Best-selling range of bore gages now offers better accuracy, user-friendliness and durability
The Best-Selling Inside Diameter Measurement Tools are now

More Accurate, More Easily Used, More Durable!

1. **All models now more accurate**

   The measurement accuracy of new models has improved by 50% or more compared with their predecessors (in JIS standard values).
   
   **Wide-range accuracy:**
   - Improved from 5 µm to 2 µm
   - Repeatability: Improved from 2 µm to 0.5 µm
   - Adjacent error: Improved from 2 µm to 1 µm

2. **33% longer plunger stroke**

   The plunger stroke of flagship models has expanded from 1.2mm to 1.6mm, still maintaining the stated accuracy.
   (For information about compatible models, refer to the specification of each model on pages 4 and 6.)

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**Example of Bore Gage Wide-range Accuracy**

- Old model: 1.2 mm
- New model: 1.6 mm

**Plunger stroke of old models**

**Plunger stroke of new models with a measuring range of 50mm or more**
The Nakatsugawa Plant was established in 1997 as the twelfth Mitutoyo plant in Japan and is located in a beautiful natural environment within the central industrial complex of Nakatsugawa City, Gifu Prefecture. It is dedicated to sensor manufacture and incorporates an integrated production system from design to manufacture of measuring instruments such as dial gages, test indicators, digimatic indicators and bore gages. Leading-edge production technologies and facilities ensure that the Mitutoyo-brand instruments shipped from here are highly valued as the world’s best, providing users with a strong feeling of confidence.

3 Carbide contact-tips and anvils

The new carbide-ball contact point and anvil tip have increased abrasion resistance compared with the steel-ball type and better surface roughness compared with the molded carbide-tip type. Thus, they almost never scratch a workpiece.

- Improved abrasion resistance over a steel-ball type

Steel ball

Carbide ball

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<th>Test method</th>
<th>Depth of wear</th>
<th>Hardness</th>
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<td>Rotating a sandpaper-wrapped cylinder against the ball tip.</td>
<td>0.1mm</td>
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<td>Sandpaper: 9 µm grit size</td>
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<td>Load: 0.5N (50g)</td>
<td>Sliding distance: 1,000m</td>
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- Much less damage to soft materials

Old carbide tip (molded part)

New type carbide ball-tip

Surface profile of specimen after test

Depth: 10 µm

Surface profile of specimen after test

Depth: 1 µm or less

Test method

Reciprocating the tip 20 times on an aluminum plate under a load of 4N

4 New grip improves accuracy during prolonged use

(Design registered in Japan)

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 length below the grip is the same as that of the old model. This guarantees no difference in operability of the gage.

(Note: The overall length of this model is longer than that of its predecessor and therefore may not fit in an existing custom-made storage box.)

5 New contacts mean smoother action and better durability

Comparison of measuring force between the new and old models (50-to-150mm models)

- The new models provide a minimum difference in measuring force between the forward and retraction directions, thus achieving smooth operation and high durability.

- The new models enable stable measurement by reducing the variation of measuring force.
# Series 511

## Standard Bore Gage

## Short-leg Bore Gage

### Accuracy
- Wide-range accuracy: 2 µm
- Repeatability: 0.5 µm
- Adjacent error: 1 µm

### Measuring Heads

**Standard Bore Gage**

511-731 Standard .7”-1.4”

511-781 Short-leg .7”-1.75”

511-732 Standard 1.4”-2.5”

511-782 Short-leg 1.4”-2.875”

511-733 Standard 2”-6”

511-783 Short-leg 2”-7”

511-734 Standard 4”-6.5”

511-784 Short-leg 4”-8”

511-735 Standard 6.5”-10”

511-785 Short-leg 6.5”-12”

511-736 Standard 10”-16”

**Short-leg Bore Gage**

511-763 Short-leg .7”-1.4”

511-764 Short-leg .7”-1.75”

511-765 Short-leg 1.4”-2.5”

511-766 Short-leg 1.4”-2.875”

511-767 Short-leg 2”-6”

511-768 Short-leg 2”-7”

511-769 Short-leg 4”-6.5”

511-770 Short-leg 4”-8”

511-771 Short-leg 6.5”-10”

511-772 Short-leg 6.5”-12”

511-773 Short-leg 10”-16”

### Specifications

**Metric**

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<th>Number of adjustment spacers</th>
<th>Sub-anvil</th>
<th>Mass Net</th>
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*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.)

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### Main Standard Accessories

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### Dimensions

**Unit: mm**

#### 18-35mm/.7-1.4”

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#### 50-150mm/2-6”, 100-160mm/4-6.5”

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### Anvils

- **SR1.5 carbide ball**
- **SR2.5 carbide ball**

### Adjustment spacers

- ** metric**
  - 50mm (.2”) (supplied only for 511-703/733/783)

### Wrench

- **No.102148**

### Sub-anvil 50mm (2”)

- **M11X1**
  - 56.5
  - 30
  - No.102178
### Dimensions

Unit: mm

#### 160-250mm/6.5-10”, 250-400mm/10-16”

**Anvils**

**Metric**

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**511-706**

NOTE: Each dimension in parentheses is that of 511-706, indicating a size if the 75mm sub-anvil is used.

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<td>295(370)</td>
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**511-736**

NOTE: Each dimension in parentheses is that of 511-736, indicating a size if the 75mm sub-anvil is used.

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**Adjustment spacers**

**Metric**

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**Inch**

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**511-706**

NOTE: Each dimension in parentheses is that of 511-706, indicating a size if the 75mm sub-anvil is used.

**511-700**

NOTE: Each dimension in parentheses is that of 511-700, indicating a size if the 75mm sub-anvil is used.

**Sub-anvil 75mm (3”)**

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

No.202974: 75
No.202975: 76.2

**Set of dial gage protective cover, retaining plate, and round-head Phillips screws:** No.21DZA000
### Specifications

#### Metric

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<th>Effective stroke of plunger</th>
<th>Measuring force</th>
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<th>6N or less</th>
<th>Guide force</th>
<th>Micrometer head stroke</th>
<th>Sub-anvil</th>
<th>Mass Net</th>
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<td>5N or less</td>
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<td>511-804</td>
<td>100-160mm</td>
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<td>13mm</td>
<td>10,20,20mm</td>
<td>15N or less</td>
<td>15N or less</td>
<td>6N or less</td>
<td>310g</td>
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<td>25mm</td>
<td>25,50,50mm</td>
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<td>20N or less</td>
<td>20N or less</td>
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<td>250-400mm</td>
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<td>400-600mm</td>
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#### Inch

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<th>Sub-anvil</th>
<th>Mass Net</th>
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<td>4&quot;</td>
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*Storage boxes of 511-807, 808, 837 and 838 models are made of wood. The boxes of other models are made of plastic.

*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.)
Main Standard Accessories

- **Metric**

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- **Inch**

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Micrometer Head type

Dimensions

**Unit: mm**

Sub-anvils

- **Metric**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>RG</th>
<th>WH</th>
</tr>
</thead>
<tbody>
<tr>
<td>511-803</td>
<td>150</td>
<td>28.9</td>
<td>9</td>
<td>50</td>
<td>50</td>
<td>12.8</td>
<td>12</td>
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<td>511-804</td>
<td>250</td>
<td>70.3</td>
<td>12</td>
<td>78</td>
<td>12</td>
<td>19.8</td>
<td>15</td>
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<tr>
<td>511-805</td>
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<td>100.9</td>
<td>16</td>
<td>120</td>
<td>20.9</td>
<td>50.9</td>
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- **Inch**

<table>
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<tr>
<th>Code No.</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>RG</th>
<th>WH</th>
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<tbody>
<tr>
<td>511-833</td>
<td>5</td>
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<td>4</td>
<td>4</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>511-843</td>
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<td>8</td>
<td>8</td>
<td>8</td>
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<td>2</td>
<td></td>
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<tr>
<td>511-853</td>
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Wrenches

No. 202863

- **Metric**

<table>
<thead>
<tr>
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<th>Part No.</th>
<th>No.301336</th>
<th>No.200154</th>
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<tbody>
<tr>
<td>511-803</td>
<td>301336 (2piece)</td>
<td>202863 (1piece)</td>
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</tr>
<tr>
<td>511-804</td>
<td>301336 (2piece)</td>
<td>202863 (1piece)</td>
<td></td>
</tr>
<tr>
<td>511-805</td>
<td>301336 (2piece)</td>
<td>202863 (1piece)</td>
<td></td>
</tr>
<tr>
<td>511-806</td>
<td>200154 (2piece)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>511-807</td>
<td>200154 (2piece)</td>
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</tr>
<tr>
<td>511-808</td>
<td>200154 (2piece)</td>
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</tbody>
</table>

- **Inch**

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Part No.</th>
<th>No.301336</th>
<th>No.200154</th>
</tr>
</thead>
<tbody>
<tr>
<td>511-833</td>
<td>301336 (2piece)</td>
<td>202863 (1piece)</td>
<td></td>
</tr>
<tr>
<td>511-843</td>
<td>301336 (2piece)</td>
<td>202863 (1piece)</td>
<td></td>
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<tr>
<td>511-853</td>
<td>301336 (2piece)</td>
<td>202863 (1piece)</td>
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<tr>
<td>511-834</td>
<td>200154 (2piece)</td>
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<td>511-844</td>
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<td>511-854</td>
<td>200154 (2piece)</td>
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<td>511-835</td>
<td>200154 (2piece)</td>
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<td>511-845</td>
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<td>511-855</td>
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<td>511-846</td>
<td>200154 (2piece)</td>
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<td>511-856</td>
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<td>511-837</td>
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<td>511-847</td>
<td>200154 (2piece)</td>
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<tr>
<td>511-857</td>
<td>200154 (2piece)</td>
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</tr>
<tr>
<td>511-838</td>
<td>200154 (2piece)</td>
<td></td>
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</tr>
</tbody>
</table>

*The dimension in parentheses is that of inch type.*
Bore Gage Accessories (Options)

**Extension Rods**

- Extension rods (optional) are available to assist in deep-hole measurement.
- When a rod is connected, there might be error margins due to the distortion of the rod, etc. In order to keep the error margins minimum, please don’t connect more than 2 rods to a bore gage.
- The maximum extension is limited to 1,000 mm.
- If using an extension rod longer than 500 mm, use the bore gage only in the vertical orientation.

*To remove the measuring head, use the wrench with extension rods. With the wrench held onto the wrench hook on the main unit sleeve, dismount the head.

<table>
<thead>
<tr>
<th>Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension rod length</td>
</tr>
<tr>
<td>---------------------</td>
</tr>
<tr>
<td>125mm/5”</td>
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<tr>
<td>953550</td>
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<td>953551</td>
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<tr>
<td>250mm/10”</td>
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<tr>
<td>953554</td>
</tr>
<tr>
<td>500mm/20”</td>
</tr>
<tr>
<td>953558</td>
</tr>
</tbody>
</table>

**Dial Protection Cover**

- It is possible to mount either flat back or lug-on-center back panels on the dial gage protective cover.
515-Series Bore Gage Zero-Checker

- The datum point of bore gages with a measuring range of 18 to 400mm can be easily set using an appropriate gauge block in conjunction with this accessory.

**Specifications**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Datum point checking range (mm)</th>
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</thead>
<tbody>
<tr>
<td>515-590</td>
<td>18-400</td>
</tr>
</tbody>
</table>

**Accuracy**

Flatness of parallel jaws: 0.5μm (parallelism 1μm)

177-Series Setting Rings

- These rings are used for checking the datum point of bore gages and others. Also, if a setting ring of an optimal size is prepared, it can be used for calibration. (For ordering details, refer to the Mitutoyo General Catalog No.E2010.)

- Steel setting rings
- Ceramic setting rings

Standard configuration:

- Stand
- Attachment A, B, C (1 piece each)
- Dedicated jaws (2 pieces)
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Mitutoyo Corporation
20-1, Sakado 1-chome,
Takatsu-ku, Kawasaki-shi,
Kanagawa 213-8533, Japan
T +81 (0) 44 813-8230
F +81 (0) 44 813-8231
http://www.mitutoyo.co.jp

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Digital Scale and DRO Systems
Small Tool Instruments and
Data Management