## **Mitutoyo**



# Lever-Type Dial Indicators DIAL TEST INDICATORS



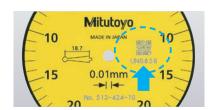


## **Enhanced Durability, Sensitivity and Readability**



## Inspection

 The QR code is used by the factory to accurately match the inspection certificate to the test indicator.



## Stylus length is marked on the dial face

• Stylus length is marked on the dial face to assist customers when ordering replacement styli.



### **Attachable limit hands**

• Limit hands (optional) can be attached to the bezel, allowing easy identification of the upper and lower limits of tolerance.





## ø8/ø9.52 stem to fit dovetails is a standard accessory

A ø8mm (ø0.315 in) plain stem (21CAB104) for the Metric models or a ø9.52mm (ø3/8 in) plain stem (21CAB105) for the Inch models that attaches to any dovetail on the frame is supplied as a standard accessory. Other sizes are available as optional accessories:

ø4mm (ø0.157 in) stem: **21CAB106** ø6mm (ø0.236 in) stem: **21CAB103** 

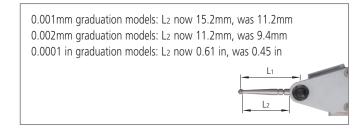


## certificate provided



## Extended stylus length for 0.001mm, 0.002mm, and 0.0001" graduation models

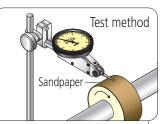
• Longer styli for the most sensitive indicators allow access to difficultto-measure features.

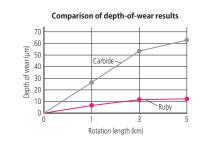


## Ruby ball-tipped stylus added

• A ruby tip has wear-resistance several times greater than a carbide tip and, since it is nonconductive, it can be used safely on an electrical discharge machine.









# **Enhanced Durability, Sensitivity and Readability**



### Improved readability

 Using universal fonts, changing dial face color and reviewing the relationship between pointer and scale marks have drastically improved readability.





Conventional

New

## **Crystal for readability**

 Glare-free flat crystal face allows easy reading of graduations.



Conventional

New

## Prevents dust and oil from penetrating the dial face

• The O-ring seal on the bezel provides smooth rotation and prevents dust and oil from penetrating the dial face.

## **Bonded bezel and crystal**

 Bonding the bezel and crystal eliminates a gap for cutting fluid or oil to penetrate the dial face.

### **Prevents bezel detachment**

 A flange prevents the bezel from unintentionally being removed during handling.





#### **Parts**





## **Choice of dial position**

Four models are available, each with a different orientation of the dial to allow the best visibility in any situation.

- Horizontal (standard model) dial is on top of the frame.
- Vertical: dial is on the end of the frame.
- Horizontal (20° tilted face): dial is on top of the frame but tilted 20°.
- Parallel: dial is on the side of the frame.

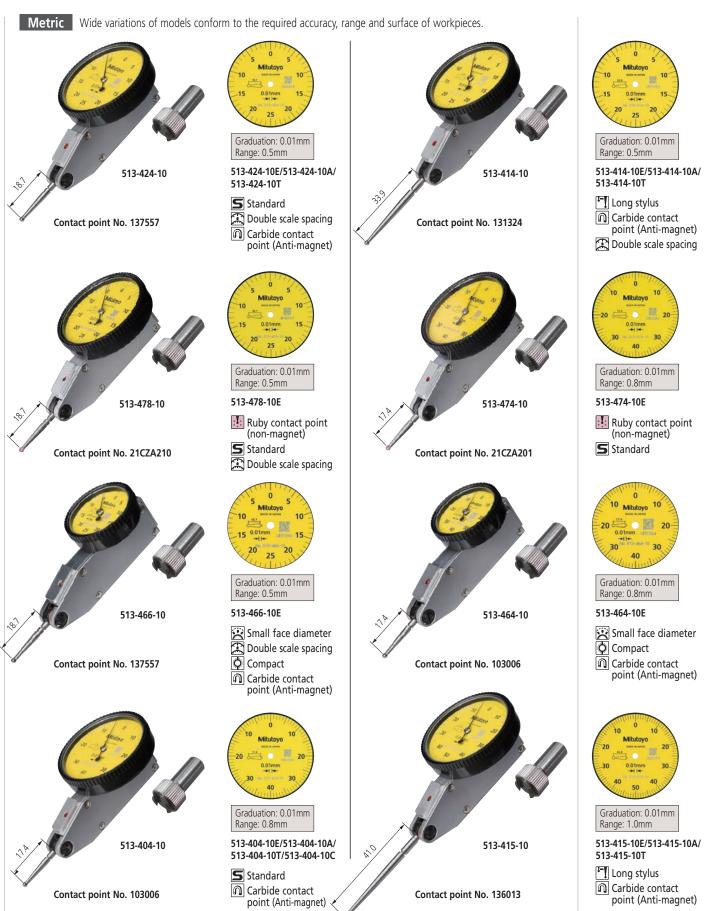
to maintain good trackability.



Indicator trackability depends on maintaining gear-train stability



#### Horizontal (Standard model)



## **M**itutoyo













Graduation: 0.01mm Range: 1.0mm

513-477-10E

Ruby contact point (non-magnet)

Graduation: 0.01mm

With revolution

 Carbide contact point (Anti-magnet)

Graduation: 0.002mm Range: 0.2mm

Carbide contact

Graduation: 0.001mm

(non-magnet)

High accuracy

Range: 0.14mm

513-471-10E

513-405-10T

**S** Standard

513-405-10E/513-405-10A/

counter

513-426-10E/513-426-10A

Double scale spacing

Range: 1.5mm

**I** Long stylus

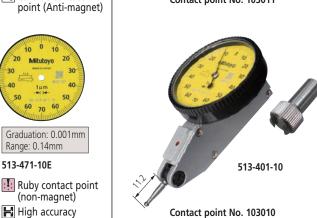








Contact point No. 103011





Graduation: 0.002mm Range: 0.2mm

513-475-10E

- Ruby contact point (non-magnet)
- **S** Standard



Graduation: 0.002mm Range: 0.6mm

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

- With revolution counter
- **O** Carbide contact point (Anti-magnet)



Graduation: 0.002mm Range: 0.2mm

513-465-10E

- Small face diameter
- Compact
- Carbide contact point (Anti-magnet)



Graduation: 0.001mm Range: 0.14mm

513-401-10E

- High accuracy
- Carbide contact point (Anti-magnet)









Graduation: 0.0005 in Range: 0.03 in

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

**S** Standard

**\overline{\Omega}** Carbide contact point (Anti-magnet)





Graduation: 0.0005 in Range: 0.03 in

513-462-10E

Compact

 Carbide contact point (Anti-magnet)





Graduation: 0.0005 in Range: 0.03 in

513-472-10E

**S**tandard Ruby contact point (non-magnet)





Graduation: 0.0001 in Range: 0.008 in

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

**S** Standard Anti-magnet (non-magnet)





Graduation: 0.0005 in Range: 0.03 in

513-412-10E/513-412-10T

Long stylus Carbide contact

point (Anti-magnet)





Graduation: 0.0001 in Range: 0.008 in

513-473-10E

**S** Standard

Ruby contact point (non-magnet)





Graduation: 0.0005 in Range: 0.03 in

512-479-10E

Long stylus

Ruby contact point (non-magnet)



Contact point No. 21CZB064



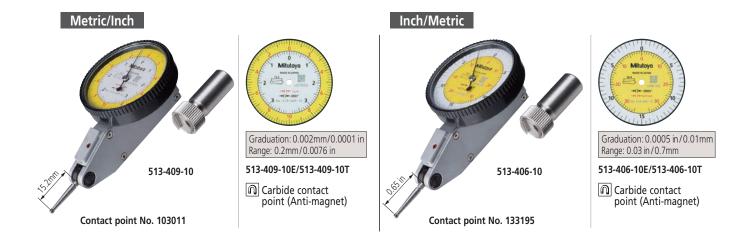
Graduation: 0.0001 in Range: 0.008 in

513-463-10E

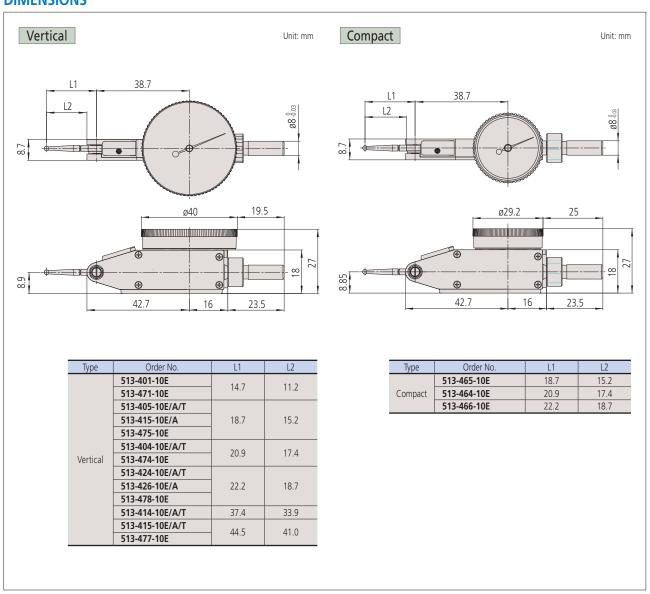
Compact

 Carbide contact point (Anti-magnet)





#### **DIMENSIONS**





#### **SPECIFICATIONS**

| Madella |  |
|---------|--|
| Metric  |  |

| Wether      | Order No.   |             |             |            |                 |                    | Indicatio             |            |               |              |                    |                 | <u>-</u>                  |               |                   |                        |           |                                     |                                 |
|-------------|-------------|-------------|-------------|------------|-----------------|--------------------|-----------------------|------------|---------------|--------------|--------------------|-----------------|---------------------------|---------------|-------------------|------------------------|-----------|-------------------------------------|---------------------------------|
|             | Order No.   |             |             |            |                 |                    | indicatio             | n accuracy |               |              |                    |                 | nte                       |               |                   | б                      |           | Ħ                                   |                                 |
| Basic set   | Plus set    | Full set    | Graduation  | Range      | Dial<br>reading | Measuring<br>range | 10 scale<br>divisions | Hysteresis | Repeatability | Mass         | Measuring<br>force | H High accuracy | ▼ With revolution counter | T Long stylus | <b>S</b> Standard | 🔁 Double scale spacing | 🕏 Compact | Carbide contact point (Anti-magnet) | Ruby contact point (non-magnet) |
| 513-424-10E | 513-424-10A | 513-424-10T |             |            |                 | 6 µm               |                       | 4 μm       |               | 45q          | 0.3N or less       |                 |                           |               | 1                 | 1                      |           | 1                                   |                                 |
| 513-478-10E | -           | -           |             | 0.5 mm     | 0-25-0          | ο μιτι             |                       | 4 μπ       |               | 439          | 0.314 01 1633      |                 |                           |               | 1                 | 1                      |           |                                     | 1                               |
| 513-466-10E | -           | -           |             |            |                 | 6 µm               |                       | 4 μm       |               | 41g          | 0.3N or less       |                 |                           |               |                   | 1                      | 1         | 1                                   |                                 |
| 513-404-10E | 513-404-10A | 513-404-10T |             | 0.8 mm     | 0-40-0          | 9 µm               |                       | 4 μιτι     |               |              | 0.314 01 1635      |                 |                           |               | 1                 |                        |           | 1                                   |                                 |
| 513-414-10E | 513-414-10A | 513-414-10T | 0.01 mm     | 0.5 mm     | 0-25-0          | 10 µm              | E.um                  | 5 μm       | 2             | 45g          | 0.2N or less       |                 |                           | 1             |                   | 1                      |           | 1                                   |                                 |
| 513-474-10E | -           | -           | 0.01 111111 | 0.8 mm     | 0-40-0          | 0                  | 5 µm                  | 4          | 3 µm          |              | 0.3N or less       |                 |                           |               | 1                 |                        |           |                                     | 1                               |
| 513-464-10E | -           | -           |             | 0.8 111111 | 0-40-0          | 9 µm               |                       | 4 μm       |               | 41g          | 0.314 01 1635      |                 |                           |               |                   |                        | 1         | 1                                   |                                 |
| 513-415-10E | 513-415-10A | 513-415-10T |             | 1.0 mm     | 0-50-0          | 10                 |                       |            |               |              | 0.2N or less       |                 |                           | 1             |                   |                        |           | 1                                   |                                 |
| 513-477-10E | -           | -           |             | 1.0 111111 | 0-30-0          | 10 µm              |                       | 5 μm       |               |              | 0.211 01 1855      |                 |                           | 1             |                   |                        |           |                                     | 1                               |
| 513-426-10E | 513-426-10A | -           |             | 1.5 mm     | 0-25-0          | 16 µm              |                       |            |               |              | 0.4N or less       |                 | 1                         |               |                   | 1                      |           | 1                                   |                                 |
| 543-405-10E | 543-405-10A | 543-405-10T | 0.002 mm    | 0.2 mm     | 0-100-0         |                    |                       |            |               | 45g          |                    |                 |                           |               | 1                 |                        |           | 1                                   |                                 |
| 513-471-10E | -           | -           | 0.001 mm    | 0.14 mm    | 0-70-0          | 4 µm               |                       | 3 µm       |               |              | 0.3N or less       | 1               |                           |               |                   |                        |           |                                     | 1                               |
| 513-475-10E | -           | -           |             | 0.2 mm     |                 | 00-0 7 μm 2 μm 4   |                       | 1 µm       |               |              |                    |                 |                           | 1             |                   |                        |           | 1                                   |                                 |
| 513-425-10E | 513-425-10A | -           | 0.002 mm    | 0.6 mm     | 0-100-0         |                    | 4 μm                  | ΙμΠ        |               | 0.4N or less |                    | 1               |                           |               |                   |                        | 1         |                                     |                                 |
| 513-465-10E | -           | -           |             | 0.2 mm     |                 |                    | 3 μm                  |            | 41g           | 0.3N or less |                    |                 |                           |               |                   | 1                      | 1         |                                     |                                 |
| 513-401-10E | -           | -           | 0.001 mm    | 0.14 mm    | 0-70-0          | 4 µIII             |                       | βμπ        |               | 45g          | 0.314 01 1622      | 1               |                           |               |                   |                        |           | 1                                   |                                 |

|             |           |             |            |          |                 |            |                  |               |             |                    | _             | _                       | _             | _        | _                      | _         |                                     |                                 |
|-------------|-----------|-------------|------------|----------|-----------------|------------|------------------|---------------|-------------|--------------------|---------------|-------------------------|---------------|----------|------------------------|-----------|-------------------------------------|---------------------------------|
|             | Order No. |             |            |          |                 | Inc        | dication accura- | су            |             |                    |               | ter                     |               |          |                        |           | ±                                   |                                 |
| Basic set   | Plus set  | Full set    | Graduation | Range    | Dial<br>reading | One rev.   | Hysteresis       | Repeatability | Mass        | Measuring<br>force | High accuracy | With revolution counter | T Long stylus | Standard | 🗷 Double scale spacing | 🗘 Compact | Carbide contact point (Anti-magnet) | Ruby contact point (non-magnet) |
| 513-402-10E | -         | 513-402-10T |            |          |                 |            |                  |               |             | 0.3N or less       |               |                         |               | 1        |                        |           | 1                                   |                                 |
| 513-472-10E | -         | -           |            |          |                 |            |                  |               | 45~         | 0.314 01 1635      |               |                         |               | 1        |                        |           |                                     | 1                               |
| 513-412-10E | -         | 513-412-10T | 0.0005 in  | 0.03 in  | 0-15-0          | ±0.0005 in | 0.0002 in        | 0.0002 in     | 45g         | 0.2N or less       |               |                         | 1             |          |                        |           | 1                                   |                                 |
| 513-479-10E | -         | -           |            |          |                 |            |                  |               |             | U.ZIN OF IESS      |               |                         | 1             |          |                        |           |                                     | 1                               |
| 513-462-10E | -         | -           |            |          |                 |            |                  |               | 41g         |                    |               |                         |               |          |                        | 1         | 1                                   |                                 |
| 513-403-10E | -         | 513-403-10T |            |          |                 |            |                  |               | 45g         | 0.3N or less       |               |                         |               | 1        |                        |           | 1                                   |                                 |
| 513-473-10E | -         | -           | 0.0001 in  | 0.008 in | 0-4-0           | ±0.0001 in | 0.0001 in        | 0.00004 in    | 45 <u>y</u> | 0.311 01 1835      |               |                         |               | 1        |                        |           |                                     | 1                               |
| 513-463-10E | -         | -           |            |          |                 |            |                  |               | 41g         |                    |               |                         |               |          |                        | 1         | 1                                   |                                 |

#### Metric/Inch

|             | Order No. |             |                       |                     |                   |                    | Indicatio             | n accuracy |               |      |                    |                 | ıter                      |               |          |                        |         | ŧ                                   |                                 |
|-------------|-----------|-------------|-----------------------|---------------------|-------------------|--------------------|-----------------------|------------|---------------|------|--------------------|-----------------|---------------------------|---------------|----------|------------------------|---------|-------------------------------------|---------------------------------|
| Basic set   | Plus set  | Full set    | Graduation            | Range               | Dial<br>reading   | Measuring<br>range | 10 scale<br>divisions | Hysteresis | Repeatability | Mass | Measuring<br>force | H High accuracy | 🗹 With revolution counter | T Long stylus | Standard | 🗷 Double scale spacing | Compact | Carbide contact point (Anti-magnet) | Ruby contact point (non-magnet) |
| 513-409-10E | -         | 513-409-10T | 0.002mm<br>/0.0001 in | 0.2mm<br>/0.0076 in | 0-10-0<br>/0-38-0 | 4µm                | 2µm                   | 3µm        | 1µm           | 45g  | 0.3N or less       |                 |                           |               |          |                        |         | 1                                   | 1                               |

#### Inch/Metric

|             | Order No. |             |                      |                   |                   | Inc                | dication accura | су            |      |                    |               | ıter                    |               |          |                      |      | ±             |                                 |
|-------------|-----------|-------------|----------------------|-------------------|-------------------|--------------------|-----------------|---------------|------|--------------------|---------------|-------------------------|---------------|----------|----------------------|------|---------------|---------------------------------|
| Basic set   | Plus set  | Full set    | Graduation           | Range             | Dial<br>reading   | Measuring<br>range | Hysteresis      | Repeatability | Mass | Measuring<br>force | High accuracy | With revolution counter | T Long stylus | Standard | Double scale spacing | pact | (Anti-magnet) | Ruby contact point (non-magnet) |
| 513-406-10E | -         | 513-406-10T | 0.0005 in<br>/0.01mm | 0.03 in<br>/0.7mm | 0-15-0<br>/0-35-0 | ±0.0005 in         | 0.0002 in       | 0.0002 in     | 45g  | 0.3N or less       |               |                         |               |          |                      |      | 1             | 1                               |

<sup>\*</sup> Stem with ø6 dovetail groove is not included in the mass.

\* Be sure to perform calibration with reference gage, etc. after changing the contact point. The inside parts may be damaged when the contact point is changed due to the breakage. In the case the of the significant deterioration during the operation, repair is required.





**Parallel** (The scale can be read from the front, with the contact point pivoting in a plane parallel to that of the dial face.)



#### **SPECIFICATIONS**

|     | _   |    |   |   |
|-----|-----|----|---|---|
| - 1 | V/P | ٦. | W | • |
|     |     |    |   |   |

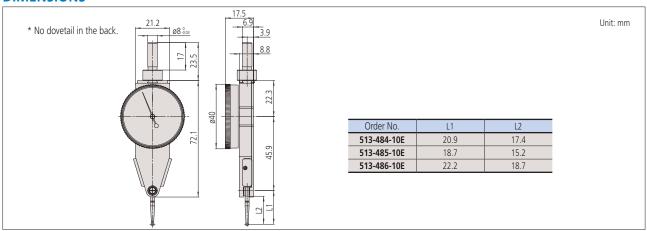
|             | Order No.   |             |            |       |                 |                    | Indicatio             | n accuracy |               |      |                    | >               | counter         |               |          | spacing      |     | boint               | point et)                     |
|-------------|-------------|-------------|------------|-------|-----------------|--------------------|-----------------------|------------|---------------|------|--------------------|-----------------|-----------------|---------------|----------|--------------|-----|---------------------|-------------------------------|
| Basic set   | Plus set    | Full set    | Graduation | Range | Dial<br>reading | Measuring<br>range | 10 scale<br>divisions | Hysteresis | Repeatability | Mass | Measuring<br>force | H High accuracy | With revolution | T Long stylus | Standard | Double scale | act | de contac<br>i-magr | Ruby contact p<br>(non-magnet |
| 513-484-10E | 513-484-10A | 513-484-10T | 0.01mm     | 0.8mm | 0-40-0          | 9µm                | 5µm                   | 4µm        | 3µm           |      |                    |                 |                 |               |          |              |     | 1                   |                               |
| 513-485-10E | -           | -           | 0.002mm    | 0.2mm | 0-100-0         | 4µm                | 2µm                   | 3µm        | 1µm           | 53g  | 0.3N or less       |                 |                 |               |          |              |     | 1                   |                               |
| 513-486-10E | _           | -           | 0.01mm     | 0.5mm | 0-25-0          | 6µm                | 5µm                   | 4µm        | 3µm           |      |                    |                 |                 |               |          | 1            |     | 1                   |                               |

#### Inch

| IIICII    | Order No.   |             |            |         |                 | Inc                | dication accura | CV            |      |                    |               | ter                     |               |          | ing               |           | Ħ                     | Ħ                               |
|-----------|-------------|-------------|------------|---------|-----------------|--------------------|-----------------|---------------|------|--------------------|---------------|-------------------------|---------------|----------|-------------------|-----------|-----------------------|---------------------------------|
| Basic set | Plus set    | Full set    | Graduation | Range   | Dial<br>reading | Measuring<br>range | Hysteresis      | Repeatability | Mass | Measuring<br>force | High accuracy | Vith revolution counter | T Long stylus | Standard | Double scale spac | 🗘 Compact | de contact<br>i-magne | Ruby contact point (non-magnet) |
| -         | 513-482-10A | 513-482-10T | 0.0005 in  | 0.03 in | 0-15-0          | ±0.0005 in         | 0.0002 in       | 0.0002 in     | 53g  | 0.3N or less       |               |                         |               |          |                   |           | 1                     |                                 |

- \* Stem with ø6 dovetail groove is not included in the mass.
- \* Be sure to perform calibration with reference gage, etc. after changing the contact point. The inside parts may be damaged when the contact point is changed due to the breakage. In the case the of the significant deterioration during the operation, repair is required.

#### **DIMENSIONS**





**Vertical** (Best suited for centering holes under the spindle of a machine tool.)







Graduation: 0.01mm Range: 0.8mm

513-454-10E/513-454-10A/ 513-454-10T

Carbide contact point (Anti-magnet)

#### Inch





Graduation: 0.0005 in Range: 0.03 in

513-452-10E/513-452-10T

Carbide contact point (Anti-magnet)





Graduation: 0.002mm Range: 0.2mm

513-455-10E/513-455-10A/ 513-455-10T

Carbide contact point (Anti-magnet)





Graduation: 0.0001 in Range: 0.008 in

513-453-10E/513-453-10T

Carbide contact point (Anti-magnet)





Graduation: 0.01mm Range: 0.5mm

513-456-10E

Double scale spacing
Carbide contact
point (Anti-magnet)



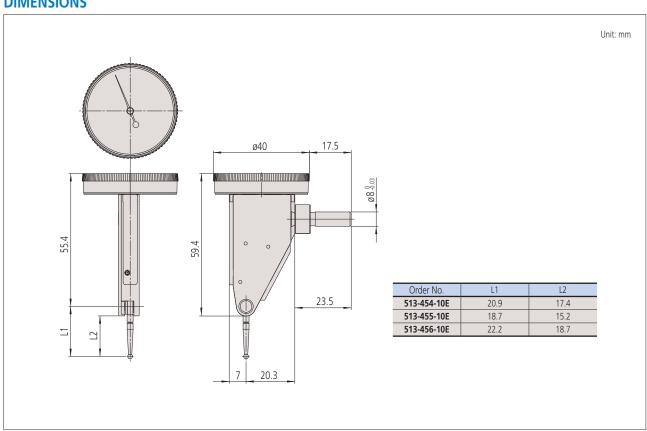


#### **SPECIFICATIONS**

| Metric      |             |             | ı          |       |                 |                    |                       |            |               |      |                    |                 |                         |               |          |                      |                  |                                     |                                 |
|-------------|-------------|-------------|------------|-------|-----------------|--------------------|-----------------------|------------|---------------|------|--------------------|-----------------|-------------------------|---------------|----------|----------------------|------------------|-------------------------------------|---------------------------------|
|             | Order No.   |             |            |       |                 |                    | Indicatio             | n accuracy |               |      |                    |                 | nter                    |               |          | _                    |                  | Ħ                                   |                                 |
| Basic set   | Plus set    | Full set    | Graduation | Range | Dial<br>reading | Measuring<br>range | 10 scale<br>divisions | Hysteresis | Repeatability | Mass | Measuring<br>force | H High accuracy | With revolution counter | T Long stylus | Standard | Double scale spacing | <b>₫</b> Compact | Carbide contact point (Anti-magnet) | Ruby contact point (non-magnet) |
| 513-454-10E | 513-454-10A | 513-454-10T | 0.01mm     | 0.8mm | 0-40-0          | 9µm                | 5µm                   | 4µm        | 3µm           |      |                    |                 |                         |               |          |                      |                  | 1                                   |                                 |
| 513-455-10E | 513-455-10A | 513-455-10T | 0.002mm    | 0.2mm | 0-100-0         | 4µm                | 2µm                   | 3µm        | 1µm           | 46g  | 0.3N or less       |                 |                         |               |          |                      |                  | 1                                   |                                 |
| 513-456-10E | -           | -           | 0.01mm     | 0.5mm | 0-25-0          | 6µm                | 5µm                   | 4µm        | 3µm           |      |                    |                 |                         |               |          | 1                    |                  | 1                                   |                                 |

| Inch        |           |             |            |          |                 |                    |                 |               |      |                    |                 |                         |               |                   |                      |         |                                     |                                 |
|-------------|-----------|-------------|------------|----------|-----------------|--------------------|-----------------|---------------|------|--------------------|-----------------|-------------------------|---------------|-------------------|----------------------|---------|-------------------------------------|---------------------------------|
|             | Order No. |             |            |          |                 | Inc                | lication accura | су            |      |                    |                 | iter                    |               |                   |                      |         | <sub>=</sub>                        |                                 |
| Basic set   | Plus set  | Full set    | Graduation | Range    | Dial<br>reading | Measuring<br>range | Hysteresis      | Repeatability | Mass | Measuring<br>force | H High accuracy | With revolution counter | T Long stylus | <b>S</b> Standard | Double scale spacing | Compact | Carbide contact point (Anti-magnet) | Ruby contact point (non-magnet) |
| 513-452-10E | -         | 513-452-10T | 0.0005 in  | 0.03 in  | 0-15-0          | ±0.0005 in         | 0.0002 in       | 0.0002 in     | 46g  | 0.3N or less       |                 |                         |               |                   |                      |         | 1                                   |                                 |
| 513-453-10E | -         | 513-453-10T | 0.0001 in  | 0.008 in | 0-4-0           | ±0.0001 in         | 0.0001 in       | 0.00004 in    | 40y  | 0.314 01 1635      |                 |                         |               |                   |                      |         | 1                                   |                                 |

#### **DIMENSIONS**



<sup>\*</sup> Stem with ø6 dovetail groove is not included in the mass.

\* Be sure to perform calibration with reference gage, etc. after changing the contact point. The inside parts may be damaged when the contact point is changed due to the breakage. In the case the of the significant deterioration during the operation, repair is required.



#### Horizontal (20° Tilted Face) (Dial face inclined 20°, compared with the vertical type.)





Graduation: 0.01mm Range: 1.6mm

513-444-10E/513-444-10A/ 513-444-10T

- With revolution counter
- Carbide contact point (Anti-magnet)





Graduation: 0.02mm Range: 0.4mm

513-445-10E/513-445-10A/ 513-445-10T

- With revolution counter
- Carbide contact point (Anti-magnet)





Graduation: 0.0005 in Range: 0.06 in

- 513-442-10A/513-442-10T
- With revolution counter
- Carbide contact point (Anti-magnet)





Graduation: 0.0005 in Range: 0.06 in

#### 513-442-16A/513-442-16T

- With revolution counter
- Carbide contact point (Anti-magnet)







- With revolution counter
- Long stylus
- Carbide contact point (Anti-magnet)





Graduation: 0.0005 in Range: 0.06 in

#### 513-446-16A/513-446-16T

- With revolution counter
- Long stylus
- Carbide contact point (Anti-magnet)





513-443-10A/513-443-10T

- With revolution counter
- Carbide contact point (Anti-magnet)





Graduation: 0.0001 in Range: 0.016 in

#### 513-443-16A/513-443-16T

- With revolution counter
- Carbide contact point (Anti-magnet)



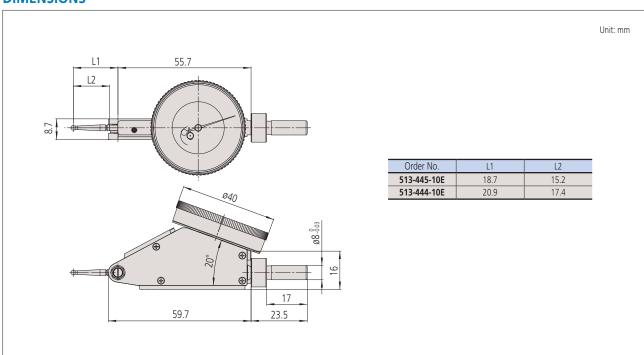


#### **SPECIFICATIONS**

| Metric      |             |             |            |       |                 |                    |                       |            |               |      |                    |                 |                         |                 |          |                      |         |           |                                 |
|-------------|-------------|-------------|------------|-------|-----------------|--------------------|-----------------------|------------|---------------|------|--------------------|-----------------|-------------------------|-----------------|----------|----------------------|---------|-----------|---------------------------------|
|             | Order No.   |             |            |       |                 |                    | Indicatio             | n accuracy |               |      |                    |                 | nter                    |                 |          |                      | -       | <u> </u>  |                                 |
| Basic set   | Plus set    | Full set    | Graduation | Range | Dial<br>reading | Measuring<br>range | 10 scale<br>divisions | Hysteresis | Repeatability | Mass | Measuring<br>force | H High accuracy | With revolution counter | [7] Long stylus | Standard | Double scale spacing | Compact | ide conta | Ruby contact point (non-magnet) |
| 513-444-10E | 513-444-10A | 513-444-10T | 0.01mm     | 1.6mm | 0-40-0          | 16µm               | 5µm                   | 5µm        | 3µm           | 48g  | 0.3N or less       |                 | 1                       |                 |          |                      |         | 1         |                                 |
| 513-445-10E | 513-445-10A | 513-445-10T | 0.002mm    | 0.4mm | 0-100-0         | 6µm                | 2µm                   | 4µm        | 1µm           | 469  | 0.514 01 1688      |                 | 1                       |                 |          |                      |         | /         |                                 |

| Inch      |             |             |            |          |                 |                    |                 |               |      |                    |               |                         |               |          |                      |         |                                     |                                 |
|-----------|-------------|-------------|------------|----------|-----------------|--------------------|-----------------|---------------|------|--------------------|---------------|-------------------------|---------------|----------|----------------------|---------|-------------------------------------|---------------------------------|
|           | Order No.   |             |            |          |                 | Inc                | dication accura | су            |      |                    |               | ıter                    |               |          |                      |         | ±                                   |                                 |
| Basic set | Plus set    | Full set    | Graduation | Range    | Dial<br>reading | Measuring<br>range | Hysteresis      | Repeatability | Mass | Measuring<br>force | High accuracy | With revolution counter | 🗐 Long stylus | Standard | Double scale spacing | Compact | Carbide contact point (Anti-magnet) | Ruby contact point (non-magnet) |
| -         | 513-442-10A | 513-442-10T |            |          |                 |                    |                 |               |      | 0.3N or less       |               | 1                       |               |          |                      |         | 1                                   |                                 |
| -         | 513-442-16A | 513-442-16T | 0.0005 in  | 0.06 in  | 0-15-0          | ±0.0005 in         | 0.0002 in       | 0.0002 in     |      | 0.310 01 1655      |               | 1                       |               |          |                      |         | 1                                   |                                 |
| -         | 513-446-10A | 513-446-10T | 0.0003 111 | 0.00 111 | 0-13-0          | ±0.0003 III        | 0.0002 111      | 0.0002 111    | 48g  | 0.2N or less       |               | 1                       | /             |          |                      |         | 1                                   |                                 |
| -         | 513-446-16A | 513-446-16T |            |          |                 |                    |                 |               | 40y  | 0.214 01 1655      |               | /                       | /             |          |                      |         | 1                                   |                                 |
| -         | 513-443-10A | 513-443-10T | 0.0001 in  | 0.016 in | 0-4-0           | ±0.0002 in         | 0.0001 in       | 0.00004 in    |      | 0.3N or less       |               | 1                       |               |          |                      |         | 1                                   |                                 |
| -         | 513-443-16A | 513-443-16T | 0.0001111  | 0.010111 | 0-4-0           | ±0.0002 III        | 0.0001111       | 0.00004 111   |      | 0.311 01 1855      |               | 1                       |               |          |                      |         | 1                                   |                                 |

#### **DIMENSIONS**



Refer to MEASURING INSTRUMENTS CATALOG No. US-1004 for the accessories such as styli, stems with dovetail, holding bars, etc.

<sup>\*</sup> Stem with ø6 dovetail groove is not included in the mass.
\* Be sure to perform calibration with reference gage, etc. after changing the contact point. The inside parts may be damaged when the contact point is changed due to the breakage. In the case the of the significant deterioration during the operation, repair is required.



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