting of dial bore gages with ranges of 18 mm (0.7 in) through 400 mm (16 in) using gauge blocks.
- Can be used in both vertical and horizontal positions.



515-590

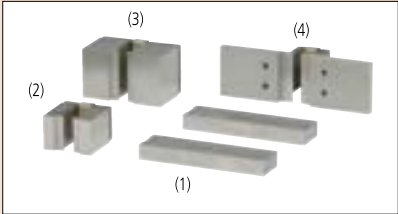
SPECIFICATIONS

Code No.	Applicable range	Flatness of parallel jaw	Parallelism of parallel jaw
515-590	18 - 400 mm (0.7 - 16 in)	0.5 μm	1 μm

Measurement example



Standard Accessories



- (1) Parallel jaw 2 pcs. **630030**
- (2) Attachment A **940088**
- (3) Attachment B **940089**
- (4) Attachment C **940090**