Dial Test Indicators
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

SERIES 513 — Dial Test Indicator Features

- Designed to probe surfaces that cannot be reached with a normal dial gauge. Useful both for alignment and for measurement purposes.
- Mitutoyo’s proprietary new design permits smooth pointer operation.
- Strong frame provides excellent rigidity and durability.
- Non-magnetic pointer and contact point permit reliable operation even in magnetic environments.
- Clear and concise wide dial face allows excellent visibility.
- The surface of the crystal is hard-coated for excellent scratch resistance.
- Flat crystal makes graduations easy to read. Moreover, the O-ring sealing method used for the bezel prevents water or oil penetration. (Note that this type is NOT waterproof.)

- Six types are available: horizontal, horizontal (20° tilted face), vertical, parallel, universal, and pocket, allowing users to select the model most suited to their needs.
  - Horizontal: Standard
  - Horizontal (20° Tilted Face): Dial face inclined 20° compared with the vertical type, allows easy reading.
  - Vertical: Best suited for centering holes under the spindle of a machine tool.
  - Parallel: The scale can be read from the front, with the stylus pivoting in a plane parallel to that of the dial face.
  - Universal: The direction of the probe movement can be freely changed.
  - Pocket: Compact type.

Feature icons

<table>
<thead>
<tr>
<th>Icon</th>
<th>Feature description</th>
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<tbody>
<tr>
<td>🎓</td>
<td>High accuracy</td>
</tr>
<tr>
<td>🕒</td>
<td>With revolution counter</td>
</tr>
<tr>
<td>🗑</td>
<td>Long stylus</td>
</tr>
<tr>
<td>📏</td>
<td>Standard</td>
</tr>
<tr>
<td>🏆</td>
<td>Double scale spacing</td>
</tr>
<tr>
<td>⚓</td>
<td>Compact</td>
</tr>
<tr>
<td>🗡</td>
<td>Carbide contact point (Slightly magnetic)</td>
</tr>
<tr>
<td>💍</td>
<td>Ruby contact point (non-magnetic)</td>
</tr>
</tbody>
</table>

Old design: Stylus bearing screw held in frame.
New design: Stylus bearing screw held in sub-plate provides smoother tracking action.

Naming of parts

- Crystal
- Bezel
- Frame
- Movement
- Cover
- Dovetail
- Contact point (on stylus)
Dial Test Indicator
SERIES 513 — Horizontal Type

- Provides easy access to shrouded surfaces that cannot be reached with conventional dial indicators.
- No-clutch structure for automatic reversal of measuring direction.
- Resistant to water and dust thanks to the one-piece bezel and O-ring seal for the crystal.
- The glare-free flat crystal face has a scratch-resistant coating.
- High sensitivity and quick response due to low-friction jeweled bearings.

**DIMENSIONS**

**Horizontal**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>L1</th>
<th>L2</th>
<th>L3</th>
</tr>
</thead>
<tbody>
<tr>
<td>513-401-10E</td>
<td>14.7</td>
<td>11.2</td>
<td>27</td>
</tr>
<tr>
<td>513-471-10E</td>
<td>18.7</td>
<td>15.2</td>
<td>28</td>
</tr>
<tr>
<td>513-402-10E/A</td>
<td>20.9</td>
<td>17.4</td>
<td>27</td>
</tr>
<tr>
<td>513-474-10E</td>
<td>22.2</td>
<td>18.7</td>
<td>28</td>
</tr>
<tr>
<td>513-426-10E/A</td>
<td>37.4</td>
<td>33.9</td>
<td>27</td>
</tr>
<tr>
<td>513-415-10E/A/T</td>
<td>44.5</td>
<td>41.0</td>
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**Compact**

<table>
<thead>
<tr>
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<th>L1</th>
<th>L2</th>
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</thead>
<tbody>
<tr>
<td>513-465-10E</td>
<td>18.7</td>
<td>15.2</td>
</tr>
<tr>
<td>513-466-10E</td>
<td>22.2</td>
<td>18.7</td>
</tr>
</tbody>
</table>

Note: A slight difference may occur depending on the center of the contact point, graduation plate, and stem fixing position, etc.

**Special Set: No.513-908-10E (Metric)**

- 513-404-10E: Dial test indicator
- 7014-10: Mini magnetic stand

**No.513-907-10E (inch)**

- 513-402-10E: Dial test indicator
- 7014E-10: Mini magnetic stand
### Dial Test Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

#### SPECIFICATIONS

**Metric**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Graduation</th>
<th>Dial reading</th>
<th>Range</th>
<th>Measuring range</th>
<th>One rev.</th>
<th>T scale divisions</th>
<th>Hysteresis</th>
<th>Repetability</th>
<th>Mass</th>
<th>Measuring force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic set</td>
<td>0.0005 in</td>
<td>0-15 in</td>
<td>0.33 in</td>
<td>±0.0005 in</td>
<td>0.0002 in</td>
<td>±0.0002 in</td>
<td>0.06 in</td>
<td>±0.015 in</td>
<td>45 g</td>
<td>0.3 N or less</td>
</tr>
<tr>
<td>Plus set</td>
<td>0.0005 in</td>
<td>0-15 in</td>
<td>0.33 in</td>
<td>±0.0005 in</td>
<td>0.0002 in</td>
<td>±0.0002 in</td>
<td>0.06 in</td>
<td>±0.015 in</td>
<td>45 g</td>
<td>0.3 N or less</td>
</tr>
<tr>
<td>Full set</td>
<td>0.0005 in</td>
<td>0-15 in</td>
<td>0.33 in</td>
<td>±0.0005 in</td>
<td>0.0002 in</td>
<td>±0.0002 in</td>
<td>0.06 in</td>
<td>±0.015 in</td>
<td>45 g</td>
<td>0.3 N or less</td>
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**Inch**

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<th>Range</th>
<th>Measuring range</th>
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<th>Repetability</th>
<th>Mass</th>
<th>Measuring force</th>
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</thead>
<tbody>
<tr>
<td>Basic set</td>
<td>0.0001 in</td>
<td>0-4 in</td>
<td>0.08 in</td>
<td>±0.0001 in</td>
<td>0.0001 in</td>
<td>±0.00004 in</td>
<td>0.08 in</td>
<td>±0.015 in</td>
<td>45 g</td>
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<td>45 g</td>
<td>0.3 N or less</td>
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**Metric/Inch**

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<th>Range</th>
<th>Measuring range</th>
<th>One rev.</th>
<th>T scale divisions</th>
<th>Hysteresis</th>
<th>Repetability</th>
<th>Mass</th>
<th>Measuring force</th>
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</thead>
<tbody>
<tr>
<td>Basic set</td>
<td>0.002 in</td>
<td>0-15 in</td>
<td>0.33 in</td>
<td>±0.0005 in</td>
<td>0.0002 in</td>
<td>±0.0002 in</td>
<td>0.06 in</td>
<td>±0.015 in</td>
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<td>0.33 in</td>
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<td>0.0002 in</td>
<td>±0.0002 in</td>
<td>0.06 in</td>
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<td>0.3 N or less</td>
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**Inch/Metric**

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<th>Graduation</th>
<th>Dial reading</th>
<th>Range</th>
<th>Measuring range</th>
<th>One rev.</th>
<th>T scale divisions</th>
<th>Hysteresis</th>
<th>Repetability</th>
<th>Mass</th>
<th>Measuring force</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0-15-0</td>
<td>0.33 in</td>
<td>±0.0005 in</td>
<td>0.0002 in</td>
<td>±0.0002 in</td>
<td>0.06 in</td>
<td>±0.015 in</td>
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<td>0.06 in</td>
<td>±0.015 in</td>
<td>45 g</td>
<td>0.3 N or less</td>
</tr>
</tbody>
</table>

#### Note 1:
- Stem with ø8 dovetail groove is not included in the mass.
- Be sure to perform calibration with a reference gage after exchanging the contact point. The inside parts may be damaged when the contact point is exchanged due to the breakage. In the case of the significant deterioration in the operation, repair is required.

#### Note 2:
- Mitutoyo reserves the right to change any or all aspects of any product specification, including price, designs and service content, without notice.
Optional Accessories

- Swivel clamps (See page F-69)
- Holding bars (See page F-69)
- Stems (See page F-69)
- Stylus (See page F-69)

Dial Test Indicator
SERIES 513 — Horizontal (20° Tilted Face), Vertical, and Parallel Types

- Specially designed for easy viewing of dial.
- The dial face obliquely faces upward, allowing users to read the graduations from the user’s side. It is convenient when probing on the side of a large workpiece and the workbench is high.
- Using the universal holder allows easy hole centering. The dial face always faces upward when the indicator is rotated, which makes reading easy.

513-454-10E/513-454-10A/513-454-10T
Contact point No. 103006
Graduation: 0.01 mm
Range: 0.8 mm
Carbide contact point (Slightly magnetic)

513-444-10E/513-444-10A/513-444-10T
Contact point No. 103006
Graduation: 0.01 mm
Range: 1.6 mm
With revolution counter
Carbide contact point (Slightly magnetic)

513-484-10E/513-484-10A/513-484-10T
Contact point No. 103006
Graduation: 0.01 mm
Range: 0.8 mm
Carbide contact point (Slightly magnetic)

Contact point No. 103011
Graduation: 0.002 mm
Range: 0.4 mm
With revolution counter
Carbide contact point (Slightly magnetic)

513-485-10E
Contact point No. 103011
Graduation: 0.002 mm
Range: 0.2 mm
Carbide contact point (Slightly magnetic)

513-452-10E/513-452-10A/513-452-10T
Contact point No. 133195
Graduation: 0.0005 in
Range: 0.03 in
Carbide contact point (Slightly magnetic)
Dial Test Indicators
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

**SPECIFICATIONS**

### Metric

#### Horizontal (20° tilted face) type

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>513-446-10E</td>
<td>-0.005 in</td>
<td>0.06 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
</tr>
<tr>
<td>513-446-10A</td>
<td>-0.004 in</td>
<td>0.05 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
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<tr>
<td>513-448-10E</td>
<td>-0.004 in</td>
<td>0.05 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
</tr>
<tr>
<td>513-448-10A</td>
<td>-0.004 in</td>
<td>0.05 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
</tr>
<tr>
<td>513-452-10T</td>
<td>-0.002 in</td>
<td>0.04 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
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#### Inch

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<tbody>
<tr>
<td>513-446-10E</td>
<td>-0.005 in</td>
<td>0.06 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
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<td>&lt; 0.2 N or less</td>
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</tr>
<tr>
<td>513-446-10A</td>
<td>-0.004 in</td>
<td>0.05 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
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<td>48 g</td>
<td></td>
</tr>
<tr>
<td>513-446-10T</td>
<td>-0.002 in</td>
<td>0.04 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
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<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
</tr>
<tr>
<td>513-452-10T</td>
<td>-0.002 in</td>
<td>0.04 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
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<td>&lt; 0.2 N or less</td>
<td>48 g</td>
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### Parallel Type

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</thead>
<tbody>
<tr>
<td>513-446-10E</td>
<td>-0.005 in</td>
<td>0.06 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
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<td>513-446-10A</td>
<td>-0.004 in</td>
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<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
</tr>
<tr>
<td>513-446-10T</td>
<td>-0.002 in</td>
<td>0.04 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
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</tr>
<tr>
<td>513-452-10T</td>
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<td>0.04 in</td>
<td>0-15-0</td>
<td>-0.0005 in</td>
<td>0.0002 in</td>
<td>&lt; 2 µm</td>
<td>-0.003 in</td>
<td>&lt; 0.2 N or less</td>
<td>48 g</td>
<td></td>
</tr>
</tbody>
</table>

### DIMENSIONS

- **Horizontal (20° Tilted Face) Type**
  - Unit: mm
  - **Order No.** 513-445-10E 18.7, 15.2
  - **Order No.** 513-446-10E 18.7, 17.4

- **Parallel Type**
  - Unit: mm
  - **Order No.** 513-485-10E 18.7, 15.2
  - **Order No.** 513-486-10E 22.2, 18.7

**Set Configuration: Metric**

- **Full set**
  - Swivel clamp (ø4 mm, ø8 mm stem, and dovetail)
  - Metric holding bar (L: 100 mm)

- **Plus set**
  - Stylus, ø1 mm carbide point
  - Stylus, ø6 mm carbide point

- **Basic set**
  - Stylus, ø0.079 inch DIA. point (carbine)
  - Stem, ø8 mm

**Set Configuration: Inch**

- **Full set**
  - Swivel clamp (1.15 inch DIA. stem, 3/8 inch DIA. stem, and dovetail)
  - Inch holding bar (L: 4 inch)

- **Plus set**
  - Stylus, 0.039 inch DIA. carbide point
  - Stylus, 0.118 inch DIA. carbide point

- **Basic set**
  - Stylus, 0.079 inch DIA. point (carbine)
  - Stem, 3/8 inch DIA.

**Note:** A slight difference may occur depending on the center of the contact point, graduation plate, and stem fixing position, etc.
Dial Test Indicator
SERIES 513 — Universal Type

- Universal application to all directions. Not only the direction of the measuring point, but also the direction of measurement itself can be adjusted 360 degrees without moving the indicator.

**Optional Accessories**
- Swivel clamps (See page F-69)
- Holding bars (See page F-69)
- Stems (See page F-69)
- 102824: Stylus, ø1 mm ball contact (carbide)
- 102825: Stylus, ø2 mm ball contact (carbide)
- 102826: Stylus, ø3 mm ball contact (carbide)

**SPECIFICATIONS**

### Metric

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Graduation</th>
<th>Range</th>
<th>Accuracy</th>
<th>Dial reading</th>
<th>Measuring force</th>
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<tbody>
<tr>
<td>513-304GE</td>
<td>0.01 mm</td>
<td>0.8 mm</td>
<td>±0.0005 in</td>
<td>0-40-0</td>
<td>0.3 N or less</td>
</tr>
</tbody>
</table>

### Inch

<table>
<thead>
<tr>
<th>Order No.</th>
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<th>Dial reading</th>
<th>Measuring force</th>
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<tbody>
<tr>
<td>513-302G</td>
<td>0.0005 in</td>
<td>0.03 in</td>
<td>±0.0005 in</td>
<td>0-15-0</td>
<td>0.3 N or less</td>
</tr>
</tbody>
</table>

**DIMENSIONS**

Unit: mm

Note: A slight difference may occur depending on the center of the contact point, graduation plate, and stem fixing position, etc.
Dial Test Indicators
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Pocket Type Dial Test Indicator
SERIES 513

• Jeweled bearings assure higher sensitivity and accuracy.
  Indicator can be mounted by clamping the stem or the body (except for 513-517WE and 513-517WT).
• Reversible measuring direction (Clutch type).

• Two holding bars are supplied. (Full sets only.)
• Fully adjustable bezel/dial face.
• Stylus is adjustable within 220°.
• Bezel is sealed with an O-ring to keep out water and oil.

513-515T 513-503E
513-501E
513-517E 513-517WE
513-528 513-518 513-514E
513-512 513-504
513-517E 513-517WE
513-515T 513-515T
513-503E
513-501E

Optional Accessories
- Swivel clamps (See page F-69)
- Holding bars (See page F-69)
- Stems (See page F-69)
- Stylus (See page F-69)
**F-68**

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<table>
<thead>
<tr>
<th>Order No.</th>
<th>Graduation Range</th>
<th>Accuracy</th>
<th>Dial reading</th>
<th>Measuring force</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic set</td>
<td>Full set</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>513-514E</td>
<td>0.01 mm</td>
<td>0.5 mm</td>
<td>10 µm</td>
<td>0-25-0</td>
</tr>
<tr>
<td>513-517E</td>
<td>0.01 mm</td>
<td>0.8 mm</td>
<td>8 µm</td>
<td>0-40-0</td>
</tr>
<tr>
<td>513-517WE</td>
<td>0.01 mm</td>
<td>0.8 mm</td>
<td>8 µm</td>
<td>0-40-0</td>
</tr>
<tr>
<td>513-527E</td>
<td>0.01 mm</td>
<td>0.8 mm</td>
<td>8 µm</td>
<td>0-40-0</td>
</tr>
</tbody>
</table>

For 513-517WE, use the indicator with measuring range of ±30º.

**DIMENSIONS**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>L (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>513-514E</td>
<td>16.8</td>
</tr>
<tr>
<td>513-517E</td>
<td>20.9</td>
</tr>
<tr>
<td>513-517T</td>
<td>44.5</td>
</tr>
<tr>
<td>513-503E</td>
<td>14.7</td>
</tr>
<tr>
<td>513-501E</td>
<td>12</td>
</tr>
<tr>
<td>513-517WE</td>
<td>20.9</td>
</tr>
<tr>
<td>513-527E</td>
<td>14.7</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No.</th>
<th>L (inch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>513-518</td>
<td>0.63</td>
</tr>
<tr>
<td>513-528</td>
<td>1.25</td>
</tr>
<tr>
<td>513-512</td>
<td>0.40</td>
</tr>
<tr>
<td>513-504</td>
<td>0.20</td>
</tr>
</tbody>
</table>

There are two types of Mitutoyo Dial Test Indicator:

**The non-clutch type (without a clutch lever) and the clutch type (with a two-position clutch lever)***

In the non-clutch type, although the contact point may move either in the upward or downward direction, the pointer always rotates clockwise.

In the clutch type, if the clutch lever is set in one position the contact point moves in the upward direction and the pointer rotates clockwise. Conversely, if the lever is set in the other position the contact point moves in the downward direction and the pointer rotates counterclockwise.
Dial Test Indicators

Comparison measuring instruments which ensure high quality, high accuracy and reliability.

Styli, Stems and Holders
Optional Accessories for Dial Test Indicators

Styli (for Metric Models Only*)
* Except for universal type dial test indicator (513-304GE).

- Stylus length affects the scale factor of an indicator. The stylus provided as standard give a scale factor of unity.

ø0.5 mm ball-point
190547 (L2=11.2 mm)
21CAB109 (L2=15.2 mm)
190549 (L2=17.4 mm)
190654 (L2=18.7 mm)
21CAB111 (L2=33.9 mm)
190656 (L2=41.0 mm)

ø0.7 mm ball-point
190548 (L2=11.2 mm)
21CAB110 (L2=15.2 mm)
190550 (L2=17.4 mm)
190653 (L2=18.7 mm)
21CAB112 (L2=33.9 mm)
190655 (L2=41.0 mm)

ø1 mm ball-point (Carbide)
103017 (L2=11.2 mm)
131314 (L2=15.2 mm)
103013 (L2=17.4 mm)
137558 (L2=18.7 mm)
131316 (L2=33.9 mm)
136235 (L2=41.0 mm)

ø2 mm ball-point (Carbide)
103010 (L2=11.2 mm)
103011 (L2=15.2 mm)
103006 (L2=17.4 mm)
137557 (L2=18.7 mm)
131324 (L2=33.9 mm)
136013 (L2=41.0 mm)

ø2 mm ball-point (Ruby)
21CZA209 (L2=11.2 mm)
21CZB068 (L2=15.2 mm)
21CZA201 (L2=17.4 mm)
21CZA210 (L2=18.7 mm)
21CZA211 (L2=41.0 mm)

ø3 mm ball-point (Carbide)
103018 (L2=11.2 mm)
131315 (L2=15.2 mm)
103014 (L2=17.4 mm)
137559 (L2=18.7 mm)
131317 (L2=33.9 mm)
136236 (L2=41.0 mm)

Stems with Knurled Clamp Ring

ø4 mm (0.157 inch DIA.)
21CZB131

ø8 mm 3/8 inch DIA.
21CZB129
21CZB130

Swivel Clamps
• Can be used with Holding Bars.

For ø6 mm stem, ø8 mm stem, and dovetail
For ø4 mm stem, ø8 mm stem, and dovetail
For 0.157 inch DIA. stem, 3/8 inch DIA. stem, and dovetail

Holding Bars
9 x 9mm 953638 (Length: 50 mm)
900209 (Length: 100 mm)

ø8mm (0.315 inch DIA) 900211 (Length: 115 mm/ 4.528 inch)

0.25 inch x 0.5 inch 953639 (Length: 2 inch)
900306 (Length: 4 inch)

Universal Holder
• Allows the indicator to be set at the desired attitude to the workpiece.

Spanner
102037

Centering Holder
• Allows large diameter cylinders or holes to be centered on a machine tool.

901959 (ø8 mm stem)
901997 (0.25 inch DIA. stem)
Styli, Stems and Holders
Optional Accessories for Pocket Type Dial Test Indicators

Styli (for Metric Models Only)
- Stylus length affects the scale factor of an indicator. The styli provided as standard give a scale factor of unity.

Stems
- ø4 mm (0.157 inch DIA.)
- ø8 mm
- 3/8 inch DIA.

Swivel Clamps
- Can be used with Holding Bars.
  - For ø6 mm stem, ø8 mm stem, and dovetail
  - For ø4 mm stem and ø8 mm stem, and dovetail

Holding Bars
- 9 x 9 mm
- ø8 mm (0.315 inch DIA)

Spanner
- 0.25 x 0.5 inch

Universal Holder
- Allows the indicator to be set at the desired attitude to the workpiece.