

Bore Gages

SERIES 511 — Standard Type

Mitutoyo offers a complete range of Bore Gages, all of them with interchangeable anvils and the necessary accessories to perform close-tolerance ID measurements.

FEATURES

- Allows inside diameter measurement with high accuracy.
- Longer effective stroke (compared with the conventional product)
- Carbide is used for the contact point ensuring high durability and wear resistance.
- High-accuracy measurement is aided by a large grip with a sponge-like structure that reduces heat transfer from the operator's hand by 50%.
- Interchangeable washers 0.5mm thick (standard accessories) are supplied as standard accessories to enable setting in small steps.
- Optional extension rods can be attached for measuring deep holes. (For details, refer to page C-27.)
- A Bore Gage Checker and a range of Setting Rings are available to aid in accurately setting a gage before making a measurement. (For details, refer to pages C-28, C-29 and C-30.)



511-713

SPECIFICATIONS

Metric					
Range	Order No.	Content of set		Dial protection Cover Ass'y	Probe depth
		Bore gage	Dial indicator		
18 - 35mm	511-701	511-701	Not supplied	Not supplied	100mm
35 - 60mm	511-702	511-702			150mm
50 - 150mm	511-703	511-703			150mm
100 - 160mm	511-704	511-704			150mm
160 - 250mm	511-705	511-705			250mm
250 - 400mm	511-706	511-706			250mm
18 - 35mm	511-721	511-701	2109SB-10	21DZA000	100mm
35 - 60mm	511-722	511-702			150mm
50 - 150mm	511-723	511-703			150mm
100 - 160mm	511-724	511-704			150mm
160 - 250mm	511-725	511-705			250mm
250 - 400mm	511-726	511-706			250mm
18 - 35mm	511-711	511-701	2046SB	21DZA000	100mm
35 - 60mm	511-712	511-702			150mm
50 - 150mm	511-713	511-703			150mm
100 - 160mm	511-714	511-704			150mm
160 - 250mm	511-715	511-705			250mm
250 - 400mm	511-716	511-706			250mm

0.001mm graduation

0.01mm graduation



511-921

Metric					
Range	Order No.	Content of set		Dial protection Cover Ass'y	Probe depth
		Bore gage	Indicator		
18 - 150mm	511-921	511-701	2046SB	21DZA000	100mm (511-701)
	511-922	511-702	2109SB-10	21DZA000	150mm (511-702, 511-703)
	511-925	511-703	543-264B	21DZA000	

Inch					
Range	Order No.	Content of set		Dial protection Cover Ass'y	Probe depth
		Bore gage	Dial indicator		
.7"-1.4"	511-731	511-731	Not supplied	Not supplied	4"
1.4"-2.5"	511-732	511-732			6"
2"-6"	511-733	511-733			6"
4"-6.5"	511-734	511-734			6"
6.5"-10"	511-735	511-735			10"
10"-16"	511-736	511-736			10"
.7"-1.4"	511-751	511-731	2923SB-10	21DZA000	4"
1.4"-2.5"	511-752	511-732			6"
2"-6"	511-753	511-733			6"
4"-6.5"	511-754	511-734			6"
6.5"-10"	511-755	511-735			10"
10"-16"	511-756	511-736			10"
.7"-1.4"	511-741	511-731	2922SB	21DZA000	4"
1.4"-2.5"	511-742	511-732			6"
2"-6"	511-743	511-733			6"
4"-6.5"	511-744	511-734			6"
6.5"-10"	511-745	511-735			10"
10"-16"	511-746	511-736			10"

.0001" graduation

.0005" graduation



511-931

Inch					
Range	Order No.	Content of set		Dial protection Cover Ass'y	Probe depth
		Bore gage	Indicator		
.7"-6"	511-931	511-731	2922SB	21DZA000	4" (511-731)
	511-932	511-732	2923SB-10	21DZA000	6" (511-732, 511-733)
	511-935	511-733	543-266B	21DZA000	



New grip improves accuracy during prolonged use

Technical Data

Wide-range accuracy: 2 μ m

Repeatability: 0.5 μ m

Adjacent error: 1 μ m

Optional Accessories

— : Setting ring (See page C-28.)

— : Extension rod (See page C-27.)

Unit: mm

18 - 35mm/7 - 1.4"

100 123 Approx. 80

Anvil

Contact point
SR1.0 carbide ball

11.9 6.4 12.7

32(23)*

9.53(3/8)*

* Dimensions in parentheses apply to inch models

35 - 60mm/1.4 - 2.5"
50 - 150mm/2-6"
100 - 160mm/4-6.5"

150 123 Approx. 80

Anvil

Contact point
SR1.5 carbide ball

28.9 9 12

32(23)*

9.53(3/8)*

* Dimensions in parentheses apply to inch models

Range	A
50 - 150mm/2 - 6"	38
100 - 160mm/4 - 6.5"	50

A

12.8

Dimensions of 35 - 60mm/1.4 - 2.5"

Anvil

Contact point
SR1.0 carbide ball

18.2 9 12.7

32(23)*

9.53(3/8)*

160 - 250mm/6.5 - 10"
250 - 400mm/10 - 16"

100.9 250 123 Approx. 80

Anvil

Contact point
SR1.5 carbide ball

12 15

32(23)*

9.53(3/8)*

* Dimensions in parentheses apply to inch models

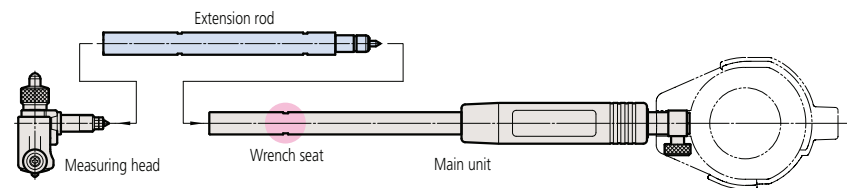
90 19.8

Extension Rods

Accessories for Bore Gages

FEATURES

- Extension rods (optional) are available to assist in deep-hole measurement.
- When several extension rods are joined together there is the possibility of small errors arising from the extra joints involved. Therefore it is good practice not to connect more than 2 rods to a bore gage at any one time. If possible use a single, longer, extension rod rather than several short ones.
- The extension rod can be used up to 1,000 mm.
- If using an extension rod longer than 500 mm, use the bore gage in the vertical orientation.
- Accuracy and satisfactory operation should be confirmed after connecting an extension rod.



*To separate an extension rod from the measuring head or main unit, use the dedicated wrench that engages with seats on the rod and main unit sleeve.

SPECIFICATIONS

Extension rod length					Extension rod diameter	Wrench Part No.	Applicable measuring range
125mm/5"	250mm/10"	500mm/20"	750mm/30"	1,000mm/40"			
953549	953550	953551	—	—	ø9	102148	18-35mm/.7"-1.4"
953552	953553	953554	953555	953556	ø12	212556	35-60mm/1.4"-2.5"
							50-150mm/2"-6"
							100-160mm/4"-6.5"
							60-100mm/2.4"-4"
953557	952361	953558	953559	953560	ø15	212556	100-160mm/4"-6.4"
							160-250mm/6.5"-10"
							250-400mm/10"-16"
							150-250mm/6"-10"
							250-400mm/10"-16"
							400-600mm/16"-24"
							600-800mm/24"-32"

*The compatible models are the Standard Bore Gage (refer to page C-20) and Micrometer Head Bore Gage (refer to page C-22).

*Accuracy may be affected by unintended deflections, etc., when using an extension rod.



Setting Rings

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

FEATURES

- Used for quick and accurate setting of dial bore gages, Holtest, and inside micrometers.
- Actual calibration value for the diameter is marked on each ring.
- No anticorrosion treatment is required when handling Ceramic Setting Rings normally, resulting in simple maintenance and storage.

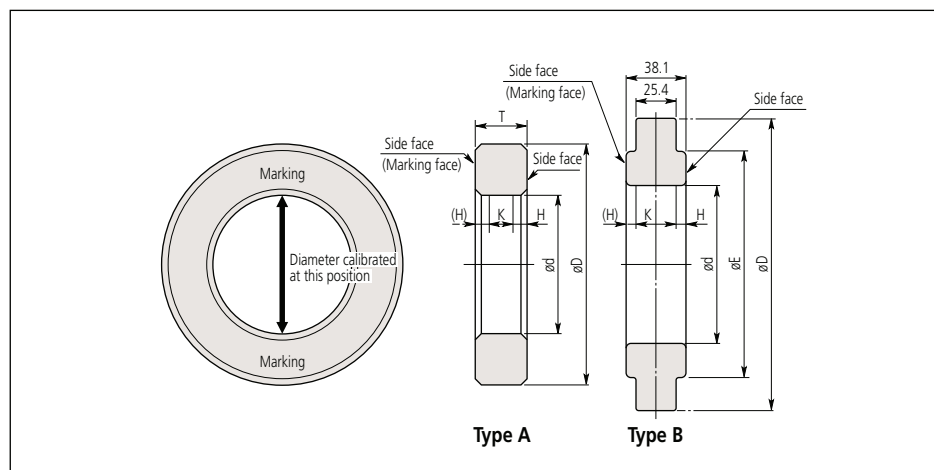
Steel Setting Rings



Ceramic Setting Rings



DIMENSIONS



Suffix

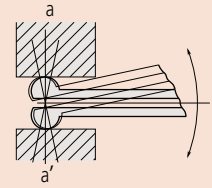
177-***-12: With Inspection Certificate

177-***-62: With Inspection Certificate and Calibration Certificate

177-***-82: With Inspection Certificate, Calibration Certificate, and Traceability System Chart

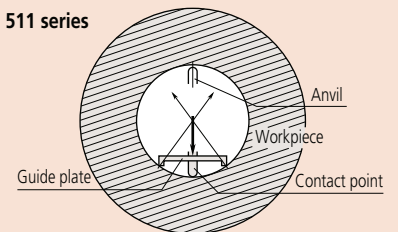
Reading the indicated value

526 series



- The 526 series has a gage head with high curvature. Alignment with the diameter (a-a') is achieved by rotating the gage head in the direction indicated by the arrow, and the reading is the minimum value read from the dial indicator.

511 series



- The 511 series provides a guide plate to align the setting ring diameter with the measurement axis of the bore gage.

SPECIFICATION

Steel Setting Rings

Metric

Nominal size ϕ D	Order No.	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (μ m)	Uncertainty of marked dimension value (μ m)	Roundness/Cylindricity (μ m)	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
1mm	177-220	20	—	4	A	± 10	± 1.5	1	1.6	0.8
1.1mm	177-222	20	—	4	A	± 10	± 1.5	1	1.6	0.8
1.2mm	177-225	20	—	4	A	± 10	± 1.5	1	1.6	0.8
1.3mm	177-227	20	—	4	A	± 10	± 1.5	1	1.6	0.8
1.4mm	177-230	20	—	4	A	± 10	± 1.5	1	1.6	0.8
1.75mm	177-236	25	—	5	A	± 10	± 1.5	1	1.6	1.8
2mm	177-239	25	—	5	A	± 10	± 1.5	1	1.6	1.8
2.25mm	177-242	25	—	5	A	± 10	± 1.5	1	1.6	1.8
2.5mm	177-208	25	—	7	A	± 10	± 1.5	1	1.7	3.6
2.75mm	177-246	25	—	7	A	± 10	± 1.5	1	1.7	3.6
3mm	177-248	25	—	7	A	± 10	± 1.5	1	1.7	3.6
3.25mm	177-250	25	—	7	A	± 10	± 1.5	1	1.7	3.6
3.5mm	177-252	25	—	7	A	± 10	± 1.5	1	1.7	3.6
3.75mm	177-255	25	—	7	A	± 10	± 1.5	1	1.7	3.6
4mm	177-204	25	—	7	A	± 10	± 1.5	1	1.7	3.6
4.5mm	177-257	25	—	7	A	± 10	± 1.5	1	1.7	3.6
5mm	177-205	25	—	7	A	± 10	± 1.5	1	1.7	3.6
5.5mm	177-263	25	—	7	A	± 10	± 1.5	1	1.7	3.6
6mm	177-267	25	—	7	A	± 10	± 1.5	1	1.7	3.6
6.5mm	177-271	25	—	7	A	± 10	± 1.5	1	1.7	3.6
7mm	177-275	25	—	7	A	± 10	± 1.5	1	1.7	3.6
8mm	177-125	32	—	10	A	± 10	± 1.5	1	2.0	6.0
9mm	177-129	32	—	10	A	± 10	± 1.5	1	2.0	6.0
10mm	177-276	32	—	10	A	± 10	± 1.5	1	2.0	6.0
12mm	177-284	32	—	10	A	± 10	± 1.5	1	2.0	6.0
14mm	177-132	38	—	10	A	± 10	± 1.5	1	2.0	6.0

Nominal size ϕ D	Order No.	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (μ m)	Uncertainty of marked dimension value (μ m)	Roundness/Cylindricity (μ m)	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
16mm	177-177	45	—	10	A	± 10	± 1.5	1	2.0	6.0
17mm	177-133	45	—	10	A	± 10	± 1.5	1	2.0	6.0
18mm	177-285	45	—	10	A	± 10	± 1.5	1	2.0	6.0
20mm	177-286	45	—	10	A	± 10	± 1.5	1	2.0	6.0
25mm	177-139	53	—	15	A	± 10	± 1.5	1	3.2	8.6
30mm	177-288	71	—	15	A	± 10	± 1.5	1	3.2	8.6
35mm	177-140	71	—	15	A	± 10	± 1.5	1	3.2	8.6
40mm	177-290	71	—	15	A	± 10	± 1.5	1	3.2	8.6
45mm	177-178	85	—	15	A	± 10	± 1.5	1	3.7	7.6
50mm	177-146	85	—	20	A	± 20	± 1.5	1	3.7	12.6
60mm	177-292	112	—	20	A	± 20	± 1.5	1	3.7	12.6
62mm	177-314	112	—	20	A	± 20	± 1.5	1.5	3.7	12.6
70mm	177-147	112	—	20	A	± 20	± 1.5	1.5	3.7	12.6
75mm	177-316	125	—	25	A	± 20	± 1.5	1.5	4.2	16.6
80mm	177-294	125	—	25	A	± 20	± 1.5	1.5	4.2	16.6
87mm	177-318	140	—	25	A	± 20	± 1.5	1.5	4.2	16.6
90mm	177-148	140	—	25	A	± 20	± 1.5	1.5	4.2	16.6
100mm	177-296	160	—	25	A	± 20	± 1.5	2	4.2	16.6
125mm	177-298	210	168	38.1 (25.4)	B	± 20	± 1.5	2	5.3	27.5
150mm	177-300	235	187		B	± 20	± 1.5	2	5.3	27.5
175mm	177-302	260	215		B	± 20	± 1.5	2.5	5.3	27.5
200mm	177-304	311	244		B	± 20	± 1.5	2.5	5.3	27.5
225mm	177-306	337	264		B	± 20	± 1.5	2.5	5.3	27.5
250mm	177-308	362	290		B	± 20	± 1.5	3	5.3	27.5
275mm	177-310	413	321		B	± 20	± 1.5	3	5.3	27.5
300mm	177-312	438	340		B	± 20	± 1.5	3	5.3	27.5

Inch

Nominal size ϕ D	Order No.	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (inch)	Uncertainty of marked dimension value (inch)	Roundness/Cylindricity (inch)	Distance from the side face H (inch)	Size of warranted calibration surface K (inch)
.1"	177-209	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.067"	.142"
.16"	177-206	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.067"	.142"
.24"	177-207	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.067"	.142"
.275"	177-281	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.118"
.35"	177-179	32	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.236"
.425"	177-283	32	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.236"
.5"	177-180	32	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.236"
.6"	177-181	38	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.236"
.65"	177-182	45	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.236"
.7"	177-183	45	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.236"
.8"	177-287	45	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.079"	.236"
1"	177-184	53	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.126"	.339"
1.2"	177-289	71	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.126"	.339"
1.4"	177-185	71	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.126"	.339"
1.6"	177-291	71	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.126"	.339"
1.8"	177-186	85	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	.146"	.299"

Nominal size ϕ D	Order No.	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (inch)	Uncertainty of marked dimension value (inch)	Roundness/Cylindricity (inch)	Distance from the side face H (inch)	Size of warranted calibration surface K (inch)
2"	177-187	85	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00004"	.146"	.496"
2.4"	177-293	112	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00004"	.146"	.496"
2.5"	177-315	112	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	.165"	.457"
2.8"	177-188	112	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	.165"	.457"
3"	177-317	125	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	.165"	.654"
3.2"	177-295	125	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	.165"	.654"
3.5"	177-319	140	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	.165"	.654"
3.6"	177-189	140	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	.165"	.654"
4"	177-297	160	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00008"	.165"	.654"
5"	177-299	210	168	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00008"	.209"	1.083"
6"	177-301	235	187	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00008"	.209"	1.083"
7"	177-303	260	215	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00010"	.209"	1.083"
8"	177-305	311	244	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00010"	.209"	1.083"
9"	177-307	337	264	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00010"	.209"	1.083"
10"	177-309	362	290	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00012"	.209"	1.083"
11"	177-311	413	321	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00012"	.209"	1.083"
12"	177-313	438	340	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00012"	.209"	1.083"

Cera Setting Rings

Metric

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

Inch

Nominal size ϕ D	Order No.	Dimensions (mm)			Type	Accuracy				
		ϕ D	ϕ E	T		Tolerance between the nominal size and the actual diameter (inch)	Uncertainty of marked dimension value (inch)	Roundness/ Cylindricity (inch)	Distance from the side face H (inch)	Size of warranted calibration surface K (inch)
.16"	177-518	25	—	7	A	$\pm .0004"$	$\pm .00006"$	.00004"	.067"	.142"
.24"	177-520	25	—	7	A	$\pm .0004"$	$\pm .00006"$	.00004"	.067"	.142"
.275"	177-522	25	—	7	A	$\pm .0004"$	$\pm .00006"$	.00004"	.067"	.142"
.35"	177-523	32	—	10	A	$\pm .0004"$	$\pm .00006"$	.00004"	.079"	.236"
.425"	177-524	32	—	10	A	$\pm .0004"$	$\pm .00006"$	.00004"	.079"	.236"
.5"	177-525	32	—	10	A	$\pm .0004"$	$\pm .00006"$	.00004"	.079"	.236"
.65"	177-527	45	—	10	A	$\pm .0004"$	$\pm .00006"$	.00004"	.079"	.236"
.8"	177-529	45	—	10	A	$\pm .0004"$	$\pm .00006"$	.00004"	.079"	.236"
1"	177-530	53	—	15	A	$\pm .0004"$	$\pm .00006"$	.00004"	.126"	.339"
1.2"	177-531	71	—	15	A	$\pm .0004"$	$\pm .00006"$	.00004"	.126"	.339"
1.4"	177-532	71	—	15	A	$\pm .0004"$	$\pm .00006"$	.00004"	.126"	.339"
1.6"	177-533	71	—	15	A	$\pm .0004"$	$\pm .00006"$	.00004"	.126"	.339"
1.8"	177-534	85	—	15	A	$\pm .0004"$	$\pm .00006"$	.00004"	.146"	.299"