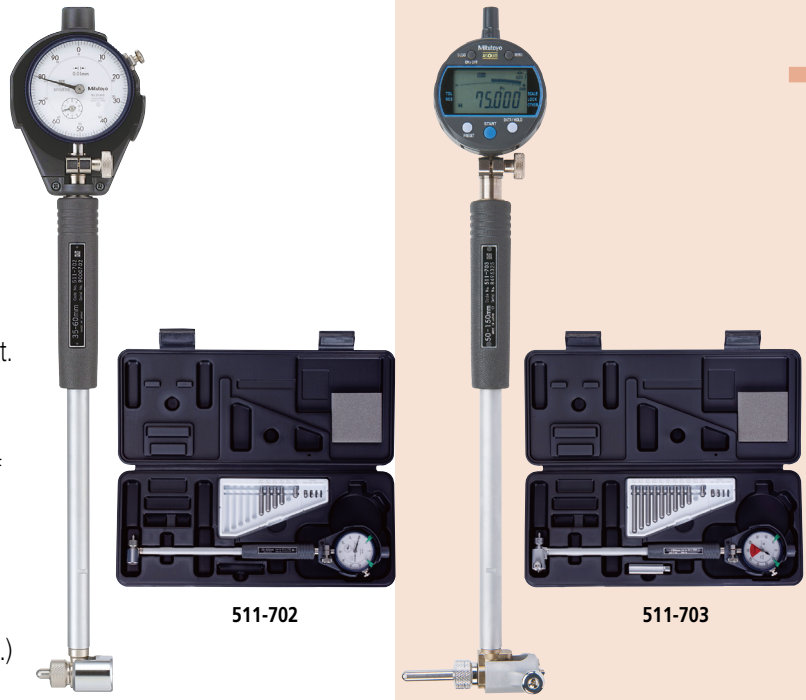


Bore Gages

For easy and accurate measurement of inside diameters

Bore Gages SERIES 511

- Longer plunger stroke with no effect 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.)



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 - 35 mm	1.2 mm	4N or less	6N or less	511-701	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	100 mm	
511-702	35 - 60 mm				511-702			6 pcs.					
511-703	50 - 150 mm				511-703			11 pcs.					
511-704	100 - 160 mm		5N or less	10N or less	511-704			13 pcs.	4 pcs.	1 pc.	Not supplied		Not supplied
511-705	160 - 250 mm				511-705			6 pcs.					
511-706	250 - 400 mm				511-706			5 pcs.					
511-721	18 - 35 mm	1.2 mm	4N or less	6N or less	511-701	2109SB-10 (Graduation: 0.001mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100 mm	
511-722	35 - 60 mm				511-702			6 pcs.					
511-723	50 - 150 mm				511-703			11 pcs.					
511-724	100 - 160 mm		5N or less	10N or less	511-704			13 pcs.	4 pcs.	1 pc.	Not supplied		Not supplied
511-725	160 - 250 mm				511-705			6 pcs.					
511-726	250 - 400 mm				511-706			5 pcs.					
511-711	18 - 35 mm	1.2 mm	4N or less	6N or less	511-701	2046SB (Graduation: 0.01mm)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100 mm	
511-712	35 - 60 mm				511-702			6 pcs.					
511-713	50 - 150 mm				511-703			11 pcs.					
511-714	100 - 160 mm		5N or less	10N or less	511-704			13 pcs.	4 pcs.	1 pc.	Not supplied		Not supplied
511-715	160 - 250 mm				511-705			6 pcs.					
511-716	250 - 400 mm				511-706			5 pcs.					
511-921	18 - 150 mm	—	—	—	511-701	2046SB	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	100 mm	
511-922					511-702			6 pcs.					
511-925-10					511-703			11 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	0.7 - 1.4 in	0.047 in	4N or less	6N or less	511-731	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	4 in	
511-732	1.4 - 2.5 in				511-732			6 pcs.					
511-733	2.0 - 6.0 in				511-733			11 pcs.					
511-734	4.0 - 6.5 in		5N or less	10N or less	511-734			13 pcs.	4 pcs.	1 pc.	Not supplied		Not supplied
511-735	6.5 - 10.0 in				511-735			6 pcs.					
511-736	10.0 - 16.0 in				511-736			5 pcs.					
511-751	0.7 - 1.4 in	0.047 in	4N or less	6N or less	511-731	2923SB-10 (Graduation: 0.0001 in)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	4 in	
511-752	1.4 - 2.5 in				511-732			6 pcs.					
511-753	2.0 - 6.0 in				511-733			11 pcs.					
511-754	4.0 - 6.5 in		5N or less	10N or less	511-734			13 pcs.	4 pcs.	1 pc.	Not supplied		Not supplied
511-755	6.5 - 10.0 in				511-735			6 pcs.					
511-756	10.0 - 16.0 in				511-736			5 pcs.					
511-741	0.7 - 1.4 in	0.047 in	4N or less	6N or less	511-731	2922SB (Graduation: 0.0005 in)	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	4 in	
511-742	1.4 - 2.5 in				511-732			6 pcs.					
511-743	2.0 - 6.0 in				511-733			11 pcs.					
511-744	4.0 - 6.5 in		5N or less	10N or less	511-734			13 pcs.	4 pcs.	1 pc.	Not supplied		Not supplied
511-745	6.5 - 10.0 in				511-735			6 pcs.					
511-746	10.0 - 16.0 in				511-736			5 pcs.					
511-931	0.7 - 6.0 in	—	—	—	511-731	2922SB	21DZA000	9 pcs.	2 pcs.	Not supplied	1 pc.	4 in	
511-932					511-732			6 pcs.					
511-935-10					511-733			11 pcs.					

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

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

Anvil

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

Comparison of abrasion resistance

Hardened steel ball
(conventional model)

Carbide ball
(current model)



Abrasion depth: 0.1 mm
750 HV or more



Abrasion depth: 0.001 mm
1350 HV or more

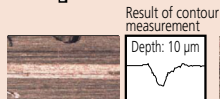
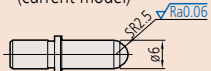
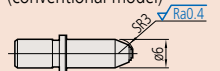
Inspection method

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

Comparison of marks on the workpiece

Carbide tip
(conventional model)

Carbide ball
(current model)

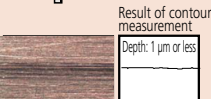


Result of contour measurement

Depth: 10 μm

Vertical magnification: 2,000

Horizontal magnification: 200



Result of contour measurement

Depth: 1 μm or less

Vertical magnification: 2,000

Horizontal magnification: 200

Inspection method

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



The grip is highly resistant to heat transfer from the operator's hand.

Technical Data

Accuracy: Metric models 2 μm
Inch models 0.00008 in
Repeatability: Metric models 0.5 μm
Inch models 0.00002 in
Adjacent error: Metric models 1 μm
Inch models 0.00004 in

Optional Accessories

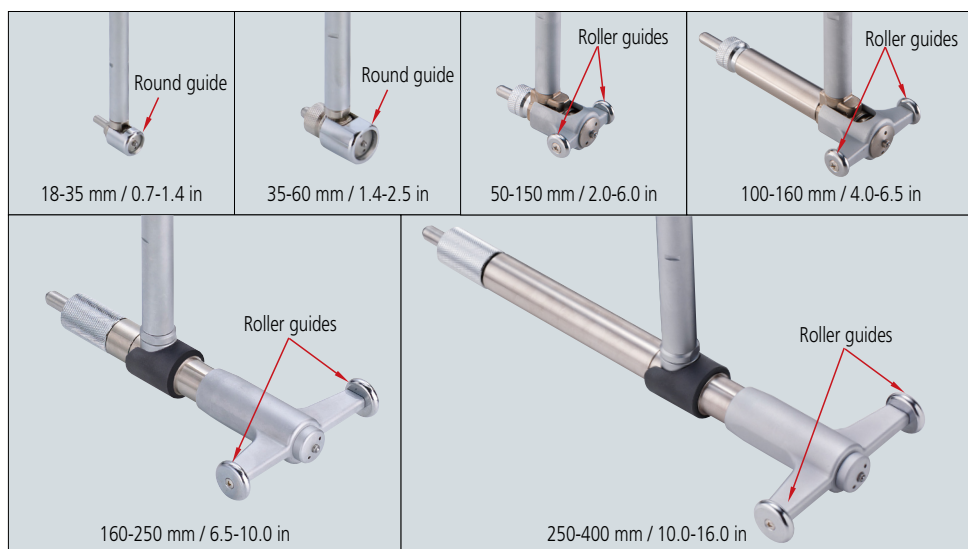
-: Dial indicator (See Chapter F)
21DZA000: Dial protection cover

Recommended Dial Indicators (see Chapter F)

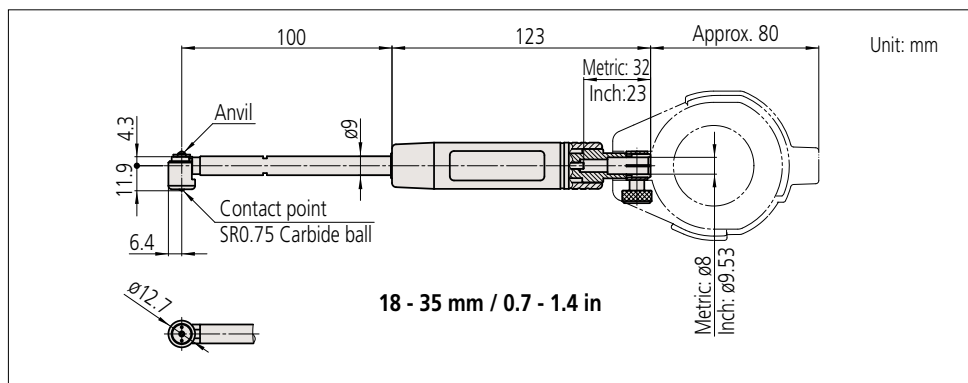
Metric models: **2046SB** (0.01 mm)
2972TB (0.01 mm - One revolution type)
2109SB-10 (0.001 mm)
2900SB-10 (0.001 mm - One-revolution type)
Inch models: **2922SB** (0.0005 in)
2977TB (0.0005 in - One-revolution type)
2923SB-10 (0.0001 in)
2910SB-10 (0.0001 in - One-revolution type)

Note: Indicators equipped with rubber bellows, such as waterproof types, cannot be used.

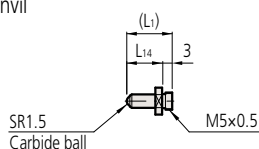
Contact Points



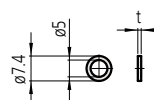
DIMENSIONS



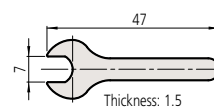
Anvil



Interchangeable washer



Spanner
102148



STANDARD ACCESSORIES

Bore gage (Main body)	Anvil					Interchangeable washer		Spanner
	Marked No.	Order No.	Indication of measuring size	L ₁	L ₁₄	Order No.	t	Order No.
511-701 511-731	1	21DZA213A	18 mm/0.71 in	5.5	2.5	205623 205624	0.5 mm/0.02 in 1.0 mm/0.04 in	102148
	2	21DZA213B	20 mm/0.79 in	7.5	4.5			
	3	21DZA213C	22 mm/0.87 in	9.5	6.5			
	4	21DZA213D	24 mm/0.94 in	11.5	8.5			
	5	21DZA213E	26 mm/1.02 in	13.5	10.5			
	6	21DZA213F	28 mm/1.10 in	15.5	12.5			
	7	21DZA213G	30 mm/1.18 in	17.5	14.5			
	8	21DZA213H	32 mm/1.26 in	19.5	16.5			
	9	21DZA213J	34 mm/1.34 in	21.5	18.5			