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.
- The indicator (dial indicator, Digimatic indicator) and dial protection cover are optional. Select an indicator from the recommended dial indicators and Digimatic indicators. Please contact us for advice when using an indicator other than the recommended indicators.
- 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

Note: The dial indicator and the protection cover are optional.

SPECIFICATIONS

Metric

Order No.	Range (mm)	Stroke of contact point (mm)	Measuring force (N)	Guide force (N)	Content of set							Probing depth (mm)
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner	
511-701	18 - 35	1.2	4 or less	6 or less	**511-701**	Not supplied	Not supplied	9 pcs.	2 pcs.	Not supplied	1 pc.	100
511-702	35 - 60				**511-702**			6 pcs.	4 pcs.		Not supplied	
511-703	50 - 150	1.6	5 or less	10 or less	**511-703**			11 pcs.		1 pc.		150
511-704	100 - 160				**511-704**			13 pcs.		Not supplied		
511-705	160 - 250		6 or less	15 or less	**511-705**			6 pcs.	7 pcs.			250
511-706	250 - 400				**511-706**			5 pcs.		1 pc.		
511-721-20	18 - 35	1.2	4 or less	6 or less	**511-701**	**2109AB-10** (Graduation: 0.001 mm)	**21DZA000**	9 pcs.	2 pcs.	Not supplied	1 pc.	100
511-722-20	35 - 60				**511-702**			6 pcs.	4 pcs.		Not supplied	
511-723-20	50 - 150	1.6	5 or less	10 or less	**511-703**			11 pcs.		1 pc.		150
511-724-20	100 - 160				**511-704**			13 pcs.		Not supplied		
511-725-20	160 - 250		6 or less	15 or less	**511-705**			6 pcs.	7 pcs.			250
511-726-20	250 - 400				**511-706**			5 pcs.		1 pc.		
511-711-20	18 - 35	1.2	4 or less	6 or less	**511-701**	**2046AB** (Graduation: 0.01 mm)	**21DZA000**	9 pcs.	2 pcs.	Not supplied	1 pc.	100
511-712-20	35 - 60				**511-702**			6 pcs.	4 pcs.		Not supplied	
511-713-20	50 - 150	1.6	5 or less	10 or less	**511-703**			11 pcs.		1 pc.		150
511-714-20	100 - 160				**511-704**			13 pcs.		Not supplied		
511-715-20	160 - 250		6 or less	15 or less	**511-705**			6 pcs.	7 pcs.			250
511-716-20	250 - 400				**511-706**			5 pcs.		1 pc.		
511-921-20	18 - 150	—	—	—	**511-701**	**2046AB**	**21DZA000**	—	—	—	—	—
511-922-20					**511-702**	**2109AB-10**						
511-925-10					**511-703**	**543-310B**						

Inch

Order No.	Range (in)	Stroke of contact point (in)	Measuring force (N)	Guide force (N)	Content of set							Probing depth (in)
					Bore gage	Dial indicator	Dial protection cover	Anvil	Interchangeable Washer	Sub-Anvil	Spanner	
511-731	0.7 - 1.4	0.047	4 or less	6 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.	4 pcs.		Not supplied	
511-733	2.0 - 6.0	0.063	5 or less	10 or less	**511-733**			11 pcs.		1 pc.		6
511-734	4.0 - 6.5				**511-734**			13 pcs.		Not supplied		
511-735	6.5 - 10.0		6 or less	15 or less	**511-735**			6 pcs.	7 pcs.			10
511-736	10.0 - 16.0				**511-736**			5 pcs.		1 pc.		
511-751-20	0.7 - 1.4	0.047	4 or less	6 or less	**511-731**	**2923AB-10** (Graduation: 0.0001 in)	**21DZA000**	9 pcs.	2 pcs.	Not supplied	1 pc.	4
511-752-20	1.4 - 2.5				**511-732**			6 pcs.	4 pcs.		Not supplied	
511-753-20	2.0 - 6.0	0.063	5 or less	10 or less	**511-733**			11 pcs.		1 pc.		6
511-754-20	4.0 - 6.5				**511-734**			13 pcs.		Not supplied		
511-755-20	6.5 - 10.0		6 or less	15 or less	**511-735**			6 pcs.	7 pcs.			10
511-756-20	10.0 - 16.0				**511-736**			5 pcs.		1 pc.		
511-741-20	0.7 - 1.4	0.047	4 or less	6 or less	**511-731**	**2922AB** (Graduation: 0.0005 in)	**21DZA000**	9 pcs.	2 pcs.	Not supplied	1 pc.	4
511-742-20	1.4 - 2.5				**511-732**			6 pcs.	4 pcs.		Not supplied	
511-743-20	2.0 - 6.0	0.063	5 or less	10 or less	**511-733**			11 pcs.		1 pc.		6
511-744-20	4.0 - 6.5				**511-734**			13 pcs.		Not supplied		
511-745-20	6.5 - 10.0		6 or less	15 or less	**511-735**			6 pcs.	7 pcs.			10
511-746-20	10.0 - 16.0				**511-736**			5 pcs.		1 pc.		
511-931-20	0.7 - 6.0	—	—	—	**511-731**	**2922AB**	**21DZA000**	—	—	—	—	—
511-932-20					**511-732**	**2923AB-10**						
511-935-10					**511-733**	**543-312B**						

Note 1: A 50 mm sub-anvil is supplied with **511-703**, and a 75 mm sub-anvil is supplied with **511-706**.
Note 2: A 2 in sub-anvil is supplied with **511-733**, and a 3 in sub-anvil is supplied with **511-736**.
Note 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)

Abrasion depth: 0.1 mm
750 HV or more

Carbide ball (current model)

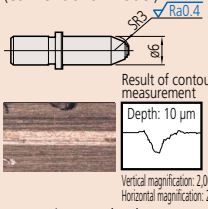
Abrasion depth: 0.001 mm
1350 HV or more

Inspection method

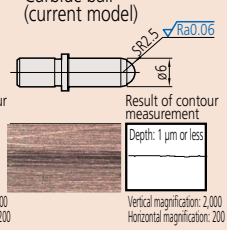
- Load a 0.5 N weight on the anvil, and slide for 1,000 m on abrasive paper of 9 µm (#2000) particle size.

Comparison of marks on the workpiece

Carbide tip (conventional model)



Carbide ball (current model)



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

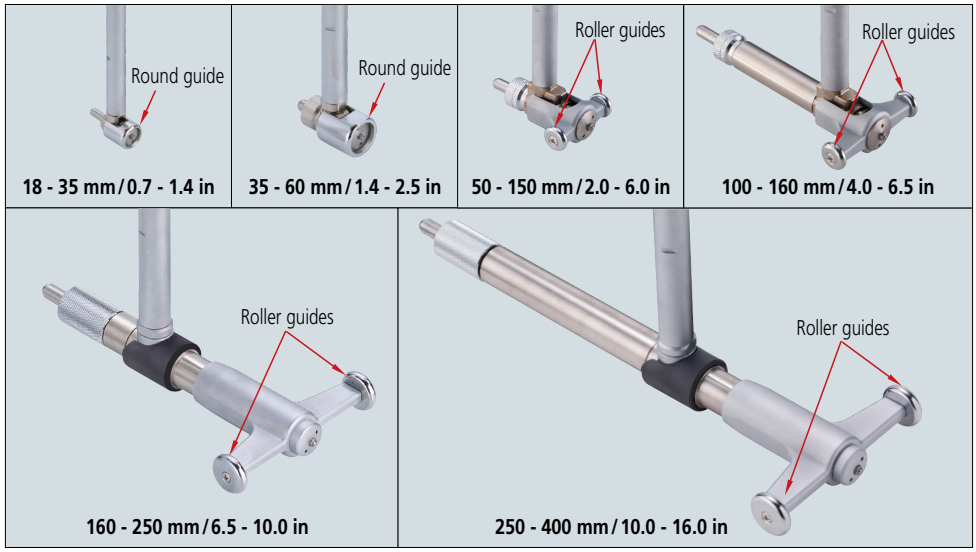
- Dial indicator (See Chapter F)
- Dial protection cover: **21DZA000** (See page C-45)

Recommended Dial Indicators (see Chapter F)

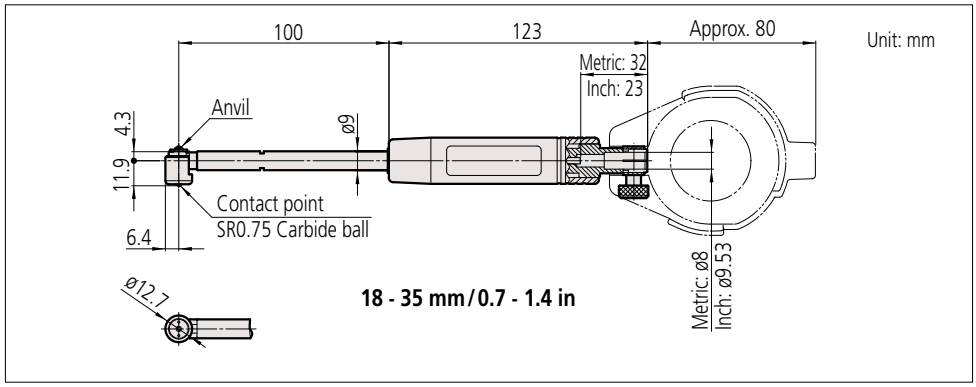
- Metric models: **2046AB** (0.01 mm)
  2972AB (0.01 mm - One revolution type)
  2109AB-10 (0.001 mm)
  2900AB-10 (0.001 mm - One-revolution type)
- Inch models: **2922AB** (0.0005 in)
  2977AB (0.0005 in- One-revolution type)
  2923AB-10 (0.0001 in)
  2910AB-10 (0.0001 in - One-revolution type)

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

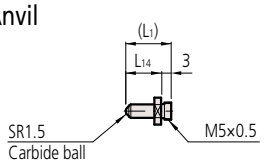
Contact Points



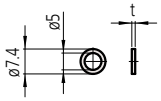
DIMENSIONS



Anvil

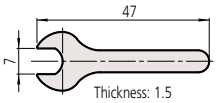


Interchangeable washer



Spanner
102148

Unit: mm



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			