

# Mitutoyo



Back with Lug  
(A type)



Flat Back  
(AB Type)

## Dial Indicator

| Order No. | Range   | Graduation             | Accuracy |
|-----------|---------|------------------------|----------|
| 2046A     | 0~10mm  | 0.01mm                 | ±13 μm   |
| 2044A     | 0~5mm   | 0.01mm                 | ±12 μm   |
| 2050A     | 0~20mm  | 0.01mm                 | ±20 μm   |
| 2052A     | 0~30mm  | 0.01mm                 | ±25 μm   |
| 3058A-19  | 0~50mm  | 0.01mm                 | ±30 μm   |
| 3062A-19  | 0~100mm | 0.01mm                 | ±50 μm   |
| 2109A-10  | 0~1mm   | 0.001mm<br>(0.2MM/REV) | ±5 μm    |
| 2414A     | 0~0.5"  | 0.001"                 | ±0.001"  |
| 2416A     | 0~1.0"  | 0.001"                 | ±0.002"  |

A Type (Back with Lug)

AB Type: Flat Back

## Feature icons

| Icon | Feature description  |
|------|--|
|      | Continuous scale   |
|      | Balanced scale   |
|      | Reverse reading type, Suitable for depth and step measurement. |
|      | One revolution type for easy and error-free reading            |
|      | Double scale spacing type, easy-on-the-eyes                    |
|      | Shockproof   |
|      | Waterproof (IP63)  |
|      | Waterproof (IP64)  |
|      | With damper at top rest point                                  |
|      | With damper at lowest rest point                               |
|      | Jeweled bearing  |
|      | Peak retaining   |
|      | Dustproof  |
|      | With coaxial revolution counter                                |
|      | Back Plunger   |
|      | Adjustable hand  |

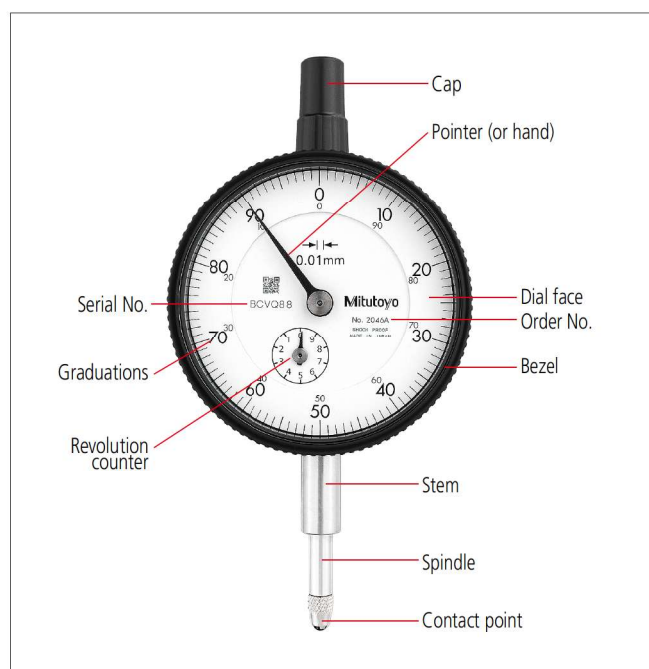
Note: Mitutoyo produces ASME-compatible products.  
Contact us for details.

## Dial Indicators

Mitutoyo's dial indicators have long been used by many of our customers. In full recognition of their needs, we have devoted ourselves to the research and development necessary to produce high-quality and high-accuracy dial indicators. Due to the recent re-acknowledgement of the importance of measurement technologies, the demands on dial indicators are many and varied: installation in measuring jigs, mounting in countless types of precision equipment, etc. We offer numerous models with various types of dial faces, measuring ranges, graduation styles and environmental resistance ratings. The stems, which ensure the fixture reliability, and the spindles, which are the basis of accuracy, have excellent resistance against harsh use thanks to the hardened stainless steel construction. 0.01 mm resolution dial indicators have a main gear made of stainless steel with high resistance to wear and deformation. 0.001 mm graduation dial indicators employ a sector gear made of a special alloy in order to further increase the resistance to wear. Many models employ an O-ring to ensure airtightness between the outer frame and the bezel in order to prevent water or oil penetration from the front.

Mitutoyo's dial indicators are manufactured and inspected according to JIS B 7503:2017. (Inspection orientation: vertical)

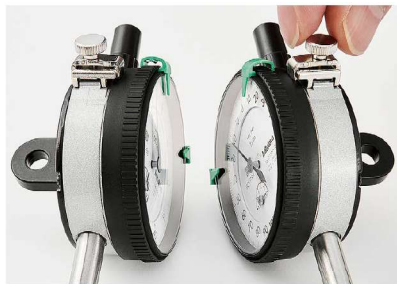
Important factors in choosing a dial indicator: the size (bezel diameter), resolution (graduation) and measuring range. Use the table on the right to help choose a suitable model for your application.



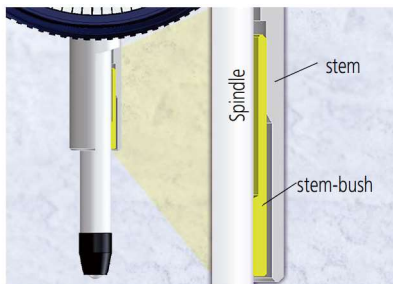
Parts of a dial indicator

## Dial Indicators

### FEATURES: A Series (SERIES 2, 3, 4)



- No through screw-holes on the frame for high oil- and dust-resistance. The bezel clamp (optional) can be attached either to the right or left side.
- Improved Impact- and oil-resistant materials are employed in the bezel. Easier reading is due to the improved shape of the crystal face.



- Revolutionary stem-bush design for trouble-free stem clamping (longer clamping range; maximum tightening torque at the clamping point with M5 screw: 150 N-cm).



- The spindle lifting lever (optional: **21EZA198**) can be attached to either the right or left side providing high operability and smooth movement. This lever can be easily installed and removed.

- Limit hand <optional> (1) can be moved without interfering with the bezel clamp <optional> (2).

- Application of anti-stain and anti-reflective coating improves scale visibility.



<Conventional model>



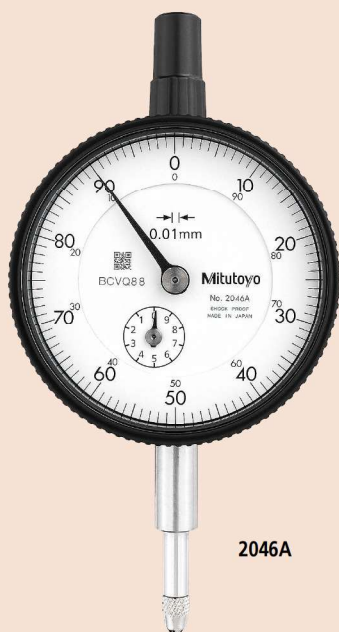
<New model>





## SERIES 2 — Standard Type, 0.01 mm Graduation

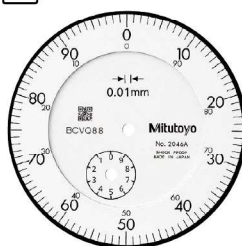
- Standard 0.01 mm graduation dial gages having a bezel with an outside diameter of 57 mm.
- The bezel clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- The grand gear is made of stainless steel with high resistance to wear and deformation.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



2046A



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 10 mm

2046A

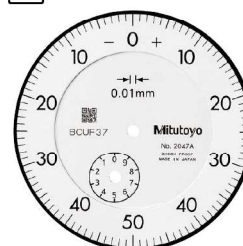
With damper at  
top rest point

2046A-09

Shockproof



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 10 mm

2047A

With damper at  
top rest point



Reverse reading type. Suitable  
for depth and step measurement.



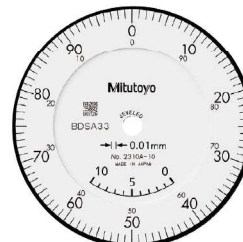
Graduation: 0.01 mm,  
Measuring range: 10 mm

2902A

With damper at  
top rest point



Continuous scale



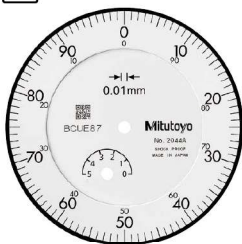
Graduation: 0.01 mm,  
Measuring range: 10 mm

2310A-10

With coaxial revolution counter  
Jeweled bearing



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 5 mm

2044A

With damper at  
top rest point

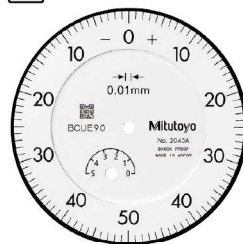
2044A-09

With damper at  
top rest point

Shockproof



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 5 mm

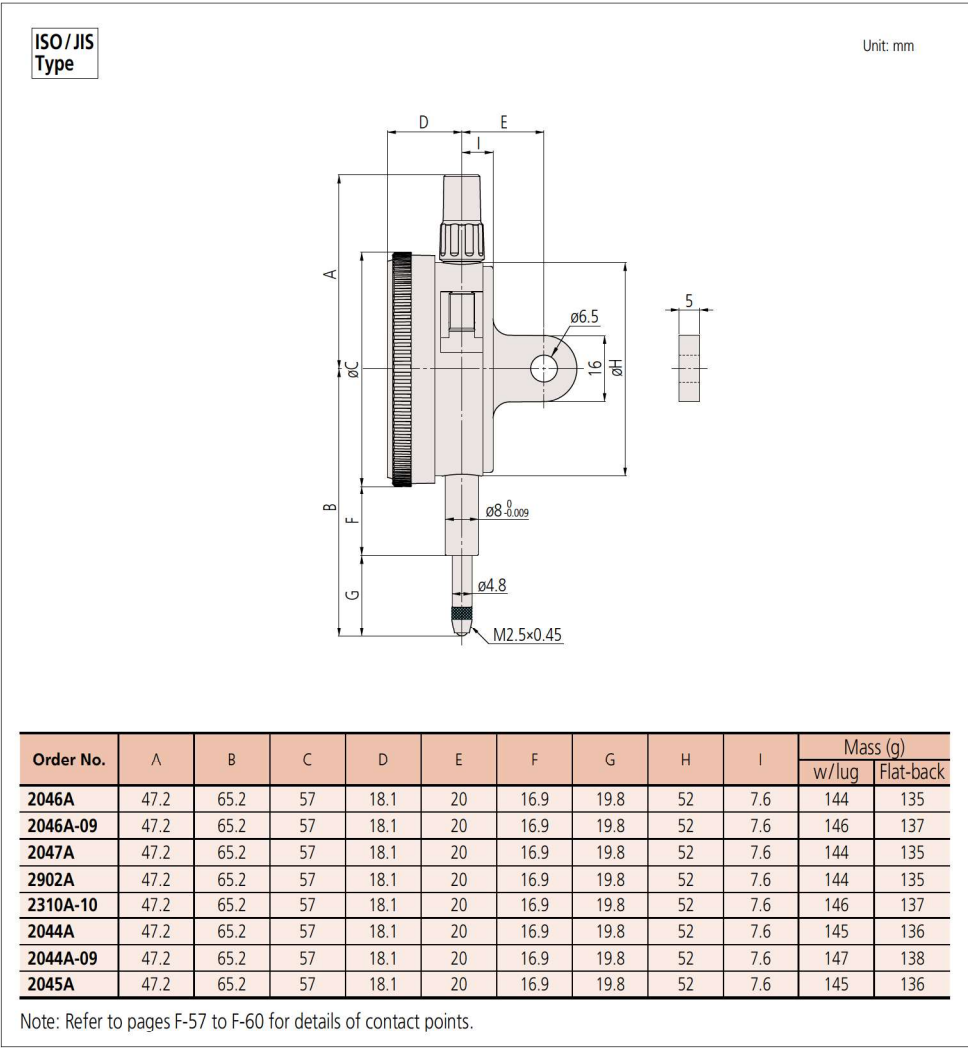
2045A

With damper at  
top rest point



Dial Indicators

DIMENSIONS



Optional Accessories

- Limit hand (2 pcs.): 21AZB195



- Bezel clamp: 21AZB148



FEATURES

| Metric    |           |     |     |      |    |      |    |      |    |
|-----------|-----------|-----|-----|------|----|------|----|------|----|
| Order No. |           | ISO | JIS | ANSI | BS | ASME | BS | ASME | BS |
| 2046A     | 2046AB    | ✓   |     |      |    |      | ✓  |      |    |
| 2046A-09  | 2046AB-09 | ✓   |     |      | ✓  |      |    |      |    |
| 2047A     | 2047AB    |     | ✓   |      |    |      | ✓  |      |    |
| 2902A     | 2902AB    |     |     | ✓    |    |      | ✓  |      |    |
| 2310A-10  | 2310AB-10 | ✓   |     |      |    |      |    | ✓    | ✓  |
| 2044A     | 2044AB    | ✓   |     |      |    |      | ✓  |      |    |
| 2044A-09  | 2044AB-09 | ✓   |     |      | ✓  |      |    |      |    |
| 2045A     | 2045AB    |     | ✓   |      |    |      | ✓  |      |    |

SPECIFICATIONS

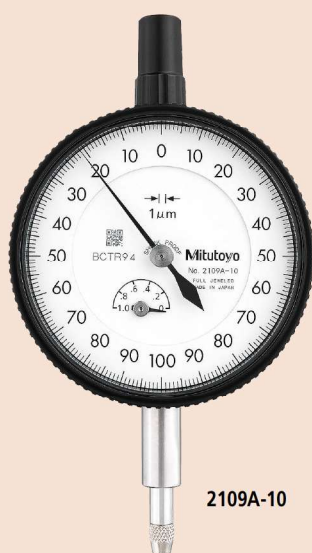
| Metric    |           |                    |                              |                                      |         |       |                 |            |                    |        |                 | ISO/JIS type           |  |
|-----------|-----------|--------------------|------------------------------|--------------------------------------|---------|-------|-----------------|------------|--------------------|--------|-----------------|------------------------|--|
| Order No. |           | Graduation<br>(mm) | Range<br>(range/rev)<br>(mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                    |        | Dial<br>reading | Measuring<br>force (N) |  |
| w/lug     | Flat-back |                    |                              | Indication error                     |         |       |                 | Hysteresis | Repeat-<br>ability |        |                 |                        |  |
|           |           |                    |                              | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                    |        |                 |                        |  |
| 2046A     | 2046AB    | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 13              | 3          | 3                  | ±0-100 | 1.4 or less     |                        |  |
| 2046A-09  | 2046AB-09 | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 15              | 3          | 3                  | ±0-100 | 1.4 or less     |                        |  |
| 2047A     | 2047AB    | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 13              | 3          | 3                  | 0-50-0 | 1.4 or less     |                        |  |
| 2902A     | 2902AB    | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 13              | 3          | 3                  | 100-0  | 1.4 or less     |                        |  |
| 2310A-10  | 2310AB-10 | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 15              | 3          | 3                  | ±0-100 | 1.4 or less     |                        |  |
| 2044A     | 2044AB    | 0.01               | 5 (1)                        | 5                                    | 9       | 10    | 12              | 3          | 3                  | ±0-100 | 1.4 or less     |                        |  |
| 2044A-09  | 2044AB-09 | 0.01               | 5 (1)                        | 5                                    | 9       | 10    | 12              | 3          | 3                  | ±0-100 | 1.4 or less     |                        |  |
| 2045A     | 2045AB    | 0.01               | 5 (1)                        | 5                                    | 9       | 10    | 12              | 3          | 3                  | 0-50-0 | 1.4 or less     |                        |  |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.



## SERIES 2 — Standard Type, 0.001 mm & 0.005 mm Graduation

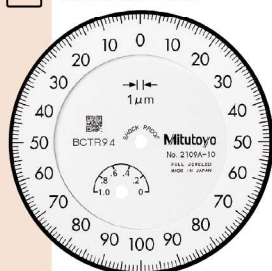
- Standard 0.001 mm and 0.005 mm graduation dial indicators having a bezel with an outside diameter of 57 mm.
- The bezel clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- A special alloy is used for the sector gears to provide improved wear resistance.
- The indicator uses jeweled bearings, providing excellent indication sensitivity and durability.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



2109A-10

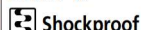


Balanced scale



Graduation: 0.001 mm,  
Measuring range: 1 mm

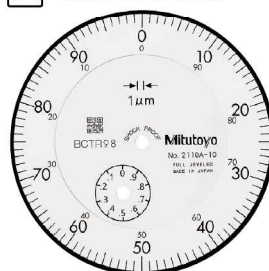
2109A-10



Jeweled bearing

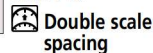


Continuous scale



Graduation: 0.001 mm,  
Measuring range: 1 mm

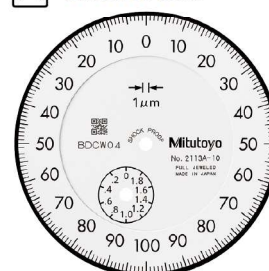
2110A-10



Shockproof  
Jeweled bearing

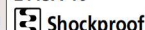


Balanced scale



Graduation: 0.001 mm,  
Measuring range: 2 mm

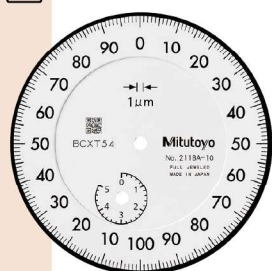
2113A-10



Jeweled bearing



Continuous scale

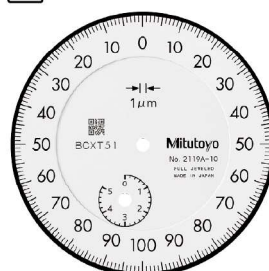


Graduation: 0.001 mm,  
Measuring range: 5 mm

2118A-10



Balanced scale



Graduation: 0.001 mm,  
Measuring range: 5 mm

2119A-10



Continuous scale



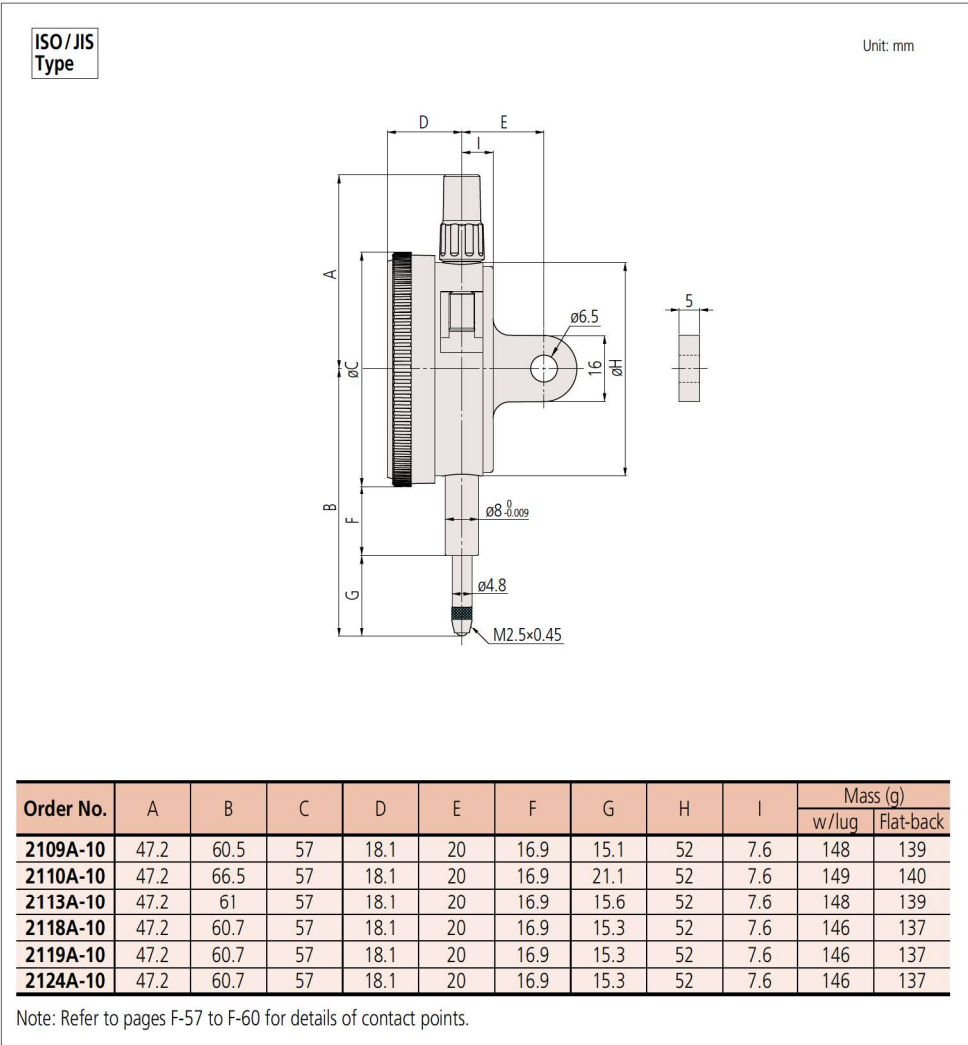
Graduation: 0.005 mm,  
Measuring range: 5 mm

2124A-10



Dial Indicators

DIMENSIONS



Optional Accessories

- Limit hand (2 pcs.): 21AZB195



- Bezel clamp: 21AZB148



FEATURES

| Metric    |           |   |   |   |  |   |   |
|-----------|-----------|---|---|---|--|---|---|
| Order No. |           |   |   |   |  |   |   |
| w/lug     | Flat-back |   |   |   |  |   |   |
| 2109A-10  | 2109AB-10 |   | ✓ | ✓ |  | ✓ |   |
| 2110A-10  | 2110AB-10 | ✓ |   | ✓ |  | ✓ | ✓ |
| 2113A-10  | 2113AB-10 |   | ✓ | ✓ |  | ✓ |   |
| 2118A-10  | 2118AB-10 | ✓ |   |   |  | ✓ |   |
| 2119A-10  | 2119AB-10 |   | ✓ |   |  | ✓ |   |
| 2124A-10  | 2124AB-10 | ✓ |   |   |  | ✓ |   |

SPECIFICATIONS

| Metric    |           |                 |                        |                                      |         |       |                 |            |                |              |                     | ISO/JIS type |  |
|-----------|-----------|-----------------|------------------------|--------------------------------------|---------|-------|-----------------|------------|----------------|--------------|---------------------|--------------|--|
| Order No. |           | Graduation (mm) | Range (range/rev) (mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                | Dial reading | Measuring force (N) |              |  |
| w/lug     | Flat-back |                 |                        | Indication error                     |         |       |                 | Hysteresis | Repeat-ability |              |                     |              |  |
|           |           |                 |                        | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                |              |                     |              |  |
| 2109A-10  | 2109AB-10 | 0.001           | 1 (0.2)                | 2                                    | 3       | 4     | 5               | 2          | 0.5            | 0-100-0      | 1.5 or less         |              |  |
| 2110A-10  | 2110AB-10 | 0.001           | 1 (0.1)                | 2                                    | 3       | 4     | 5               | 2          | 0.5            | ±0-100       | 1.8 or less         |              |  |
| 2113A-10  | 2113AB-10 | 0.001           | 2 (0.2)                | 2                                    | 4       | 5     | 7               | 2          | 0.5            | 0-100-0      | 1.5 or less         |              |  |
| 2118A-10  | 2118AB-10 | 0.001           | 5 (0.2)                | 3.5                                  | 5       | 6     | 10              | 3          | 1              | 0-100-100    | 1.5 or less         |              |  |
| 2119A-10  | 2119AB-10 | 0.001           | 5 (0.2)                | 3.5                                  | 5       | 6     | 10              | 3          | 1              | 0-100-0      | 1.5 or less         |              |  |
| 2124A-10  | 2124AB-10 | 0.005           | 5 (0.5)                | 5                                    | 8       | 9     | 12              | 3          | 3              | ±0-50        | 1.5 or less         |              |  |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.



## SERIES 2 — Water-proof Type, 0.01 mm & 0.001 mm Graduation

- Water-proof type dial indicators having a bezel with an outside diameter of 57 mm.
- O-rings and rubber bellows are used to prevent water and oil penetration.
- The bezel clamp can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



2046A-60



2109A-70



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 10 mm

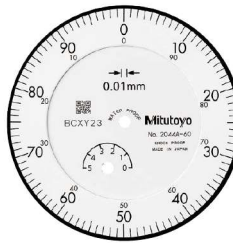
2046A-60

Waterproof

With damper at  
top rest point



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 5 mm

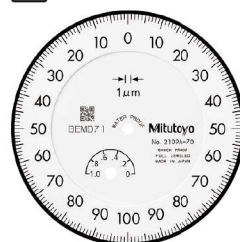
2044A-60

Waterproof

With damper at  
top rest point



Balanced scale



Graduation: 0.001 mm,  
Measuring range: 1 mm

2109A-70

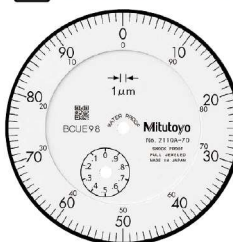
Waterproof

Shockproof

Jeweled bearing



Continuous scale



Graduation: 0.001 mm,  
Measuring range: 1 mm

2110A-70

Waterproof

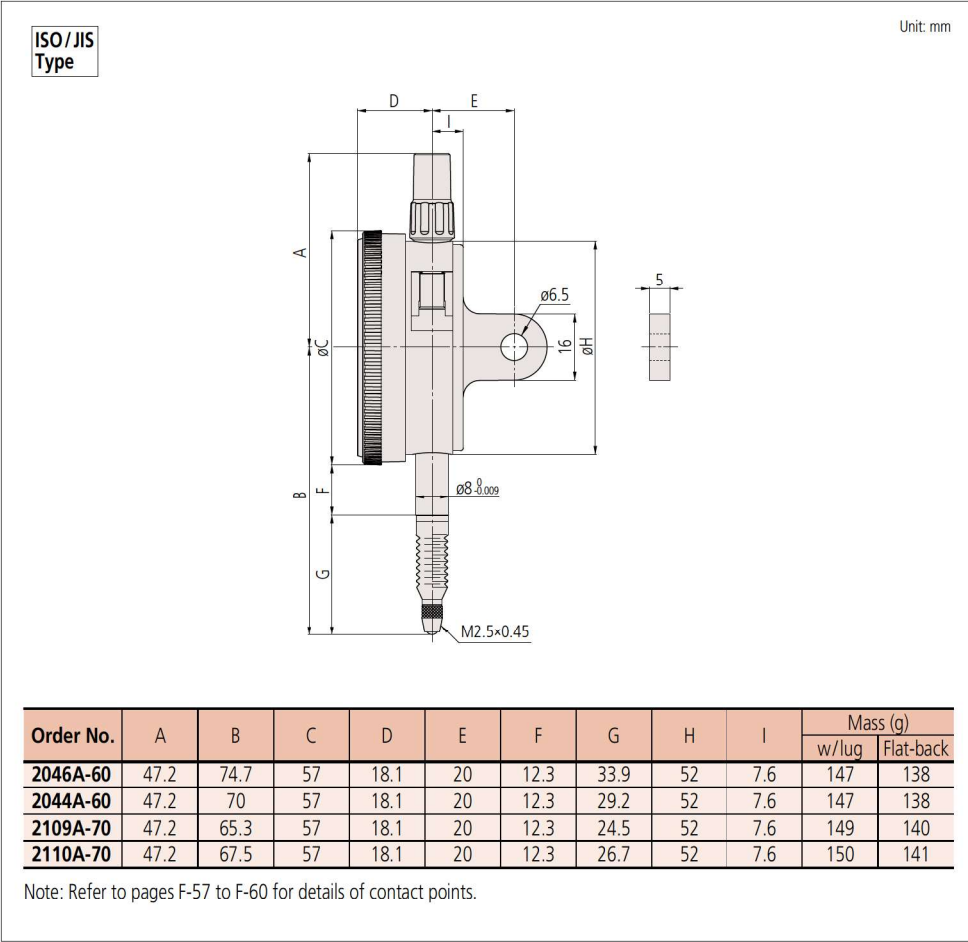
Double scale spacing

Shockproof

Jeweled bearing

Dial Indicators

DIMENSIONS



Optional Accessories

- Limit hand (2 pcs.): 21AZB195



- Bezel clamp: 21AZB148 (for metric type)  
21RZA065 (for inch type)



21AZB148

FEATURES

| Metric    |           |   |   |   |   |   |   |   |
|-----------|-----------|---|---|---|---|---|---|---|
| Order No. |           |   |   |   |   |   |   |   |
| w/lug     | Flat-back |   |   |   |   |   |   |   |
| 2046A-60  | 2046AB-60 | ✓ |   |   | ✓ | ✓ |   |   |
| 2044A-60  | 2044AB-60 | ✓ |   |   | ✓ | ✓ |   |   |
| 2109A-70  | 2109AB-70 |   | ✓ | ✓ | ✓ |   | ✓ |   |
| 2110A-70  | 2110AB-70 | ✓ |   | ✓ | ✓ |   | ✓ | ✓ |

SPECIFICATIONS

| Metric    |           |                 |                        |                                      |         |       |                 |            |                |              |                     | ISO/JIS type |  |
|-----------|-----------|-----------------|------------------------|--------------------------------------|---------|-------|-----------------|------------|----------------|--------------|---------------------|--------------|--|
| Order No. |           | Graduation (mm) | Range (range/rev) (mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                | Dial reading | Measuring force (N) |              |  |
| w/lug     | Flat-back |                 |                        | Indication error                     |         |       |                 | Hysteresis | Repeat-ability |              |                     |              |  |
|           |           |                 |                        | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                |              |                     |              |  |
| 2046A-60  | 2046AB-60 | 0.01            | 10 (1)                 | 5                                    | 9       | 10    | 13              | 3          | 3              | ±0-100       | 2.5 or less         |              |  |
| 2044A-60  | 2044AB-60 | 0.01            | 5 (1)                  | 5                                    | 9       | 10    | 12              | 3          | 3              | ±0-100       | 2.5 or less         |              |  |
| 2109A-70  | 2109AB-70 | 0.001           | 1 (0.2)                | 2                                    | 3       | 4     | 5               | 2          | 0.5            | 0-100-0      | 2.0 or less         |              |  |
| 2110A-70  | 2110AB-70 | 0.001           | 1 (0.1)                | 2                                    | 3       | 4     | 5               | 2          | 0.5            | ±0-100       | 2.0 or less         |              |  |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.



## SERIES 2 — Standard Type, Inch Reading

### SPECIFICATIONS

| Inch      |           | ANSI/AGD type   |                        |  |         |                     |              |                     |
|-----------|-----------|-----------------|------------------------|--|---------|---------------------|--------------|---------------------|
| Order No. |           | Graduation (in) | Range (range/rev) (in) | Accuracy (in)  |         | Repeat-ability (in) | Dial reading | Measuring force (N) |
| w/lug     | Flat-back |                 |                        | First 1 Rev/2.5 Rev/10 Rev   | Retrace |                     |              |                     |
| 2414A     | 2414AB    | 0.001           | 0.5 (0.1)              | ±0.001/±0.001/±0.001   | 0.0002  | ±0.0002             | ±0-100       | 1.8 or less         |
| 2415A     | 2415AB    | 0.001           | 0.5 (0.1)              | ±0.001/±0.001/±0.001   | 0.0002  | ±0.0002             | 0-50-0       | 1.8 or less         |
| 2914A     | 2914AB    | 0.001           | 0.5 (0.1)              | ±0.001/±0.001/±0.001   | 0.0002  | ±0.0002             | 100-0        | 1.8 or less         |
| 2506A     | 2506AB    | 0.0005          | 0.125 (0.05)           | ±0.0005/±0.0005/—  | 0.00016 | ±0.0001             | ±0-50        | 1.8 or less         |
| 2507A     | 2507AB    | 0.0005          | 0.125 (0.05)           | ±0.0005/±0.0005/—  | 0.00016 | ±0.0001             | 0-25-0       | 1.8 or less         |
| 2514A     | 2514AB    | 0.0005          | 0.5 (0.05)             | ±0.0005/±0.0005/±0.0015  | 0.00016 | ±0.0001             | ±0-50        | 1.8 or less         |
| 2922A     | 2922AB    | 0.0005          | 0.125 (0.05)           | ±0.0005/±0.0005/—  | 0.00016 | ±0.0001             | 0-25-0       | 1.8 or less         |
| 2356A-10  | 2356AB-10 | 0.0001          | 0.25 (0.01)            | ±0.0002/±0.0002/±0.0003/±0.0004 (First 20rev)/±0.0005 (Over 20rev) | 0.0001  | ±0.00003            | 0-10         | 2.0 or less         |
| 2358A-10  | 2358AB-10 | 0.0001          | 0.5 (0.01)             | ±0.0002/±0.0002/±0.0003/±0.0004 (First 20rev)/±0.0008 (Over 20rev) | 0.00015 | ±0.00003            | 0-10         | 2.0 or less         |
| 2802A-10  | 2802AB-10 | 0.0001          | 0.025 (0.01)           | ±0.0001/±0.0001/—  | 0.0001  | ±0.00003            | 0-10         | 2.0 or less         |
| 2803A-10  | 2803AB-10 | 0.0001          | 0.025 (0.01)           | ±0.0001/±0.0001/—  | 0.0001  | ±0.00003            | 0-5-0        | 2.0 or less         |
| 2804A-10  | 2804AB-10 | 0.0001          | 0.05 (0.01)            | ±0.0001/±0.0001/±0.0002  | 0.0001  | ±0.00003            | 0-10         | 2.0 or less         |
| 2805A-10  | 2805AB-10 | 0.0001          | 0.05 (0.01)            | ±0.0001/±0.0001/±0.0002  | 0.0001  | ±0.00003            | 0-5-0        | 2.0 or less         |
| 2905A-10  | 2905AB-10 | 0.0001          | 0.05 (0.01)            | ±0.0001/±0.0001/±0.0002  | 0.0001  | ±0.00003            | 10-0         | 2.0 or less         |
| 2923A-10  | 2923AB-10 | 0.0001          | 0.05 (0.01)            | ±0.0001/±0.0001/±0.0002  | 0.0001  | ±0.00003            | 0-5-0        | 2.0 or less         |

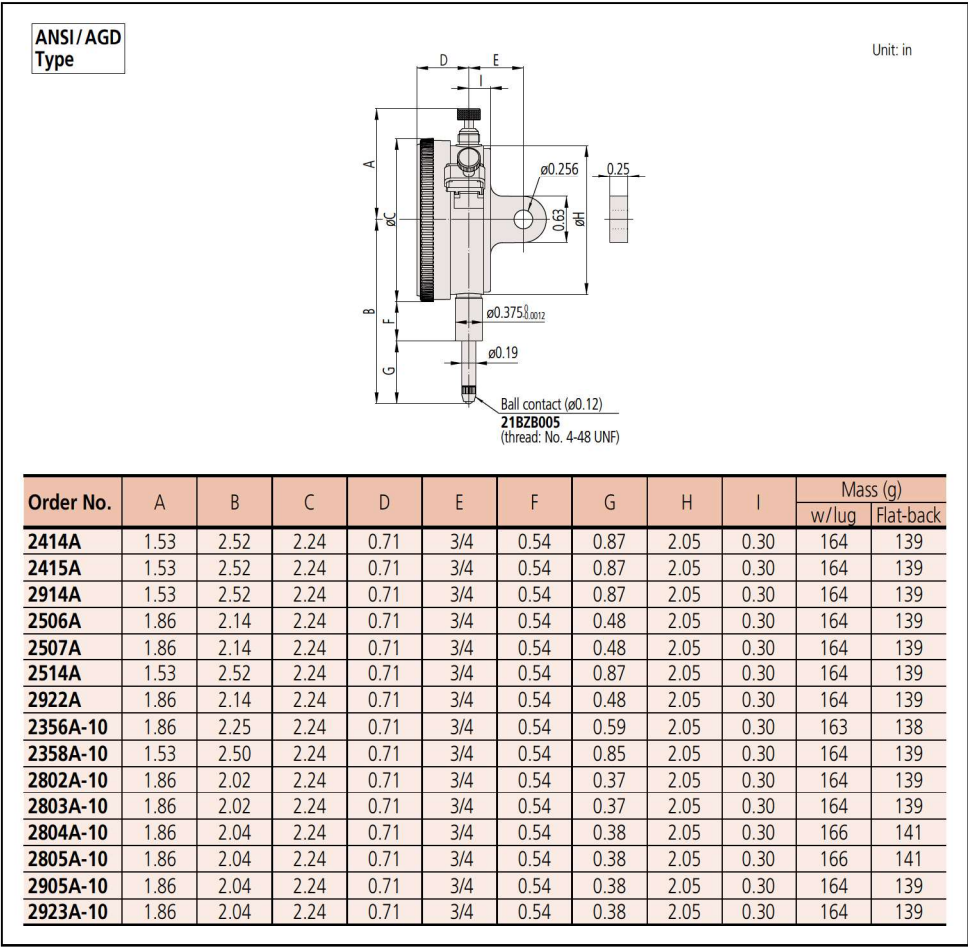
Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

### FEATURES

| Inch      |           |       |           |               |               |               |               |
|-----------|-----------|-------|-----------|---------------|---------------|---------------|---------------|
| Order No. |           | w/lug | Flat-back | ANSI/AGD type | ANSI/AGD type | ANSI/AGD type | ANSI/AGD type |
| w/lug     | Flat-back |       |           |               |               |               |               |
| 2414A     | 2414AB    |       |           | ✓             | ✓             | ✓             | ✓             |
| 2415A     | 2415AB    |       |           |               | ✓             | ✓             | ✓             |
| 2914A     | 2914AB    |       | ✓         |               |               | ✓             | ✓             |
| 2506A     | 2506AB    |       |           | ✓             |               | ✓             | ✓             |
| 2507A     | 2507AB    |       |           |               | ✓             | ✓             | ✓             |
| 2514A     | 2514AB    |       |           | ✓             |               | ✓             | ✓             |
| 2922A     | 2922AB    |       |           |               | ✓             | ✓             | ✓             |
| 2356A-10  | 2356AB-10 |       |           | ✓             | ✓             |               | ✓             |
| 2358A-10  | 2358AB-10 |       |           | ✓             | ✓             |               | ✓             |
| 2802A-10  | 2802AB-10 | ✓     |           | ✓             | ✓             |               |               |
| 2803A-10  | 2803AB-10 | ✓     |           | ✓             |               | ✓             |               |
| 2804A-10  | 2804AB-10 | ✓     |           | ✓             | ✓             |               |               |
| 2805A-10  | 2805AB-10 | ✓     |           | ✓             |               | ✓             |               |
| 2905A-10  | 2905AB-10 | ✓     | ✓         | ✓             |               |               |               |
| 2923A-10  | 2923AB-10 | ✓     |           | ✓             |               | ✓             |               |



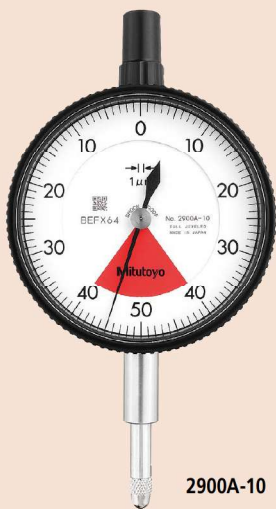
DIMENSIONS



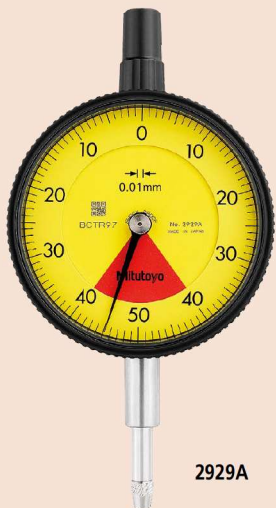


## SERIES 2 — Standard One Revolution Type for Error-free Reading

- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- The bezel clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The dead zone in red indicates "accuracy not guaranteed".

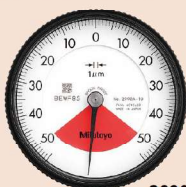


2900A-10



2929A

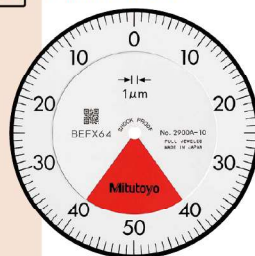
One revolution type Back Plunger dial gages are also available. (Refer to pages F-55 to F-56 for details.)



2990A-10



Balanced scale



Graduation: 0.001 mm,  
Measuring range: 0.08 mm

2900A-10

One revolution

Shockproof

Jeweled bearing

2900A-72

One revolution

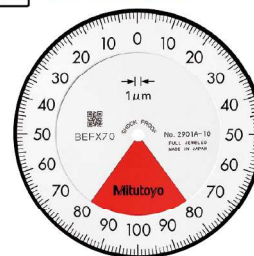
Shockproof

Dustproof

Jeweled bearing



Balanced scale



Graduation: 0.001 mm,  
Measuring range: 0.16 mm

2901A-10

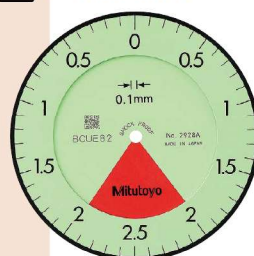
One revolution

Shockproof

Jeweled bearing



Balanced scale



Graduation: 0.1 mm,  
Measuring range: 4 mm

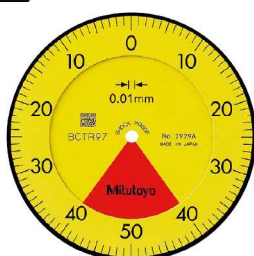
2928A

One revolution

Shockproof



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 0.8 mm

2929A

One revolution

Shockproof

2929A-62

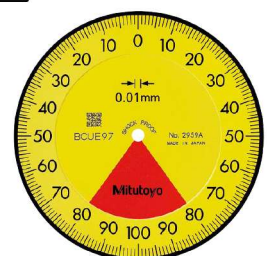
One revolution

Shockproof

Dustproof



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 1.6 mm

2959A

One revolution

Shockproof

Dial Indicators

DIMENSIONS

ISO/JIS Type

Unit: mm

ANSI/AGD Type

Unit: in

| Order No. | A    | B    | C  | D    | E  | F    | G    | H  | I   | Mass (g) |           |
|-----------|------|------|----|------|----|------|------|----|-----|----------|-----------|
|           |      |      |    |      |    |      |      |    |     | w/lug    | Flat-back |
| 2928A     | 47.2 | 65.2 | 57 | 18.1 | 20 | 16.9 | 19.8 | 52 | 7.6 | 145      | 136       |
| 2929A     | 47.2 | 65.2 | 57 | 18.1 | 20 | 16.9 | 19.8 | 52 | 7.6 | 145      | 136       |
| 2929A-62  | 47.2 | 65.2 | 57 | 18.1 | 20 | 16.9 | 19.8 | 52 | 7.6 | 145      | 136       |
| 2959A     | 47.2 | 65.2 | 57 | 18.1 | 20 | 16.9 | 19.8 | 52 | 7.6 | 145      | 136       |
| 2900A-10  | 47.2 | 66   | 57 | 18.1 | 20 | 16.9 | 20.6 | 52 | 7.6 | 149      | 140       |
| 2900A-72  | 47.2 | 66   | 57 | 18.1 | 20 | 16.9 | 20.6 | 52 | 7.6 | 149      | 140       |
| 2901A-10  | 47.2 | 66.1 | 57 | 18.1 | 20 | 16.9 | 20.7 | 52 | 7.6 | 149      | 140       |

Note: Refer to pages F-57 to F-60 for details of contact points.

| Order No. | A    | B    | C    | D    | E   | F    | G    | H    | I    | Mass (g) |           |
|-----------|------|------|------|------|-----|------|------|------|------|----------|-----------|
|           |      |      |      |      |     |      |      |      |      | w/lug    | Flat-back |
| 2909A-62  | 1.86 | 2.04 | 2.24 | 0.71 | 3/4 | 0.54 | 0.39 | 2.05 | 0.30 | 163      | 138       |
| 2910A-10  | 1.86 | 2.02 | 2.24 | 0.71 | 3/4 | 0.54 | 0.36 | 2.05 | 0.30 | 164      | 139       |

FEATURES

| Metric    |           |   |   |   |  |   |   |
|-----------|-----------|---|---|---|--|---|---|
| Order No. |           |   |   |   |  |   |   |
| w/lug     | Flat-back |   |   |   |  |   |   |
| 2928A     | 2928AB    | ✓ | ✓ | ✓ |  |   |   |
| 2929A     | 2929AB    | ✓ | ✓ | ✓ |  |   |   |
| 2929A-62  | 2929AB-62 | ✓ | ✓ | ✓ |  | ✓ |   |
| 2959A     | 2959AB    | ✓ | ✓ | ✓ |  |   |   |
| 2900A-10  | 2900AB-10 | ✓ | ✓ | ✓ |  |   | ✓ |
| 2900A-72  | 2900AB-72 | ✓ | ✓ | ✓ |  | ✓ | ✓ |
| 2901A-10  | 2901AB-10 | ✓ | ✓ | ✓ |  |   | ✓ |

| Inch      |           |   |   |   |  |   |   |
|-----------|-----------|---|---|---|--|---|---|
| Order No. |           |   |   |   |  |   |   |
| w/lug     | Flat-back |   |   |   |  |   |   |
| 2909A-62  | 2909AB-62 | ✓ | ✓ | ✓ |  | ✓ |   |
| 2910A-10  | 2910AB-10 | ✓ | ✓ | ✓ |  |   | ✓ |

SPECIFICATIONS

| Metric    |           | ISO/JIS type    |                        |                                      |         |       |                 |            |                |              |                     |
|-----------|-----------|-----------------|------------------------|--------------------------------------|---------|-------|-----------------|------------|----------------|--------------|---------------------|
| Order No. |           | Graduation (mm) | Range (range/rev) (mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                | Dial reading | Measuring force (N) |
| w/lug     | Flat-back |                 |                        | Indication error                     |         |       |                 | Hysteresis | Repeat-ability |              |                     |
|           |           |                 |                        | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                |              |                     |
| 2928A     | 2928AB    | 0.1             | 4 (5)                  | 20                                   | —       | —     | 40              | 20         | 20             | 2-0-2        | 1.4 or less         |
| 2929A     | 2929AB    | 0.01            | 0.8 (1)                | 5                                    | —       | —     | 8               | 3          | 3              | 40-0-40      | 1.4 or less         |
| 2929A-62  | 2929AB-62 | 0.01            | 0.8 (1)                | 5                                    | —       | —     | 8               | 3          | 3              | 40-0-40      | 2.0 or less         |
| 2959A     | 2959AB    | 0.01            | 1.6 (2)                | 5                                    | —       | —     | 10              | 3          | 3              | 80-0-80      | 1.4 or less         |
| 2900A-10  | 2900AB-10 | 0.001           | 0.08 (0.1)             | 2                                    | —       | —     | 3               | 2          | 0.5            | 40-0-40      | 1.5 or less         |
| 2900A-72  | 2900AB-72 | 0.001           | 0.08 (0.1)             | 2                                    | —       | —     | 3               | 2          | 0.5            | 40-0-40      | 2.0 or less         |
| 2901A-10  | 2901AB-10 | 0.001           | 0.16 (0.2)             | 2                                    | —       | —     | 4               | 2          | 0.5            | 80-0-80      | 1.5 or less         |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

| Inch      |           |                 |                        |                            |         |                     |              | ANSI/AGD type       |  |
|-----------|-----------|-----------------|------------------------|----------------------------|---------|---------------------|--------------|---------------------|--|
| Order No. |           | Graduation (in) | Range (range/rev) (in) | Accuracy (in)              |         | Repeat-ability (in) | Dial reading | Measuring force (N) |  |
| w/lug     | Flat-back |                 |                        | First 1 Rev/2.5 Rev/10 Rev | Retrace |                     |              |                     |  |
| 2909A-62  | 2909AB-62 | 0.0005          | 0.04/0.05              | ±0.0005/—/—                | 0.00016 | ±0.0001             | 20-0-20      | 2.5 or less         |  |
| 2910A-10  | 2910AB-10 | 0.0001          | 0.008/0.01             | ±0.0001/—/—                | 0.0001  | ±0.00003            | 4-0-4        | 1.8 or less         |  |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Optional Accessories

- Limit hand (2 pcs.): 21AZB195



- Bezel clamp: 21AZB148 (for metric type)  
21RZA065 (for inch type)

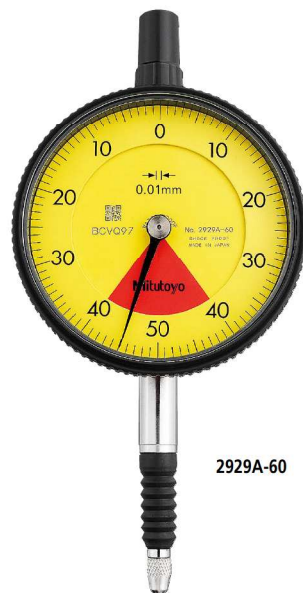


21AZB148



## SERIES 2 — Standard One Revolution Type for Error-free Reading, Water-proof Type

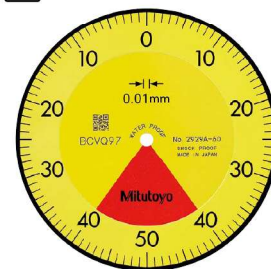
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- The bezel clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The dead zone in red indicates "accuracy not guaranteed".



2929A-60



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 0.8 mm

2929A-60

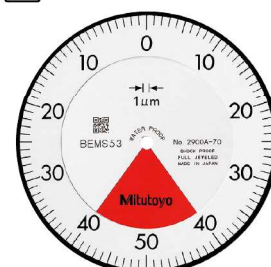
- One revolution
- Shockproof
- Waterproof



2900A-70



Balanced scale



Graduation: 0.001 mm,  
Measuring range: 0.08 mm

2900A-70

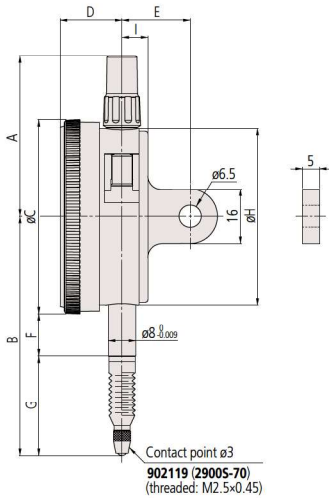
- One revolution
- Shockproof
- Waterproof
- Jeweled bearing

Dial Indicators

DIMENSIONS

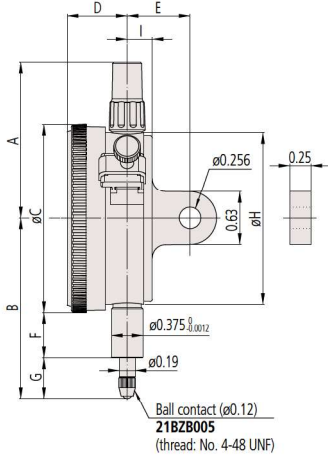
ISO / JIS  
Type

Unit: mm



ANSI / AGD  
Type

Unit: in



| Order No. | A    | B  | C  | D    | E  | F    | G    | H  | I   | Mass (g) |           |
|-----------|------|----|----|------|----|------|------|----|-----|----------|-----------|
|           |      |    |    |      |    |      |      |    |     | w/lug    | Flat-back |
| 2929A-60  | 47.2 | 70 | 57 | 18.1 | 20 | 12.3 | 29.2 | 52 | 7.6 | 146      | 137       |
| 2900A-70  | 47.2 | 67 | 57 | 18.1 | 20 | 12.3 | 26.2 | 52 | 7.6 | 150      | 141       |

Note: Refer to pages F-57 to F-60 for details of contact points.

| Order No. | A    | B    | C    | D    | E   | F    | G    | H    | I    | Mass (g) |           |
|-----------|------|------|------|------|-----|------|------|------|------|----------|-----------|
|           |      |      |      |      |     |      |      |      |      | w/lug    | Flat-back |
| 2910A-72  | 1.86 | 2.02 | 2.24 | 0.71 | 3/4 | 0.54 | 0.36 | 2.05 | 0.30 | 150      | 141       |

Note: Refer to pages F-57 to F-60 for details of contact points.

FEATURES

| Metric    |           |         |         |         |        |        |        |
|-----------|-----------|---------|---------|---------|--------|--------|--------|
| Order No. |           | 10 0.01 | 10 0.02 | 10 0.05 | 10 0.1 | 10 0.2 | 10 0.5 |
| 2929A-60  | 2929AB-60 | ✓       | ✓       | ✓       | ✓      | ✓      | ✓      |
| 2900A-70  | 2900AB-70 | ✓       | ✓       | ✓       | ✓      | ✓      | ✓      |

| Inch      |           |         |         |         |        |        |        |
|-----------|-----------|---------|---------|---------|--------|--------|--------|
| Order No. |           | 10 0.01 | 10 0.02 | 10 0.05 | 10 0.1 | 10 0.2 | 10 0.5 |
| 2910A-72  | 2910AB-72 | ✓       | ✓       | ✓       | ✓      | ✓      | ✓      |

SPECIFICATIONS

| Metric    |           |                    |                              |                                      |         |       |                 |            |                 | ISO/JIS type           |                    |
|-----------|-----------|--------------------|------------------------------|--------------------------------------|---------|-------|-----------------|------------|-----------------|------------------------|--------------------|
| Order No. |           | Graduation<br>(mm) | Range<br>(range/rev)<br>(mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            | Dial<br>reading | Measuring<br>force (N) |                    |
| w/lug     | Flat-back |                    |                              | Indication error                     |         |       |                 | Hysteresis |                 |                        | Repeat-<br>ability |
|           |           |                    |                              | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                 |                        |                    |
| 2929A-60  | 2929AB-60 | 0.01               | 0.8 (1)                      | 5                                    | —       | —     | 8               | 3          | 3               | 40-0-40                | 2.0 or less        |
| 2900A-70  | 2900AB-70 | 0.001              | 0.08 (0.1)                   | 2                                    | —       | —     | 3               | 2          | 0.5             | 40-0-40                | 2.0 or less        |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

| Inch      |           |                 |                        | <input type="checkbox"/> ANSI/AGD type |         |                     |              |                     |  |  |
|-----------|-----------|-----------------|------------------------|--|---------|---------------------|--------------|---------------------|--|--|
| Order No. |           | Graduation (in) | Range (range/rev) (in) | Accuracy (in)                          |         | Repeat-ability (in) | Dial reading | Measuring force (N) |  |  |
| w/lug     | Flat-back |                 |                        | First 1 Rev/2.5 Rev/10 Rev             | Retrace |                     |              |                     |  |  |
| 2910A-72  | 2910AB-72 | 0.0001          | 0.008/0.01             | ±0.0001/—/—                            | 0.0001  | ±0.00003            | 4-0-4        | 2.5 or less         |  |  |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Optional Accessories

- Limit hand (2 pcs.): 21AZB195



- Bezel clamp: 21AZB148 (for metric type)  
21RZA065 (for inch type)

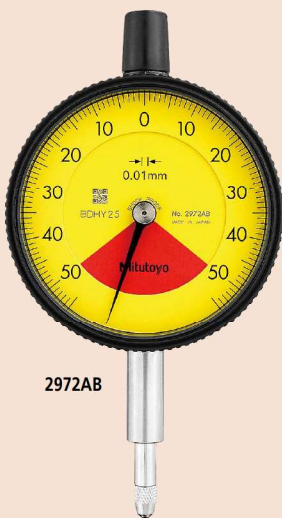


21AZB148



### SERIES 2 — Standard One Revolution Type for Error-free Reading, Lightweight Type

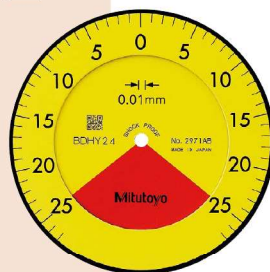
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- Lightweight type (70 g).
- The dead zone in red indicates "accuracy not guaranteed".



2972AB



Balanced scale



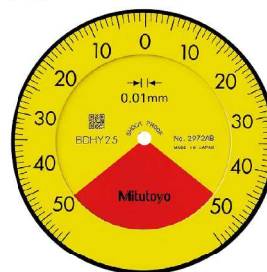
Graduation: 0.01 mm,  
Measuring range: 0.5 mm

2971AB

- One revolution
- Shockproof
- Dustproof



Balanced scale



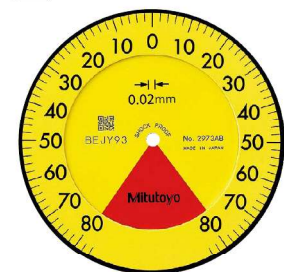
Graduation: 0.01 mm,  
Measuring range: 1 mm

2972AB

- One revolution
- Shockproof
- Dustproof



Balanced scale



Graduation: 0.02 mm,  
Measuring range: 1.6 mm

2973AB

- One revolution
- Shockproof
- Dustproof



Dial Indicators

DIMENSIONS

ISO/JIS Type

Unit: mm

ANSI/AGD Type

Unit: in

Note 1: When installing an optional back (refer to page F-61 for details) 4 retaining screws must also be obtained (546666: Self-tapping screw only for plastic).  
Do not apply a tightening torque of more than 20 N-cm in order to avoid stripping the screw threads.  
Note 2: An optional lifting lever, release or bezel clamp cannot be installed.

| Metric    |      |      |    |      |      |      |    |     |          |
|-----------|------|------|----|------|------|------|----|-----|----------|
| Order No. | A    | B    | C  | D    | F    | G    | H  | I   | Mass (g) |
| 2971AB    | 43.2 | 65.6 | 57 | 16.9 | 20.3 | 16.8 | 55 | 7.6 | 70       |
| 2972AB    | 43.2 | 66   | 57 | 16.9 | 20.3 | 17.2 | 55 | 7.6 |          |
| 2973AB    | 43.2 | 66.3 | 57 | 16.9 | 20.3 | 17.5 | 55 | 7.6 |          |

| Inch      |      |      |      |      |      |      |      |      |          |
|-----------|------|------|------|------|------|------|------|------|----------|
| Order No. | A    | B    | C    | D    | F    | G    | H    | I    | Mass (g) |
| 2976AB    | 1.70 | 2.55 | 2.24 | 0.67 | 0.80 | 0.63 | 2.17 | 0.30 | 70       |
| 2977AB    | 1.70 | 2.56 | 2.24 | 0.67 | 0.80 | 0.64 | 2.17 | 0.30 |          |
| 2978AB    | 1.70 | 2.57 | 2.24 | 0.67 | 0.80 | 0.65 | 2.17 | 0.30 |          |

Note: Refer to pages F-57 to F-60 for details of contact points.

FEATURES

| Metric    |        |           |         |         |         |         |
|-----------|--------|-----------|---------|---------|---------|---------|
| Order No. |        | Flat-back | 10 0 10 | 10 0 10 | 10 0 10 | 10 0 10 |
| —         | 2971AB | ✓         | ✓       | ✓       | ✓       | ✓       |
| —         | 2972AB | ✓         | ✓       | ✓       | ✓       | ✓       |
| —         | 2973AB | ✓         | ✓       | ✓       | ✓       | ✓       |

| Inch      |        |           |         |         |         |         |
|-----------|--------|-----------|---------|---------|---------|---------|
| Order No. |        | Flat-back | 10 0 10 | 10 0 10 | 10 0 10 | 10 0 10 |
| —         | 2976AB | ✓         | ✓       | ✓       | ✓       | ✓       |
| —         | 2977AB | ✓         | ✓       | ✓       | ✓       | ✓       |
| —         | 2978AB | ✓         | ✓       | ✓       | ✓       | ✓       |

SPECIFICATIONS

| Metric    |           |                    |                              |                                      |         |       |                 | ISO/JIS type |                    |                 |                        |
|-----------|-----------|--------------------|------------------------------|--------------------------------------|---------|-------|-----------------|--------------|--------------------|-----------------|------------------------|
| Order No. |           | Graduation<br>(mm) | Range<br>(range/rev)<br>(mm) | Maximum permissible error (MPE) (μm) |         |       |                 |              |                    | Dial<br>reading | Measuring<br>force (N) |
| w/lug     | Flat-back |                    |                              | Indication error                     |         |       |                 | Hysteresis   | Repeat-<br>ability |                 |                        |
|           |           |                    |                              | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |              |                    |                 |                        |
| —         | 2971AB    | 0.01               | 0.5 (0.7)                    | 5                                    | —       | —     | 8               | 3            | 3                  | 25-0-25         | 1.4 or less            |
| —         | 2972AB    | 0.01               | 1 (1.4)                      | 5                                    | —       | —     | 8               | 3            | 3                  | 50-0-50         | 1.4 or less            |
| —         | 2973AB    | 0.02               | 1.6 (2)                      | 8                                    | —       | —     | 16              | 6            | 5                  | 80-0-80         | 1.4 or less            |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

| Inch      |           |                 |                        |                            | ANSI/AGD type |                     |              |                     |
|-----------|-----------|-----------------|------------------------|----------------------------|---------------|---------------------|--------------|---------------------|
| Order No. |           | Graduation (in) | Range (range/rev) (in) | Accuracy (in)              |               | Repeat-ability (in) | Dial reading | Measuring force (N) |
| w/lug     | Flat-back |                 |                        | First 1 Rev/2.5 Rev/10 Rev | Retrace       |                     |              |                     |
| —         | 2976AB    | 0.0005          | 0.02 (0.028)           | ±0.0005/—/—                | 0.00016       | ±0.0001             | 10-0-10      | 1.4 or less         |
| —         | 2977AB    | 0.0005          | 0.04 (0.055)           | ±0.0005/—/—                | 0.00016       | ±0.0001             | 20-0-20      | 1.4 or less         |
| —         | 2978AB    | 0.001           | 0.06 (0.079)           | ±0.001/—/—                 | 0.0002        | ±0.0002             | 30-0-30      | 1.4 or less         |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Optional Accessory  
• Limit hand (2 pcs.): 21AZB195



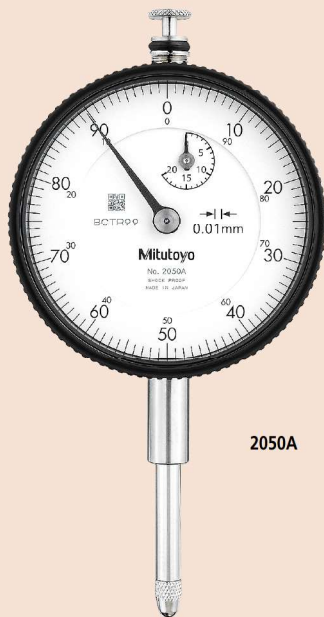


## SERIES 2 — Long Stroke Type

- Long stroke dial indicators with a  $\varnothing 57$  mm bezel.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and the spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is employed.
- The grand gear is made of stainless steel with high resistance to wear and deformation.

- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The bezel clamp and lifting lever\* (optional) can be attached to either the right or left side. These parts can be easily installed and removed without any tools.

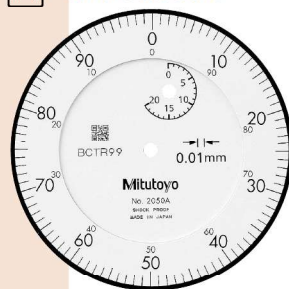
\* These cannot be used on water-proof models and models with a measuring range of 30 mm.



2050A



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 20 mm

2050A

- With damper at lowest rest point

2050A-19

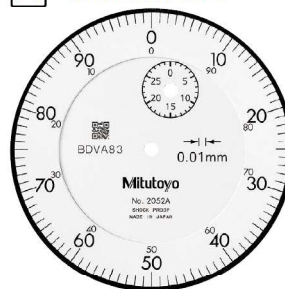
- Shockproof
- Jeweled bearing
- With damper at lowest rest point

2050A-60

- Waterproof



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 30 mm

2052A

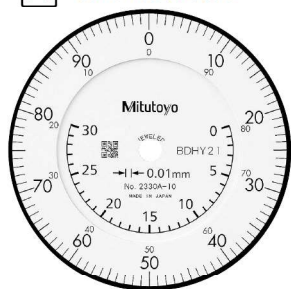
- With damper at lowest rest point

2052A-19

- Shockproof
- Jeweled bearing
- With damper at lowest rest point



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 30 mm

2330A-10

- With coaxial revolution counter

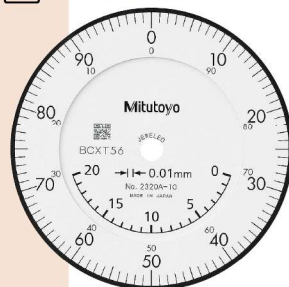
- With damper at lowest rest point
- Jeweled bearing



2050A-60



Continuous scale



Graduation: 0.01 mm,  
Measuring range: 20 mm

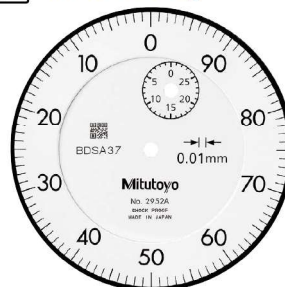
2320A-10

- With coaxial revolution counter

- With damper at lowest rest point
- Jeweled bearing



Reverse reading



Graduation: 0.01 mm,  
Measuring range: 30 mm

2952A

- With damper at lowest rest point



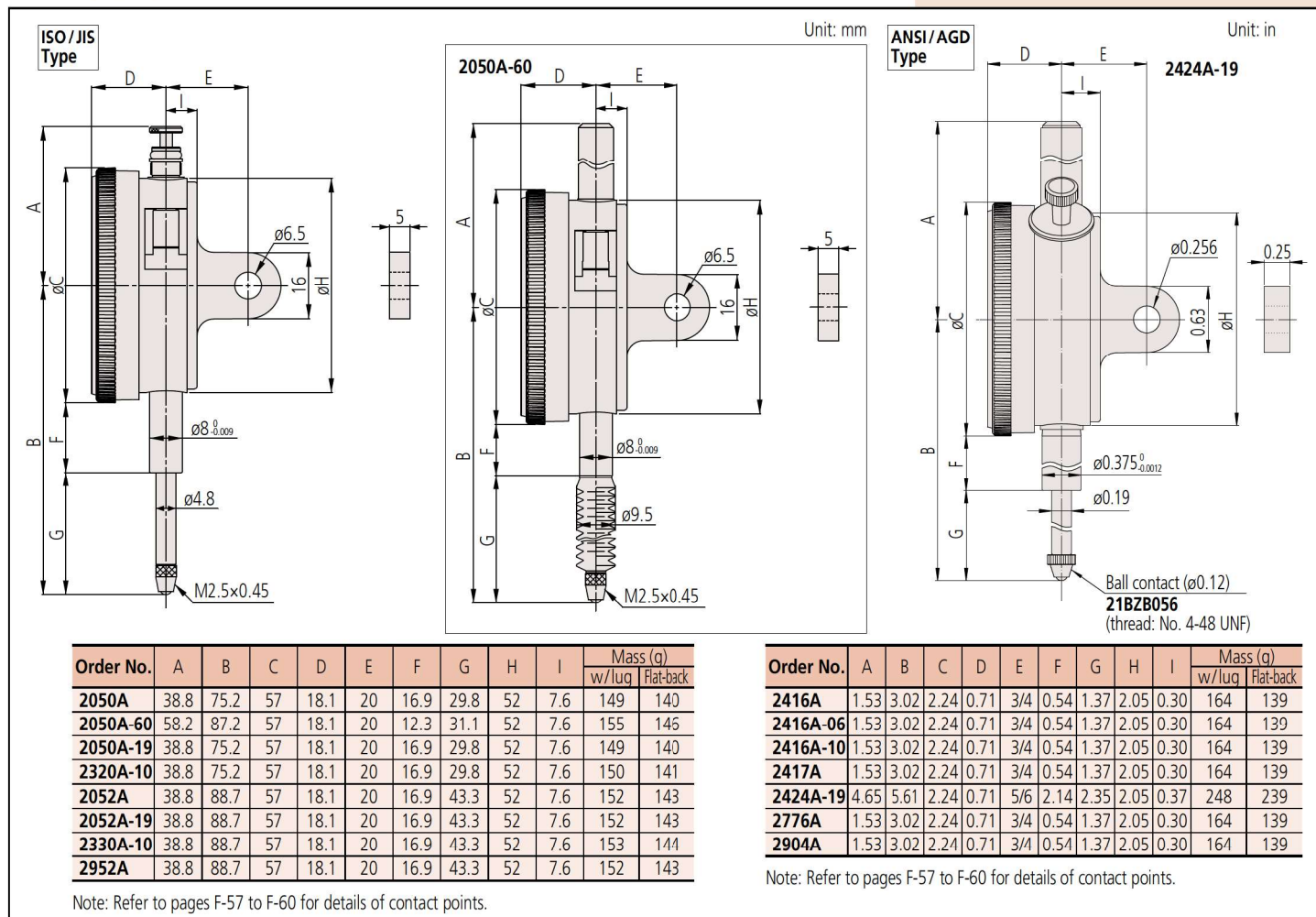
# Dial Indicators

## FEATURES

| Metric    |           |           |              |    |    |    |    |    |    |    |
|-----------|-----------|-----------|--------------|----|----|----|----|----|----|----|
| Order No. | w/lug     | Flat-back | ISO/JIS Type | 64 | 60 | 60 | 60 | 60 | 60 | 60 |
| 2050A     | 2050AB    | ✓         |              |    |    |    |    |    |    |    |
| 2050A-60  | 2050AB-60 | ✓         |              |    |    |    |    |    |    |    |
| 2050A-19  | 2050AB-19 | ✓         |              |    |    |    |    |    |    |    |
| 2320A-10  | 2320AB-10 | ✓         |              |    |    |    |    |    |    |    |
| 2052A     | 2052AB    | ✓         |              |    |    |    |    |    |    |    |
| 2052A-19  | 2052AB-19 | ✓         |              |    |    |    |    |    |    |    |
| 2330A-10  | 2330AB-10 | ✓         |              |    |    |    |    |    |    |    |
| 2952A     | 2952AB    |           | ✓            |    |    |    |    |    |    |    |

| Inch      |           |           |              |    |    |    |    |    |    |    |
|-----------|-----------|-----------|--------------|----|----|----|----|----|----|----|
| Order No. | w/lug     | Flat-back | ISO/JIS Type | 64 | 60 | 60 | 60 | 60 | 60 | 60 |
| 2416A     | 2416AB    | ✓         |              |    |    |    |    |    |    |    |
| 2416A-06  | 2416AB-06 | ✓         |              |    |    |    |    |    |    |    |
| 2416A-10  | 2416AB-10 | ✓         |              |    |    |    |    |    |    |    |
| 2417A     | 2417AB    |           | ✓            |    |    |    |    |    |    |    |
| 2424A-19  | 2424AB-19 | ✓         |              | ✓  |    |    |    |    |    | ✓  |
| 2776A     | 2776AB    | ✓         |              |    |    |    |    |    |    |    |
| 2904A     | 2904AB    |           |              |    | ✓  |    |    |    |    |    |

## DIMENSIONS



## Optional Accessories

- Limit hand (2 pcs.): **21AZB195**
- Bezel clamp: **21AZB148** (for metric type)  
**21RZA065** (for inch type)  
**21RZA067** (for **2424A(B)-19**)


## SPECIFICATIONS

| Metric    |            |                    |                              |                                      |         |       |                 |            | ISO/JIS type       |                 |                        |
|-----------|------------|--------------------|------------------------------|--------------------------------------|---------|-------|-----------------|------------|--------------------|-----------------|------------------------|
| Order No. |            | Graduation<br>(mm) | Range<br>(range/rev)<br>(mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                    | Dial<br>reading | Measuring<br>force (N) |
| w/lug     | Flat-back  |                    |                              | Indication error                     |         |       |                 | Hysteresis | Repeat-<br>ability |                 |                        |
|           |            |                    |                              | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                    |                 |                        |
| 2050A     | 2050AB     | 0.01               | 20 (1)                       | 8                                    | 10      | 15    | 20              | 5          | 4                  | ±0-100          | 2.0 or less            |
| 2050A-60* | 2050AB-60* | 0.01               | 20 (1)                       | 8                                    | 10      | 15    | 20              | 5          | 4                  | ±0-100          | 2.5 or less            |
| 2050A-19  | 2050AB-19  | 0.01               | 20 (1)                       | 8                                    | 10      | 15    | 20              | 5          | 4                  | ±0-100          | 2.0 or less            |
| 2320A-10  | 2320AB-10  | 0.01               | 20 (1)                       | 8                                    | 10      | 15    | 20              | 5          | 4                  | ±0-100          | 2.0 or less            |
| 2052A     | 2052AB     | 0.01               | 30 (1)                       | 10                                   | 12      | 15    | 25              | 7          | 5                  | ±0-100          | 2.5 or less            |
| 2052A-19  | 2052AB-19  | 0.01               | 30 (1)                       | 10                                   | 12      | 15    | 25              | 7          | 5                  | ±0-100          | 2.5 or less            |
| 2330A-10  | 2330AB-10  | 0.01               | 30 (1)                       | 10                                   | 12      | 15    | 25              | 7          | 5                  | ±0-100          | 2.5 or less            |
| 2952A     | 2952AB     | 0.01               | 30 (1)                       | 10                                   | 12      | 15    | 25              | 7          | 5                  | 100-0           | 2.5 or less            |

\* **2050A-60** and **2050AB-60** are water-proof types that use a rubber bellows to cover the spindle.

Note that the outer diameter of the bellows (ø9.5) is larger than that of the stem (ø8).

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

| Inch      |           |                    |                           |  |  ANSI/AGD type |                         |                 |                        |
|-----------|-----------|--------------------|---------------------------|--|---|-------------------------|-----------------|------------------------|
| Order No. |           | Graduation<br>(in) | Range<br>(range/rev) (in) | Accuracy (in)                                    |   | Repeat-<br>ability (in) | Dial<br>reading | Measuring<br>force (N) |
| w/lug     | Flat-back |                    |                           | First 1 Rev/2.5 Rev/10 Rev                       | Retrace   |                         |                 |                        |
| 2416A     | 2416AB    | 0.001              | 1 (0.1)                   | ±0.001/±0.001/±0.002                             | 0.0002  | ±0.0002                 | ±0-100          | 1.8 or less            |
| 2416A-06  | 2416AB-06 | 0.001              | 1 (0.1)                   | ±0.001/±0.001/±0.002                             | 0.0002  | ±0.0002                 | ±0-100          | 1.8 or less            |
| 2416A-10  | 2416AB-10 | 0.001              | 1 (0.1)                   | ±0.001/±0.001/±0.002                             | 0.0002  | ±0.0002                 | ±0-100          | 1.8 or less            |
| 2417A     | 2417AB    | 0.001              | 1 (0.1)                   | ±0.001/±0.001/±0.002                             | 0.0002  | ±0.0002                 | 0-50-0          | 1.8 or less            |
| 2424A-19  | 2424AB-19 | 0.001              | 2 (0.1)                   | ±0.001/±0.001/±0.002/±0.003<br>(First 20 Rev)    | 0.00033   | ±0.0002                 | ±0-100          | 2.5 or less            |
| 2776A     | 2776AB    | 0.0005             | 1 (0.05)                  | ±0.0005/±0.0005/±0.0015/±0.002<br>(First 20 Rev) | 0.0002  | ±0.0001                 | ±0-50           | 2.5 or less            |
| 2904A     | 2904AB    | 0.001              | 1 (0.1)                   | ±0.001/±0.001/±0.002                             | 0.0002  | ±0.0002                 | 100-0           | 1.8 or less            |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.





## SERIES 1 — Compact Type, Extra Small Diameter

- Compact dial indicators with bezel diameters of 31 or 36 mm for restricted-space applications in gaging jigs.



1911A-10



Balanced scale



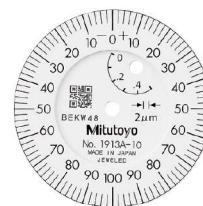
Graduation: 0.01 mm,  
Measuring range: 2.5 mm

1911A-10

Jeweled bearing



Balanced scale



Graduation: 0.02 mm,  
Measuring range: 0.5 mm

1913A-10

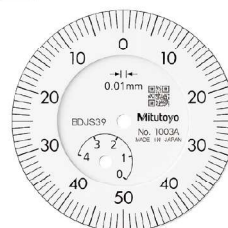
Jeweled bearing



1003A



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 4 mm

1003A



DIMENSIONS

ISO/JIS  
Type

1911A-10/1913A-10

ANSI/AGD  
Type

1921A-10/1923A-10/1925A-10

1003A

Unit: mm

Unit: in

Metric

Unit: mm

| Order No. | A    | B    | C  | D    | E    | F    | G    | H  | I | Mass (g) |           |
|-----------|------|------|----|------|------|------|------|----|---|----------|-----------|
|           |      |      |    |      |      |      |      |    |   | w/lug    | Flat-back |
| 1911A-10  | 15.5 | 42   | 31 | 13.6 | 19.4 | 15.1 | 11.5 | 30 | 6 | 55       | 51        |
| 1913A-10  | 15.5 | 39.5 | 31 | 13.6 | 19.4 | 15.1 | 8.9  | 30 | 6 | 55       | 51        |
| 1003A     | 18   | 40.3 | 36 | 13.5 | 15   | 9.5  | 12.8 | 32 | 6 | 51       | 48        |

Inch

Unit: in

| Order No. | A    | B    | C    | D    | E   | F    | G    | H    | I    | Mass (g) |           |
|-----------|------|------|------|------|-----|------|------|------|------|----------|-----------|
|           |      |      |      |      |     |      |      |      |      | w/lug    | Flat-back |
| 1921A-10  | 0.61 | 1.58 | 1.22 | 0.52 | 3/4 | 0.59 | 0.37 | 1.18 | 0.27 | 55       | 51        |
| 1923A-10  | 0.61 | 1.51 | 1.22 | 0.52 | 3/4 | 0.59 | 0.31 | 1.18 | 0.27 | 55       | 51        |
| 1925A-10  | 0.61 | 1.48 | 1.22 | 0.52 | 3/4 | 0.59 | 0.28 | 1.18 | 0.27 | 55       | 51        |

Note 1: Limit hands, bezel clamps and lifting levers cannot be installed.

Note 2: The shoulder on a contact point (standard accessory) acts as a stop to prevent spindle overrun that may otherwise damage the indicator. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7 mm, use a washer (with outside diameter of at least 7 mm, inside diameter of 3 mm, and thickness of approx. 0.5 mm) placed between the contact point and the spindle.

Note 3: Being fixed by only two retaining screws, the back cannot be rotated by 90° to change the orientation of the lug.

SPECIFICATIONS

Metric

ISO/JIS type

| Order No. | w/lug     | Flat-back | Graduation (mm) | Range (range/rev) (mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                | Dial reading | Measuring force (N) |
|-----------|-----------|-----------|-----------------|------------------------|--------------------------------------|---------|-------|-----------------|------------|----------------|--------------|---------------------|
|           |           |           |                 |                        | Indication error                     |         |       |                 | Hysteresis | Repeat-ability |              |                     |
|           |           |           |                 |                        | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                |              |                     |
| 1911A-10  | 1911AB-10 | 0.01      | 2.5 (1)         | 8                      | 9                                    | 10      | 12    | 4               | 3          | 0-50-0         | 1.8 or less  |                     |
| 1913A-10  | 1913AB-10 | 0.002     | 0.5 (0.2)       | 2.5                    | 4                                    | 5       | 6     | 2.5             | 1          | 0-100-0        | 1.8 or less  |                     |
| 1003A     | 1003AB    | 0.01      | 4 (1)           | 8                      | 10                                   | 11      | 13    | 4               | 3          | 0-50-0         | 1.4 or less  |                     |

Inch

ANSI/AGD type

| Order No. | w/lug     | Flat-back | Graduation (in) | Range (range/rev) (in) | Accuracy (in)              |         |         | Repeat-ability (in) | Dial reading | Measuring force (N) |
|-----------|-----------|-----------|-----------------|------------------------|----------------------------|---------|---------|---------------------|--------------|---------------------|
|           |           |           |                 |                        | First 1 Rev/2.5 Rev/10 Rev |         | Retrace |                     |              |                     |
|           |           |           |                 |                        | First 1 Rev                | 2.5 Rev |         |                     |              |                     |
| 1921A-10  | 1921AB-10 | 0.001     | 0.1 (0.04)      | ±0.001                 | ±0.001                     | —       | 0.0002  | ±0.0002             | 0-20-0       | 1.8 or less         |
| 1923A-10  | 1923AB-10 | 0.0005    | 0.05 (0.02)     | ±0.0005                | ±0.0005                    | —       | 0.00016 | ±0.0001             | 0-10-0       | 1.8 or less         |
| 1925A-10  | 1925AB-10 | 0.0001    | 0.025 (0.01)    | ±0.0002                | ±0.0002                    | —       | 0.0001  | ±0.00003            | 0-5-0        | 1.8 or less         |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.



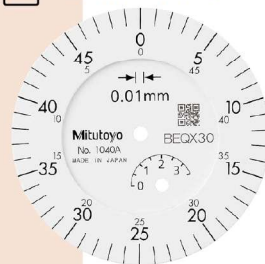
## SERIES 1 — Compact Type, Small Diameter

- Compact dial indicators ideal for restricted-space applications in gaging jigs.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



1044A

Continuous scale

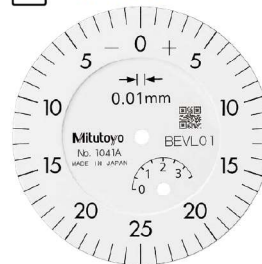


Graduation: 0.01 mm,  
Measuring range: 3.5 mm

1040A

Double scale spacing

Balanced scale

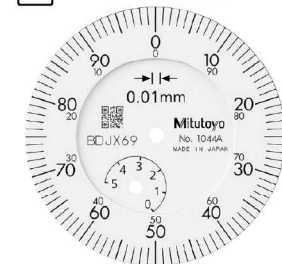


Graduation: 0.01 mm,  
Measuring range: 3.5 mm

1041A

Double scale spacing

Continuous scale



Graduation: 0.01 mm,  
Measuring range: 5 mm

1044A

1044A-15

Jeweled bearing

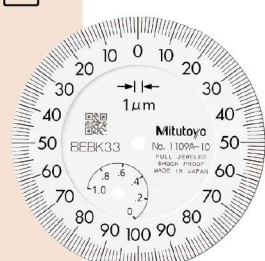
Balanced scale



Graduation: 0.01 mm,  
Measuring range: 5 mm

1045A

Balanced scale



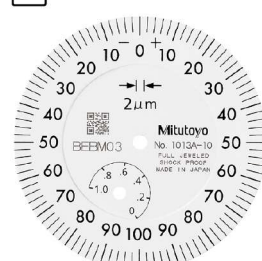
Graduation: 0.001 mm,  
Measuring range: 1 mm

1109A-10

Shockproof

Jeweled bearing

Balanced scale



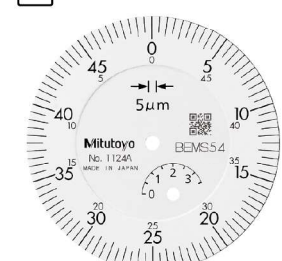
Graduation: 0.002 mm,  
Measuring range: 1 mm

1013A-10

Shockproof

Jeweled bearing

Continuous scale



Graduation: 0.005 mm,  
Measuring range: 3.5 mm

1124A



1109A-10



Dial Indicators



Continuous scale



Graduation: 0.01 mm, Measuring range: 5 mm

1044A-60

Waterproof

1044A-60

SPECIFICATIONS

| Metric    |           | ISO/JIS type       |                              |                                      |         |       |                 |            |                    |                 |                        |
|-----------|-----------|--------------------|------------------------------|--------------------------------------|---------|-------|-----------------|------------|--------------------|-----------------|------------------------|
| Order No. |           | Graduation<br>(mm) | Range<br>(range/rev)<br>(mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                    | Dial<br>reading | Measuring<br>force (N) |
| w/lug     | Flat-back |                    |                              | Indication error                     |         |       |                 | Hysteresis | Repeat-<br>ability |                 |                        |
|           |           |                    |                              | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                    |                 |                        |
| 1013A-10  | 1013AB-10 | 0.002              | 1 (0.2)                      | 2.5                                  | 4       | 5     | 6               | 2.5        | 1                  | 0-100-0         | 1.5 or less            |
| 1040A     | 1040AB    | 0.01               | 3.5 (0.5)                    | 8                                    | 10      | 11    | 13              | 4          | 3                  | ±0-50           | 1.4 or less            |
| 1041A     | 1041AB    | 0.01               | 3.5 (0.5)                    | 8                                    | 10      | 11    | 13              | 4          | 3                  | 0-25-0          | 1.4 or less            |
| 1044A     | 1044AB    | 0.01               | 5 (1)                        | 8                                    | 10      | 11    | 13              | 4          | 3                  | ±0-100          | 1.4 or less            |
| 1044A-15  | 1044AB-15 | 0.01               | 5 (1)                        | 8                                    | 10      | 11    | 13              | 4          | 3                  | ±0-100          | 0.4 or less*           |
| 1044A-60  | 1044AB-60 | 0.01               | 5 (1)                        | 8                                    | 10      | 11    | 13              | 4          | 3                  | ±0-100          | 2.0 or less            |
| 1045A     | 1045AB    | 0.01               | 5 (1)                        | 8                                    | 10      | 11    | 13              | 4          | 3                  | 0-50-0          | 1.4 or less            |
| 1109A-10  | 1109AB-10 | 0.001              | 1 (0.2)                      | 2.5                                  | 3.5     | 4.5   | 5               | 2          | 1                  | 0-100-0         | 1.5 or less            |
| 1124A     | 1124AB    | 0.005              | 3.5 (0.5)                    | 6                                    | 9       | 10    | 12              | 3.5        | 3                  | ±0-50           | 1.4 or less            |

\* For low measuring force type, use in the vertical orientation.  
Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

| Inch      |           | ANSI/AGD type   |                        |                            |         |  |                     |              |                     |             |  |
|-----------|-----------|-----------------|------------------------|----------------------------|---------|--|---------------------|--------------|---------------------|-------------|--|
| Order No. |           | Graduation (in) | Range (range/rev) (in) | Accuracy (in)              |         |  | Repeat-ability (in) | Dial reading | Measuring force (N) |             |  |
| w/lug     | Flat-back |                 |                        | First 1 Rev/2.5 Rev/10 Rev | Retrace |  |                     |              |                     |             |  |
| 1410A     | 1410AB    | 0.001           | 0.25 (0.1)             | ±0.001/±0.001/—            |         |  | 0.0002              | ±0.0002      | 0-100               | 1.4 or less |  |
| 1411A     | 1411AB    | 0.001           | 0.25 (0.1)             | ±0.001/±0.001/—            |         |  | 0.0002              | ±0.0002      | 0-50-0              | 1.4 or less |  |
| 1410A-10  | 1410AB-10 | 0.001           | 0.25 (0.1)             | ±0.001/±0.001/—            |         |  | 0.0002              | ±0.0002      | 0-100               | 1.4 or less |  |
| 1780A     | 1780AB    | 0.001           | 0.125 (0.05)           | ±0.001/±0.001/—            |         |  | 0.0002              | ±0.0002      | 0-50                | 1.4 or less |  |
| 1781A     | 1781AB    | 0.001           | 0.125 (0.05)           | ±0.001/±0.001/—            |         |  | 0.0002              | ±0.0002      | 0-25-0              | 1.4 or less |  |
| 1506A     | 1506AB    | 0.0005          | 0.125 (0.05)           | ±0.0005/±0.0005/—          |         |  | 0.00016             | ±0.0001      | 0-50                | 1.4 or less |  |
| 1507A     | 1507AB    | 0.0005          | 0.125 (0.05)           | ±0.0005/±0.0005/—          |         |  | 0.00016             | ±0.0001      | 0-25-0              | 1.4 or less |  |
| 1670A     | 1670AB    | 0.0005          | 0.1 (0.04)             | ±0.0005/±0.0005/—          |         |  | 0.00016             | ±0.0001      | 0-40                | 1.4 or less |  |
| 1671A     | 1671AB    | 0.0005          | 0.1 (0.04)             | ±0.0005/±0.0005/—          |         |  | 0.00016             | ±0.0001      | 0-20-0              | 1.4 or less |  |
| 1802A-10  | 1802AB-10 | 0.0001          | 0.025 (0.01)           | ±0.0001/±0.0001/—          |         |  | 0.0001              | ±0.00003     | 0-10                | 1.5 or less |  |
| 1803A-10  | 1803AB-10 | 0.0001          | 0.025 (0.01)           | ±0.0001/±0.0001/—          |         |  | 0.0001              | ±0.00003     | 0-5-0               | 1.5 or less |  |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

DIMENSIONS

ANSI/AGD Type

Unit: in

| Order No. | A    | B    | C    | D    | E   | F    | G    | H    | I    |
|-----------|------|------|------|------|-----|------|------|------|------|
| 1410A     | 1.28 | 1.87 | 1.57 | 0.59 | 3/4 | 0.50 | 0.58 | 1.50 | 0.26 |
| 1411A     | 1.28 | 1.87 | 1.57 | 0.59 | 3/4 | 0.50 | 0.58 | 1.50 | 0.26 |
| 1410A-10  | 1.28 | 1.87 | 1.57 | 0.59 | 3/4 | 0.50 | 0.58 | 1.50 | 0.26 |
| 1780A     | 1.28 | 1.74 | 1.57 | 0.59 | 3/4 | 0.50 | 0.44 | 1.50 | 0.26 |
| 1781A     | 1.28 | 1.74 | 1.57 | 0.59 | 3/4 | 0.50 | 0.44 | 1.50 | 0.26 |
| 1506A     | 1.28 | 1.74 | 1.57 | 0.59 | 3/4 | 0.50 | 0.44 | 1.50 | 0.26 |
| 1507A     | 1.28 | 1.74 | 1.57 | 0.59 | 3/4 | 0.50 | 0.44 | 1.50 | 0.26 |
| 1670A     | 1.28 | 1.71 | 1.57 | 0.59 | 3/4 | 0.50 | 0.42 | 1.50 | 0.26 |
| 1671A     | 1.28 | 1.71 | 1.57 | 0.59 | 3/4 | 0.50 | 0.42 | 1.50 | 0.26 |
| 1802A-10  | 1.28 | 1.63 | 1.57 | 0.59 | 3/4 | 0.50 | 0.33 | 1.50 | 0.26 |
| 1803A-10  | 1.28 | 1.63 | 1.57 | 0.59 | 3/4 | 0.49 | 0.33 | 1.50 | 0.26 |

Note: Refer to pages F-57 to F-60 for details of contact points.

ISO/JIS Type

Unit: mm

| Order No. | A    | B    | C  | D  | E  | F    | G    | H  | I   |
|-----------|------|------|----|----|----|------|------|----|-----|
| 1013A-10  | 32.5 | 49   | 40 | 15 | 20 | 13.8 | 15.2 | 38 | 6.6 |
| 1040A     | 32.5 | 46   | 40 | 15 | 20 | 13.8 | 12.2 | 38 | 6.6 |
| 1041A     | 32.5 | 46   | 40 | 15 | 20 | 13.8 | 12.2 | 38 | 6.6 |
| 1044A     | 32.5 | 47.5 | 40 | 15 | 20 | 13.8 | 13.7 | 38 | 6.6 |
| 1044A-15* | 32.5 | 47.5 | 40 | 15 | 20 | 13.8 | 13.7 | 38 | 6.6 |
| 1044A-60  | 32.5 | 47.5 | 40 | 15 | 20 | 12.2 | 24.8 | 38 | 6.6 |
| 1045A     | 32.5 | 47.5 | 40 | 15 | 20 | 13.8 | 13.7 | 38 | 6.6 |
| 1109A-10  | 32.5 | 49   | 40 | 15 | 20 | 13.8 | 15.2 | 38 | 6.6 |
| 1124A     | 32.5 | 46   | 40 | 15 | 20 | 13.8 | 12.2 | 38 | 6.6 |

\* 3 Use in the vertical orientation (contact point downward) for the low measuring force model.  
Note: Refer to pages F-57 to F-60 for details of contact points.









Optional Accessories





• Limit hand (2 pcs.): 21AAB363



• Bezel clamp: 21RZA149

FEATURES

| Metric    |           |   |   |   |   |   |   |  |
|-----------|-----------|---|---|---|---|---|---|--|
| Order No. |           |   |   |   |   |   |   |  |
| w/lug     | Flat-back |  |  |  |  |  |  |  |
| 1013A-10  | 1013AB-10 |   | ✓   |   | ✓   | ✓   |   |  |
| 1040A     | 1040AB    | ✓   |   | ✓   |   |   |   |  |
| 1041A     | 1041AB    |   | ✓   | ✓   |   |   |   |  |
| 1044A     | 1044AB    | ✓   |   |   |   |   |   |  |
| 1044A-15  | 1044AB-15 | ✓   |   |   |   | ✓   |   |  |
| 1044A-60  | 1044AB-60 | ✓   |   |   |   |   | ✓   |  |
| 1045A     | 1045AB    |   | ✓   |   |   |   |   |  |
| 1109A-10  | 1109AB-10 |   | ✓   |   | ✓   | ✓   |   |  |
| 1124A     | 1124AB    | ✓   |   |   |   |   |   |  |

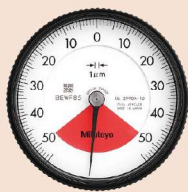
| Inch      |           |   |   |   |   |  |   |  |
|-----------|-----------|---|---|---|---|--|---|--|
| Order No. |           |  |  |  |  |  |   |  |
| w/lug     | Flat-back |   |   |   |   |  |   |  |
| 1410A     | 1410AB    | ✓   |   |   |   |  |   |  |
| 1411A     | 1411AB    |   | ✓   |   |   |  |   |  |
| 1410A-10  | 1410AB-10 | ✓   |   |   | ✓   |  |   |  |
| 1780A     | 1780AB    | ✓   |   |   |   |  |   |  |
| 1781A     | 1781AB    |   | ✓   |   |   |  |   |  |
| 1506A     | 1506AB    | ✓   |   |   |   |  |   |  |
| 1507A     | 1507AB    |   | ✓   |   |   |  |   |  |
| 1670A     | 1670AB    | ✓   |   |   |   |  |   |  |
| 1671A     | 1671AB    |   | ✓   |   |   |  |   |  |
| 1802A-10  | 1802AB-10 | ✓   |   |   | ✓   |  | ✓ |  |
| 1803A-10  | 1803AB-10 |   | ✓   |   | ✓   |  | ✓ |  |



## SERIES 1 — Compact One Revolution Type for Error-free Reading

- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- Compact dial indicators ideal for restricted-space applications in gaging jigs.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- The dead zone in red indicates "accuracy not guaranteed".
- One revolution type Back Plunger dial gages are also available. (Refer to pages F-55 to F-56 for details)

One revolution type Back plunger dial gages are also available. (Refer to pages F-55 to F-56 for details.)



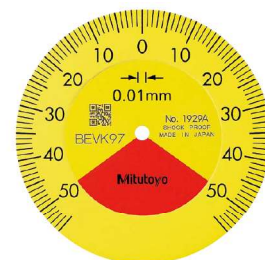
2990A-10



1929A



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 1 mm

1929A

One revolution

Shockproof

1929A-62

One revolution

Shockproof

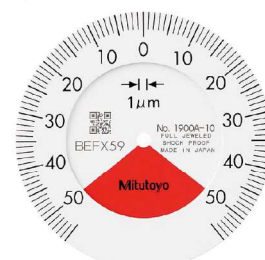
Dustproof



1900A-10



Balanced scale



Graduation: 0.001 mm,  
Measuring range: 0.1 mm

1900A-10

One revolution

Shockproof

Jeweled bearing

1900A-72

One revolution

Shockproof

Dustproof

Jeweled bearing



Dial Indicators

FEATURES

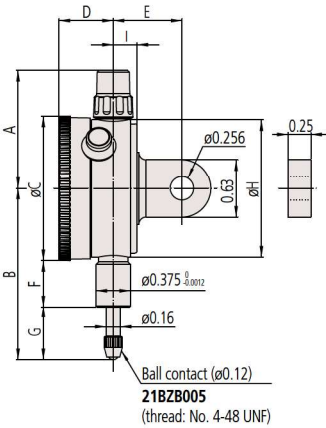
| Metric    |           |   |   |   |   |   |
|-----------|-----------|---|---|---|---|---|
| Order No. |           |   |   |   |   |   |
| w/lug     | Flat-back |   |   |   |   |   |
| 1929A     | 1929AB    | ✓ | ✓ |   |   | ✓ |
| 1929A-62  | 1929AB-62 | ✓ | ✓ |   | ✓ | ✓ |
| 1900A-10  | 1900AB-10 | ✓ | ✓ | ✓ |   | ✓ |
| 1900A-72  | 1900AB-72 | ✓ | ✓ | ✓ | ✓ | ✓ |

| Inch      |           |   |   |   |   |   |
|-----------|-----------|---|---|---|---|---|
| Order No. |           |   |   |   |   |   |
| w/lug     | Flat-back |   |   |   |   |   |
| 1909A-62  | 1909AB-62 | ✓ | ✓ |   | ✓ | ✓ |
| 1910A-72  | 1910AB-72 | ✓ | ✓ | ✓ | ✓ | ✓ |

DIMENSIONS

ANSI/AGD Type

Unit: in

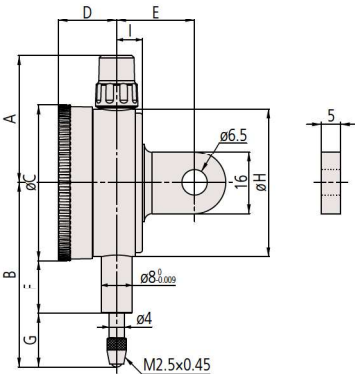


| Order No. | A    | B    | C    | D    | E    | F    | G    | H    | I    | Mass (g) |           |
|-----------|------|------|------|------|------|------|------|------|------|----------|-----------|
|           |      |      |      |      |      |      |      |      |      | w/lug    | Flat-back |
| 1909A-62  | 1.28 | 1.64 | 1.57 | 0.59 | 0.75 | 0.50 | 0.35 | 1.50 | 0.26 | 90       | 70        |
| 1910A-72  | 1.28 | 1.61 | 1.57 | 0.59 | 0.75 | 0.50 | 0.31 | 1.50 | 0.26 | 90       | 70        |

Note: Refer to pages F-57 to F-60 for details of contact points.

ISO/JIS Type

Unit: mm



| Order No. | A    | B    | C  | D  | E  | F    | G    | H  | I   | Mass (g) |           |
|-----------|------|------|----|----|----|------|------|----|-----|----------|-----------|
|           |      |      |    |    |    |      |      |    |     | w/lug    | Flat-back |
| 1929A     | 32.5 | 47.5 | 40 | 15 | 20 | 13.8 | 13.7 | 38 | 6.6 | 90       | 70        |
| 1929A-62  | 32.5 | 47.5 | 40 | 15 | 20 | 13.8 | 13.7 | 38 | 6.6 | 90       | 70        |
| 1900A-10  | 32.5 | 53.5 | 40 | 15 | 20 | 13.8 | 19.7 | 38 | 6.6 | 95       | 75        |
| 1900A-72  | 32.5 | 53.5 | 40 | 15 | 20 | 13.8 | 19.7 | 38 | 6.6 | 95       | 75        |

Note: Refer to pages F-57 to F-60 for details of contact points.

Optional Accessories

- Limit hand (2 pcs.): 21AAB363



- Bezel clamp: 21RZA149





## SERIES 3, 4 — Long StrokeType, Large Diameter

### Optional Accessories

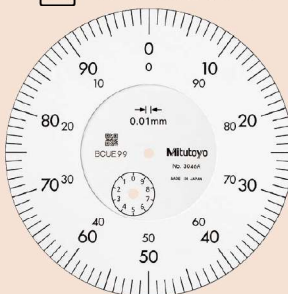
- Limit hand (2 pcs.): **21AZB195**
- Bezel clamp: **21AZB148** (for metric type)  
**21RZA065** (for inch type)

- Dial indicators with a large-diameter dial face for easy reading.
- Models with longer measuring ranges are also available.
- All types are supplied with limit markers and a bezel clamp as standard.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- The bezel clamp and lifting lever\* (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.

\* Can be attached only to **3046A, 3047A, 3050A, 3109A-10** and **4046A**.



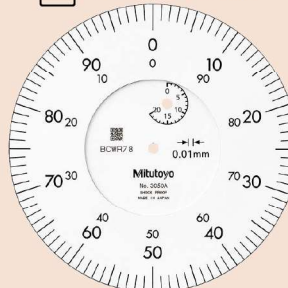
### Continuous scale



Graduation: 0.01 mm, Measuring range: 10 mm **3046A**



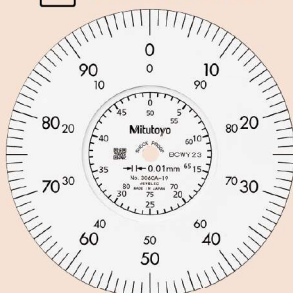
### Continuous scale



Graduation: 0.01 mm, Measuring range: 20 mm **3050A**



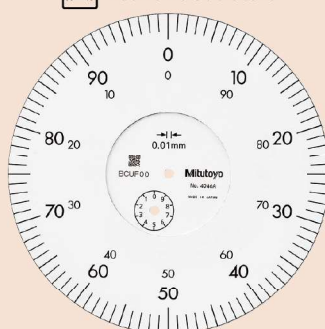
### Continuous scale



Graduation: 0.01 mm, Measuring range: 80 mm **3060A-19**



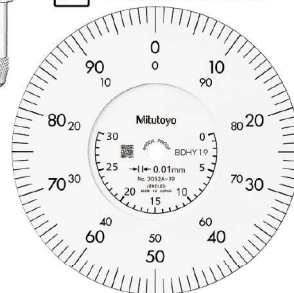
### Continuous scale



Graduation: 0.01 mm, Measuring range: 10 mm **4046A**



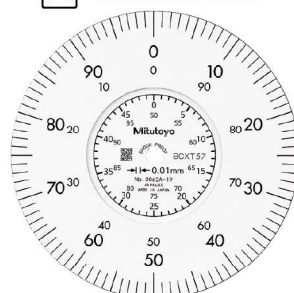
### Continuous scale



Graduation: 0.01 mm, Measuring range: 30 mm **3052A-19**



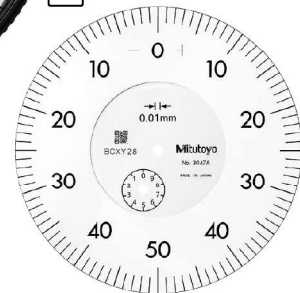
### Continuous scale



Graduation: 0.01 mm, Measuring range: 100 mm **3062A-19**



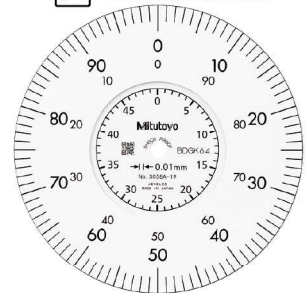
### Balanced scale



Graduation: 0.01 mm, Measuring range: 10 mm **3047A**



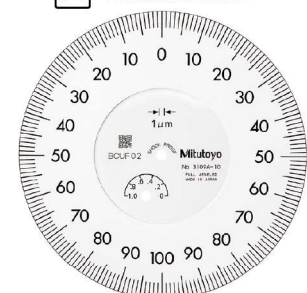
### Continuous scale



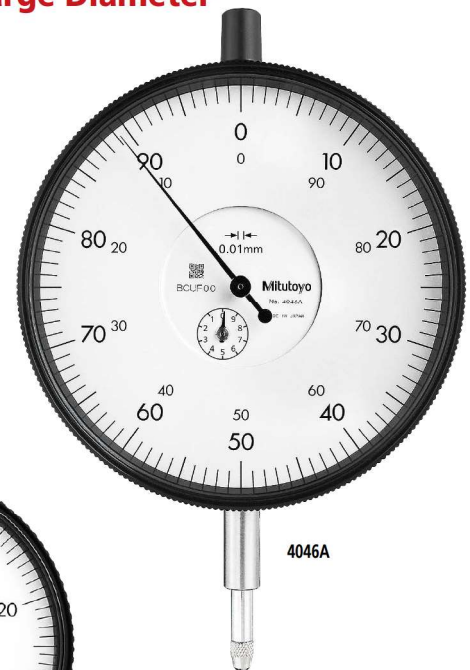
Graduation: 0.01 mm, Measuring range: 50 mm **3058A-19**



### Balanced scale



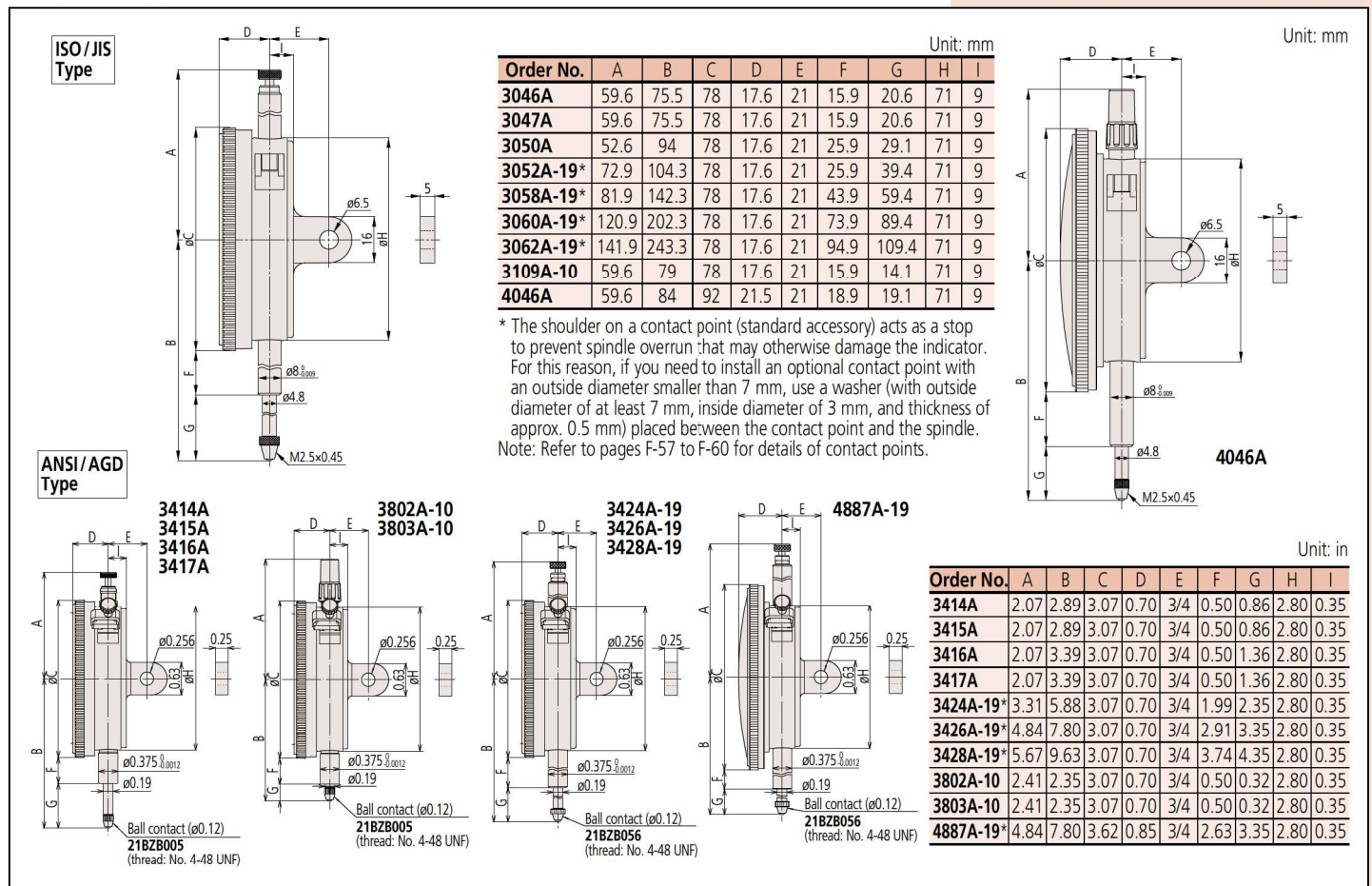
Graduation: 0.001 mm, Measuring range: 1 mm **3109A-10**





# Dial Indicators

## DIMENSIONS



## FEATURES

| Metric             |       |           |     |     |   |   |   |
|--------------------|-------|-----------|-----|-----|---|---|---|
| Order No.          | w/lug | Flat-back | 30° | 15° | 3 | 1 | 1 |
| 3046A 3046AB       | ✓     |           |     |     |   |   |   |
| 3047A 3047AB       |       | ✓         |     |     |   |   |   |
| 3050A 3050AB       | ✓     |           |     |     | ✓ |   |   |
| 3052A-19 3052AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |
| 3058A-19 3058AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |
| 3060A-19 3060AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |
| 3062A-19 3062AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |
| 3109A-10 3109AB-10 |       | ✓         | ✓   |     |   | ✓ |   |
| 4046A 4046AB       | ✓     |           |     |     |   |   |   |

| Inch               |       |           |     |     |   |   |   |
|--------------------|-------|-----------|-----|-----|---|---|---|
| Order No.          | w/lug | Flat-back | 30° | 15° | 3 | 1 | 1 |
| 3414A 3414AB       | ✓     |           |     |     |   |   |   |
| 3415A 3415AB       |       | ✓         |     |     |   |   |   |
| 3416A 3416AB       | ✓     |           |     |     |   |   |   |
| 3417A 3417AB       |       | ✓         |     |     |   |   |   |
| 3424A-19 3424AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |
| 3426A-19 3426AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |
| 3428A-19 3428AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |
| 3802A-10 3802AB-10 | ✓     |           |     | ✓   |   | ✓ |   |
| 3803A-10 3803AB-10 |       | ✓         | ✓   |     |   | ✓ |   |
| 4887A-19 4887AB-19 | ✓     |           |     | ✓   |   | ✓ | ✓ |

## SPECIFICATIONS

| Metric                 |                         |                    |                              |                                      |         |       |                 |            |                    |                 |                        | ISO/JIS type |  |
|------------------------|-------------------------|--------------------|------------------------------|--------------------------------------|---------|-------|-----------------|------------|--------------------|-----------------|------------------------|--------------|--|
| Order No.              |                         | Graduation<br>(mm) | Range<br>(range/rev)<br>(mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                    | Dial<br>reading | Measuring<br>force (N) |              |  |
| w/lug                  | Flat-back               |                    |                              | Indication error                     |         |       |                 | Hysteresis | Repeat-<br>ability |                 |                        |              |  |
|                        |                         |                    |                              | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                    |                 |                        |              |  |
| 3046A                  | 3046AB                  | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 15              | 3          | 3                  | ±0-100          | 1.4 or less            |              |  |
| 3047A                  | 3047AB                  | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 15              | 3          | 3                  | 0-50-0          | 1.4 or less            |              |  |
| 3050A                  | 3050AB                  | 0.01               | 20 (1)                       | 8                                    | 10      | 15    | 20              | 5          | 4                  | ±0-100          | 2.0 or less            |              |  |
| 3052A-19               | 3052AB-19               | 0.01               | 30 (1)                       | 10                                   | 12      | 15    | 25              | 7          | 5                  | ±0-100          | 2.5 or less            |              |  |
| 3058A-19               | 3058AB-19               | 0.01               | 50 (1)                       | 10                                   | 12      | 15    | 30              | 8          | 5                  | ±0-100          | 3.0 or less            |              |  |
| 3060A-19 <sup>x1</sup> | 3060AB-19 <sup>x1</sup> | 0.01               | 80 (1)                       | 12                                   | 17      | 20    | 45              | 9          | 5                  | ±0-100          | 3.0 or less            |              |  |
| 3062A-19 <sup>x1</sup> | 3062AB-19 <sup>x1</sup> | 0.01               | 100 (1)                      | 12                                   | 17      | 20    | 50              | 9          | 5                  | ±0-100          | 3.5 or less            |              |  |
| 3109A-10               | 3109AB-10               | 0.001              | 1 (0.2)                      | 2                                    | 3.5     | 4     | 5               | 2          | 0.5                | 0-100-0         | 1.5 or less            |              |  |
| 4046A                  | 4046AB                  | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 15              | 3          | 3                  | ±0-100          | 1.4 or less            |              |  |

\*1 Use in a vertical orientation (contact point downward) for the long stroke model.

\*2 Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

| Inch                   |       |           |                 |                        |   |  |  |         |                     |              |                     |
|------------------------|-------|-----------|-----------------|------------------------|---|--|--|---------|---------------------|--------------|---------------------|
| Order No.              | w/lug | Flat-back | Graduation (in) | Range (range/rev) (in) | Accuracy*2 (in)   |  |  |         | Repeat-ability (in) | Dial reading | Measuring force (N) |
|                        |       |           |                 |                        | First 1 Rev/2.5 Rev/10 Rev                                |  |  | Retrace |                     |              |                     |
| 3414A 3414AB           |       |           | 0.001           | 0.5 (0.1)              | ±0.001/±0.001/±0.001                                      |  |  | 0.0002  | ±0.0002             | ±0-100       | 1.8 or less         |
| 3415A 3415AB           |       |           | 0.001           | 0.5 (0.1)              | ±0.001/±0.001/±0.001                                      |  |  | 0.0002  | ±0.0002             | 0-50-0       | 1.8 or less         |
| 3416A 3416AB           |       |           | 0.001           | 1 (0.1)                | ±0.001/±0.001/±0.002                                      |  |  | 0.0002  | ±0.0002             | ±0-100       | 1.8 or less         |
| 3417A 3417AB           |       |           | 0.001           | 1 (0.1)                | ±0.001/±0.001/±0.002                                      |  |  | 0.0002  | ±0.0002             | 0-50-0       | 1.8 or less         |
| 3424A-19 3424AB-19     |       |           | 0.001           | 2 (0.1)                | ±0.001/±0.001/±0.002/±0.003 (20 Rev)                      |  |  | 0.00033 | ±0.0002             | ±0-100       | 3.0 or less         |
| 3426A-19*1 3426AB-19*1 |       |           | 0.001           | 3 (0.1)                | ±0.001/±0.001/±0.002/±0.003 (20 Rev)/±0.005 (Over 20 Rev) |  |  | 0.00033 | ±0.0002             | ±0-100       | 3.0 or less         |
| 3428A-19*1 3428AB-19*1 |       |           | 0.001           | 4 (0.1)                | ±0.001/±0.001/±0.002/±0.003 (20 Rev)/±0.005 (Over 20 Rev) |  |  | 0.00033 | ±0.0002             | ±0-100       | 3.5 or less         |
| 3802A-10 3802AB-10     |       |           | 0.0001          | 0.025 (0.01)           | ±0.0001/±0.0001/—   |  |  | 0.0001  | ±0.00003            | 0-10         | 2.0 or less         |
| 3803A-10 3803AB-10     |       |           | 0.0001          | 0.025 (0.01)           | ±0.0001/±0.0001/—   |  |  | 0.0001  | ±0.00003            | 0-5-0        | 2.0 or less         |
| 4887A-19*1 4887AB-19*1 |       |           | 0.001           | 3 (0.1)                | ±0.001/±0.001/±0.002/±0.003 (20 Rev)/±0.005 (Over 20 Rev) |  |  | 0.00033 | ±0.0002             | ±0-100       | 3.0 or less         |

\*1 Use in a vertical orientation (contact point downward) for the long stroke model.

\*2 Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.



## ANSI/AGD Type Metric Dial Indicators with $\varnothing 3/8$ inch Stem and #4-48UNF-Thread Contact Point Compatible Type

### SPECIFICATIONS

| Metric    |           | SERIES 1        |                        | ANSI/AGD type              |         |                                  |              |                     |
|-----------|-----------|-----------------|------------------------|----------------------------|---------|----------------------------------|--------------|---------------------|
| Order No. |           | Graduation (mm) | Range (range/rev) (mm) | Accuracy ( $\mu\text{m}$ ) |         | Repeat-ability ( $\mu\text{m}$ ) | Dial reading | Measuring force (N) |
| w/lug     | Flat-back |                 |                        | First 1 Rev/2.5 Rev/10 Rev | Retrace |                                  |              |                     |
| 1230A-01  | 1230AB-01 | 0.01            | 2.5 (1)                | $\pm 10/\pm 10/-$          | 3       | $\pm 2$                          | 0-100        | 1.4 or less         |
| 1231A-01  | 1231AB-01 | 0.01            | 2.5 (1)                | $\pm 10/\pm 10/-$          | 3       | $\pm 2$                          | 0-50-0       | 1.4 or less         |
| 1044A-01  | 1044AB-01 | 0.01            | 5 (1)                  | $\pm 10/\pm 10/\pm 13$     | 3       | $\pm 3$                          | $\pm 0$ -100 | 1.4 or less         |
| 1045A-01  | 1045AB-01 | 0.01            | 5 (1)                  | $\pm 10/\pm 10/\pm 13$     | 3       | $\pm 3$                          | 0-50-0       | 1.4 or less         |
| 1010A-11  | 1010AB-11 | 0.002           | 0.5 (0.2)              | $\pm 2/\pm 2/-$            | 2       | $\pm 1$                          | 0-20         | 1.5 or less         |
| 1011A-11  | 1011AB-11 | 0.002           | 0.5 (0.2)              | $\pm 2/\pm 2/-$            | 2       | $\pm 1$                          | 0-10-0       | 1.5 or less         |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

| Metric    |           | SERIES 2        |                        | ANSI/AGD type   |         |                                  |              |                     |
|-----------|-----------|-----------------|------------------------|---|---------|----------------------------------|--------------|---------------------|
| Order No. |           | Graduation (mm) | Range (range/rev) (mm) | Accuracy ( $\mu\text{m}$ )  |         | Repeat-ability ( $\mu\text{m}$ ) | Dial reading | Measuring force (N) |
| w/lug     | Flat-back |                 |                        | First 1 Rev/2.5 Rev/10 Rev  | Retrace |                                  |              |                     |
| 2231A-01  | 2231AB-01 | 0.01            | 2.5 (1)                | $\pm 10/\pm 10/-$   | 3       | $\pm 3$                          | 0-50-0       | 1.4 or less         |
| 2046A-01  | 2046AB-01 | 0.01            | 10 (1)                 | $\pm 10/\pm 10/\pm 13$  | 3       | $\pm 3$                          | $\pm 0$ -100 | 1.4 or less         |
| 2046A-11  | 2046AB-11 | 0.01            | 10 (1)                 | $\pm 10/\pm 10/\pm 13$  | 3       | $\pm 3$                          | $\pm 0$ -100 | 1.4 or less         |
| 2047A-01  | 2047AB-01 | 0.01            | 10 (1)                 | $\pm 10/\pm 10/\pm 13$  | 3       | $\pm 3$                          | 0-50-0       | 1.4 or less         |
| 2047A-11  | 2047AB-11 | 0.01            | 10 (1)                 | $\pm 10/\pm 10/\pm 13$  | 3       | $\pm 3$                          | 0-50-0       | 1.4 or less         |
| 2902A-01  | 2902AB-01 | 0.01            | 10 (1)                 | $\pm 10/\pm 10/\pm 13$  | 3       | $\pm 3$                          | 100-0        | 1.4 or less         |
| 2050A-01  | 2050AB-01 | 0.01            | 20 (1)                 | $\pm 10/\pm 10/\pm 15/\pm 20$ (20 Rev)                            | 4       | $\pm 3$                          | $\pm 0$ -100 | 2.0 or less         |
| 2056A-01  | 2056AB-01 | 0.01            | 25 (1)                 | $\pm 10/\pm 10/\pm 15/\pm 20$ (20 Rev)/<br>$\pm 25$ (Over 20 Rev) | 4       | $\pm 3$                          | $\pm 0$ -100 | 2.5 or less         |
| 2109A-11  | 2109AB-11 | 0.001           | 1 (0.2)                | $\pm 3/\pm 3/\pm 4$   | 2       | $\pm 0.3$                        | 0-10-0       | 1.5 or less         |
| 2119A-11  | 2119AB-11 | 0.001           | 5 (0.2)                | $\pm 7/\pm 7/\pm 8/\pm 10$ (20 Rev)/<br>$\pm 10$ (Over 20 Rev)    | 2.5     | $\pm 0.3$                        | 0-10-0       | 1.5 or less         |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

### FEATURES

| Metric    |           |       |           |  |  |  |   |  |   |
|-----------|-----------|-------|-----------|--|--|--|---|--|---|
| Order No. |           | w/lug | Flat-back |  |  |  |   |  |   |
| 1230A-01  | 1230AB-01 |       |           |  |  |  |   |  |   |
| 1231A-01  | 1231AB-01 |       |           |  |  |  |   |  |   |
| 1044A-01  | 1044AB-01 |       |           |  |  |  |   |  |   |
| 1045A-01  | 1045AB-01 |       |           |  |  |  |   |  |   |
| 1010A-11  | 1010AB-11 |       |           |  |  |  | ✓ |  | ✓ |
| 1011A-11  | 1011AB-11 |       |           |  |  |  | ✓ |  | ✓ |

| Metric    |           |       |           |  |  |  |   |  |   |  |   |
|-----------|-----------|-------|-----------|--|--|--|---|--|---|--|---|
| Order No. |           | w/lug | Flat-back |  |  |  |   |  |   |  |   |
| 2231A-01  | 2231AB-01 |       |           |  |  |  |   |  |   |  |   |
| 2046A-01  | 2046AB-01 |       |           |  |  |  |   |  |   |  |   |
| 2046A-11  | 2046AB-11 |       |           |  |  |  | ✓ |  |   |  |   |
| 2047A-01  | 2047AB-01 |       |           |  |  |  |   |  |   |  |   |
| 2047A-11  | 2047AB-11 |       |           |  |  |  | ✓ |  |   |  |   |
| 2902A-01  | 2902AB-01 |       |           |  |  |  |   |  |   |  | ✓ |
| 2050A-01  | 2050AB-01 |       |           |  |  |  |   |  |   |  |   |
| 2056A-01  | 2056AB-01 |       |           |  |  |  |   |  |   |  |   |
| 2109A-11  | 2109AB-11 |       |           |  |  |  | ✓ |  | ✓ |  |   |
| 2119A-11  | 2119AB-11 |       |           |  |  |  | ✓ |  |   |  |   |

### Optional Accessories

- Backs (See page F-61)
- Contact points (See pages F-57 to F-60)



Dial Indicators

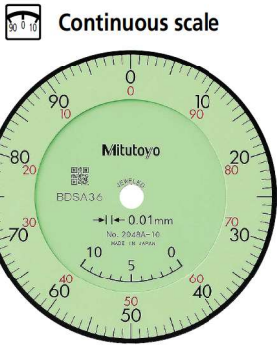
SERIES 2 — Special Dial Indicators


Adjustable hand dial indicator

- The hand position can be adjusted independently of the position of the spindle by rotating the top knob.






2048A-10



**Continuous scale**

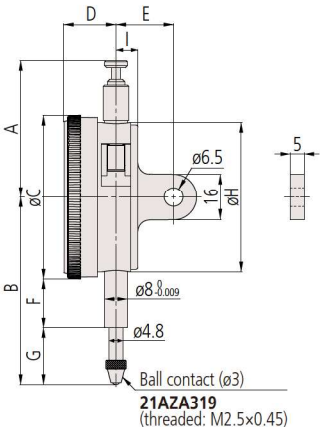
Graduation: 0.01 mm,  
Measuring range: 10 mm

**2048A-10**

-  With coaxial revolution counter
-  Adjustable hand
-  Jeweled bearing

DIMENSIONS

ISO/JIS  
Type



Unit: mm

| Order No. | A    | B    | C  | D    | E  | F    | G    | H  | I   | Mass (g) |           |
|-----------|------|------|----|------|----|------|------|----|-----|----------|-----------|
|           |      |      |    |      |    |      |      |    |     | w/lug    | Flat-back |
| 2048A-10  | 47.4 | 64.9 | 57 | 18.1 | 20 | 16.9 | 19.5 | 52 | 7.6 | 144      | 135       |

Note 1: Contact points, other than dedicated types, cannot be installed.






Note 2: The shoulder on a contact point (standard accessory) acts as a stop to prevent spindle overrun that may otherwise damage the indicator. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7 mm, use a washer (with outside diameter of at least 7 mm, inside diameter of 3 mm, and thickness of approx. 0.5 mm) placed between the contact point and the spindle.

SPECIFICATIONS

| Metric    |           | Graduation<br>(mm) | Range<br>(range/rev)<br>(mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                    | Dial<br>reading | Measuring<br>force (N) |
|-----------|-----------|--------------------|------------------------------|--------------------------------------|---------|-------|-----------------|------------|--------------------|-----------------|------------------------|
| Order No. |           |                    |                              | Indication error                     |         |       |                 | Hysteresis | Repeat-<br>ability |                 |                        |
| w/lug     | Flat-back |                    |                              | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                    |                 |                        |
| 2048A-10  | 2048AB-10 | 0.01               | 10 (1)                       | 5                                    | 9       | 10    | 15              | 3          | 3                  | ±0-100          | 1.4 or less            |

Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

FEATURES

| Metric    |           |  |  |  |  |  |
|-----------|-----------|---|---|---|---|---|
| Order No. |           |   |   |   |   |   |
| w/lug     | Flat-back |   |   |   |   |   |
| 2048A-10  | 2048AB-10 | ✓   | ✓   |   | ✓   | ✓   |



Optional Accessories

- Limit hand (2 pcs.): 21AZB195



- Bezel clamp: 21AZB148





## Optional Accessories

- Limit hand (2 pcs.): **21AZB195**



- Bezel clamp: **21AZB148**



## SERIES 2 — Special Dial Indicators

- A mechanism holds the pointer and the spindle at the position of maximum depression and hence displays the maximum value.

Note: Clearance of peak hold: Push the mechanism release in the direction of the arrow indicated in the dimensional drawing below.



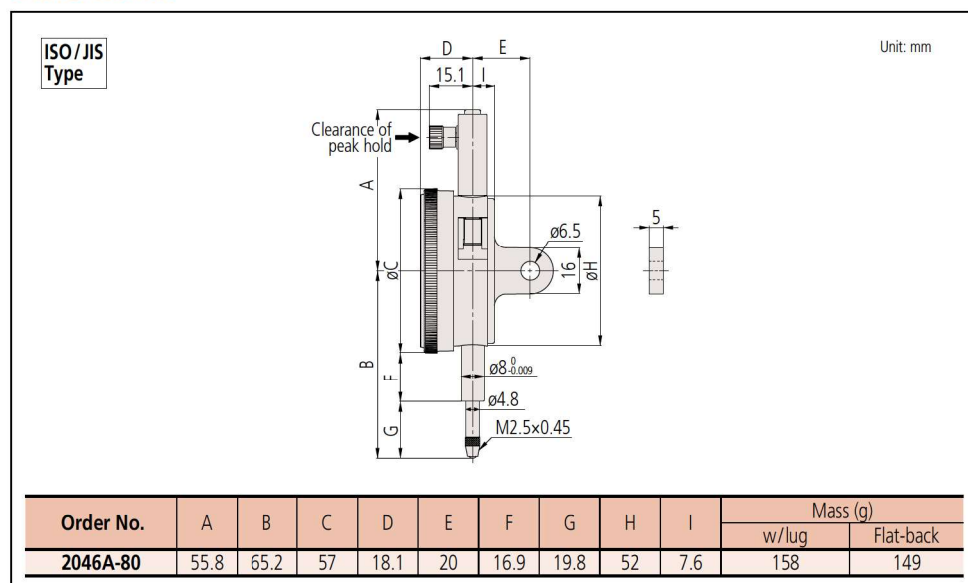
2046A-80

Continuous scale



Graduation: 0.01 mm, Measuring range: 10 mm **2046A-80** Peak retaining

## DIMENSIONS



## FEATURES

| Metric    |           |   |  |   |  |
|-----------|-----------|---|--|---|--|
| Order No. |           |   |  |   |  |
| w/lug     | Flat-back |   |  |   |  |
| 2046A-80  | 2046AB-80 | ✓ |  | ✓ |  |

## SPECIFICATIONS

| Metric    |           |                 |                        |                                      |         |       |                 |            |                |              |                     |
|-----------|-----------|-----------------|------------------------|--------------------------------------|---------|-------|-----------------|------------|----------------|--------------|---------------------|
| Order No. |           | Graduation (mm) | Range (range/rev) (mm) | Maximum permissible error (MPE) (μm) |         |       |                 | Hysteresis | Repeat-ability | Dial reading | Measuring force (N) |
| w/lug     | Flat-back |                 |                        | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                |              |                     |
| 2046A-80  | 2046AB-80 | 0.01            | 10 (1)                 | 5                                    | 9       | 10    | 15              | —          | —              | ±0-100       | 5.0 or less         |

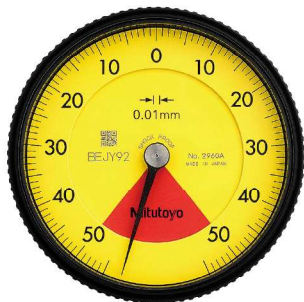
Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.



## Dial Indicators

### Back Plunger Type Dial Indicators SERIES 2

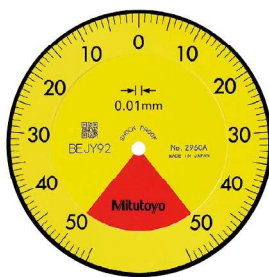
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- Back Plunger type dial indicators are suitable for mounting onto leveling machine tool tables or inspection jigs, and for use in small spaces where the graduations of standard dial indicators are difficult to see.
- Mitutoyo's proprietary shock-proofing mechanism provides excellent durability and shock resistance.
- Model **2990A-10** provides 0.001 mm graduation.



2960A



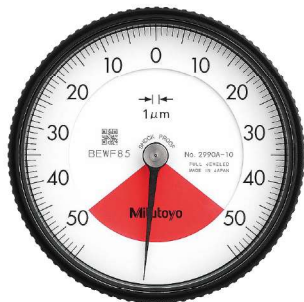
Balanced scale



Graduation: 0.01 mm,  
Measuring range: 1 mm

2960A

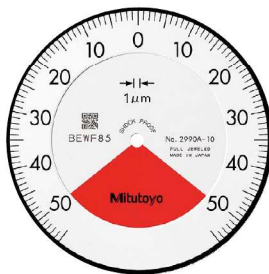
- One revolution
- Shockproof
- Back Plunger



2990A-10



Balanced scale



Graduation: 0.01 mm,  
Measuring range: 1 mm

2990A-10

- One revolution
- Shockproof
- Back Plunger
- Jeweled bearing



Holding bar

#### Holding bar (optional)

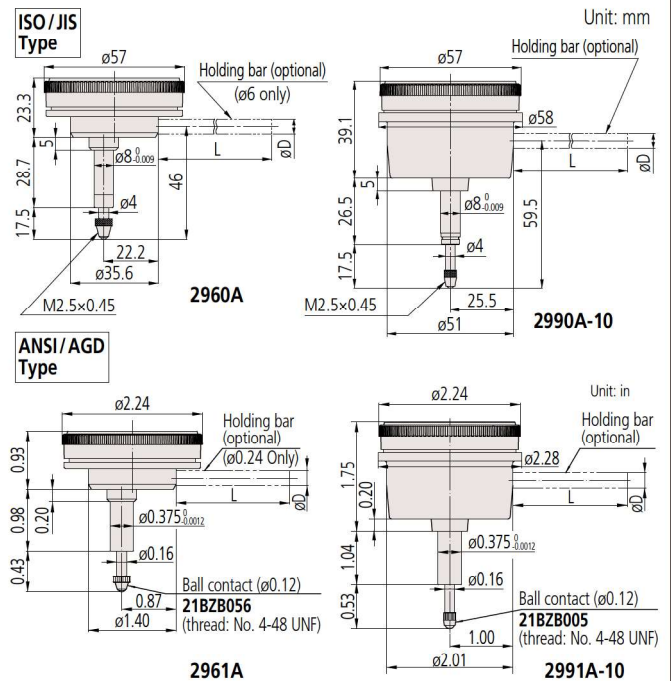
| Order No. | øD (mm) | L (mm) |
|-----------|---------|--------|
| 21AAA166  | ø6      | 42     |
| 136567    | ø6      | 81     |
| 124625    | ø6.35   | 81     |
| 21AAA167  | ø6.35   | 42     |
| 21AAA168  | ø8      | 42     |
| 136568    | ø8      | 81     |

Note: øD and L: detail shown in drawing below.

#### Optional Accessory

- Limit hand (2 pcs.): **21AZB195**

#### DIMENSIONS



Note 1: The shoulder on a contact point (standard accessory) for **2960A** and **2961A** acts as a stop to prevent spindle overrun that may otherwise damage the indicator. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7 mm, use a washer (with outside diameter of at least 7 mm, inside diameter of 3 mm, and thickness of approx. 0.5 mm) placed between the contact point and the spindle.

Note 2: Refer to pages F-57 to F-60 for details of contact points.

| Metric    |                 |                        |                                      |         |       |                 |            |              | ISO/JIS type        |                |
|-----------|-----------------|------------------------|--------------------------------------|---------|-------|-----------------|------------|--------------|---------------------|----------------|
| Order No. | Graduation (mm) | Range (range/rev) (mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            | Dial reading | Measuring force (N) |                |
|           |                 |                        | Indication error                     |         |       |                 | Hysteresis |              |                     | Repeat-ability |
|           |                 |                        | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |              |                     |                |
| 2960A     | 0.01            | 1 (1.27)               | 8                                    | —       | —     | 14              | 4          | 3            | 50-0-50             | 1.4 or less    |
| 2990A-10  | 0.001           | 0.1 (0.14)             | 2.5                                  | —       | —     | 5               | 2          | 1            | 50-0-50             | 1.5 or less    |

Note 1: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Note 2: The bezel clamp cannot be used.

| Inch      |                 |                        |                            |         |                    |              | ANSI/AGD type       |
|-----------|-----------------|------------------------|----------------------------|---------|--------------------|--------------|---------------------|
| Order No. | Graduation (in) | Range (range/rev) (in) | Accuracy (in)              |         | Repeatability (in) | Dial reading | Measuring force (N) |
|           |                 |                        | First 1 Rev/2.5 Rev/10 Rev | Retrace |                    |              |                     |
| 2961A     | 0.0005          | 0.04 (0.05)            | ±0.0005/—/—                | 0.00016 | ±0.0001            | 20-0-20      | 1.4 or less         |
| 2991A-10  | 0.0001          | 0.008 (0.01)           | ±0.0002/—/—                | 0.0001  | ±0.00005           | 4-0-4        | 1.5 or less         |

Note 1: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Note 2: The bezel clamp cannot be used.

**Mitutoyo**





## Dial Indicators



Holding bar

### Back Plunger Type Dial Indicators SERIES 1

- Back Plunger type dial indicators are suitable for mounting onto leveling machine tool tables or inspection jigs, and for use in situations where standard dial indicators are difficult to read.
- Model **1960A** and **1961A**, which uses Mitutoyo's proprietary shock-proofing mechanism, has excellent durability and shock resistance.

#### Holding bar (optional)

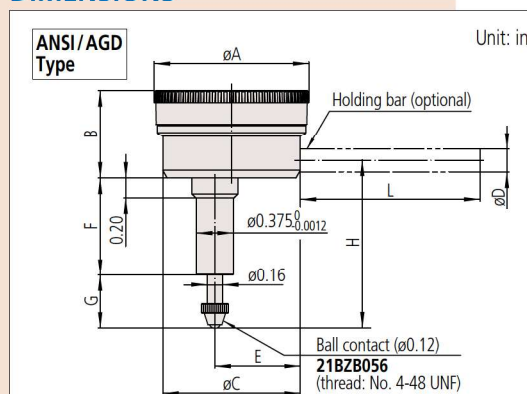
| Order No. | øD (mm) | L (mm) |
|-----------|---------|--------|
| 21AAA166  | ø6      | 42     |
| 136567    | ø6      | 81     |
| 124625    | ø6.35   | 81     |
| 21AAA167  | ø6.35   | 42     |
| 21AAA168  | ø8      | 42     |
| 136568    | ø8      | 81     |

Note: øD and L: detail shown in drawing below.

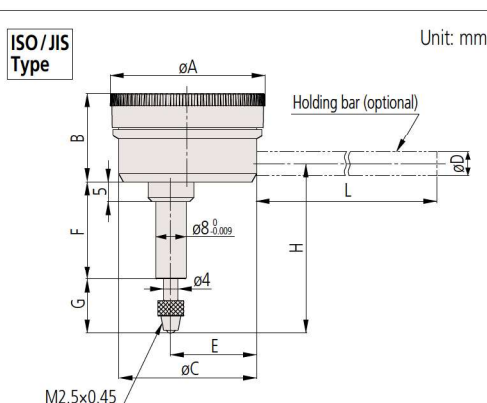
#### Optional Accessory

- Limit hand (2 pcs.): **21AAB363**

## DIMENSIONS



| Order No. | A    | B    | C    | E   | F    | G    | H    | Mass (g)<br>(Bar excluded) |
|-----------|------|------|------|-----|------|------|------|----------------------------|
| 1166A     | 1.57 | 0.89 | 1.40 | 7/8 | 0.98 | 0.43 | 1.67 | 80                         |
| 1167A     | 1.57 | 0.89 | 1.40 | 7/8 | 0.98 | 0.43 | 1.67 | 80                         |
| 1168A     | 1.57 | 0.89 | 1.40 | 7/8 | 0.98 | 0.43 | 1.67 | 80                         |
| 1961A     | 1.57 | 0.89 | 1.40 | 7/8 | 0.98 | 0.43 | 1.59 | 80                         |



| Order No. | A  | B    | C    | E    | F    | G    | H    | Mass (g)<br>(Bar excluded) |
|-----------|----|------|------|------|------|------|------|----------------------------|
| 1160A     | 40 | 22.7 | 35.6 | 21.8 | 25   | 13.8 | 43.3 | 80                         |
| 1162A     | 40 | 22.7 | 35.6 | 21.8 | 25   | 13.8 | 43.3 | 80                         |
| 1960A     | 40 | 22.7 | 35.6 | 21.8 | 28.7 | 12.8 | 46   | 80                         |

Note 1: Contact point (standard accessory) for all products in this page has a role as a top dead point stopper. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7 mm, use a washer (with outside diameter of at least 7 mm, inside diameter of 3 mm, and thickness of approx. 0.5 mm) placed between the contact point and the spindle.

Note 2: Refer to pages F-57 to F-60 for details of contact points.

## FEATURES

| Order No. | ISO/JIS Type | Continuous scale | Reverse reading | Balanced scale | Shockproof | Back Plunger |
|-----------|--------------|------------------|-----------------|----------------|------------|--------------|
| 1960A     |              | ✓                | ✓               | ✓              | ✓          | ✓            |
| 1160A     | ✓            |                  |                 |                |            | ✓            |
| 1162A     |              |                  |                 |                |            | ✓            |

| Order No. | ISO/JIS Type | Continuous scale | Reverse reading | Balanced scale | Shockproof | Back Plunger |
|-----------|--------------|------------------|-----------------|----------------|------------|--------------|
| 1961A     |              | ✓                | ✓               | ✓              | ✓          | ✓            |
| 1166A     | ✓            |                  |                 |                |            | ✓            |
| 1167A     |              | ✓                |                 |                |            | ✓            |
| 1168A     |              |                  |                 |                | ✓          | ✓            |

## SPECIFICATIONS

| Metric    |                 |                        |                                      |         |       |                 |            |                | ISO/JIS type |                     |
|-----------|-----------------|------------------------|--------------------------------------|---------|-------|-----------------|------------|----------------|--------------|---------------------|
| Order No. | Graduation (mm) | Range (range/rev) (mm) | Maximum permissible error (MPE) (μm) |         |       |                 |            |                | Dial reading | Measuring force (N) |
|           |                 |                        | Indication error                     |         |       |                 | Hysteresis | Repeat-ability |              |                     |
|           |                 |                        | 1/10 Rev                             | 1/2 Rev | 1 Rev | Measuring range |            |                |              |                     |
| 1960A     | 0.01            | 1 (1.27)               | 8                                    | —       | —     | 14              | 4          | 3              | 50-0-50      | 1.4 or less         |
| 1160A     | 0.01            | 5 (1)                  | 8                                    | 12      | 14    | 16              | 4          | 3              | ±0-100       | 1.4 or less         |
| 1162A     | 0.01            | 5 (1)                  | 8                                    | 12      | 14    | 16              | 4          | 3              | 100-0        | 1.4 or less         |

Note 1: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Note 2: The bezel clamp cannot be used.

| Inch      | ANSI/AGD type   |                        |                            |         |                    |              |                     |
|-----------|-----------------|------------------------|----------------------------|---------|--------------------|--------------|---------------------|
| Order No. | Graduation (in) | Range (range/rev) (in) | Accuracy (in)              |         | Repeatability (in) | Dial reading | Measuring force (N) |
|           |                 |                        | First 1 Rev/2.5 Rev/10 Rev | Retrace |                    |              |                     |
| 1961A     | 0.001           | 0.04 (0.05)            | ±0.001/—/—                 | 0.0002  | ±0.0002            | 20-0-20      | 1.4 or less         |
| 1166A     | 0.001           | 0.2 (0.05)             | ±0.001/±0.001/±0.001       | 0.00033 | ±0.0002            | ±0-50        | 1.4 or less         |
| 1167A     | 0.001           | 0.2 (0.05)             | ±0.001/±0.001/±0.001       | 0.00033 | ±0.0002            | 0-25-0       | 1.4 or less         |
| 1168A     | 0.001           | 0.2 (0.05)             | ±0.001/±0.001/±0.001       | 0.00033 | ±0.0002            | 50-0         | 1.4 or less         |

Note 1: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Note 2: The bezel clamp cannot be used.