

# 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 gage. Useful both for alignment and for measurement purposes.
- Mitutoyo's proprietary new design permits smooth pointer operation.
- Strong frame provides excellent rigidity and durability.
- The pointer and carbide contact point are only slightly magnetizable\*, and so they are hardly affected by a magnetic environment. In addition, models with a ruby contact point are available. The ruby contact point also has several times the abrasion resistance of carbide contact point and is safely usable with an electric discharge machine thanks to its being a non-conductor.
- 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.)
- The main unit is equipped with three dovetails to which the stem with dovetail groove  $\varnothing 6$  (standard accessory) can be attached. This greatly improves convenience as the attachment location can be adjusted as needed.
- Five types are available: horizontal, horizontal (20° tilted face), vertical, parallel, and universal, allowing users to select according to their needs.
- Completed products are inspected according to JIS B 7533:2015. Horizontal, horizontal (20° tilted face), and vertical types are inspected with the dial face in the upward orientation, while the parallel type is inspected with the dial face in the vertical orientation to guarantee their accuracy.

\* Magnetic material is used for some internal parts.



An inspection certificate is supplied as standard. Refer to page U-11 for details.

### Feature icons

| Icon | Feature description  |
|------|--|
|      | High accuracy  |
|      | With revolution counter                                    |
|      | Long contact point   |
|      | Standard   |
|      | Double scale spacing                                       |
|      | Compact  |
|      | Carbide contact point (Slightly magnetic)                  |
|      | Ruby contact point (Non-conductive and abrasion resistant) |



Horizontal



Vertical



Horizontal (20° Tilted face)



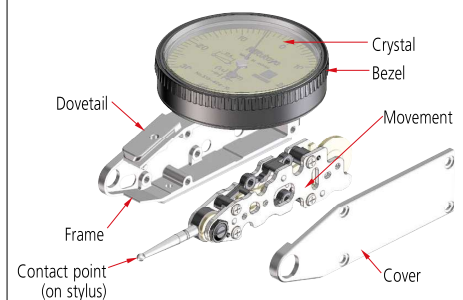
Parallel



Universal



### Naming of parts



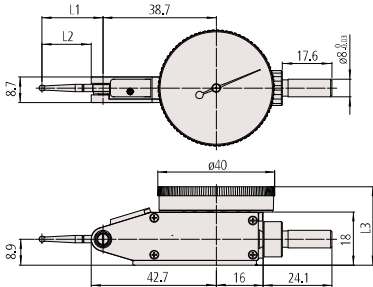


An inspection certificate is supplied as standard. Refer to page U-11 for details.

## DIMENSIONS

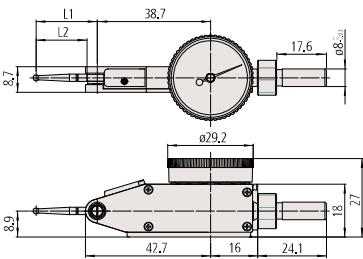
### Horizontal

unit: mm



| Order No.       | L1   | L2   | L3 |
|-----------------|------|------|----|
| 513-401-10E     | 14.7 | 11.2 | 27 |
| 513-471-10E     |      |      |    |
| 513-405-10E/A/T |      |      |    |
| 513-475-10E     | 18.7 | 15.2 | 28 |
| 513-425-10E/A   |      |      |    |
| 513-404-10E/A/T | 20.9 | 17.4 | 27 |
| 513-474-10E     |      |      |    |
| 513-424-10E/A/T | 22.2 | 18.7 | 28 |
| 513-426-10E/A   |      |      |    |
| 513-478-10E     | 37.4 | 33.9 | 27 |
| 513-414-10E/A/T |      |      |    |
| 513-415-10E/A/T |      |      |    |
| 513-477-10E     | 44.5 | 41.0 |    |

### Compact



| Type    | Order No.   | L1   | L2   |
|---------|-------------|------|------|
| Compact | 513-465-10E | 18.7 | 15.2 |
|         | 513-464-10E | 20.9 | 17.4 |
|         | 513-466-10E | 22.2 | 18.7 |

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

### Special Set: 513-908-10E (Metric)

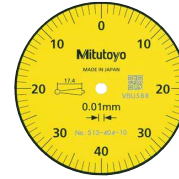
513-404-10E: Dial test indicator  
7014-10: Mini magnetic stand

### 513-907-10E (inch)

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



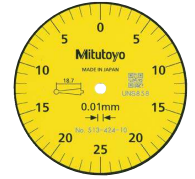
## Dial Test Indicator SERIES 513 — Horizontal Type



Graduation: 0.01 mm  
Range: 0.8 mm

**513-404-10E/10A/10T**

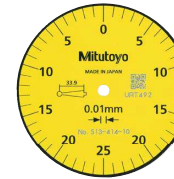
- Standard
- Carbide contact point (Slightly magnetic)



Graduation: 0.01 mm  
Range: 0.5 mm

**513-424-10E/10A/10T**

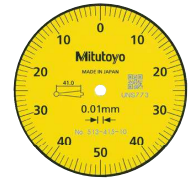
- Standard
- Double scale spacing
- Carbide contact point (Slightly magnetic)



Graduation: 0.01 mm  
Range: 0.5 mm

**513-414-10E/10A/10T**

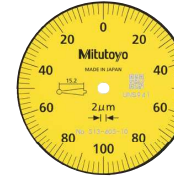
- Long stylus
- Carbide contact point (Slightly magnetic)
- Double scale spacing



Graduation: 0.01 mm  
Range: 1.0 mm

**513-415-10E/10A/10T**

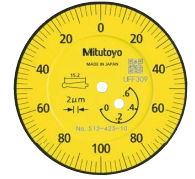
- Long stylus
- Carbide contact point (Slightly magnetic)



Graduation: 0.002 mm  
Range: 0.2 mm

**513-405-10E/10A/10T**

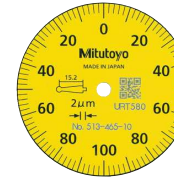
- Standard
- Carbide contact point (Slightly magnetic)



Graduation: 0.002 mm  
Range: 0.6 mm

**513-425-10E/10A**

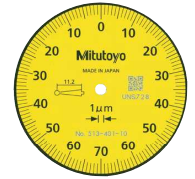
- With revolution counter
- Carbide contact point (Slightly magnetic)



Graduation: 0.002 mm  
Range: 0.2 mm

**513-465-10E**

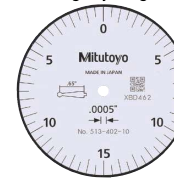
- Compact
- Carbide contact point (Slightly magnetic)



Graduation: 0.001 mm  
Range: 0.14 mm

**513-401-10E**

- High accuracy
- Carbide contact point (Slightly magnetic)



Graduation: 0.0005 in  
Range: 0.03 in

**513-402-10E/10T**

- Standard
- Carbide contact point (Slightly magnetic)



Graduation: 0.0001 in  
Range: 0.008 in

**513-403-10E/10T**

- Standard
- Carbide contact point (Slightly magnetic)

Note: 513-4XX-10 is indicated on the dial face. But the Order No. for the Special Set provided with the stem etc. has a suffix (E or T) at the end.

# Dial Test Indicators

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

## SPECIFICATIONS

| Order No.   |             |             | Graduation (mm) | Range (mm) | Dial reading | Maximum permissible error (MPE)* (µm) |          |                    |            | Mass (g)    | Measuring force (N) | High accuracy | With revolution counter | Long contact point | Standard | Double scale spacing | Compact | Carbide contact point (Slightly magnetic) | Ruby contact point |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
|-------------|-------------|-------------|-----------------|------------|--------------|---------------------------------------|----------|--------------------|------------|-------------|---------------------|---------------|-------------------------|--------------------|----------|----------------------|---------|---|--------------------|---------------|--------|---|---|----|-------------|-------------|-------------|---|---|---|---|---|---|---|
| Basic set   | Plus set    | Full set    |                 |            |              | Measuring range                       | One rev. | 10 scale divisions | Hysteresis |             |                     |               |                         |                    |          |                      |         |   |                    | Repeatability |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-424-10E | 513-424-10A | 513-424-10T | 0.01            | 0.5        | 0-25-0       | 6                                     | -        | 4                  | 3          | 45          | 0.3 or less         | ✓             | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   | ✓                  |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-478-10E | -           | -           |                 |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   |                    | 10            | 10     | 5 | 4 | 3  | 45          | 0.2 or less | ✓           | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 513-466-10E | -           | -           |                 |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-414-10E | 513-414-10A | 513-414-10T |                 | 1.5        | 10           | 5                                     | 4        | 3                  | 45         | 0.3 or less | ✓                   | ✓             | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-426-10E | 513-426-10A | -           |                 |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   | 1.0                | 0-50-0        | 10     | - | 5 | 4  | 3           | 45          | 0.2 or less | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   |
| 513-404-10E | 513-404-10A | 513-404-10T |                 | 0.002      | 0.2          | 0-100-0                               | 4        | -                  | 2          | 1           | 45                  | 0.3 or less   | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-474-10E | -           | -           |                 |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   | 0.6                | 7             | 5      | 4 | 1 | 45 | 0.4 or less | ✓           | ✓           | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   |
| 513-464-10E | -           | -           |                 | 0.001      | 0.14         | 0-70-0                                | 4        | -                  | 3          | 1           | 45                  | 0.3 or less   | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-415-10E | 513-415-10A | 513-415-10T |                 |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   | 0.001              | 0.14          | 0-70-0 | 4 | - | 3  | 1           | 45          | 0.3 or less | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |   |
| 513-477-10E | -           | -           |                 | 0.001      | 0.14         | 0-70-0                                | 4        | -                  | 3          | 1           | 45                  | 0.3 or less   | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-405-10E | 513-405-10A | 513-405-10T | 0.001           |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   | 0.14               | 0-70-0        | 4      | - | 3 | 1  | 45          | 0.3 or less | ✓           | ✓ | ✓ | ✓ | ✓ | ✓ |   |   |
| 513-475-10E | -           | -           |                 | 0.001      | 0.14         | 0-70-0                                | 4        | -                  | 3          | 1           | 45                  | 0.3 or less   | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-455-10E | 513-455-10A | 513-455-10T | 0.001           |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   | 0.14               | 0-70-0        | 4      | - | 3 | 1  | 45          | 0.3 or less | ✓           | ✓ | ✓ | ✓ | ✓ | ✓ |   |   |
| 513-425-10E | 513-425-10A | -           |                 | 0.001      | 0.14         | 0-70-0                                | 4        | -                  | 3          | 1           | 45                  | 0.3 or less   | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |
| 513-401-10E | -           | -           | 0.001           |            |              |                                       |          |                    |            |             |                     |               |                         |                    |          |                      |         |   | 0.14               | 0-70-0        | 4      | - | 3 | 1  | 45          | 0.3 or less | ✓           | ✓ | ✓ | ✓ | ✓ | ✓ |   |   |
| 513-471-10E | -           | -           |                 | 0.001      | 0.14         | 0-70-0                                | 4        | -                  | 3          | 1           | 45                  | 0.3 or less   | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |               |        |   |   |    |             |             |             |   |   |   |   |   |   |   |

| Order No.   |          |             | Graduation (in) | Range (in) | Dial reading | Maximum permissible error (MPE)* (in) |            |               | Mass (g) | Measuring force (N) | High accuracy | With revolution counter | Long contact point | Standard | Double scale spacing | Compact | Carbide contact point (Slightly magnetic) | Ruby contact point |         |        |          |         |             |         |    |             |   |   |   |   |   |   |
|-------------|----------|-------------|-----------------|------------|--------------|---------------------------------------|------------|---------------|----------|---------------------|---------------|-------------------------|--------------------|----------|----------------------|---------|---|--------------------|---------|--------|----------|---------|-------------|---------|----|-------------|---|---|---|---|---|---|
| Basic set   | Plus set | Full set    |                 |            |              | One rev.                              | Hysteresis | Repeatability |          |                     |               |                         |                    |          |                      |         |   |                    |         |        |          |         |             |         |    |             |   |   |   |   |   |   |
| 513-402-10E | -        | 513-402-10T | 0.0005          | 0.03       | 0-15-0       | ±0.0005                               | 0.0002     | ±0.0002       | 45       | 0.3 or less         | ✓             | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   | ✓                  |         |        |          |         |             |         |    |             |   |   |   |   |   |   |
| 513-472-10E | -        | -           |                 |            |              |                                       |            |               |          |                     |               |                         |                    |          |                      |         |   |                    | 0.0005  | 0.03   | 0-15-0   | ±0.0005 | 0.0002      | ±0.0002 | 45 | 0.2 or less | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| 513-412-10E | -        | 513-412-10T |                 |            |              |                                       |            |               |          |                     |               |                         |                    |          |                      |         |   |                    |         |        |          |         |             |         |    |             |   |   |   |   |   |   |
| 513-479-10E | -        | -           |                 |            |              |                                       |            |               |          |                     |               |                         |                    |          |                      |         |   |                    | 0.0005  | 0.03   | 0-15-0   | ±0.0005 | 0.0002      | ±0.0002 | 45 | 0.2 or less | ✓ | ✓ | ✓ | ✓ | ✓ |   |
| 513-462-10E | -        | -           | 0.0005          | 0.03       | 0-15-0       | ±0.0005                               | 0.0002     | ±0.0002       | 45       | 0.3 or less         | ✓             | ✓                       | ✓                  | ✓        | ✓                    |         |   |                    |         |        |          |         |             |         |    |             |   |   |   |   |   |   |
| 513-407-10E | -        | 513-407-10T |                 |            |              |                                       |            |               |          |                     |               |                         |                    |          |                      | 0.0001  | 0.008                                     | 0-4-0              | ±0.0001 | 0.0001 | ±0.00004 | 45      | 0.3 or less | ✓       | ✓  | ✓           | ✓ | ✓ |   |   |   |   |
| 513-403-10E | -        | 513-403-10T | 0.0001          | 0.008      | 0-4-0        | ±0.0001                               | 0.0001     | ±0.00004      | 45       | 0.3 or less         | ✓             | ✓                       | ✓                  | ✓        | ✓                    |         |   |                    |         |        |          |         |             |         |    |             |   |   |   |   |   |   |
| 513-473-10E | -        | -           |                 |            |              |                                       |            |               |          |                     |               |                         |                    |          |                      | 0.0001  | 0.008                                     | 0-4-0              | ±0.0001 | 0.0001 | ±0.00004 | 45      | 0.3 or less | ✓       | ✓  | ✓           | ✓ | ✓ |   |   |   |   |
| 513-463-10E | -        | -           | 0.0001          | 0.008      | 0-4-0        | ±0.0001                               | 0.0001     | ±0.00004      | 45       | 0.3 or less         | ✓             | ✓                       | ✓                  | ✓        | ✓                    |         |   |                    |         |        |          |         |             |         |    |             |   |   |   |   |   |   |

| Order No.   |          |             | Graduation           | Range              | Dial reading    | Maximum permissible error (MPE)* (µm) |                    |            |               | Mass (g) | Measuring force (N) | High accuracy | With revolution counter | Long contact point | Standard | Double scale spacing | Compact | Carbide contact point (Slightly magnetic) | Ruby contact point |
|-------------|----------|-------------|----------------------|--------------------|-----------------|---------------------------------------|--------------------|------------|---------------|----------|---------------------|---------------|-------------------------|--------------------|----------|----------------------|---------|---|--------------------|
| Basic set   | Plus set | Full set    |                      |                    |                 | Measuring range                       | 10 scale divisions | Hysteresis | Repeatability |          |                     |               |                         |                    |          |                      |         |   |                    |
| 513-409-10E | -        | 513-409-10T | 0.002 mm / 0.0001 in | 0.2 mm / 0.0076 in | 0-10-0 / 0-38-0 | 4                                     | 2                  | 3          | 1             | 45       | 0.3 or less         | ✓             | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   | ✓                  |

| Order No.   |          |             | Graduation          | Range            | Dial reading    | Maximum permissible error (MPE)* (in) |            |               | Mass (g) | Measuring force (N) | High accuracy | With revolution counter | Long contact point | Standard | Double scale spacing | Compact | Carbide contact point (Slightly magnetic) | Ruby contact point |
|-------------|----------|-------------|---------------------|------------------|-----------------|---------------------------------------|------------|---------------|----------|---------------------|---------------|-------------------------|--------------------|----------|----------------------|---------|---|--------------------|
| Basic set   | Plus set | Full set    |                     |                  |                 | One rev.                              | Hysteresis | Repeatability |          |                     |               |                         |                    |          |                      |         |   |                    |
| 513-406-10E | -        | 513-406-10T | 0.0005 in / 0.01 mm | 0.03 in / 0.7 mm | 0-15-0 / 0-35-0 | ±0.0005                               | 0.0002     | ±0.0002       | 45       | 0.3 or less         | ✓             | ✓                       | ✓                  | ✓        | ✓                    | ✓       | ✓   |                    |

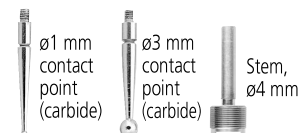
\* We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.  
Note: Stem with dovetail groove is not included in the mass.

## Set Configuration: Metric and Metric/Inch

### Full set



### Plus set

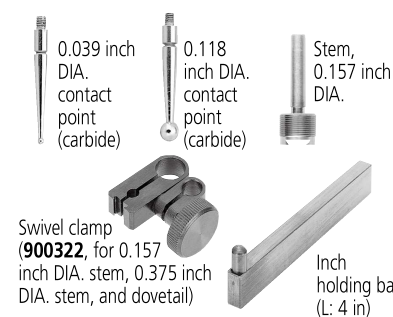


### Basic set

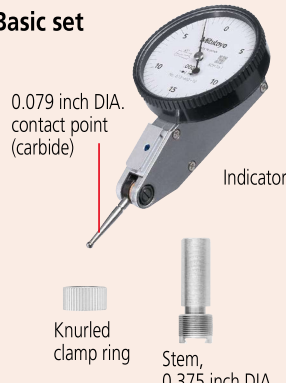


## Set Configuration: Inch and Inch/Metric

### Full set



### Basic set



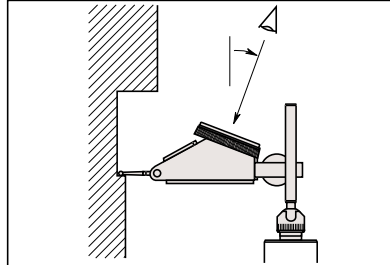




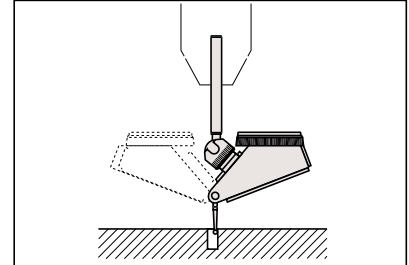
An inspection certificate is supplied as standard. Refer to page U-11 for details.

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

- Specially designed for easy viewing of dial.



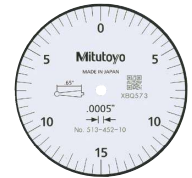
- The dial face obliquely faces upward, allowing users to read the graduations from the user's side. It is convenient when probing on the side of a large workpiece and the workbench is high.



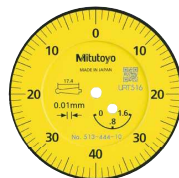
- Using the universal holder allows easy hole centering. The dial face always faces upward when the indicator is rotated, which makes reading easy.



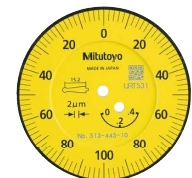
- Carbide contact point (Slightly magnetic)



- Carbide contact point (Slightly magnetic)



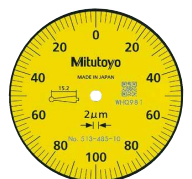
- With revolution counter
- Carbide contact point (Slightly magnetic)



- With revolution counter
- Carbide contact point (Slightly magnetic)



- Carbide contact point (Slightly magnetic)



- Carbide contact point (Slightly magnetic)

Note: 513-4XX-10 is indicated on the dial face. But the Order No. for the set provided with the stem etc. has a suffix (E or T) at the end.



# Dial Test Indicators

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



With revlution counter



Long stylus



Carbide contact point  
(Slightly magnetic)

## SPECIFICATIONS

| Metric      |             |             | Horizontal (20° tilted face) type |            |              |                                       |          |                    |            |          |                     |                        |             |   |         |
|-------------|-------------|-------------|-----------------------------------|------------|--------------|---------------------------------------|----------|--------------------|------------|----------|---------------------|------------------------|-------------|---|---------|
| Basic set   | Order No.   |             | Graduation (mm)                   | Range (mm) | Dial reading | Maximum permissible error (MPE)* (μm) |          |                    |            | Mass (g) | Measuring force (N) | With revlution counter | Long stylus | Carbide contact point (Slightly magnetic) | Remarks |
|             | Plus set    | Full set    |                                   |            |              | Measuring range                       | One rev. | 10 scale divisions | Hysteresis |          |                     |                        |             |   |         |
| 513-444-10E | 513-444-10A | 513-444-10T | 0.01                              | 1.6        | 0-40-0       | 16                                    | 10       | 5                  | 5          | 3        | 48                  | 0.3 or less            | ✓           | ✓   | ✓       |
| 513-445-10E | 513-445-10A | 513-445-10T | 0.002                             | 0.4        | 0-100-0      | 6                                     | 5        | 2                  | 4          | 1        |                     |                        |             |   |         |

| Inch      |             |             | Horizontal (20° tilted face) type |            |              |                                       |                |            |               |          |                     |                        |             |   |            |
|-----------|-------------|-------------|-----------------------------------|------------|--------------|---------------------------------------|----------------|------------|---------------|----------|---------------------|------------------------|-------------|---|------------|
| Basic set | Order No.   |             | Graduation (in)                   | Range (in) | Dial reading | Maximum permissible error (MPE)* (in) |                |            |               | Mass (g) | Measuring force (N) | With revlution counter | Long stylus | Carbide contact point (Slightly magnetic) | Remarks    |
|           | Plus set    | Full set    |                                   |            |              | One rev.                              | First 2.5 rev. | Hysteresis | Repeatability |          |                     |                        |             |   |            |
| —         | 513-442-10A | 513-442-10T | 0.0005                            | 0.06       | 0-15-0       | ±0.0005                               | ±0.0005        | 0.0002     | ±0.0002       | 48       | 0.3 or less         | ✓                      | ✓           | ✓   | Black dial |
| —         | 513-442-16A | 513-442-16T |                                   |            |              | ±0.0005                               | ±0.0005        | 0.0002     | ±0.0002       |          |                     |                        |             |   |            |
| —         | 513-446-10A | 513-446-10T |                                   |            |              | ±0.0005                               | ±0.0005        | 0.0002     | ±0.0002       |          |                     |                        |             |   |            |
| —         | 513-446-16A | 513-446-16T | 0.0001                            | 0.016      | 0-4-0        | ±0.0002                               | ±0.0002        | 0.0001     | ±0.00004      | 48       | 0.3 or less         | ✓                      | ✓           | ✓   | Black dial |
| —         | 513-443-10A | 513-443-10T |                                   |            |              | ±0.0002                               | ±0.0002        | 0.0001     | ±0.00004      |          |                     |                        |             |   |            |
| —         | 513-443-16A | 513-443-16T | ±0.0002                           | ±0.0002    | 0.0001       | ±0.00004                              | ±0.00004       | ±0.00004   | ±0.00004      | 48       | 0.3 or less         | ✓                      | ✓           | ✓   | Black dial |

| Metric      |             |             | Vertical type   |            |              |                                       |          |                    |            |          |                     |                        |             |   |         |
|-------------|-------------|-------------|-----------------|------------|--------------|---------------------------------------|----------|--------------------|------------|----------|---------------------|------------------------|-------------|---|---------|
| Basic set   | Order No.   |             | Graduation (mm) | Range (mm) | Dial reading | Maximum permissible error (MPE)* (μm) |          |                    |            | Mass (g) | Measuring force (N) | With revlution counter | Long stylus | Carbide contact point (Slightly magnetic) | Remarks |
|             | Plus set    | Full set    |                 |            |              | Measuring range                       | One rev. | 10 scale divisions | Hysteresis |          |                     |                        |             |   |         |
| 513-456-10E | —           | —           | 0.01            | 0.5        | 0-25-0       | 6                                     | —        | 5                  | 4          | 3        | 46                  | 0.3 or less            | ✓           | ✓   | ✓       |
| 513-454-10E | 513-454-10A | 513-454-10T |                 | 0.8        | 0-40-0       | 9                                     | —        | 5                  | 4          | 3        |                     |                        |             |   |         |
| 513-455-10E | 513-455-10A | 513-455-10T | 0.002           | 0.2        | 0-100-0      | 4                                     | —        | 2                  | 3          | 1        | 46                  | 0.3 or less            | ✓           | ✓   | ✓       |

| Inch        |           |             | Vertical type   |            |              |                                       |                |            |               |          |                     |                        |             |   |         |
|-------------|-----------|-------------|-----------------|------------|--------------|---------------------------------------|----------------|------------|---------------|----------|---------------------|------------------------|-------------|---|---------|
| Basic set   | Order No. |             | Graduation (in) | Range (in) | Dial reading | Maximum permissible error (MPE)* (in) |                |            |               | Mass (g) | Measuring force (N) | With revlution counter | Long stylus | Carbide contact point (Slightly magnetic) | Remarks |
|             | Plus set  | Full set    |                 |            |              | One rev.                              | First 2.5 rev. | Hysteresis | Repeatability |          |                     |                        |             |   |         |
| 513-452-10E | —         | 513-452-10T | 0.0005          | 0.03       | 0-15-0       | ±0.0005                               | —              | 0.0002     | ±0.0002       | 46       | 0.3 or less         | ✓                      | ✓           | ✓   |         |
| 513-453-10E | —         | 513-453-10T | 0.0001          | 0.008      | 0-4-0        | ±0.0001                               | —              | 0.0001     | ±0.00004      |          |                     |                        |             |   |         |

| Metric      |             |             | Parallel Type   |            |              |                                       |          |                    |            |          |                     |                        |             |   |         |
|-------------|-------------|-------------|-----------------|------------|--------------|---------------------------------------|----------|--------------------|------------|----------|---------------------|------------------------|-------------|---|---------|
| Basic set   | Order No.   |             | Graduation (mm) | Range (mm) | Dial reading | Maximum permissible error (MPE)* (μm) |          |                    |            | Mass (g) | Measuring force (N) | With revlution counter | Long stylus | Carbide contact point (Slightly magnetic) | Remarks |
|             | Plus set    | Full set    |                 |            |              | Measuring range                       | One rev. | 10 scale divisions | Hysteresis |          |                     |                        |             |   |         |
| 513-486-10E | —           | —           | 0.01            | 0.5        | 0-25-0       | 6                                     | —        | 5                  | 4          | 3        | 53                  | 0.3 or less            | ✓           | ✓   | ✓       |
| 513-484-10E | 513-484-10A | 513-484-10T |                 | 0.8        | 0-40-0       | 9                                     | —        | 5                  | 4          | 3        |                     |                        |             |   |         |
| 513-485-10E | —           | —           | 0.002           | 0.2        | 0-100-0      | 4                                     | —        | 2                  | 3          | 1        | 53                  | 0.3 or less            | ✓           | ✓   | ✓       |

| Inch      |             |             | Parallel Type   |            |              |                                       |                |            |               |          |                     |                        |             |   |         |
|-----------|-------------|-------------|-----------------|------------|--------------|---------------------------------------|----------------|------------|---------------|----------|---------------------|------------------------|-------------|---|---------|
| Basic set | Order No.   |             | Graduation (in) | Range (in) | Dial reading | Maximum permissible error (MPE)* (in) |                |            |               | Mass (g) | Measuring force (N) | With revlution counter | Long stylus | Carbide contact point (Slightly magnetic) | Remarks |
|           | Plus set    | Full set    |                 |            |              | One rev.                              | First 2.5 rev. | Hysteresis | Repeatability |          |                     |                        |             |   |         |
| —         | 513-482-10A | 513-482-10T | 0.0005          | 0.03       | 0-15-0       | ±0.0005                               | —              | 0.0002     | ±0.0002       | 53       | 0.3 or less         | ✓                      | ✓           | ✓   |         |

\* Horizontal (20° Tilted Face) Type, Vertical type:

We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.

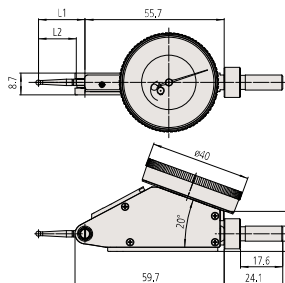
Parallel Type: We guarantee the accuracy of completed products by inspecting them with the dial face vertical.

Note: 513-4XX-10 is indicated on the dial face. But the Order No. for the set provided with the stem etc. has a suffix (E or T) at the end.

## DIMENSIONS

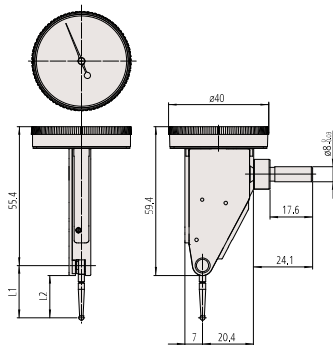
### Horizontal (20° Tilted Face) Type

unit: mm



| Order No.   | L1   | L2   |
|-------------|------|------|
| 513-445-10E | 18.7 | 15.2 |
| 513-444-10E | 20.9 | 17.4 |

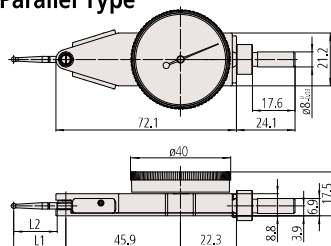
### Vertical Type



| Order No.   | L1   | L2   |
|-------------|------|------|
| 513-484-10E | 20.9 | 17.4 |
| 513-485-10E | 18.7 | 15.2 |
| 513-486-10E | 22.2 | 18.7 |

| Order No.   | L1   | L2   |
|-------------|------|------|
| 513-454-10E | 20.9 | 17.4 |
| 513-455-10E | 18.7 | 15.2 |
| 513-456-10E | 22.2 | 18.7 |

### Parallel Type



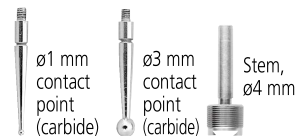
Note: A slight difference may occur depending on the center of the contact point, graduation plate, and stem fixing position, etc.

## Set Configuration: Metric

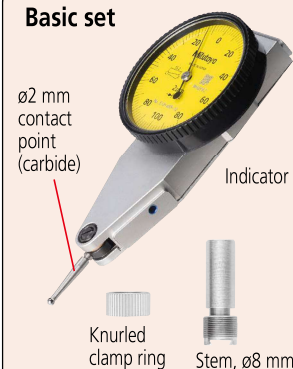
### Full set



### Plus set



### Basic set

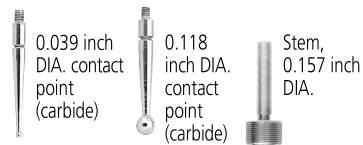


## Set Configuration: Inch

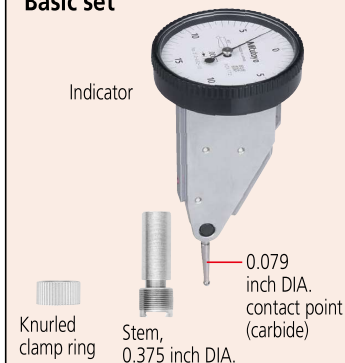
### Full set



### Plus set



### Basic set





An inspection certificate is supplied as standard. Refer to page U-11 for details.

### Set Configuration: Metric

**Full set**

- Swivel clamp (900321 for  $\varnothing 4$  mm stem,  $\varnothing 8$  mm stem, dovetail)
- $\varnothing 1$  mm contact point (carbide)
- $\varnothing 3$  mm contact point (carbide)
- Stem,  $\varnothing 4$  mm
- Metric holding bar (L: 100 mm)
- Spare  $\varnothing 2$  mm contact point (carbide)

**Basic set**

- $\varnothing 2$  mm contact point (carbide) (102825)
- $\varnothing 8$  mm stem
- Indicator
- Knurled clamp ring
- Spanner (102037)

### Set Configuration: Inch

**Full set**

- (900322 for 0.157 inch DIA stem, 0.375 inch DIA. stem, dovetail)
- 0.039 inch DIA. contact point (carbide)
- 0.118 inch DIA. contact point (carbide)
- Stem, 0.157 inch DIA.
- Inch holding bar (L: 4 in)
- Spare 0.079 inch DIA. contact point (carbide)

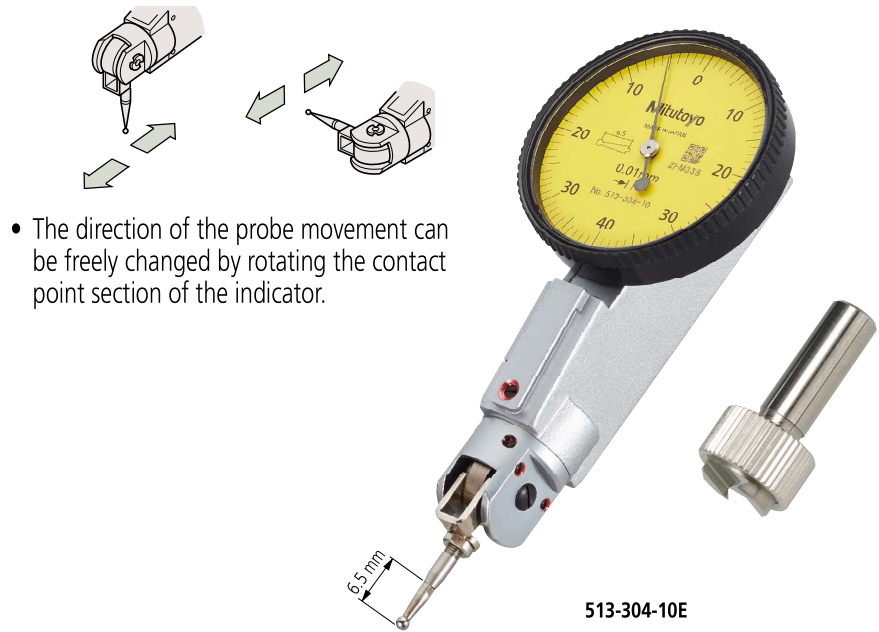
**Basic set**

- 0.079 inch DIA. contact point (carbide) (102825)
- 0.375 inch DIA. stem
- Indicator
- Knurled clamp ring
- Spanner (102037)

### Optional Accessories

- Swivel clamps (See page F-75)
- Holding bars (See page F-75)
- Stems (See page F-75)
- 102824:  $\varnothing 1$  mm contact point (carbide)
- 102825:  $\varnothing 2$  mm contact point (carbide)
- 102826:  $\varnothing 3$  mm contact point (carbide)

## Dial Test Indicator SERIES 513 — Universal Type



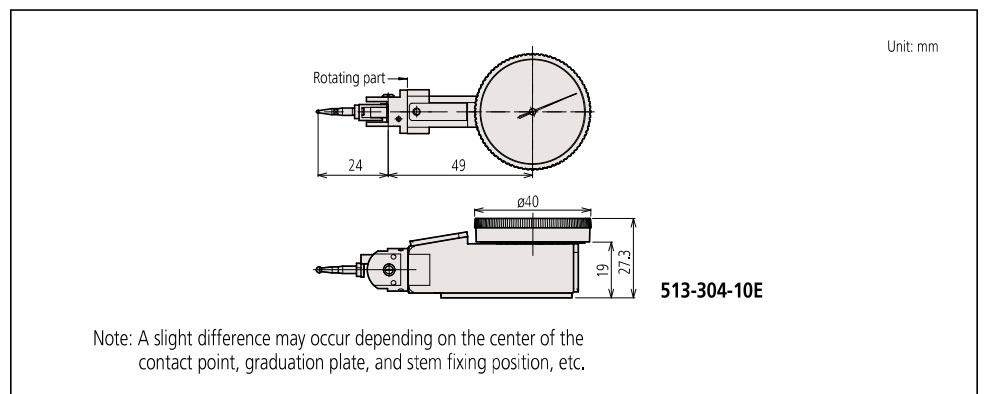
### SPECIFICATIONS

| Order No.   |             | Graduation (mm) | Range (mm) | Dial reading | Maximum permissible error (MPE)* ( $\mu\text{m}$ ) |          |                    |            | Mass (g) | Measuring force (N) | Features      |                                     |                                     |                                     |                                     |                                     |                                     |                                     |   |
|-------------|-------------|-----------------|------------|--------------|--|----------|--------------------|------------|----------|---------------------|---------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|
| Basic set   | Full set    |                 |            |              | Measuring range                                    | One rev. | 10 scale divisions | Hysteresis |          |                     | Repeatability | High accuracy                       | With revolution counter             | Long contact point                  | Standard                            | Double scale spacing                | Compact                             | Dustproof                           | Carbide contact point (Slightly magnetic) |
| 513-304-10E | 513-304-10T | 0.01            | 0.8        | 0-40-0       | 9  | —        | 5                  | 4          | 3        | 71                  | 0.3 or less   | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>       |

| Order No.   |             | Graduation (in) | Range (in) | Dial reading | Maximum permissible error (MPE)* (in) |            |               | Mass (g) | Measuring force (N) | Features                            |                                     |                                     |                                     |                                     |                                     |                                     |   |                                     |                                     |
|-------------|-------------|-----------------|------------|--------------|---------------------------------------|------------|---------------|----------|---------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|---|-------------------------------------|-------------------------------------|
| Basic set   | Full set    |                 |            |              | One rev.                              | Hysteresis | Repeatability |          |                     | High accuracy                       | With revolution counter             | Long contact point                  | Standard                            | Double scale spacing                | Compact                             | Dustproof                           | Carbide contact point (Slightly magnetic) | Ruby contact point                  |                                     |
| 513-302-10E | 513-302-10T | 0.0005          | 0.03       | 0-15-0       | $\pm 0.0005$                          | 0.0003     | $\pm 0.0003$  | 71       | 0.3 or less         | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/>       | <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> |

\* We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.  
Note: 513-3XX-10 is indicated on the dial face. But the Order No. for the set provided with the stem etc. has a suffix (E or T) at the end.

### DIMENSIONS

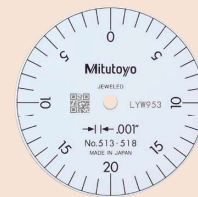


# Dial Test Indicators

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

## Pocket Type Dial Test Indicator SERIES 513

- Slim design is suited for measurement in deep holes.
- 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**).
- Bezel is sealed with an O-ring to keep out water and oil. (Note that this type is NOT waterproof.)
- Clutch type (with a clutch lever)
- With  $\varnothing 2$  mm Carbide contact point
- Jeweled bearing
- Completed products are inspected according to JIS B 7533:1990.



513-518



513-528



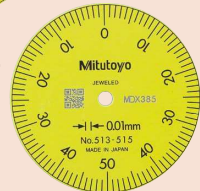
513-512



513-504



513-517E  
513-517WE



513-515T



513-514E



513-503E



513-501E

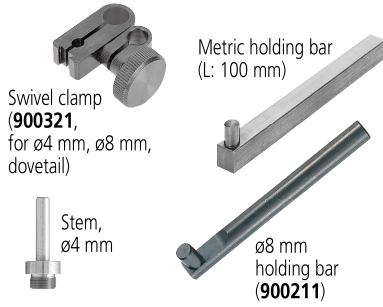
### Optional Accessories

- Swivel clamps (See page F-75)
- Holding bars (See page F-75)
- Stems (See page F-75)
- Contact point (See page F-75)

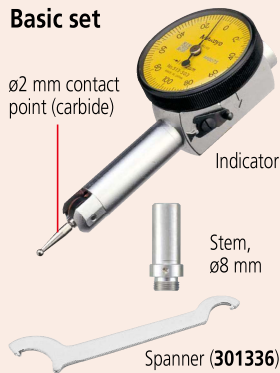


## Set Configuration: Metric

### Full set

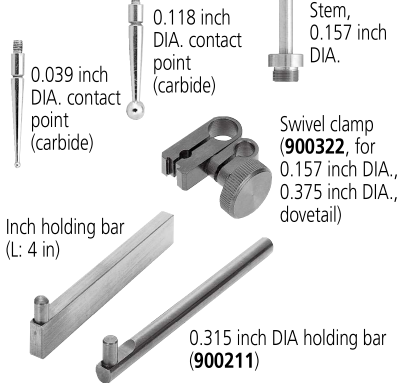


### Basic set

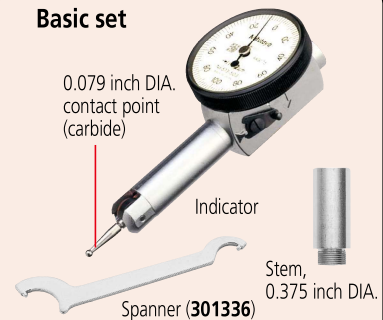


## Set Configuration: Inch

### Full set



### Basic set



Long contact point



Jeweled bearing



Dustproof



Compact

## SPECIFICATIONS

### Metric

| Order No. |           | Graduation (mm) | Range (mm) | Accuracy (µm) | Dial reading | Measuring force (N) | Long contact point | Jeweled bearing | Compact | Dustproof | — | — |
|-----------|-----------|-----------------|------------|---------------|--------------|---------------------|--------------------|-----------------|---------|-----------|---|---|
| Basic set | Full set  |                 |            |               |              |                     |                    |                 |         |           |   |   |
| 513-514E  | 513-514T  | 0.01            | 0.5        | 10            | 0-25-0       | 0.3 or less         | ✓                  | ✓               |         |           |   |   |
| 513-517E  | 513-517T  | 0.01            | 0.8        | 8             | 0-40-0       | 0.3 or less         |                    | ✓               |         |           |   |   |
| 513-517WE | 513-517WT | 0.01            | 0.8        | 8             | 0-40-0       | 0.3 or less         |                    | ✓               |         | ✓         |   |   |
| 513-527E  | 513-527T  | 0.01            | 0.8        | 8             | 0-40-0       | 0.3 or less         |                    | ✓               | ✓       |           |   |   |
| —         | 513-515T  | 0.01            | 1          | 10            | 0-50-0       | 0.3 or less         | ✓                  | ✓               |         |           |   |   |
| 513-503E  | 513-503T  | 0.002           | 0.2        | 3             | 0-100-0      | 0.3 or less         |                    | ✓               |         |           |   |   |
| 513-501E  | 513-501T  | 0.001           | 0.14       | 3             | 0-70-0       | 0.4 or less         |                    | ✓               |         |           |   |   |

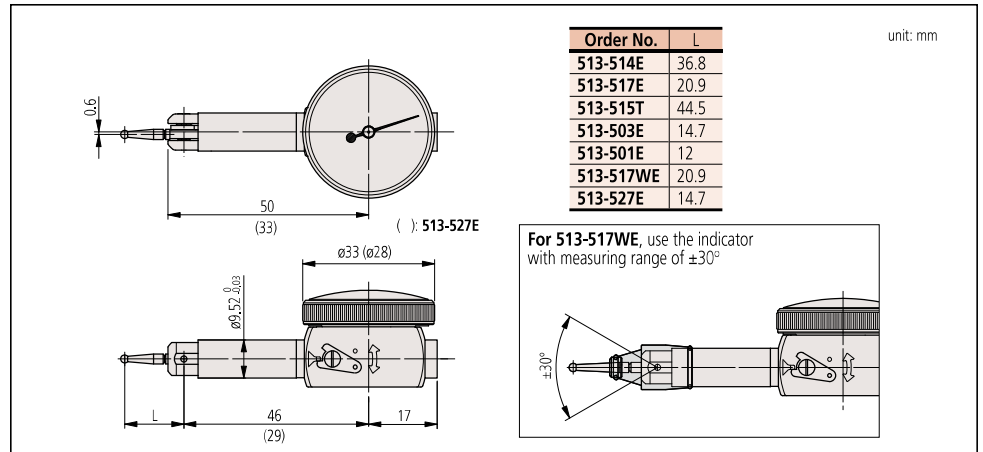
Note: We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.

### Inch

| Order No. |          | Graduation (in) | Range (in) | Accuracy (in) | Dial reading | Measuring force (N) | Long contact point | Jeweled bearing | Compact | — | — | — |
|-----------|----------|-----------------|------------|---------------|--------------|---------------------|--------------------|-----------------|---------|---|---|---|
| Basic set | Full set |                 |            |               |              |                     |                    |                 |         |   |   |   |
| 513-518   | 513-518T | 0.001           | 0.04       | ±0.001        | 0-20-0       | 0.3 or less         |                    | ✓               |         |   |   |   |
| 513-528   | 513-528T | 0.001           | 0.04       | ±0.001        | 0-20-0       | 0.3 or less         |                    | ✓               | ✓       |   |   |   |
| 513-512   | 513-512T | 0.0005          | 0.02       | ±0.0005       | 0-10-0       | 0.3 or less         | ✓                  | ✓               |         |   |   |   |
| 513-504   | 513-504T | 0.0001          | 0.01       | ±0.0002       | 0-5-0        | 0.3 or less         | ✓                  | ✓               |         |   |   |   |

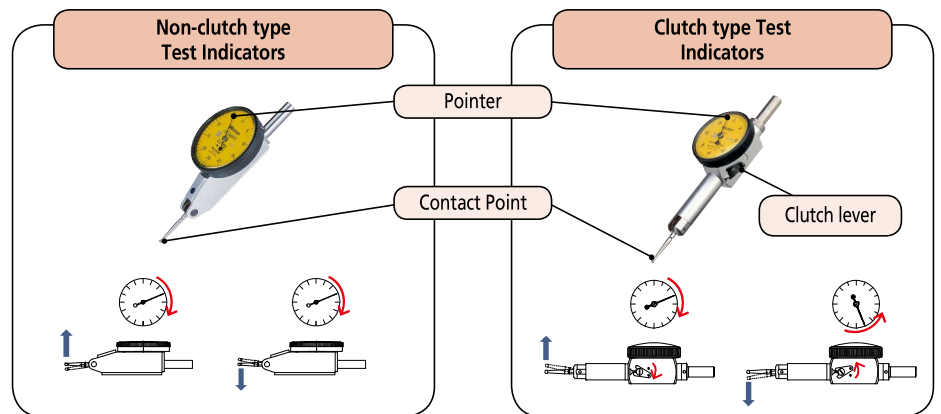
Note: We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.

## DIMENSIONS



## There are two types of Mitutoyo Dial Test Indicator:

The non-clutch type (without a clutch lever) and the clutch type (with a 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.

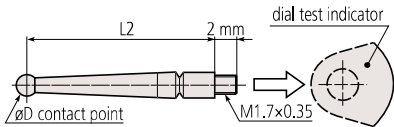
# Dial Test Indicators

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

## Contact points, Stems and Holders Optional Accessories for Dial Test Indicators

### Contact point (for Metric Models Only\*)

\* Except for universal type dial test indicator (513-304-10).



Ø0.5 mm contact point    Ø0.7 mm contact point



- |                       |                       |
|-----------------------|-----------------------|
| 190547 (L2=11.2 mm)   | 190548 (L2=11.2 mm)   |
| 21CAB109 (L2=15.2 mm) | 21CAB110 (L2=15.2 mm) |
| 190549 (L2=17.4 mm)   | 190550 (L2=17.4 mm)   |
| 190654 (L2=18.7 mm)   | 190653 (L2=18.7 mm)   |
| 21CAB111 (L2=33.9 mm) | 21CAB112 (L2=33.9 mm) |
| 190656 (L2=41.0 mm)   | 190655 (L2=41.0 mm)   |

Ø1 mm contact point (Carbide)    Ø2 mm contact point (Carbide)



- |                     |                     |
|---------------------|---------------------|
| 103017 (L2=11.2 mm) | 103010 (L2=11.2 mm) |
| 131314 (L2=15.2 mm) | 103011 (L2=15.2 mm) |
| 103013 (L2=17.4 mm) | 103006 (L2=17.4 mm) |
| 137558 (L2=18.7 mm) | 137557 (L2=18.7 mm) |
| 131316 (L2=33.9 mm) | 131324 (L2=33.9 mm) |
| 136235 (L2=41.0 mm) | 136013 (L2=41.0 mm) |

Ø2 mm contact point (Ruby)    Ø3 mm contact point (Carbide)



- |                       |                     |
|-----------------------|---------------------|
| 21CZA209 (L2=11.2 mm) | 103018 (L2=11.2 mm) |
| 21CZB068 (L2=15.2 mm) | 131315 (L2=15.2 mm) |
| 21CZA201 (L2=17.4 mm) | 103014 (L2=17.4 mm) |
| 21CZA210 (L2=18.7 mm) | 137559 (L2=18.7 mm) |
| 21CZA211 (L2=41.0 mm) | 131317 (L2=33.9 mm) |
|                       | 136236 (L2=41.0 mm) |

### Swivel Clamps

For Ø6 mm stem, Ø8 mm stem, and dovetail



902053

For Ø4 mm stem, Ø8 mm stem, and dovetail

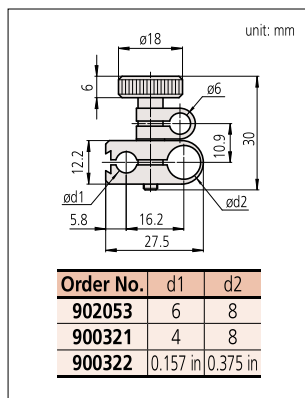


900321

For 0.157 inch DIA. stem, 0.375 inch DIA. stem, and dovetail



900322



### Spanner



102037

### Holding Bars



9x9 mm    953638 (Length: 50 mm)  
900209 (Length: 100 mm)



Ø8 mm (0.315 inch DIA)    900211 (Length: 115 mm/4.528 in)



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

### Stems with Knurled Clamp Ring

Ø4 mm (0.157 inch DIA.)



21CZB131

Ø8 mm    0.375 inch DIA.



21CZB129

21CZB130

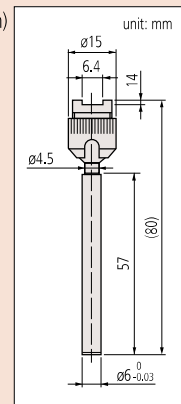
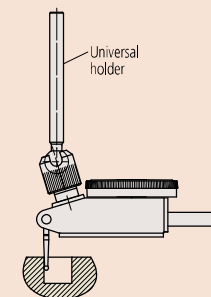
| Stem DIA. Ød | Stem with dovetail (Individual item) | Nut (Individual item) | Full set (Stem with dovetail+Nut) |
|--------------|--------------------------------------|-----------------------|-----------------------------------|
|              | Order No.                            |                       |                                   |
| Ø4           | 21CAB106                             | 190322                | 21CZB131                          |
| Ø6           | 21CAB103                             | 190322                | 21CZB128                          |
| Ø8           | 21CAB104                             | 190322                | 21CZB129                          |
| Ø0.375 in    | 21CAB105                             | 190322                | 21CZB130                          |

### Universal Holder (dovetail clamp)

- A universal holder is an attachment used to mount a dial test indicator in a machine tool spindle so that it can be used to align the spindle axis with a workpiece feature such as a hole center, or a machine axis with an edge. (See diagram below.) It also gives some protection against accidental impacts on the indicator.

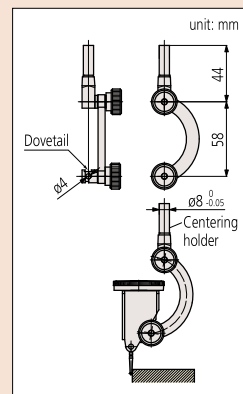


21CZA233 (Ø8 mm stem)  
21CZA231 (0.25 inch DIA. stem)  
21CZA229 (Ø6 mm stem)



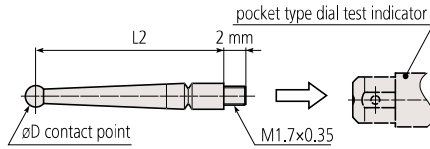
### Centering Holder

- Allows large diameter cylinders or holes to be centered on a machine tool.

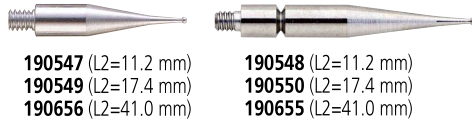


901959 (Ø8 mm stem)  
901997 (0.25 inch DIA. stem)

## Contact point (for Metric Models Only)



### $\phi 0.5$ mm contact point    $\phi 0.7$ mm contact point



190547 (L2=11.2 mm)  
190549 (L2=17.4 mm)  
190656 (L2=41.0 mm)

190548 (L2=11.2 mm)  
190550 (L2=17.4 mm)  
190655 (L2=41.0 mm)

### $\phi 1$ mm contact point (Carbide)    $\phi 2$ mm contact point (Carbide)



136756 (L2=8.6 mm)  
103017 (L2=11.2 mm)  
103013 (L2=17.4 mm)  
137746 (L2=33.3 mm)  
136235 (L2=41.0 mm)

136104 (L2=8.6 mm)  
103010 (L2=11.2 mm)  
103006 (L2=17.4 mm)  
129949 (L2=33.3 mm)  
136013 (L2=41.0 mm)

### $\phi 2$ mm contact point (Ruby)    $\phi 3$ mm contact point (Carbide)



21CZA209 (L2=11.2 mm)  
21CZA201 (L2=17.4 mm)  
21CZA211 (L2=41.0 mm)

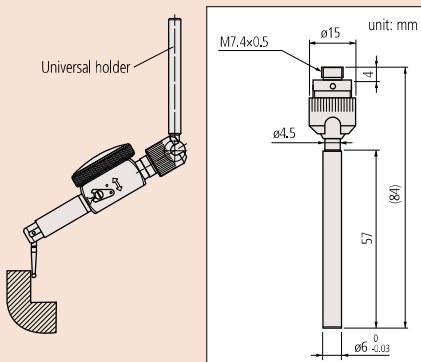
136758 (L2=8.6 mm)  
103018 (L2=11.2 mm)  
103014 (L2=17.4 mm)  
137747 (L2=33.3 mm)  
136236 (L2=41.0 mm)

## Universal Holder (screw clamp)

- A universal holder is an attachment used to mount a dial test indicator in a machine tool spindle so that it can be used to align the spindle axis with a workpiece feature such as a hole center, or a machine axis with an edge. (See diagram below.) It also gives some protection against accidental impacts on the indicator.



21CZA234 ( $\phi 8$  mm stem)  
21CZA232 (0.25 inch DIA. stem)  
21CZA230 ( $\phi 6$  mm stem)



## Swivel Clamps

For  $\phi 6$  mm stem,  
 $\phi 8$  mm stem,  
and dovetail



902053

For  $\phi 4$  mm stem  
and  $\phi 8$  mm stem,  
and dovetail

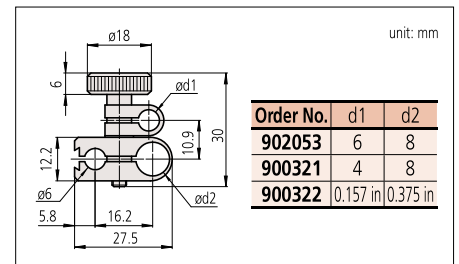


900321

For 0.157 inch DIA. stem  
and 0.375 inch DIA. stem,  
and dovetail



900322



## Stems

$\phi 4$  mm     $\phi 8$  mm  
(0.157 inch DIA.)    (0.315 inch DIA.)    0.375 inch DIA.

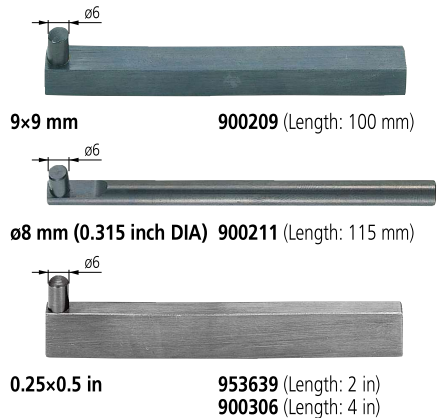


102036

102822

102081

## Holding Bars



9x9 mm

902029 (Length: 100 mm)

0.8 mm (0.315 inch DIA)

900211 (Length: 115 mm)

0.25x0.5 in

953639 (Length: 2 in)

900306 (Length: 4 in)

Note: Suitable for height gages with a scriber section of 12.7x6.35 mm.

## Spanner



301336

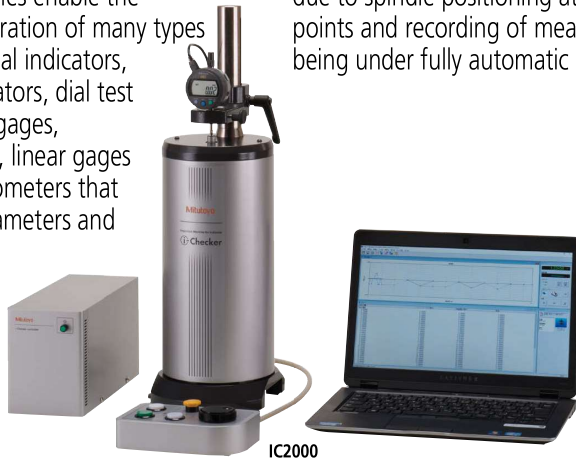


# Indicator Calibration

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

## i-Checker IC2000 SERIES 170

- Indication accuracy of  $(0.1 + 0.4L/100) \mu\text{m}$ , the highest level in the world, is achieved. (When inspected in the vertical orientation.)
- Can directly inspect indicators with a stroke of up to 100 mm. Moreover, a wide variety of optional accessories enable the inspection and calibration of many types of gage including dial indicators, lever-type dial indicators, dial test indicators, cylinder gages, Digimatic indicators, linear gages and electronic micrometers that use various stem diameters and support systems.
- The pointer of the analog indicator is positioned just before the measuring point automatically in the semi-automatic mode.
- Digital indicators equipped with a data output function are checked very efficiently due to spindle positioning at the inspection points and recording of measurement results being under fully automatic control.



## SPECIFICATIONS

| Order No.                   | 170-402   | 170-403          |
|-----------------------------|---|------------------|
| Remarks                     | with 8 mm bush  | with 3/8 in bush |
| Measuring Range             | 100 mm  |                  |
| Resolution                  | 0.01 $\mu\text{m}$  |                  |
| Accuracy (20 °C)            | $(0.1 + 0.4L/100) \mu\text{m}$ L=Arbitrary length (mm)<br>(0.15 + 0.6L/100) $\mu\text{m}$ L=Arbitrary length (mm)               |                  |
| Feed speed                  | Maximum 10 mm/s   |                  |
| Drive method                | Motor drive (semi-automatic/fully-automatic)  |                  |
| Measuring Unit              | Separate type Linear Encoder  |                  |
| Measurement method          | Semi-automatic measurement<br>Fully automatic measurement (only when using an indicator equipped with data output function)*1*2 |                  |
| Mass                        | 20 kg   |                  |
| Operating temperature range | 20 °C±0.5 °C  |                  |

\*1 Automatic measurement requires the indicator's connecting cable. Additionally some form of indicator, along with the normally connected accessory (the optional accessory for the indicator such as a Digimatic power-supply unit in an EF counter) will be required.

\*2 The indicator measured via RS-232C has the capability to receive data from the main unit and output the counter value.



An inspection certificate is supplied as standard. Refer to page U-11 for details.



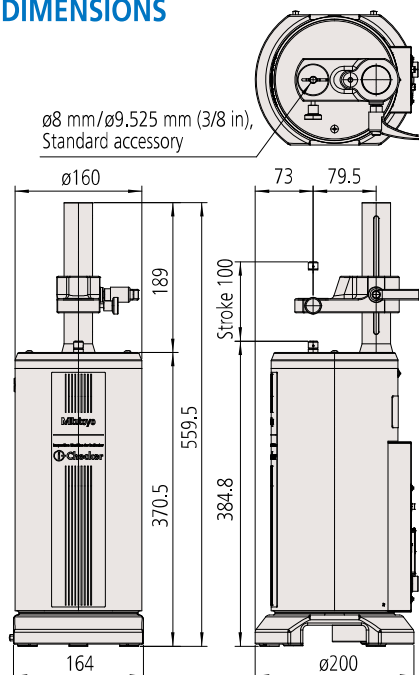
## Typical application for Dial Test Indicator Accessory Set



Typical application using dial test indicator attachment set (**02ASK000**)



## DIMENSIONS



Refer to the i-Checker Brochure (**E12015**) for more details.

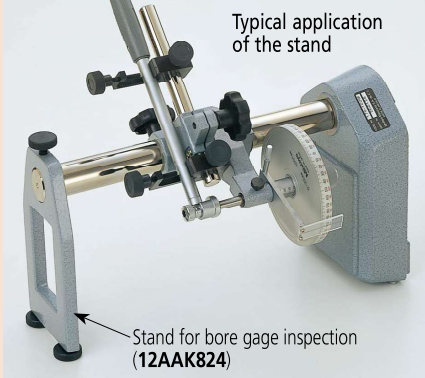


An inspection certificate is supplied as standard. Refer to page U-11 for details.

### Optional accessory

Stand for bore gage inspection (**12AAK824**)

Note: Can be used for the inspection of bore gages 511 SERIES standard type and with micrometer head up to 400 mm. (Refer to pages C-33 and C-39 for details.)



Typical application of the stand

Stand for bore gage inspection (**12AAK824**)

## SERIES 170 — UDT-2 Dial Indicator Tester

- UDT-2 is the accuracy tester for 0.01 mm resolution/graduation dial indicators, dial test indicators and bore gages.
- Stem mounting hole:  $\varnothing 6$ ,  $\varnothing 8$  mm (Metric)  $\varnothing 1/4$  in,  $\varnothing 3/8$  in (Inch)



170-102-12

### SPECIFICATIONS

| Metric            |                 |            |                              |            |
|-------------------|-----------------|------------|------------------------------|------------|
| Order No.         | Micrometer head |            | Accuracy ( $\mu\text{m}$ )   |            |
|                   | Graduation (mm) | Range (mm) | Feed accuracy (25 mm stroke) | Hysteresis |
| <b>170-102-12</b> | 0.001           | 0 - 25     | $\pm 2$                      | 0.5        |

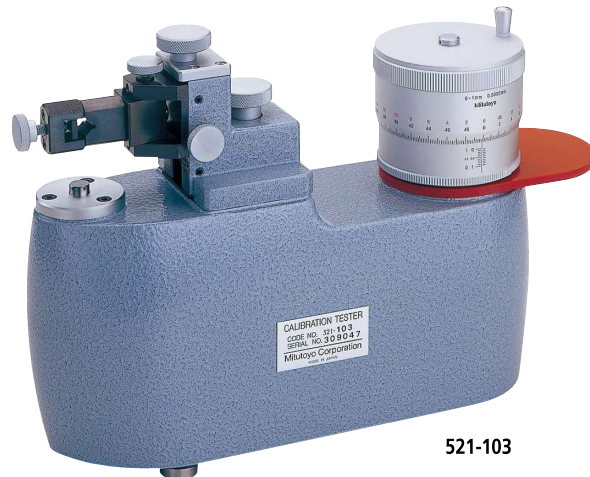
| Inch              |                 |            |                              |            |
|-------------------|-----------------|------------|------------------------------|------------|
| Order No.         | Micrometer head |            | Accuracy (in)                |            |
|                   | Graduation (in) | Range (in) | Feed accuracy (25 mm stroke) | Hysteresis |
| <b>170-101-10</b> | 0.0001          | 0 - 1      | $\pm 0.0001$                 | 0.00002    |

## SERIES 521 — Calibration Tester

- Can also be used to inspect dial indicators and dial test indicators with 0.001 mm graduations, or to adjust the sensitivity of electronic micrometers.
- The mounting bracket, which can move in any direction, accepts a wide range of indicator stem sizes ( $\varnothing 4$  mm to  $\varnothing 10$  mm).



Calibrating a dial test indicator



521-103

### SPECIFICATIONS

| Metric         |                 |            |                            |            |
|----------------|-----------------|------------|----------------------------|------------|
| Order No.      | Micrometer head |            | Accuracy ( $\mu\text{m}$ ) |            |
|                | Graduation (mm) | Range (mm) | Indication accuracy        | Hysteresis |
| <b>521-103</b> | 0.0002          | 0 - 1      | $\pm 0.2$                  | 0.2        |
| <b>521-105</b> | 0.0002          | 0 - 5      | $\pm 0.8$                  | 0.8        |

| Inch           |                 |            |                     |            |
|----------------|-----------------|------------|---------------------|------------|
| Order No.      | Micrometer head |            | Accuracy (in)       |            |
|                | Graduation (in) | Range (in) | Indication accuracy | Hysteresis |
| <b>521-104</b> | 0.00001         | 0 - 0.05   | $\pm 0.00001$       | 0.00001    |
| <b>521-106</b> | 0.00001         | 0 - 0.2    | $\pm 0.00003$       | 0.00003    |