

# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages

### SERIES 526 — for Extra Small Holes

- These gages are designed to measure the diameters of very small holes. The radial displacement of the split-ball anvil is converted to axial displacement of the measuring rod, which is shown on the dial indicator.
- Alternative indicators may be used in place of those recommended\*.

\* Some indicators and protection covers cannot be used with these bore gages. Contact a Mitutoyo sales office if considering the use of dial or digimatic indicators other than the recommended models.

- An optional stand (215-120-10) is available for efficient measurement of multiple small holes. Refer to page C-30 for details.



526-170

\* The dial indicator and the protection cover are optional.

## SPECIFICATIONS

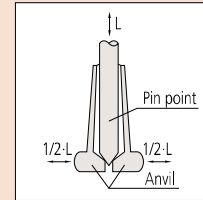
### Metric

Order No.	Range	Bore gage	Content of set				Probing depth	
			Dial indicator	Dial protection cover	Anvil	Pin point		Setting ring
526-170	0.95-1.55mm	526-170	Not supplied	Not supplied	5 pcs.	1 pc.	5 pcs.	11.5mm
526-160	1.50-4.00mm	526-160			9 pcs.	2 pcs.	9 pcs.	17.5, 22.5mm
526-150	3.70-7.30mm	526-150			7 pcs.	1 pc.	7 pcs.	32.0mm
526-172	0.95-1.55mm	526-170	2109SB-10 (Graduation 0.001mm)	21DZA000	5 pcs.	1 pc.	5 pcs.	11.5mm
526-162	1.50-4.00mm	526-160			9 pcs.	2 pcs.	9 pcs.	17.5, 22.5mm
526-152	3.70-7.30mm	526-150			7 pcs.	1 pc.	7 pcs.	32.0mm
526-173	0.95-1.55mm	526-170	2046SB (Graduation: 0.01mm)	21DZA000	5 pcs.	1 pc.	5 pcs.	11.5mm
526-163	1.50-4.00mm	526-160			9 pcs.	2 pcs.	9 pcs.	17.5, 22.5mm
526-153	3.70-7.30mm	526-150			7 pcs.	1 pc.	7 pcs.	32.0mm

### Inch

Order No.	Range	Bore gage	Content of set				Probing depth	
			Dial indicator	Dial protection cover	Anvil	Pin point		Setting ring
526-175	.037-.061"	526-175	Not supplied	Not supplied	5 pcs.	1 pc.	5 pcs.	.45"
526-165	.06-.157"	526-165			9 pcs.	2 pcs.	9 pcs.	.68, .88"
526-155	.145-.29"	526-155			7 pcs.	1 pc.	7 pcs.	1.25"
526-176	.037-.061"	526-175	2923SB-10 (Graduation: .0001")	21DZA000	5 pcs.	1 pc.	5 pcs.	.45"
526-166	.06-.157"	526-165			9 pcs.	2 pcs.	9 pcs.	.68, .88"
526-156	.145-.29"	526-155			7 pcs.	1 pc.	7 pcs.	1.25"

## Measurement principle



## Technical Data

Accuracy  
 Metric models: 4µm  
 Inch models: .00016"  
 Repeatability  
 Metric models: 2µm  
 Inch models: .00008"

## Optional Accessories

- : Dial indicator (See Chapter F)
- 21DZA000: Dial protection cover
- 215-120-10: Stand for small holes

## Recommended dial indicators (see Chapter F)

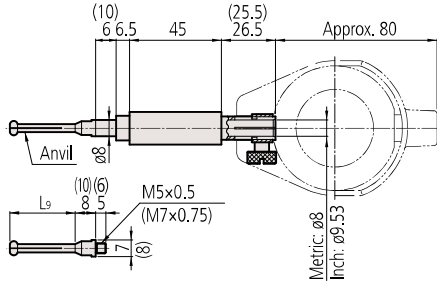
Metric models: 2046SB (0.01mm)  
 2972TB (0.01mm - One-revolution type)  
 2109SB-10 (0.001mm)  
 2900SB-10 (0.001mm - One-revolution type)  
 2922SB (.0005")  
 2977TB (.0005" - One-revolution type)  
 2923SB-10 (.0001")  
 2910SB-10 (.0001" - One-revolution type)

## Recommended digimatic indicators (see Chapter F)

Metric models: 543-310B (ID-C112GXB: 0.001mm)  
 Inch models: 543-312B (ID-C112GEXB: 0.001mm/.00005")  
 \* Indicators equipped with rubber bellows, such as water-proof types, cannot be used.

## DIMENSIONS

Unit: mm

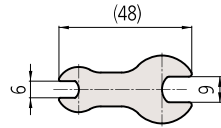


( ) : 3.7 - 7.3mm / .145 - .29 range model

## STANDARD ACCESSORIES

Bore gage (Main body)	Anvil			Pin point	Setting ring mm/inch	Spanner Parts No.
	Marked No.	Parts No.	Measuring range			
526-170 526-175	1.0	201414	0.95-1.15mm/.037-.045"	11.5mm/.45"	201435	210188
	1.1	201415	1.07-1.25mm/.042-.049"			
	1.2	201416	1.17-1.35mm/.046-.053"			
	1.3	201417	1.27-1.45mm/.050-.057"			
	1.4	201418	1.37-1.55mm/.054-.061"			
526-160 526-165	1.75	201419	1.50-1.90mm/.060-.075"	17.5mm/.68"	201436	210188
	2.00	201420	1.80-2.20mm/.070-.085"			
	2.25	201421	2.05-2.45mm/.080-.095"			
	2.50	201422	2.25-2.75mm/.090-.105"			
	2.75	201423	2.50-3.00mm/.100-.115"	22.5mm/.88"	201437	
	3.00	201424	2.75-3.25mm/.110-.125"			
	3.25	201425	3.00-3.50mm/.120-.135"			
	3.50	201426	3.25-3.75mm/.130-.145"			
3.75	201427	3.50-4.00mm/.140-.157"	32.0mm/1.25"	201438		
526-150 526-155	4.0	201428			3.70-4.30mm/.145-.170"	
	4.5	201429			4.20-4.80mm/.165-.190"	
	5.0	201430			4.70-5.30mm/.185-.210"	
	5.5	201431			5.20-5.80mm/.205-.230"	
	6.0	201432			5.70-6.30mm/.225-.250"	
	6.5	201433			6.20-6.80mm/.245-.270"	
	7.0	201434	6.70-7.30mm/.265-.290"			

Spanner  
No.210188



Thickness: 1.5

C

# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages SERIES 526 — for Extra Small Holes



526-101

\* The dial indicator and the protection cover are optional.

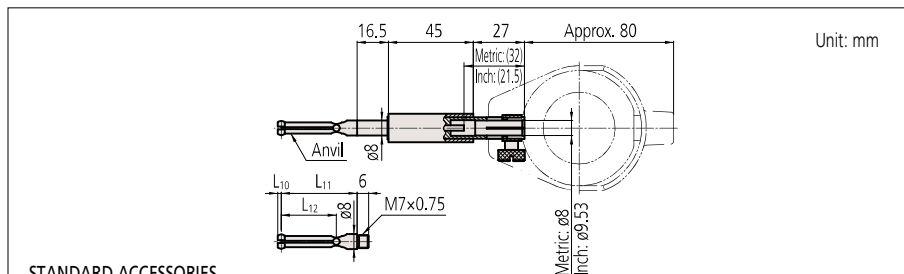
### SPECIFICATIONS

Metric						
Order No.	Range	Content of set				Probing depth
		Bore gage	Dial indicator	Dial protection cover	Anvil	
526-101	7-10mm	526-101	Not supplied	Not supplied	6 pcs.	32mm
526-102	10-18mm	526-102	Not supplied	Not supplied	8 pcs.	62mm
526-124	7-10mm	526-101	2109SB-10 (Graduation: 0.001mm)	21DZA000	6 pcs.	32mm
526-125	10-18mm	526-102	(Graduation: 0.001mm)	21DZA000	8 pcs.	62mm
526-126	7-10mm	526-101	2046SB	21DZA000	6 pcs.	32mm
526-127	10-18mm	526-102	(Graduation: 0.01mm)	21DZA000	8 pcs.	62mm

Inch						
Order No.	Range	Content of set				Probing depth
		Bore gage	Dial indicator	Dial protection cover	Anvil	
526-103	.3-.4"	526-103	Not supplied	Not supplied	6 pcs.	1.25"
526-104	.4-.7"	526-104	Not supplied	Not supplied	8 pcs.	2.42"
526-122	.3-.4"	526-103	2923SB-10 (Graduation: .0001")	21DZA000	6 pcs.	1.25"
526-123	.4-.7"	526-104	(Graduation: .0001")	21DZA000	8 pcs.	2.42"
526-119	.3-.4"	526-103	2922SB	21DZA000	6 pcs.	1.25"
526-120	.4-.7"	526-104	(Graduation: .0005")	21DZA000	8 pcs.	2.42"

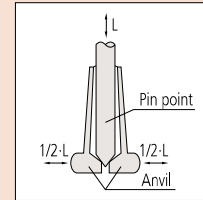
### DIMENSIONS



### STANDARD ACCESSORIES

Bore gage (Main body)	Anvil			Spanner Parts No.
	Marked No.	Parts No.	Measuring range	
526-101 526-103	1	102469	7.0 - 7.5mm/.28 - .30"	1.8mm/.07" 40mm/1.57" 29.2mm/1.15" 102148
	2	102470	7.5 - 8.0mm/.30 - .32"	
	3	102471	8.0 - 8.5mm/.32 - .34"	
	4	102472	8.5 - 9.0mm/.34 - .36"	
	5	102473	9.0 - 9.5mm/.36 - .38"	
	6	102474	9.5 - 10.0mm/.38 - .40"	
526-102 526-104	1	102454	10 - 11mm/.40 - .44"	2.1mm/.08" 46mm/1.81" 38mm/1.50" 102148
	2	102455	11 - 12mm/.44 - .48"	
	3	102456	12 - 13mm/.48 - .52"	
	4	102457	13 - 14mm/.52 - .56"	
	5	102458	14 - 15mm/.56 - .60"	
	6	102459	15 - 16mm/.60 - .64"	
	7	102460	16 - 17mm/.64 - .68"	
	8	102461	17 - 18mm/.68 - .72"	

### Measurement principle



### Technical Data

Accuracy  
Metric models: 7-10mm, 4µm / 10-18mm, 6µm  
Inch models: .3-.4", .00016" / .4-.7", .00024"  
Repeatability  
Metric models: 2µm  
Inch models: .00008"

### Optional accessories

-: Dial indicator (See Chapter F)  
21DZA000: Dial protection cover  
 -: Setting ring (See page C-47)  
215-120-10: Stand for small holes

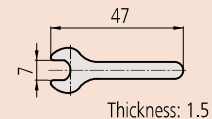
### Recommended dial indicators (see Chapter F)

Metric models: 2046SB (0.01mm)  
2972TB (0.01mm - One-revolution type)  
2109SB-10 (0.001mm)  
2900SB-10 (0.001mm - One-revolution type)  
Inch models: 2922SB (.0005")  
2977TB (.0005" - One-revolution type)  
2923SB-10 (.0001")  
2910SB-10 (.0001" - One-revolution type)

### Recommended digimatic indicators (see Chapter F)

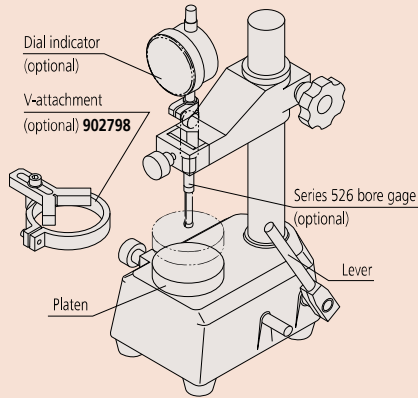
Metric models: 543-310B (ID-C112GXB, 0.001mm)  
Inch models: 543-312B (ID-C112GEXB, 0.001mm/.00005")  
\* Indicators equipped with rubber bellows, such as water-proof types, cannot be used.

Spanner  
No. 102148



## Operating method

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



## Bore Gage Stand SERIES 215

- Optimal for efficient measurement of multiple small holes with a bore gage (series 526).
- V-attachment (**902798**) is available for centering a large number of workpieces quickly (option).
- With platen (60mm).

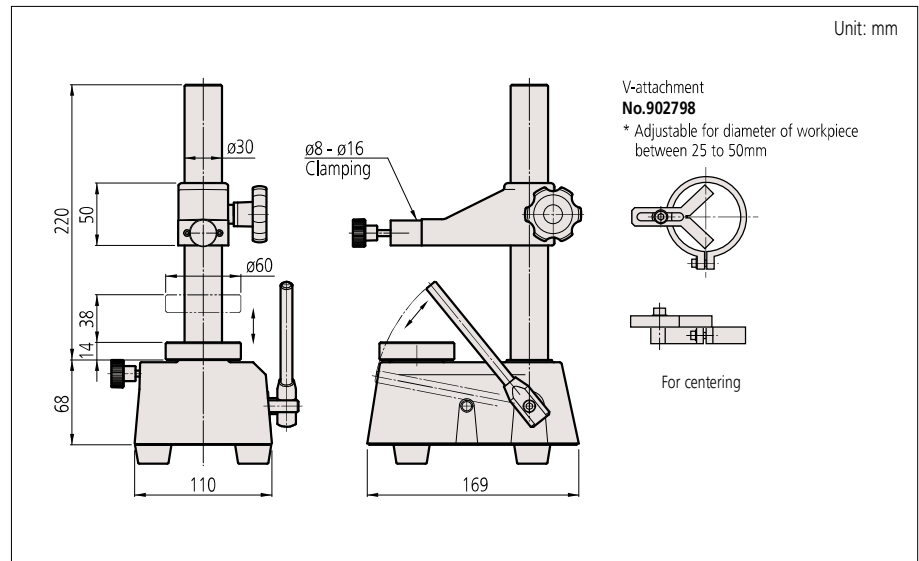


215-120-10

## SPECIFICATIONS

Order No.	Measuring table displacement	Measuring table
215-120-10	38 mm	Flat measuring table (ø60mm)

## DIMENSIONS



# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages SERIES 511 — for Small Holes

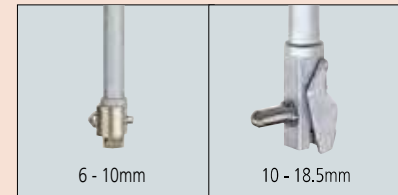
- Alternative indicators may be used in place of those recommended\*.  
\* Some indicators and protection covers cannot be used with these bore gages. Contact a Mitutoyo sales office if considering the use of dial or digimatic indicators other than the recommended models.
- Setting Rings are available to aid in accurately setting a gage before making a measurement. (For details, refer to page C-47)



511-201

The dial indicator and protection cover are optional.

### Close-up view of anvils and contact points



### Technical Data

Accuracy: Metric models: 5µm  
Inch models: .0002"  
Repeatability: Metric modes: 2µm  
Inch models: .00008"  
Adjacent error: Metric modes: 2µm  
Inch models: .00008"

### Optional Accessories

- : Dial indicator (See Chapter F)  
**21DZA000**: Dial protection cover

### Recommended digimatic indicators (see Chapter F)

Metric models: **2046SB** (0.01mm)  
**2972TB** (0.01mm - One-revolution type)  
**2109SB-10** (0.001mm)  
**2900SB-10** (0.001mm - One-revolution type)  
Inch models: **2922SB** (.0005")  
**2977TB** (.0005" - One-revolution type)  
**2923SB-10** (.0001")  
**2910SB-10** (.0001" - One-revolution type)

### Recommended digimatic indicators (see Chapter F)

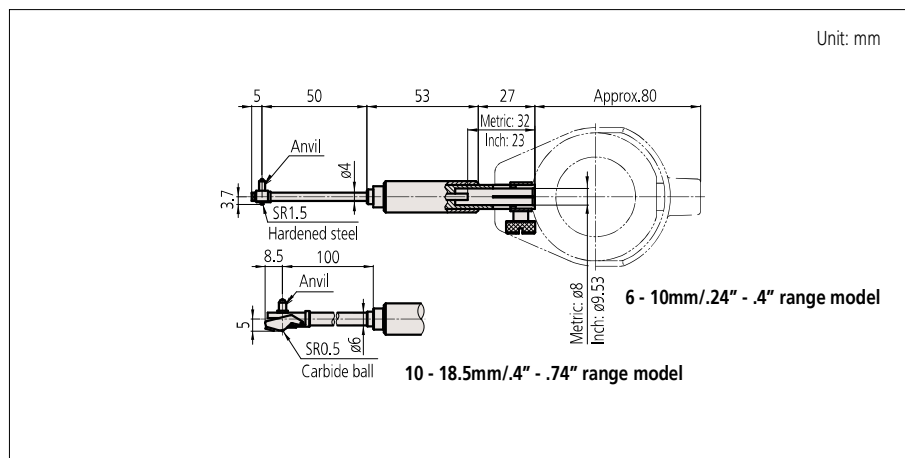
Metric models: **543-310B** (ID-C112GXB: 0.001mm)  
Inch models: **543-312B** (ID-C112GEXB: 0.001mm/.00005")  
\* Indicators equipped with rubber bellows, such as water-proof types, cannot be used.

## SPECIFICATIONS

Metric										
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set					
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Probing depth
<b>511-209</b>	6-10mm	0.5mm	2N or less	—	<b>511-209</b>	Not supplied	Not supplied	9 pcs.	Not supplied	50mm
<b>511-201</b>	10-18.5mm	0.6mm		6N or less	<b>511-201</b>				1 pc.	100mm
<b>511-210</b>	6-10mm	0.5mm	2N or less	—	<b>511-209</b>	<b>2109SB-10</b> (Graduation: 0.001mm)	<b>21DZA000</b>	9 pcs.	Not supplied	50mm
<b>511-203</b>	10-18.5mm	0.6mm		6N or less	<b>511-201</b>				1 pc.	100mm
<b>511-211</b>	6-10mm	0.5mm	2N or less	—	<b>511-209</b>	<b>2046SB</b> (Graduation: 0.01mm)	<b>21DZA000</b>	9 pcs.	Not supplied	50mm
<b>511-204</b>	10-18.5mm	0.6mm		6N or less	<b>511-201</b>				1 pcs.	100mm

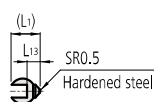
Inch										
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set					
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Probing depth
<b>511-214</b>	.24-.4"	.020"	2N or less	—	<b>511-214</b>	Not supplied	Not supplied	9 pcs.	Not supplied	2"
<b>511-205</b>	.4-.74"	.024"		6N or less	<b>511-205</b>				1 pc.	4"
<b>511-212</b>	.24-.4"	.020"	2N or less	—	<b>511-214</b>	<b>2923SB-10</b> (Graduation: .0001")	<b>21DZA000</b>	9 pcs.	Not supplied	2"
<b>511-206</b>	.4-.74"	.024"		6N or less	<b>511-205</b>				1 pc.	4"
<b>511-213</b>	.24-.4"	.020"	2N or less	—	<b>511-214</b>	<b>2922SB</b> (Graduation: .0005")	<b>21DZA000</b>	9 pcs.	Not supplied	2"
<b>511-207</b>	.4-.74"	.024"		6N or less	<b>511-205</b>				1 pc.	4"

## DIMENSIONS



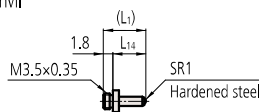
### 511-209/511-214

Anvil

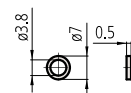


### 511-201/511-205

Anvil



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



No.204355

## STANDARD ACCESSORIES

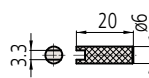
Bore gage (Main body)	Anvil					Interchangeable Washer Parts No.	Spanner Parts No.
	Marked No.	Parts No.	Indication of measuring size	L1	L13		
<b>511-209</b> <b>511-214</b>	1	<b>952168</b>	6.0mm/.24"	4.7mm/.19"	1.2mm/.05"	Not supplied	<b>206709</b>
	2	<b>952169</b>	6.5mm/.26"	5.3mm/.21"	1.7mm/.07"		
	3	<b>952170</b>	7.0mm/.28"	5.8mm/.23"	2.2mm/.09"		
	4	<b>952414</b>	7.5mm/.30"	6.3mm/.25"	2.7mm/.11"		
	5	<b>952415</b>	8.0mm/.32"	6.8mm/.27"	3.2mm/.13"		
	6	<b>952416</b>	8.5mm/.34"	7.3mm/.29"	3.7mm/.15"		
	7	<b>952417</b>	9.0mm/.36"	7.8mm/.31"	4.2mm/.17"		
	8	<b>952418</b>	9.5mm/.38"	8.3mm/.33"	4.7mm/.19"		
	9	<b>952419</b>	10.0mm/.40"	8.8mm/.35"	5.2mm/.21"		

Bore gage (Main body)	Anvil					Interchangeable Washer Parts No.	Spanner Parts No.
	Marked No.	Parts No.	Indication of measuring size	L1	L14		
<b>511-201*</b> <b>511-205</b>	1	<b>204356</b>	10mm/.40"	3.8mm/.15"	2mm/.08"	<b>204355</b>	<b>204354</b>
	2	<b>204357</b>	11mm/.44"	4.8mm/.19"	3mm/.12"		
	3	<b>204358</b>	12mm/.48"	5.8mm/.23"	4mm/.16"		
	4	<b>204359</b>	13mm/.52"	6.8mm/.27"	5mm/.20"		
	5	<b>204360</b>	14mm/.56"	7.8mm/.31"	6mm/.24"		
	6	<b>204361</b>	15mm/.60"	8.8mm/.35"	7mm/.28"		
	7	<b>204362</b>	16mm/.64"	9.8mm/.39"	8mm/.32"		
	8	<b>204363</b>	17mm/.68"	10.8mm/.43"	9mm/.36"		
	9	<b>204364</b>	18mm/.72"	11.8mm/.46"	10mm/.40"		

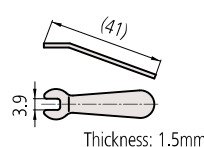
\* Equipped with an anvil fixing plate.

Spanner

No.206709



No.204354

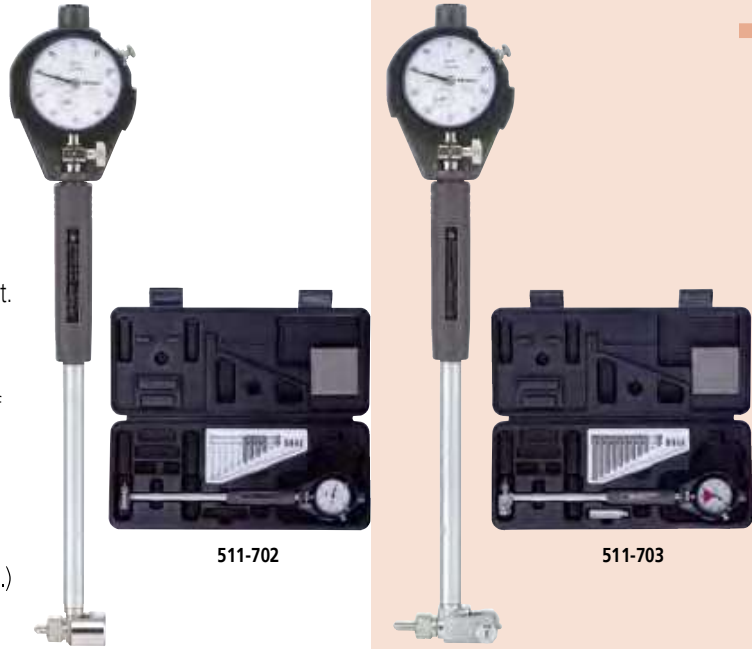


# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages SERIES 511

- Longer plunger stroke with no affect on accuracy.
- Carbide is used for the contact point ensuring high durability and wear resistance.
- This model reduces the influence of heat from the operator's hand by 50% by increasing the grip size and making the grip hollow-structured, thereby retaining high-accuracy measurement.
- Alternative indicators may be used in place of those recommended\*.
- \* Some indicators and protection covers cannot be used with these bore gages. Contact a Mitutoyo sales office if considering the use of dial or digimatic indicators other than the recommended models.
- Optional extension rods can be attached for measuring deep holes. (For details, refer to page C-45.)
- 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-46 and C-47.)



511-702

511-703

Dial indicators and protection covers are optional.

## SPECIFICATIONS

Metric													
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set							Probing depth	
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner		
511-701	18-35mm	1.2mm	4N or less	6N or less	511-701	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	100mm	
511-702	35-60mm				511-702			6 pcs.					
511-703	50-150mm				511-703			11 pcs.					
511-704	100-160mm		5N or less	10N or less	511-704			13 pcs.	4 pcs.	1 pc.	Not supplied	Not supplied	150mm
511-705	160-250mm				511-705			6 pcs.					
511-706	250-400mm				511-706			5 pcs.					
511-701	18-35mm	1.2mm	4N or less	6N or less	511-701	2109SB-10 (Graduation: 0.001mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100mm	
511-702	35-60mm				511-702			6 pcs.					
511-703	50-150mm				511-703			11 pcs.					
511-704	100-160mm		5N or less	10N or less	511-704			13 pcs.	4 pcs.	1 pc.	Not supplied	Not supplied	150mm
511-705	160-250mm				511-705			6 pcs.					
511-706	250-400mm				511-706			5 pcs.					
511-701	18-35mm	1.2mm	4N or less	6N or less	511-701	2046SB (Graduation: 0.01mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100mm	
511-702	35-60mm				511-702			6 pcs.					
511-703	50-150mm				511-703			11 pcs.					
511-704	100-160mm		5N or less	10N or less	511-704			13 pcs.	4 pcs.	1 pc.	Not supplied	Not supplied	150mm
511-705	160-250mm				511-705			6 pcs.					
511-706	250-400mm				511-706			5 pcs.					
511-921	18-150mm	—	—	—	511-701	2046SB	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100mm	
511-922					511-702			2109SB-10					6 pcs.
511-925-10					511-703			543-310B					5 pcs.

Inch													
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set							Probing depth	
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner		
511-731	.7-1.4"	.047"	4N or less	6N or less	511-731	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	4"	
511-732	1.4-2.5"				511-732			6 pcs.					
511-733	2.0-6.0"				511-733			11 pcs.					
511-734	4.0-6.5"		5N or less	10N or less	511-734			13 pcs.	4 pcs.	1 pc.	Not supplied	Not supplied	6"
511-735	6.5-10.0"				511-735			6 pcs.					
511-736	10.0-16.0"				511-736			5 pcs.					
511-731	.7-1.4"	.047"	4N or less	6N or less	511-731	2923SB-10 (Graduation: .0001")	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	4"	
511-732	1.4-2.5"				511-732			6 pcs.					
511-733	2.0-6.0"				511-733			11 pcs.					
511-734	4.0-6.5"		5N or less	10N or less	511-734			13 pcs.	4 pcs.	1 pc.	Not supplied	Not supplied	6"
511-735	6.5-10.0"				511-735			6 pcs.					
511-736	10.0-16.0"				511-736			5 pcs.					
511-741	.7-1.4"	.047"	4N or less	6N or less	511-731	2922SB (Graduation: .0005")	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	4"	
511-742	1.4-2.5"				511-732			6 pcs.					
511-743	2.0-6.0"				511-733			11 pcs.					
511-744	4.0-6.5"		5N or less	10N or less	511-734			13 pcs.	4 pcs.	1 pc.	Not supplied	Not supplied	6"
511-745	6.5-10.0"				511-735			6 pcs.					
511-746	10.0-16.0"				511-736			5 pcs.					
511-931	.7-6.0"	—	—	—	511-731	2922SB	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	4"	
511-932					511-732			2923SB-10					6 pcs.
511-935-10					511-733			543-312B					5 pcs.

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

2) A 2" sub-anvil is supplied with 511-733, and a 3" sub-anvil is supplied with 511-736.

3) 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.)



New grip improves accuracy during prolonged use

### Technical Data

Accuracy: Metric models 2µm  
Inch models .00008"  
Repeatability: Metric models 0.5µm  
Inch models .00002"  
Adjacent error: Metric models 1µm  
Inch models .00004"

### Optional Accessories

- Dial indicator (See Chapter F)  
**21DZA000**: Dial protection cover

### Recommended dial indicators (see Chapter F)

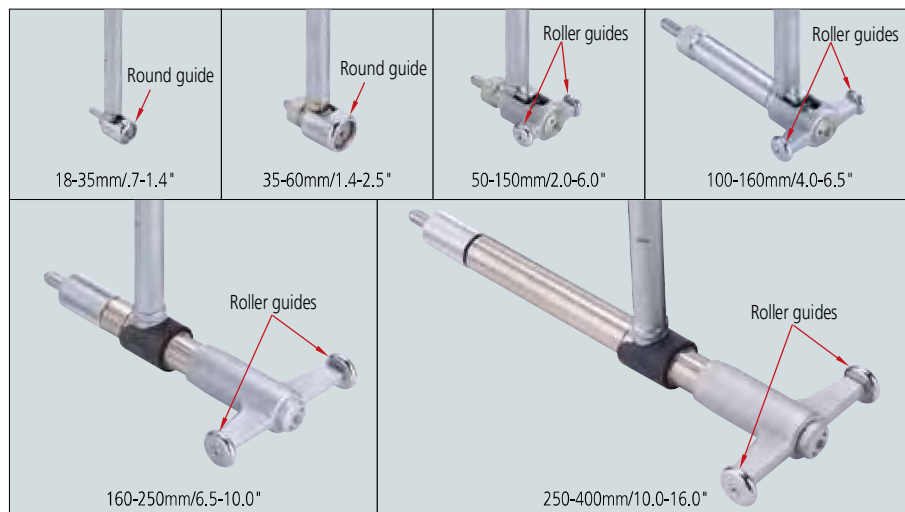
Metric models: **2046SB** (0.01mm)  
**2972TB** (0.01mm - One revolution type)  
**2109SB-10** (0.001mm)  
**2900SB-10** (0.001mm - One-revolution type)  
Inch models: **2922SB** (.0005")  
**2977TB** (.0005" - One-revolution type)  
**2923SB-10** (.0001")  
**2910SB-10** (.0001" - One-revolution type)

### Recommended digimatic indicators (see Chapter F)

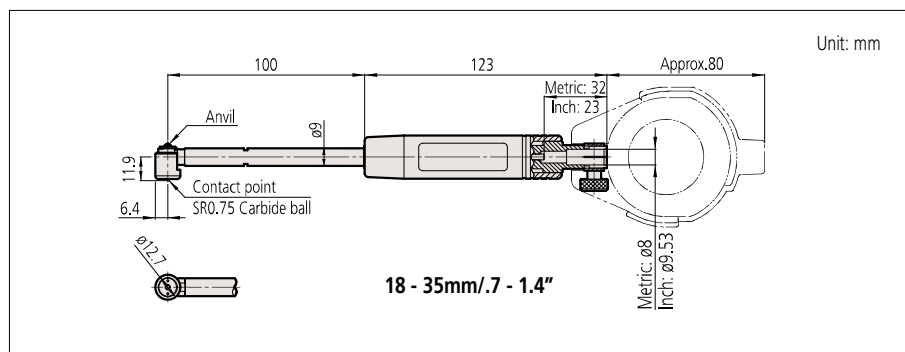
Metric models: **543-310B** (ID-C112GXB: 0.001mm)  
Inch models: **543-312B** (ID-C112GXB: 0.001mm/.00005")

\* Indicators equipped with rubber bellows, such as water-proof types, cannot be used.

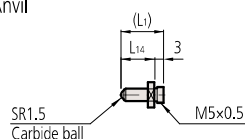
## Contact Points



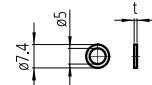
## DIMENSIONS



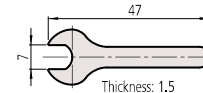
### Anvil



### Interchangeable washer



### Spanner 102148



## STANDARD ACCESSORIES

Bore gage (Main body)	Anvil					Interchangeable washer		Spanner
	Marked No.	Parts No.	Indication of measuring size	L1	L14	Parts No.	t	Parts No.
<b>511-701</b> <b>511-731</b>	1	<b>21DZA213A</b>	18mm/.71"	5.5mm/2.17"	2.5mm/.10"	<b>205623</b> <b>205624</b>	0.5mm/.02" 1.0mm/.04"	<b>102148</b>
	2	<b>21DZA213B</b>	20mm/.79"	7.5mm/2.95"	4.5mm/.18"			
	3	<b>21DZA213C</b>	22mm/.87"	9.5mm/3.74"	6.5mm/.26"			
	4	<b>21DZA213D</b>	24mm/.94"	11.5mm/4.53"	8.5mm/.33"			
	5	<b>21DZA213E</b>	26mm/1.02"	13.5mm/5.31"	10.5mm/.41"			
	6	<b>21DZA213F</b>	28mm/1.10"	15.5mm/6.10"	12.5mm/.49"			
	7	<b>21DZA213G</b>	30mm/1.18"	17.5mm/6.89"	14.5mm/.57"			
	8	<b>21DZA213H</b>	32mm/1.26"	19.5mm/7.68"	16.5mm/.65"			
	9	<b>21DZA213J</b>	34mm/1.34"	21.5mm/8.46"	18.5mm/.73"			

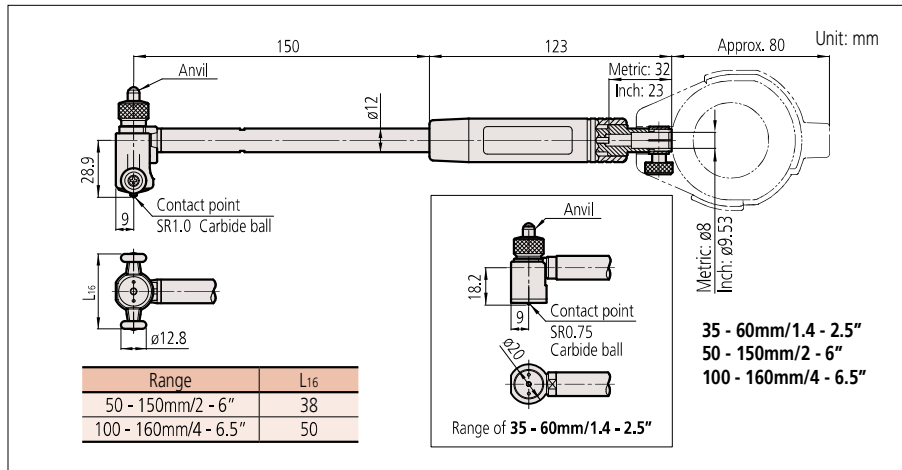


# Bore Gages

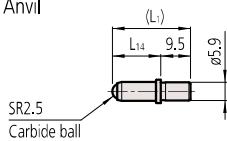
For easy and accurate measurement of inside diameters

## Bore Gages SERIES 511

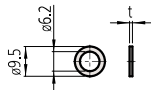
### DIMENSIONS



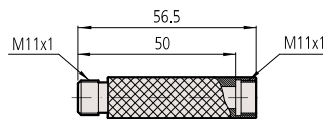
Anvil



Interchangeable washer



Sub-anvil  
(Supplied only for 511-703/733)



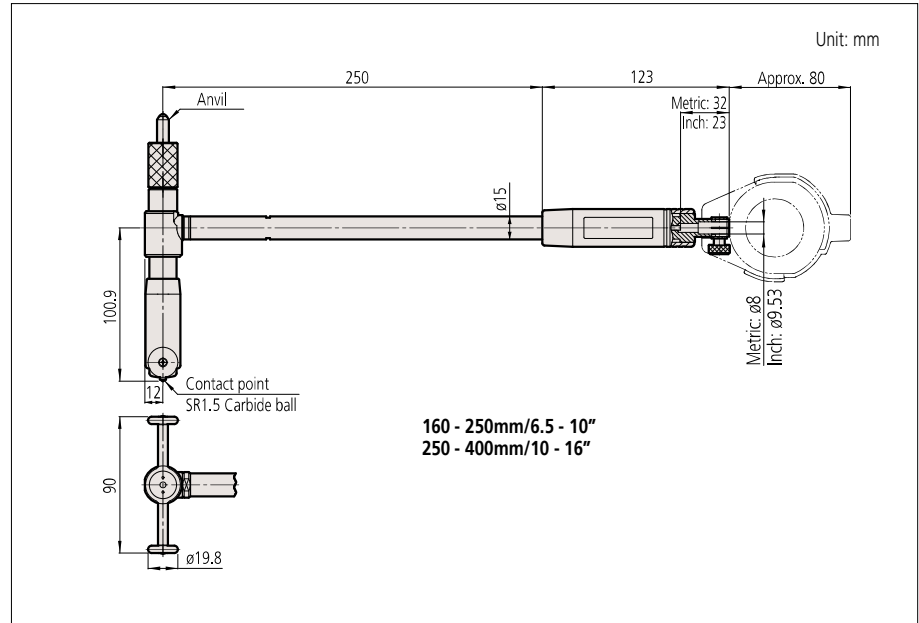
102178

Notes: 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.)

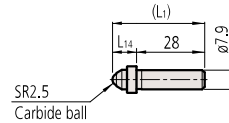
### STANDARD ACCESSORIES

Bore gage (Main body)	Anvil				Interchangeable washer		Sub-Anvil	
	Marked No.	Parts No.	Indication of measuring size	L1	L14	Parts No.	t	Parts No.
511-702 511-732	1	21DZA232A	35mm/1.38"	15mm/.59"	5.5mm/.22"	205457 205458 205459 205460	0.5mm/.02" 1.0mm/.04" 2.0mm/.08" 3.0mm/.12"	102178 (50mm/2")
	2	21DZA232B	40mm/1.57"	20mm/.79"	10.5mm/.41"			
	3	21DZA232C	45mm/1.77"	25mm/.98"	15.5mm/.61"			
	4	21DZA232D	50mm/1.97"	30mm/1.18"	20.5mm/.81"			
	5	21DZA232E	55mm/2.17"	35mm/1.38"	25.5mm/1.00"			
	6	21DZA232F	60mm/2.36"	40mm/1.57"	30.5mm/1.20"			
511-703 511-733 ( ) Used 50mm/2" Sub-Anvil	7	21DZA232G	80mm (130mm)/3.12" (5.12")	45mm/1.77"	35.5mm/1.40"			
	8	21DZA232H	85mm (135mm)/3.31" (5.31")	50mm/1.97"	40.5mm/1.59"			
	9	21DZA232J	90mm (140mm)/3.50" (5.51")	55mm/2.17"	45.5mm/1.79"			
	10	21DZA232L	95mm (145mm)/3.69" (5.71")	60mm/2.36"	50.5mm/1.99"			
	11	21DZA232M	100mm (150mm)/3.88" (5.91")	65mm/2.56"	55.5mm/2.19"			
511-704 511-734	1	21DZA232A	100mm/3.94"	15mm/.59"	5.5mm/.22"			
	2	21DZA232B	105mm/4.13"	20mm/.79"	10.5mm/.41"			
	3	21DZA232C	110mm/4.33"	25mm/.98"	15.5mm/.61"			
	4	21DZA232D	115mm/4.53"	30mm/1.18"	20.5mm/.81"			
	5	21DZA232E	120mm/4.72"	35mm/1.38"	25.5mm/1.00"			
	6	21DZA232F	125mm/4.92"	40mm/1.57"	30.5mm/1.20"			
	7	21DZA232G	130mm/5.12"	45mm/1.77"	35.5mm/1.40"			
	8	21DZA232H	135mm/5.31"	50mm/1.97"	40.5mm/1.59"			
	9	21DZA232J	140mm/5.51"	55mm/2.17"	45.5mm/1.79"			
	10	21DZA232L	145mm/5.71"	60mm/2.36"	50.5mm/1.99"			
	11	21DZA232M	150mm/5.91"	65mm/2.56"	55.5mm/2.19"			
	12	21DZA232N	155mm/6.10"	70mm/2.76"	60.5mm/2.38"			
13	21DZA232P	160mm/6.30"	75mm/2.95"	65.5mm/2.58"				

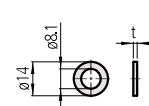
## DIMENSIONS



Anvil

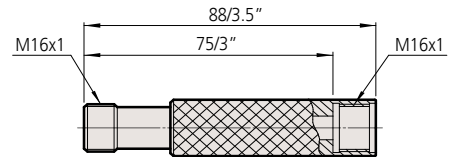


Interchangeable washer



Sub-anvil

(Supplied only for 511-706 (202974) and 511-736 (202975))



**No. 202974 (511-706)**  
**No. 202975 (511-736)**

Notes: 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					Interchangeable washer	Sub-Anvil	
	Marked No.	Parts No.	Indication of measuring size	L <sub>1</sub>	L <sub>14</sub>			Parts No.
511-705 511-735	1	21DZA241A	160mm/6.30"	38mm/1.50"	10mm/.39"	205467 205461 205462 205463 205464 205465 205466	0.5mm/.02" 1.0mm/.04" 2.0mm/.08" 3.0mm/.12" 4.0mm/.16" 5.0mm/.20" 6.0mm/.24"	Metric:202974 (75mm) Inch:202975 (3.0")
	2	21DZA241B	175mm/6.89"	53mm/2.09"	25mm/.98"			
	3	21DZA241C	190mm/7.48"	68mm/2.68"	40mm/1.57"			
	4	21DZA241D	205mm/8.07"	83mm/3.27"	55mm/2.17"			
	5	21DZA241E	220mm/8.66"	98mm/3.86"	70mm/2.76"			
	6	21DZA241F	235mm/9.25"	113mm/4.45"	85mm/3.35"			
511-706 511-736 ( ) Used 75mm/3" Sub-Anvil	1	21DZA241A	250mm (325mm)/9.84" (12.80")	38mm/1.50"	10mm/.39"	205467 205465 205466	0.5mm/.02" 5.0mm/.20" 6.0mm/.24"	Metric:202974 (75mm) Inch:202975 (3.0")
	2	21DZA241B	265mm (340mm)/10.43" (13.39")	53mm/2.09"	25mm/.98"			
	3	21DZA241C	280mm (355mm)/11.02" (13.98")	68mm/2.68"	40mm/1.57"			
	4	21DZA241D	295mm (370mm)/11.61" (14.57")	83mm/3.27"	55mm/2.17"			
	5	21DZA241E	310mm (385mm)/12.20" (15.16")	98mm/3.86"	70mm/2.76"			

# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages SERIES 511 — Short Leg Type

- Compact and lightweight due to the short length below the grip.
- Longer plunger stroke with no affect on accuracy.
- Carbide contact point ensuring high durability and wear resistance.
- This model reduces the influence of heat from the operator's hand by 50% by increasing the grip size and making the grip hollow-structured, thereby retaining high-accuracy measurement.
- Alternative indicators may be used in place of those recommended\*.

\* Some indicators and protection covers cannot be used with these bore gages. Contact a Mitutoyo sales office if considering the use of dial or digimatic indicators other than the recommended models.

- 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-46 and C-47.)



Dial indicators and protection covers are optional.

## SPECIFICATIONS

Metric												
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set							Probing depth
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner	
511-761	18-35mm	1.2mm	4N or less	6N or less	511-761	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	50mm
511-762	35-60mm				511-762			6 pcs.				
511-763	50-150mm	1.6mm	5N or less	10N or less	511-763	Not supplied	Not supplied	11 pcs.	4 pcs.	1 pc.	Not supplied	
511-764	100-160mm				511-764			13 pcs.				
511-771	18-35mm	1.2mm	4N or less	6N or less	511-761	2109SB-10 (Graduation: 0.001mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	
511-772	35-60mm				511-762			6 pcs.				
511-773	50-150mm	1.6mm	5N or less	10N or less	511-763	Not supplied	Not supplied	11 pcs.	4 pcs.	1 pc.	Not supplied	
511-774	100-160mm				511-764			13 pcs.				
511-766	18-35mm	1.2mm	4N or less	6N or less	511-761	2046SB (Graduation: 0.01mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	
511-767	35-60mm				511-762			6 pcs.				
511-768	50-150mm	1.6mm	5N or less	10N or less	511-763	Not supplied	Not supplied	11 pcs.	4 pcs.	1 pc.	Not supplied	
511-769	100-160mm				511-764			13 pcs.				

Inch												
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set							Probing depth
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner	
511-781	.7-1.4"	.047"	4N or less	6N or less	511-781	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	2"
511-782	1.4-2.5"				511-782			6 pcs.				
511-783	2.0-6.0"	.063"	5N or less	10N or less	511-783	Not supplied	Not supplied	11 pcs.	4 pcs.	1 pc.	Not supplied	
511-784	4.0-6.5"				511-784			13 pcs.				
511-791	.7-1.4"	.047"	4N or less	6N or less	511-781	2923SB-10 (Graduation: .0001")	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	
511-792	1.4-2.5"				511-782			6 pcs.				
511-793	2.0-6.0"	.063"	5N or less	10N or less	511-783	Not supplied	Not supplied	11 pcs.	4 pcs.	1 pc.	Not supplied	
511-794	4.0-6.5"				511-784			13 pcs.				
511-786	.7-1.4"	.047"	4N or less	6N or less	511-781	2922SB (Graduation: .0005")	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	
511-787	1.4-2.5"				511-782			6 pcs.				
511-788	2.0-6.0"	.063"	5N or less	10N or less	511-783	Not supplied	Not supplied	11 pcs.	4 pcs.	1 pc.	Not supplied	
511-789	4.0-6.5"				511-784			13 pcs.				

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

2) A 2" sub-anvil is supplied with 511-783.

3) 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.)

### Technical Data

Accuracy: Metric models 2µm  
Inch models .00008"  
Repeatability: Metric models 0.5µm  
Inch models .00002"  
Adjacent error: Metric models 1µm  
Inch models .00004"

### Optional Accessories

- Dial indicator (See Chapter F)  
**21DZA000**: Dial protection cover

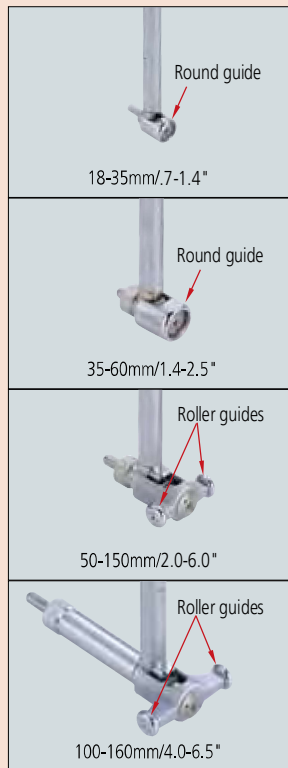
### Recommended dial indicators (see Chapter F)

Metric models: **2046SB** (0.01mm)  
**2972TB** (0.01mm - One-revolution type)  
**2109SB-10** (0.001mm)  
**2900SB-10** (0.001mm - One-revolution type)  
Inch models: **2922SB** (.0005")  
**2977TB** (.0005" - One-revolution type)  
**2923SB-10** (.0001")  
**2910SB-10** (.0001" - One-revolution type)

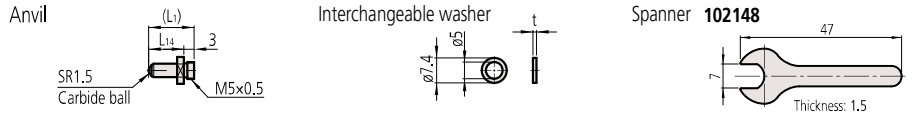
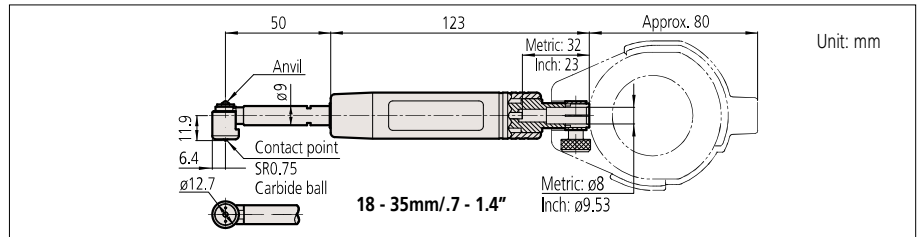
### Recommended digimatic indicators (see Chapter F)

Metric models: **543-310B** (ID-C112GXB, 0.001mm)  
**543-312B** (ID-C112GEXB, 0.001mm/.00005")  
\* Indicators equipped with rubber bellows, such as water-proof types, cannot be used.

### Contact Points



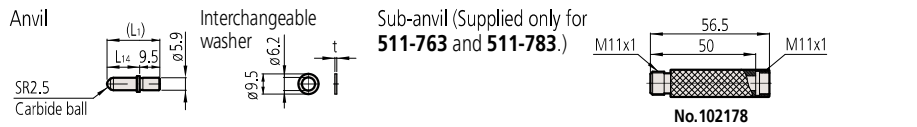
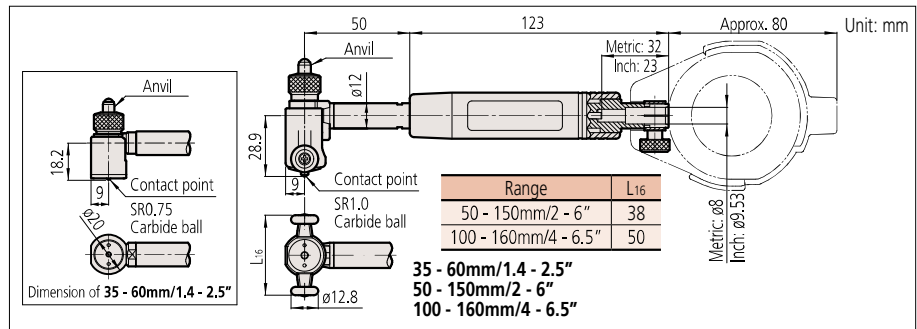
### DIMENSIONS



### STANDARD ACCESSORIES

Bore gage (Main body)	Anvil				Interchangeable washer	Spanner		
	Marked No.	Parts No.	Indication of measuring size	L1			L14	Parts No.
<b>511-761</b> <b>511-781</b>	1	<b>21DZA213A</b>	18mm/.71"	5.5mm/.22"	2.5mm/.10"	<b>205623</b> <b>205624</b>	0.5mm/.02" 1.0mm/.04"	<b>102148</b>
	2	<b>21DZA213B</b>	20mm/.79"	7.5mm/.30"	4.5mm/.18"			
	3	<b>21DZA213C</b>	22mm/.87"	9.5mm/.37"	6.5mm/.26"			
	4	<b>21DZA213D</b>	24mm/.94"	11.5mm/.45"	8.5mm/.33"			
	5	<b>21DZA213E</b>	26mm/1.02"	13.5mm/.53"	10.5mm/.41"			
	6	<b>21DZA213F</b>	28mm/1.10"	15.5mm/.61"	12.5mm/.49"			
	7	<b>21DZA213G</b>	30mm/1.18"	17.5mm/.69"	14.5mm/.57"			
	8	<b>21DZA213H</b>	32mm/1.26"	19.5mm/.77"	16.5mm/.65"			
	9	<b>21DZA213J</b>	34mm/1.34"	21.5mm/.85"	18.5mm/.73"			

### DIMENSIONS



Notes: 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				Interchangeable washer	Sub-Anvil		
	Marked No.	Parts No.	Indication of measuring size	L1			L14	Parts No.
<b>511-762</b> <b>511-782</b>	1	<b>21DZA232A</b>	35mm/1.38"	15mm/.59"	5.5mm/.22"	<b>205457</b> <b>205458</b> <b>205459</b> <b>205460</b>	0.5mm/.02" 1.0mm/.04" 2.0mm/.08" 3.0mm/.12"	<b>102178</b> (50mm/2")
	2	<b>21DZA232B</b>	40mm/1.57"	20mm/.79"	10.5mm/.41"			
	3	<b>21DZA232C</b>	45mm/1.77"	25mm/.98"	15.5mm/.61"			
	4	<b>21DZA232D</b>	50mm/1.97"	30mm/1.18"	20.5mm/.81"			
	5	<b>21DZA232E</b>	55mm/2.17"	35mm/1.38"	25.5mm/1.00"			
	6	<b>21DZA232F</b>	60mm/2.36"	40mm/1.57"	30.5mm/1.20"			
<b>511-763</b> ( ) Used 50mm/2" Sub-Anvil	1	<b>21DZA232A</b>	50mm (100mm/3.94")	15mm/.59"	5.5mm/.22"			
	2	<b>21DZA232B</b>	55mm (105mm/4.13")	20mm/.79"	10.5mm/.41"			
	3	<b>21DZA232C</b>	60mm (110mm/4.33")	25mm/.98"	15.5mm/.61"			
	4	<b>21DZA232D</b>	65mm (115mm/4.53")	30mm/1.18"	20.5mm/.81"			
	5	<b>21DZA232E</b>	70mm (120mm/4.72")	35mm/1.38"	25.5mm/1.00"			
	6	<b>21DZA232F</b>	75mm (125mm/4.92")	40mm/1.57"	30.5mm/1.20"			
	7	<b>21DZA232G</b>	80mm (130mm/5.12")	45mm/1.77"	35.5mm/1.40"			
	8	<b>21DZA232H</b>	85mm (135mm/5.31")	50mm/1.97"	40.5mm/1.59"			
	9	<b>21DZA232J</b>	90mm (140mm/5.51")	55mm/2.17"	45.5mm/1.79"			
	10	<b>21DZA232L</b>	95mm (145mm/5.71")	60mm/2.36"	50.5mm/1.99"			
	11	<b>21DZA232M</b>	100mm (150mm/5.91")	65mm/2.56"	55.5mm/2.19"			
<b>511-764</b> <b>511-784</b>	1	<b>21DZA232A</b>	100mm/3.94"	15mm/.59"	5.5mm/.22"			
	2	<b>21DZA232B</b>	105mm/4.13"	20mm/.79"	10.5mm/.41"			
	3	<b>21DZA232C</b>	110mm/4.33"	25mm/.98"	15.5mm/.61"			
	4	<b>21DZA232D</b>	115mm/4.53"	30mm/1.18"	20.5mm/.81"			
	5	<b>21DZA232E</b>	120mm/4.72"	35mm/1.38"	25.5mm/1.00"			
	6	<b>21DZA232F</b>	125mm/4.92"	40mm/1.57"	30.5mm/1.20"			
	7	<b>21DZA232G</b>	130mm/5.12"	45mm/1.77"	35.5mm/1.40"			
	8	<b>21DZA232H</b>	135mm/5.31"	50mm/1.97"	40.5mm/1.59"			
	9	<b>21DZA232J</b>	140mm/5.51"	55mm/2.17"	45.5mm/1.79"			
	10	<b>21DZA232L</b>	145mm/5.71"	60mm/2.36"	50.5mm/1.99"			
	11	<b>21DZA232M</b>	150mm/5.91"	65mm/2.56"	55.5mm/2.19"			
	12	<b>21DZA232N</b>	155mm/6.10"	70mm/2.76"	60.5mm/2.38"			
	13	<b>21DZA232P</b>	160mm/6.30"	75mm/2.95"	65.5mm/2.58"			

# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages SERIES 511 — with Micrometer Head

- Micrometer head is attached to the anvil for accurate dimensional setting.
- Longer plunger stroke with no affect on accuracy.
- Carbide is used for the contact point ensuring high durability and wear resistance.
- This model reduces the influence of heat from the operator's hand by 50% by increasing the grip size and making the grip hollow-structured, thereby retaining high-accuracy measurement.
- Wide measuring range with sub-anvils.
- Alternative indicators may be used in place of those recommended\*.

\* Some indicators and protection covers cannot be used with these bore gages. Contact a Mitutoyo sales office if considering the use of dial or digimatic indicators other than the recommended models.

- Optional extension rods can be attached for measuring deep holes. (For details, refer to page C-45.)
- 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-46 and C-47.)



511-803

511-804



511-804



511-806

Dial indicators and protection covers are optional.

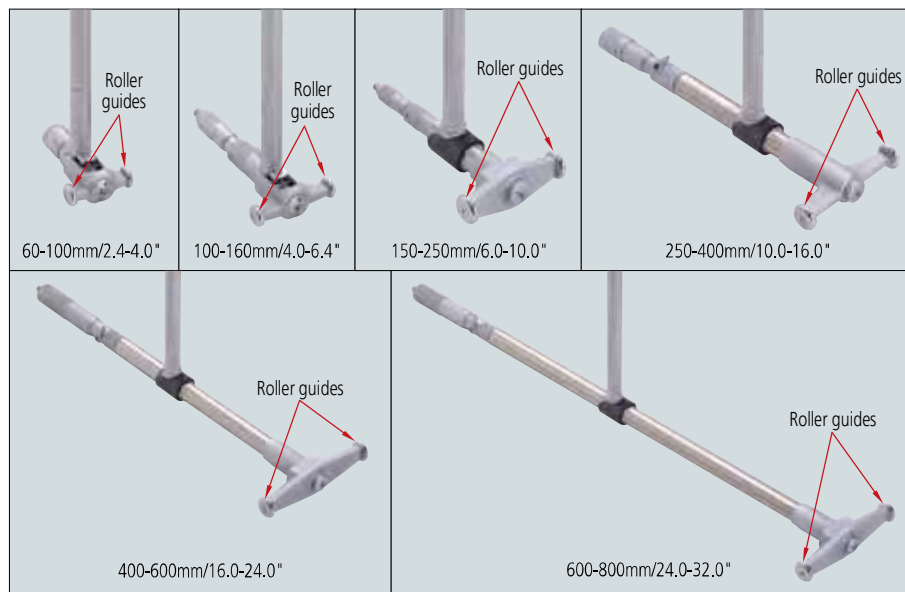
## SPECIFICATIONS

Metric																
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set						Probing depth					
					Bore gage	Dial indicator	Dial protection cover	Micrometer head	Sub-Anvil	Spanner						
511-803	60-100mm	1.6mm	5N or less	10N or less	511-803	Not supplied	Not supplied	1 pc.	2 pcs.	3 pcs.	150mm					
511-804	100-160mm				3 pcs.											
511-805	150-250mm				4 pcs.											
511-806	250-400mm								3 pcs.							
511-807	400-600mm		2 pcs.	20N or less	511-807				2 pcs.	250mm						
511-808	600-800mm				2 pcs.											
511-823	60-100mm		1.6mm	5N or less	10N or less				511-803	2109SB-10 (Graduation: 0.001mm)		21DZA000	1 pc.	2 pcs.	3 pcs.	150mm
511-824	100-160mm								3 pcs.							
511-825	150-250mm	4 pcs.														
511-826	250-400mm					3 pcs.										
511-827	400-600mm	2 pcs.		20N or less	511-806	2 pcs.	250mm									
511-828	600-800mm				2 pcs.											
511-813	60-100mm	1.6mm		5N or less	10N or less	511-803	2046SB (Graduation: 0.01mm)	21DZA000	1 pc.		2 pcs.			3 pcs.	150mm	
511-814	100-160mm					3 pcs.										
511-815	150-250mm		4 pcs.													
511-816	250-400mm					3 pcs.										
511-817	400-600mm		2 pcs.	20N or less	511-807	2 pcs.				250mm						
511-818	600-800mm				2 pcs.											
Inch																
Order No.	Range		Stroke of contact point	Measuring force	Guide force	Content of set						Probing depth				
		Bore gage				Dial indicator	Dial protection cover	Micro meter head	Sub-Anvil	Spanner						
511-833	2.4-4.0"	.063"	5N or less	10N or less	511-833	Not supplied	Not supplied	1 pc.	2 pcs.	3 pcs.	6"					
511-834	4.0-6.4"				3 pcs.											
511-835	6.0-10.0"				4 pcs.											
511-836	10.0-16.0"								3 pcs.							
511-837	16.0-24.0"		2 pcs.	20N or less	511-837				2 pcs.	10"						
511-838	24.0-32.0"				2 pcs.											
511-853	2.4-4.0"		.063"	5N or less	10N or less				511-833	2923SB-10 (Graduation: .0001")		21DZA000	1 pc.	2 pcs.	3 pcs.	4"
511-854	4.0-6.4"								3 pcs.							
511-855	6.0-10.0"	4 pcs.														
511-856	10.0-16.0"					3 pcs.										
511-857	16.0-24.0"	2 pcs.		20N or less	511-837	2 pcs.	10"									
511-858	24.0-32.0"				2 pcs.											
511-843	2.4-4.0"	.063"		5N or less	10N or less	511-833	2922SB (Graduation: .0005")	21DZA000	1 pc.		2 pcs.			3 pcs.	4"	
511-844	4.0-6.4"					3 pcs.										
511-845	6.0-10.0"		4 pcs.													
511-846	10.0-16.0"					3 pcs.										
511-847	16.0-24.0"		2 pcs.	20N or less	511-837	2 pcs.				10"						
511-848	24.0-32.0"				2 pcs.											

Notes: 1) Storage boxes for 511-807/808/837/838 models are made of wood. The boxes of other models are made of plastic.

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.)

## Contact Points



### Technical Data

Accuracy: Metric models 2µm  
Inch models .0008"  
Repeatability: Metric models 0.5µm  
Inch models .0002"  
Adjacent error: Metric models 1µm  
Inch models .0004"

### Optional Accessories

-: Dial indicator (See Chapter F)  
**21DZA000**: Dial protection cover

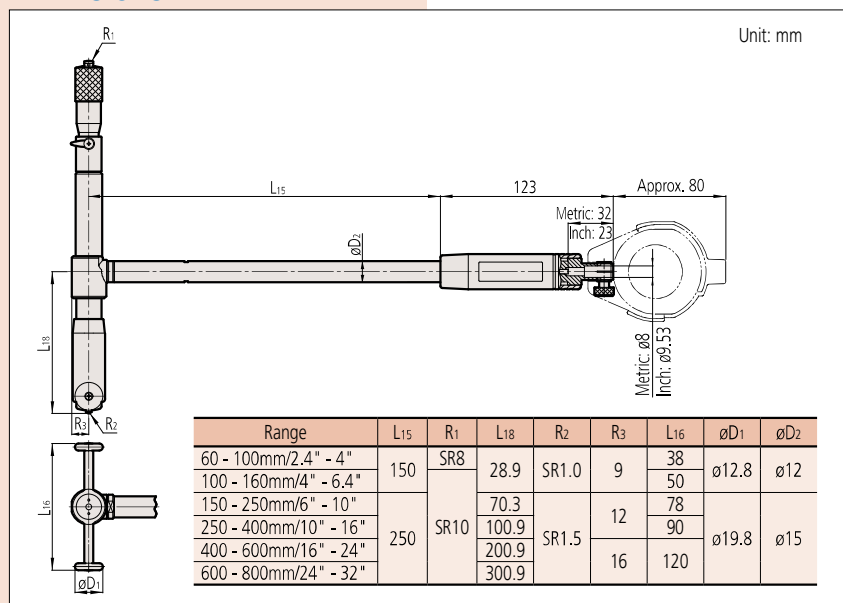
### Recommended dial indicators (see Chapter F)

Metric models: **2046SB** (0.01mm)  
**2972TB** (0.01mm - One-revolution type)  
**2109SB-10** (0.001mm)  
**2900SB-10** (0.001mm - One-revolution type)  
Inch models: **2922SB** (.0005")  
**2977TB** (.0005" - One-revolution type)  
**2923SB-10** (.0001")  
**2910SB-10** (.0001" - One-revolution type)

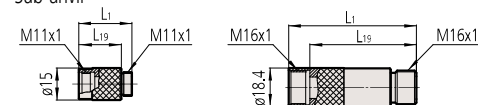
### Recommended digimatic indicators (see Chapter F)

Metric models: **543-310B** (ID-C112GXB: 0.001mm)  
Inch models: **543-312B** (ID-C112GEXB: 0.001mm/.0005")  
\* Indicators equipped with rubber bellows, such as water-proof types, cannot be used.

## DIMENSIONS



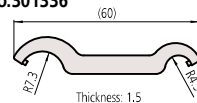
### Sub-anvil



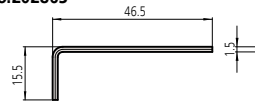
Notes: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

### Spanner

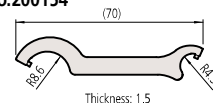
#### No.301336



#### No.202863



#### No.200154



## STANDARD ACCESSORIES

Metric								
Bore gage (Main body)	Micrometer head			Sub-Anvil				Spanner
	Parts No.	Stroke	Screw size	Marked No.	Parts No.	L1	L19	Parts No.
511-803	21DZA267	10mm	M11x1	10mm	208892	15mm	10mm	301336 (2 pcs.)
				20mm	208894	25mm	20mm	202863 (1 pcs.)
511-804	21DZA268	13mm	M11x1	10mm	208892	15mm	10mm	301336 (2 pcs.)
				20mm	208894 (2 pcs.)	25mm	20mm	
511-805	21DZA268	13mm	M11x1	10mm	208892	15mm	10mm	301336 (2 pcs.)
				20mm	208894 (2 pcs.)	25mm	20mm	
				50mm	21DAA492	55mm	50mm	
511-806	953118	25mm	M16x1	25mm	208926	35mm	25mm	200154 (2 pcs.)
				50mm	208928 (2 pcs.)	60mm	50mm	
511-807	953120	50mm	M16x1	50mm	208928	60mm	50mm	200154 (2 pcs.)
				100mm	208932	110mm	100mm	
511-808	953120	50mm	M16x1	50mm	208928	60mm	50mm	200154 (2 pcs.)
				100mm	208932	110mm	100mm	

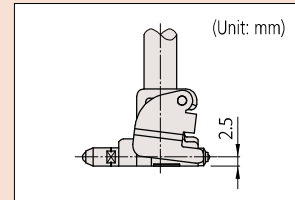
Inch								
Bore gage (Main body)	Micrometer head			Sub-Anvil				Spanner
	Parts No.	Stroke	Screw size	Marked No.	Parts No.	L1	L19	Parts No.
511-833	21DZA272	.4"	M11x1	.4"	208893	.6"	.4"	301336 (2 pcs.)
				.8"	208895	1.0"	.8"	202863 (1 pcs.)
511-834	21DZA273	.5"	M11x1	.4"	208893	.6"	.4"	301336 (2 pcs.)
				.8"	208895 (2 pcs.)	1.0"	.8"	
511-835	21DZA273	.5"	M11x1	.4"	208893	.6"	.4"	301336 (2 pcs.)
				.8"	208895 (2 pcs.)	1.0"	.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"	
511-838	902313	2.0"	M16x1	2"	208929	2.4"	2"	200154 (2 pcs.)
				4"	208933	4.4"	4"	

# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages SERIES 511 — for Blind Holes

- Capable of ID (inside diameter) measurement close to the bottom of a hole.
- Carbide contact point ensuring high durability and wear resistance.
- Grip is large and hollow to reduce effect of body heat on high-accuracy measurements.
- Alternative indicators may be used in place of those recommended\*.
- \* Some indicators and protection covers cannot be used with these bore gages. Contact a Mitutoyo sales office if considering the use of dial or digimatic indicators other than the recommended models.
- Optional extension rods can be attached for measuring deep holes. (For details, refer to page C-45.)
- 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-46 and C-47.)



### Technical Data

Accuracy: Metric models 4µm  
Inch models .00016"  
Repeatability: Metric models 1µm  
Inch models .00004"  
Adjacent error: Metric models 1µm  
Inch models .00004"

### Optional Accessories

-: Dial indicator (See Chapter F)  
**21DZA000**: Dial protection cover

### Recommended dial indicators (see Chapter F)

Metric models: **2046SB** (0.01mm)  
**2972TB** (0.01mm - One-revolution type)  
**2109SB-10** (0.001mm)  
**2900SB-10** (0.001mm - One-revolution type)  
Inch models: **2922SB** (.0005")  
**2977TB** (.0005" - One-revolution type)  
**2923SB-10** (.0001")  
**2910SB-10** (.0001" - One-revolution type)

### Recommended digimatic indicators (see Chapter F)

Metric models: **543-310B** (0.001mm)  
Inch models: **543-312B** (0.001mm/.00005")

\* Indicators equipped with rubber bellows, such as water-proof types, cannot be used.



511-416



511-417

The dial indicator and protection cover are optional.

## SPECIFICATIONS

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

Inch										
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Content of set					Probing depth
					Bore gage	Dial indicator	Dial protection cover	Anvil	Washer	
511-418	.6-1.4"	.047"	4N or less	6N or less	511-418	Not supplied	Not supplied	11 pcs.	1 pc.	6"
511-419	1.4-2.4"				511-419			6 pcs.	4 pcs.	
511-420	2.0-6.0"				511-420			11 pcs.	4 pcs.	
511-425	.6-1.4"	.047"	4N or less	6N or less	511-418	2922SB (Graduation: .0005")	21DZA000	11 pcs.	1 pc.	6"
511-429	1.4-2.4"				511-419			6 pcs.	4 pcs.	
511-430	2.0-6.0"				511-420			11 pcs.	4 pcs.	
511-438	.6-1.4"	.047"	4N or less	6N or less	511-418	2923SB-10 (Graduation: .0001")	21DZA000	11 pcs.	1 pc.	6"
511-439	1.4-2.4"				511-419			6 pcs.	4 pcs.	
511-440	2.0-6.0"				511-420			11 pcs.	4 pcs.	

Notes: 1) A 10mm (.4") sub-anvil is supplied with 511-415/425/435/418/428/438 and a 50mm (2") sub-anvil is supplied with 511-417/427/437/420/430/440.

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.)

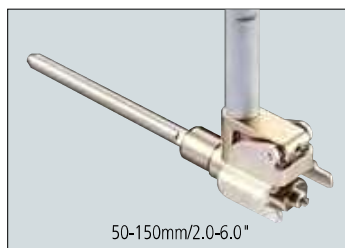
## Contact Points



15-35mm/.6-1.4"

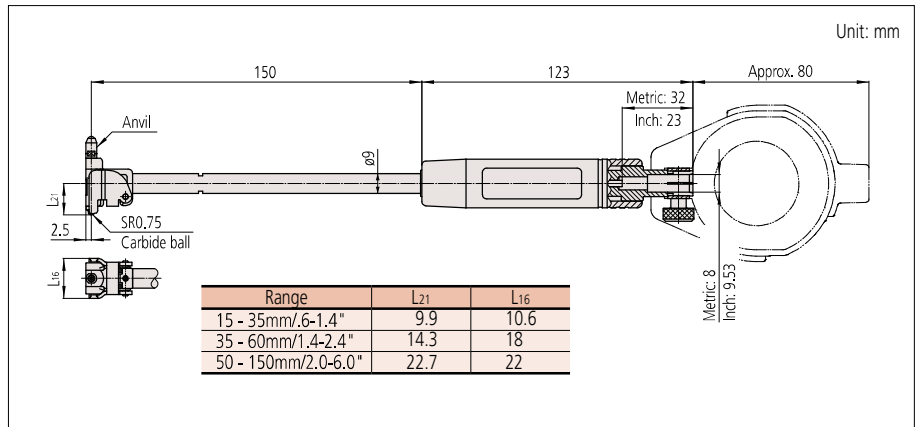


35-60mm/1.4-2.4"

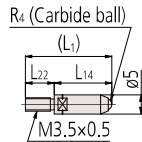


50-150mm/2.0-6.0"

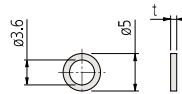
## DIMENSIONS



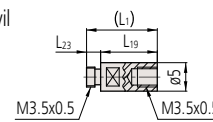
Anvil



Interchangeable washer

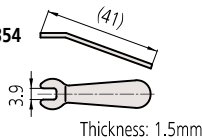


Sub-anvil

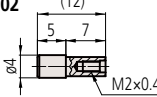


Notes: It is not permissible to use a sub-anvil other than as supplied as a standard accessory, or widen a measuring range by using multiple sub-anvils. (The measurement accuracy in such cases is not guaranteed.)

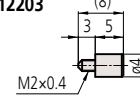
Spanner  
No.204354



Washer holder  
No.212202



Locking screw  
No.212203



## STANDARD ACCESSORIES

Bore gage (Main body)	Anvil							Interchangeable washer		Sub-Anvil		
	Marked No.	Order No.	Indication of measuring size	L <sub>1</sub>	L <sub>22</sub>	R <sub>4</sub>	L <sub>14</sub>	Order No.	t	Order No.	L <sub>23</sub>	L <sub>19</sub>
511-415 511-418 ( ) Used 10mm/.4" Sub-Anvil	1	21DZA376A	15mm(25mm)/.59*(.98")	4.5mm/.18"	2.5 mm/.1"	SR1 mm/SR.04"	2mm/.08"	212127	0.5mm/.02"	21DAA563	2.5mm/.1"	10mm/.4"
	2	21DZA376B	16mm(26mm)/.63*(1.02")	5.5mm/.22"			3mm/.12"					
	3	21DZA376C	17mm(27mm)/.67*(1.06")	6.5mm/.26"			4mm/.16"					
	4	21DZA376D	18mm(28mm)/.71*(1.10")	7.5mm/.30"			5mm/.20"					
	5	21DZA376E	19mm(29mm)/.75*(1.14")	8.5mm/.33"			6mm/.24"					
	6	21DZA376F	20mm(30mm)/.79*(1.18")	9.5mm/.37"			7mm/.28"					
	7	21DZA376G	21mm(31mm)/.83*(1.22")	10.5mm/.41"			8mm/.31"					
	8	21DZA376H	22mm(32mm)/.87*(1.26")	11.5mm/.45"			9mm/.35"					
	9	21DZA376J	23mm(33mm)/.91*(1.30")	12.5mm/.49"			10mm/.39"					
	10	21DZA376L	24mm(34mm)/.94*(1.34")	13.5mm/.53"			11mm/.43"					
	11	21DZA376M	25mm(35mm)/.98*(1.38")	14.5mm/.57"			12mm/.47"					
511-416 511-419	1	21DZA404A	35mm/1.38"	17.5mm/.69"	7.5 mm/.3"	SR1.5 mm/SR.06"	10mm/.39"	212127	0.5mm/.02"			
	2	21DZA404B	40mm/1.57"	22.5mm/.89"			15mm/.59"					
	3	21DZA404C	45mm/1.77"	27.5mm/1.08"			20mm/.79"					
	4	21DZA404D	50mm/1.97"	32.5mm/1.28"			25mm/.98"					
	5	21DZA404E	55mm/2.17"	37.5mm/1.48"			30mm/1.18"					
	6	21DZA404F	60mm/2.36"	42.5mm/1.67"			35mm/1.38"					
511-417 511-420 ( ) Used 50mm/2" Sub-Anvil	1	21DZA404A	50mm(100mm)/1.97*(3.94")	17.5mm/.69"	7.5 mm/.3"	SR1.5 mm/SR.06"	10mm/.39"	212127	0.5mm/.02"	21DAA596	7.5mm/.3"	50mm/2"
	2	21DZA404B	55mm(105mm)/2.17*(4.13")	22.5mm/.89"			15mm/.59"					
	3	21DZA404C	60mm(110mm)/2.36*(4.33")	27.5mm/1.08"			20mm/.79"					
	4	21DZA404D	65mm(115mm)/2.56*(4.53")	32.5mm/1.28"			25mm/.98"					
	5	21DZA404E	70mm(120mm)/2.76*(4.72")	37.5mm/1.48"			30mm/1.18"					
	6	21DZA404F	75mm(125mm)/2.95*(4.92")	42.5mm/1.67"			35mm/1.38"					
	7	21DZA404G	80mm(130mm)/3.15*(5.12")	47.5mm/1.87"			40mm/1.57"					
	8	21DZA404H	85mm(135mm)/3.35*(5.31")	52.5mm/2.07"			45mm/1.77"					
	9	21DZA404J	90mm(140mm)/3.54*(5.51")	57.5mm/2.26"			50mm/1.97"					
	10	21DZA404L	95mm(145mm)/3.74*(5.71")	62.5mm/2.46"			55mm/2.17"					
	11	21DZA404M	100mm(150mm)/3.94*(5.91")	67.5mm/2.66"			60mm/2.36"					



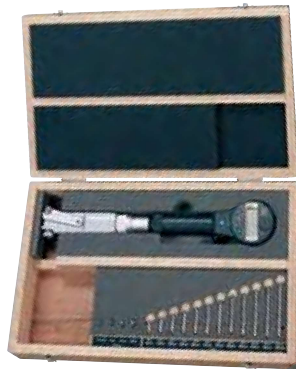
# Bore Gages

For easy and accurate measurement of inside diameters

## Bore Gages

### SERIES 511 — ABSOLUTE Digimatic Bore Gages

- These ABSOLUTE Digimatic bore gages are exclusively designed for inside diameter measurement.
- Up to four extension rods (250mm or 500mm) can be used for measuring at the bottom of a hole 2m deep.
- ABS (ABSOLUTE) type bore gages are not subject to overspeed error.
- The display and grip can be rotated up to 320 degrees and the display can be inclined up to 90 degrees, so that it is easily readable from any direction.
- The minimum value holding function provides easy measurement of hole diameter.
- Setting the Bore Gage to a master value using a gauge block set allows quick and accurate setting.
- 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-46 and C-47.)



## SPECIFICATIONS

Metric									
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Resolution	Content of set			Probing depth
						Anvil	Interchangeable washer	Battery (SR44)	
511-501	45-100mm	1.2mm	5N or less	10N or less	0.001mm	12 pcs.	4 pcs.	2 pcs.	150mm
511-502	100-160mm					13 pcs.	4 pcs.	2 pcs.	

Inch									
Order No.	Range	Stroke of contact point	Measuring force	Guide force	Resolution	Content of set			Probing depth
						Anvil	Interchangeable washer	Battery (SR44)	
511-521	1.8-4.0"	.047"	5N or less	6N or less	.0005"/0.001mm	12 pcs.	4 pcs.	2 pcs.	6"
511-522	4.0-6.5"					13 pcs.	4 pcs.	2 pcs.	

- Notes: 1) Normal use is assumed to be 8 hours per day.  
 2) The correct peak value may not be displayed if the anvil's speed exceeds 50 µm/s.  
 3) IP53 indicates resistance to dust and dripping water, but only applies when the connector cap is in place.



ABSOLUTE™ (Refer to page X for details.)

## Technical Data

- Accuracy: Metric models 3µm  
Inch models .00012"  
Excluding quantizing error
- Repeatability: Metric models 2µm  
Inch models .00008"
- Adjacent error: Metric models 2µm  
Inch models .00008"
- Battery: SR44 (2 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 2000 hours under normal use.
- Display: LCD character height 8.5mm
- Scale type: ABSOLUTE electrostatic linear encoder
- Max. response speed: Unlimited

## Function

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

## Optional Accessories

- 21DZA089**: Extension rod 250 mm (10")
- 21DZA081**: Extension rod 500 mm (20")
- Up to four extension rods can be jointed, and the maximum length 2m is allowed.
- Refer to page A-21 for details
- Connecting cables for Input Tool/ Digimatic Mini-Processor, etc.  
1m: **905338**  
2m: **905409**
- USB Input Tool Direct (2m): 06ADV380F**
- Connecting cables for **U-WAVE-T**
- For standard (160mm): **02AZD790F**
- For foot switch: **02AZE140F**
- \_\_\_\_\_ : Setting ring (See page C-47.)
- Digimatic Mini-Processor DP-1VR: **264-504**

## Example of connection

When connecting four pieces of 500mm extension rods

## Gauge blocks and block sets for setting the origin or master value (optional)

Usage example



Rectangular gauge blocks

\* Available only for 511-501/521

516-118-10

516-118-60 with calibration certificate

Description	Order 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	
Certificate of inspection		1	

\* Equivalent to JIS B 7506 Grade 0

Square gauge blocks

\* Available only for 511-501/521

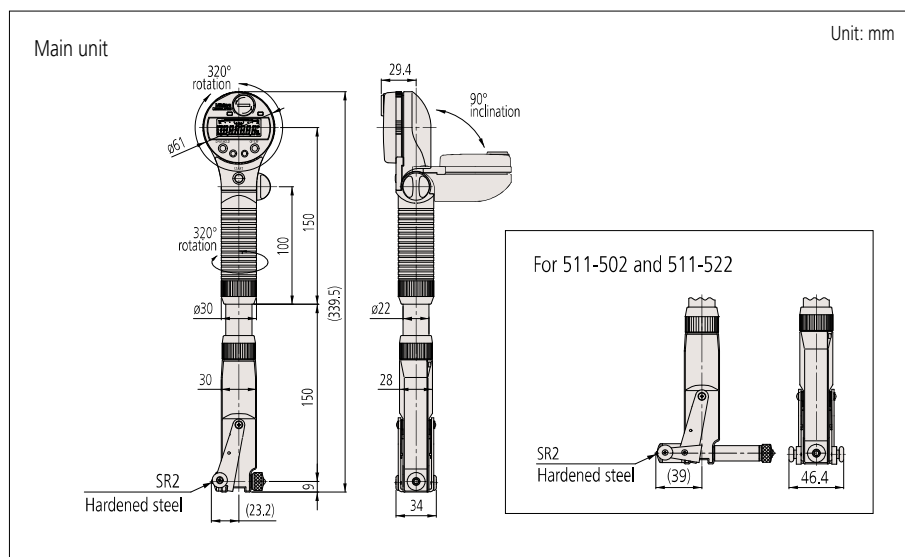
516-119-10

516-119-60 with calibration certificate

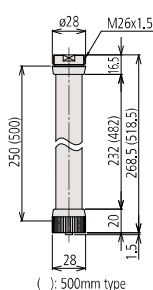
Description	Order No.	Qty	
Nominal length (mm)	1	614611-021	1
	2	614612-021	1
	3	614613-021	1
	5	614615-021	1
	10	614671-021	1
	20	614672-021	1
	30	614673-021	1
40	614674-021	1	
Flat jaw	619072	1 pair (2 pcs)	
Tie rod 3"	619062	1	
Tie rod 2 1/4"	619063	1	
Tie rod 1 1/2"	619064	1	
Flat head screw 1 1/4"	619057	2	
Flat head screw 5/8"	619058	2	
Certificate of inspection		1	

\* Equivalent to JIS B 7506 Grade 0

## DIMENSIONS

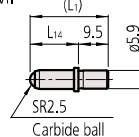


Extension rod

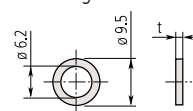


( ): 500mm type

Anvil



Interchangeable washer



## STANDARD ACCESSORIES

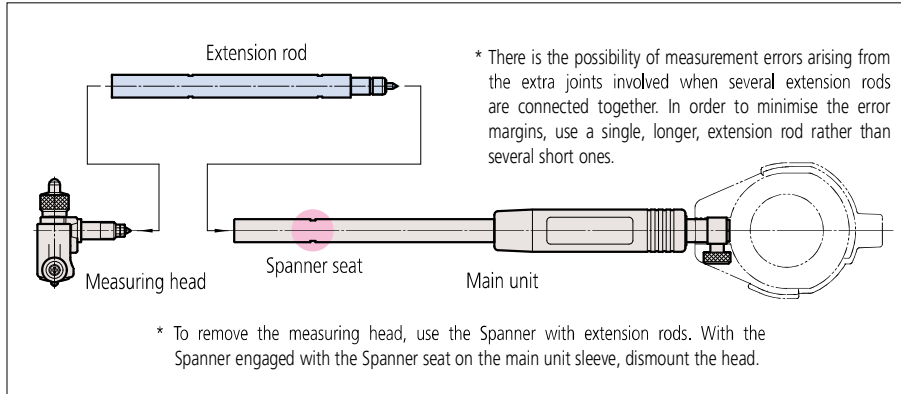
Bore gage (Main body)	Anvil					Interchangeable washer	
	Marked No.	Parts No.	Indication of measuring size	L1	L14	Parts No.	t
511-501 511-521	1	21DZA232A	45mm/1.8"	15mm/.59"	5.5mm/.22"	205457 205458 205459 205460	0.5mm/.02" 1.0mm/.04" 2.0mm/.08" 3.0mm/.12"
	2	21DZA232B	50mm/2.0"	20mm/.79"	10.5mm/.42"		
	3	21DZA232C	55mm/2.2"	25mm/.98"	15.5mm/.61"		
	4	21DZA232D	60mm/2.4"	30mm/1.18"	20.5mm/.81"		
	5	21DZA232E	65mm/2.6"	35mm/1.38"	25.5mm/1.00"		
	6	21DZA232F	70mm/2.8"	40mm/1.57"	30.5mm/1.20"		
	7	21DZA232G	75mm/3.0"	45mm/1.77"	35.5mm/1.40"		
	8	21DZA232H	80mm/3.2"	50mm/1.97"	40.5mm/1.59"		
	9	21DZA232J	85mm/3.4"	55mm/2.17"	45.5mm/1.79"		
	10	21DZA232L	90mm/3.6"	60mm/2.36"	50.5mm/1.99"		
	11	21DZA232M	95mm/3.8"	65mm/2.56"	55.5mm/2.19"		
	12	21DZA232N	100mm/4.0"	70mm/2.76"	60.5mm/2.38"		
511-502 511-522	1	21DZA232A	100mm/4.0"	15mm/.59"	5.5mm/.22"	205457 205458 205459 205460	0.5mm/.02" 1.0mm/.04" 2.0mm/.08" 3.0mm/.12"
	2	21DZA232B	105mm/4.2"	20mm/.79"	10.5mm/.42"		
	3	21DZA232C	110mm/4.4"	25mm/.98"	15.5mm/.61"		
	4	21DZA232D	115mm/4.6"	30mm/1.18"	20.5mm/.81"		
	5	21DZA232E	120mm/4.8"	35mm/1.38"	25.5mm/1.00"		
	6	21DZA232F	125mm/5.0"	40mm/1.57"	30.5mm/1.20"		
	7	21DZA232G	130mm/5.2"	45mm/1.77"	35.5mm/1.40"		
	8	21DZA232H	135mm/5.4"	50mm/1.97"	40.5mm/1.59"		
	9	21DZA232J	140mm/5.6"	55mm/2.17"	45.5mm/1.79"		
	10	21DZA232L	145mm/5.8"	60mm/2.36"	50.5mm/1.99"		
	11	21DZA232M	150mm/6.0"	65mm/2.56"	55.5mm/2.19"		
	12	21DZA232N	155mm/6.2"	70mm/2.76"	60.5mm/2.38"		
	13	21DZA232P	160mm/6.4"	75mm/2.95"	65.5mm/2.58"		

# Bore Gages

For easy and accurate measurement of inside diameters

## Extension rod SERIES 511 — Accessories for Bore Gages

- Extension rods (optional) are available to assist in deep-hole measurement.
- If two or more extension rods are connected together, measurement errors may occur due to flexure of the rod assembly. Therefore it is best to use no more than a single extension rod.
- The extension rod length is available up to 1000mm.
- Can not be connected to the products with special sizes or special specifications.
- When using a 500mm (or longer) extension rod, use the bore gage in an upright position.
- The accuracy and security of the assembly should be confirmed after connecting a rod.



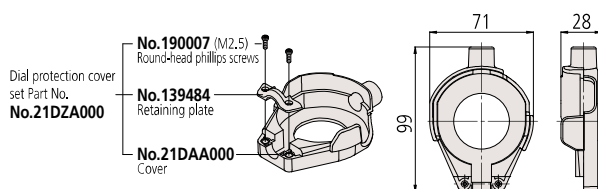
## SPECIFICATIONS

Applicable model Order No.	Extension rod length					Extension rod diameter	Spanner part No.
	125m	250m	500m	750m	1000m		
511-701/511-731	953549	953550	953551	—	—	ø9mm	102148
511-415/511-418							
511-416/511-419							
511-417/511-420							
511-702/511-732	953552	953553	953554	953555	953556	ø12mm	212556
511-703/511-733							
511-704/511-734							
511-803/511-833							
511-804/511-834	953557	952361	953558	953559	953560	ø15mm	212556
511-705/511-735							
511-706/511-736							
511-805/511-835							
511-806/511-836							
511-807/511-837							
511-808/511-838							

\*Spanner is supplied as standard.

## Protection cover

- Both the flat backplate of a dial indicator and backplate with a lug can be attached to a protection cover.



## Usage example



### Technical Data

Flatness of parallel jaw  
0.5 $\mu$ m (Parallelism 1 $\mu$ m)

### Standard accessories

Parallel jaw 2 pcs. **630030**  
Attachment A **940088**  
Attachment B **940089**  
Attachment C **940090**

## Bore Gage Checker SERIES 515

- The Bore Gage Checker allows easy setting of dial bore gages with ranges of 18mm (.7") through 400mm (16") using gauge blocks.



515-590

Standard configuration: Stand  
Attachment A, B, C 1pc. for each  
Parallel jaw (2 pcs.)

## SPECIFICATIONS

Order No.	Applicable range
515-590	18 - 400mm (.7"-16")

# Bore Gages

For easy and accurate measurement of inside diameters

## 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.

#### Steel Setting Rings



177-146



177-300

#### CERA Setting Rings

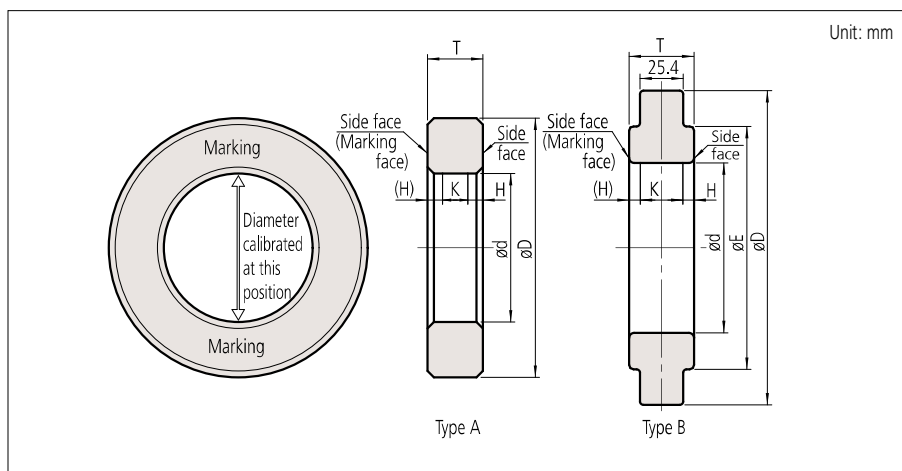


177-429



177-432

## DIMENSIONS



#### Suffix

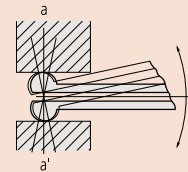
- 177-\*\*\*-12:** With Inspection Certificate (provides a record of the calibrated diameter)
- 177-\*\*\*-62:** With Inspection Certificate (provides a record of the calibrated diameter) and Calibration Certificate
- 177-\*\*\*-82:** With Inspection Certificate (provides a record of the calibrated diameter), Calibration Certificate, and Traceability System Chart

#### Notes:

- The Inspection Certificate is not a substitute for a calibration certificate as it is undated.
- A more detailed inspection certificate describing roundness and cylindricity is available on request.

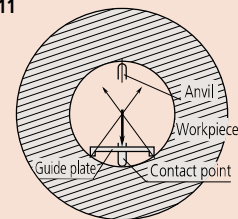
#### How to read the indicated value

##### Series 526



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 maximum value read from the dial indicator.

##### Series 511



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

# SPECIFICATIONS

## Steel Setting Rings

Metric										
Order No.	Nominal size $\phi$ d	Dimensions (mm)			Type	Accuracy				
		$\phi$ D	$\phi$ E	T		Tolerance between the nominal size and the actual diameter ( $\mu$ m)	Uncertainty of marked diameter value ( $\mu$ m)* <sup>1</sup>	Roundness/Cylindricity ( $\mu$ m)* <sup>2</sup>	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-220	1mm	20	—	4	A	$\pm 10$	$\pm 1.5$	1	1.6	0.8
177-222	1.1mm	20	—	4	A	$\pm 10$	$\pm 1.5$	1	1.6	0.8
177-225	1.2mm	20	—	4	A	$\pm 10$	$\pm 1.5$	1	1.6	0.8
177-227	1.3mm	20	—	4	A	$\pm 10$	$\pm 1.5$	1	1.6	0.8
177-230	1.4mm	20	—	4	A	$\pm 10$	$\pm 1.5$	1	1.6	0.8
177-236	1.75mm	25	—	5	A	$\pm 10$	$\pm 1.5$	1	1.6	1.8
177-239	2mm	25	—	5	A	$\pm 10$	$\pm 1.5$	1	1.6	1.8
177-242	2.25mm	25	—	5	A	$\pm 10$	$\pm 1.5$	1	1.6	1.8
177-208	2.5mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-246	2.75mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-248	3mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-250	3.25mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-252	3.5mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-255	3.75mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-204	4mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-257	4.5mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-205	5mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-263	5.5mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-267	6mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-271	6.5mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-275	7mm	25	—	7	A	$\pm 10$	$\pm 1.5$	1	1.7	3.6
177-125	8mm	32	—	10	A	$\pm 10$	$\pm 1.5$	1	2.0	6.0
177-279	9mm	32	—	10	A	$\pm 10$	$\pm 1.5$	1	2.0	6.0
177-126	10mm	32	—	10	A	$\pm 10$	$\pm 1.5$	1	2.0	6.0
177-284	12mm	32	—	10	A	$\pm 10$	$\pm 1.5$	1	2.0	6.0
177-132	14mm	38	—	10	A	$\pm 10$	$\pm 1.5$	1	2.0	6.0

Inch										
Order No.	Nominal size $\phi$ d	Dimensions (mm)			Type	Accuracy				
		$\phi$ D	$\phi$ E	T		Tolerance between the nominal size and the actual diameter (inch)	Uncertainty of marked diameter value (inch)* <sup>1</sup>	Roundness/Cylindricity (inch)* <sup>2</sup>	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-209	.1"	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	1.7	3.6
177-206	.16"	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	1.7	3.6
177-207	.24"	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	1.7	3.6
177-281	.275"	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	1.7	3.6
177-179	.35"	32	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-283	.425"	32	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-180	.5"	32	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-181	.6"	38	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-182	.65"	45	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-183	.7"	45	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-287	.8"	45	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-184	1"	53	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	3.2	8.6
177-289	1.2"	71	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	3.2	8.6
177-185	1.4"	71	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	3.2	8.6
177-291	1.6"	71	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	3.2	8.6
177-186	1.8"	85	—	15	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	3.2	8.6

## CERA Setting Rings

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

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

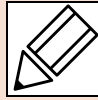
\*2 Cylindricity is defined as per JIS B 0621 Definitions and designations of geometrical deviations, Section 4.4 "Cylindricity." Cylindricity is measured using three cross-sections between the top and bottom face of a ring, namely, close to the face near each sides and the center.

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

Metric										
Order No.	Nominal size $\phi$ d	Dimensions (mm)			Type	Accuracy				
		$\phi$ D	$\phi$ E	T		Tolerance between the nominal size and the actual diameter (inch)	Uncertainty of marked diameter value (inch)* <sup>1</sup>	Roundness/Cylindricity (inch)* <sup>2</sup>	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-187	2"	85	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00004"	3.7	12.6
177-293	2.4"	112	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00004"	3.7	12.6
177-315	2.5"	112	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	3.7	12.6
177-188	2.8"	112	—	20	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	3.7	12.6
177-317	3"	125	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	4.2	16.6
177-295	3.2"	125	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	4.2	16.6
177-319	3.5"	140	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	4.2	16.6
177-189	3.6"	140	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00006"	4.2	16.6
177-297	4"	160	—	25	A	$\pm .0008$ "	$\pm .00006$ "	.00008"	4.2	16.6
177-299	5"	210	168	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00008"	5.3	27.5
177-311	6"	235	187	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00008"	5.3	27.5
177-303	7"	260	215	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00010"	5.3	27.5
177-305	8"	311	244	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00010"	5.3	27.5
177-307	9"	337	264	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00010"	5.3	27.5
177-309	10"	362	290	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00012"	5.3	27.5
177-311	11"	413	321	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00012"	5.3	27.5
177-313	12"	438	340	38.1	B	$\pm .0008$ "	$\pm .00010$ "	.00012"	5.3	27.5

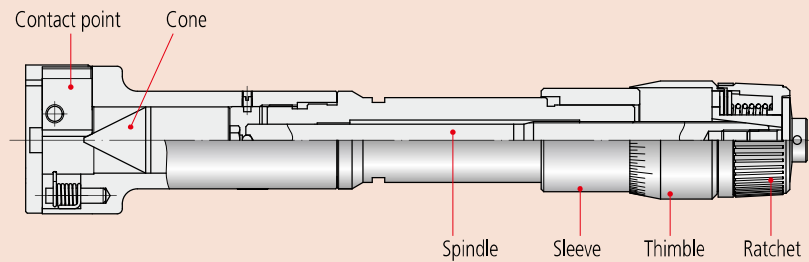
Inch										
Order No.	Nominal size $\phi$ d	Dimensions (mm)			Type	Accuracy				
		$\phi$ D	$\phi$ E	T		Tolerance between the nominal size and the actual diameter (inch)	Uncertainty of marked diameter value (inch)* <sup>1</sup>	Roundness/Cylindricity (inch)* <sup>2</sup>	Distance from the side face H (mm)	Size of warranted calibration surface K (mm)
177-518	.16"	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	1.7	3.6
177-520	.24"	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	1.7	3.6
177-522	.275"	25	—	7	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	1.7	3.6
177-523	.35"	32	—	10	A	$\pm .0004$ "	$\pm .00006$ "	.00004"	2.0	6.0
177-524	.425"	3								

# Quick Guide to Precision Measuring Instruments



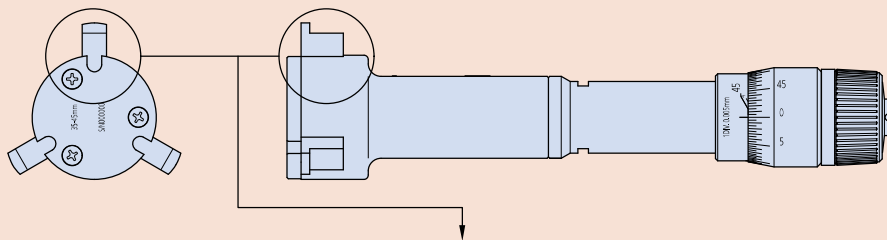
## Internal Micrometers

### Nomenclature



### Custom-ordered Products (Holtest / Borematic)

Mitutoyo can custom-build an internal micrometer best suited to your special application. Please feel free to contact Mitutoyo about the possibilities - even if only one custom-manufactured piece is required. Please note that, depending on circumstances, such a micrometer will usually need to be used with a master setting ring for accuracy assurance. (A custom-ordered micrometer can be made compatible with a master ring supplied by the customer. Please consult Mitutoyo.)



Type of feature	Workpiece profile (example)	Contact point tip profile (example)	Remarks
Square groove		<p>Tip radius R that can measure the minimum diameter (different for each size)</p>	<ul style="list-style-type: none"> <li>● Allows measurement of the diameter of variously shaped inside grooves and splines.</li> <li>● Minimum measurable groove diameter is approximately 16mm (differs depending on the workpiece profile.)</li> <li>● Dimension <math>\ell</math> should be as follows: For <math>W = \text{less than } 2\text{mm}</math>: <math>\ell = \text{less than } 2\text{mm}</math> For <math>W = 2\text{mm or more}</math>: <math>\ell = 2\text{mm}</math> as the standard value which can be modified according to circumstances.</li> <li>● The number of splines or serrations is limited to a multiple of 3.</li> <li>● Details of the workpiece profile should be provided at the time of placing a custom-order.</li> <li>● If your application needs a measuring range different from that of the standard internal micrometer an additional initial cost for the master ring gage will be required.</li> </ul>
Round groove		<p>Tip radius R that can measure the minimum diameter (different for each size)</p>	
Spline		<p>Tip radius R that can measure the minimum diameter (different for each size)</p>	
Serration			
Threaded hole			