07

Indicators

MeasurLink® ENABLED
Data Management Software by Mitutoyo

Measurement Data Network System

MeasurLink® is a measurement data management system based on databases (SQL Server). You can build a network to manage the measurement results and measuring instruments simply by combining the required functions.

IP66

IP Codes

The code indicates the degree of protection against the ingress of foreign materials and water as defined in the IEC standard (IEC 60529). The number indicates the protection level.
(Refer to page 3)

TÜVRheinland CERTIFIED
Dust- and Water-Protected
www.tuv.com ID 0000040191

TÜV Rheinland Certification Marks

All products with the marks have passed the IP test carried out by the German accreditation organization, TÜV Rheinland.

PROPRIETARY INSPECTION CERTIFICATE

Measuring Instruments Shipped with Inspection Certificate

Mitutoyo guarantees product quality as a leading precision measuring instrument manufacturer and ships measuring instruments with an inspection certificate that includes inspection data so that customers can use them with confidence.

ABSOLUTE™

ABSOLUTE Linear Encoder

Mitutoyo developed the unique ABSOLUTE method to retain position information after the power is turned off.
The origin is set once - thereafter the live position is displayed when the power is turned on.

DIGIMATIC S1

DIGIMATIC S1

Mitutoyo's proprietary bidirectional serial communication protocol enables a connected PC to execute measurement data output, setting and control of a measuring instrument, and capture of information of a specific measuring instrument.

ABSOLUTE Digimatic Indicator
ID-CNX
(Digimatic S1 supported)

Dial Indicator
Standard Type, 0.01 mm Graduation

Dial Test Indicator

INDEX

Precautions for use

Origin setting of Digimatic Indicators

Repeatability in the range of 0.2 mm from the lowest rest point is not guaranteed for Digimatic indicators. When setting the origin or presetting a specific value, be sure to lift the spindle at least 0.2 mm from the lowest rest point.

MeasurLink® ENABLED
Data Management Software by Mitutoyo

ABSOLUTE™

PROPRIETARY INSPECTION CERTIFICATE

DIGIMATIC S1

High-performance ABS Digimatic Indicator ID-FNX (Digimatic S1 supported) SERIES 543 — with Back-lit LCD Screen

- **ID-F** Series is a next-generation indicator with various new functions, supporting bidirectional communication. With the addition of the appropriate data cable and software, remote zero setting and gage setting can all be implemented from a connected PC, thereby improving your work efficiency.
- This series adopts an external power supply to operate a bright backlit display. The display color helps you make tolerance judgment at a glance.

Green indication for GO judgment

Red indication for ±NG judgment

- The next calibration due date can be set with an alarm to improve instrument management.
- The ABS (ABSOLUTE) scale restores the last origin position* automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.

* Refer to "Precautions for use" on page 07-2.

543-851

543-853

543-855

Functions

- Peak detection (MAX/MIN)
- Runout range measurement (MAX - MIN)

Note: Peak detection
1) Sampling rate:
Resolution 0.0005 mm 50 readings/s
Resolution 0.001 mm, 0.01 mm 500 readings/s
2) Capturing speed:
Resolution 0.0005 mm 50 µm/s
Resolution 0.001 mm, 0.01 mm 500 µm/s

- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment
- Resolution switching
- Simple calculation f(x) =Ax
- Analog resolution selection
- Data hold (when not connected to an external device)
- Function Lock
- Calibration schedule warning
- Data output
- Display rotation (330°)
- Error alarm display

SPECIFICATIONS

Metric ISO/JIS Type

Code No.*3	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Power source	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)		
543-855	12.7	0.0005/ 0.001/0.01 (selectable)	0.0025	0.0025	0.002	0.002	1.5 or less	AC adapter (5.9 V)	180
543-855B (flat back)									170
543-851	25.4						1.8 or less		240
543-853	50.8		0.004	0.004			2.3 or less		330
543-857			0.003	0.003					

Inch/Metric ASME/ANSI/AGD Type

Code No.*3	Range	Resolution	Maximum permissible error (MPE)*1 (in)			Maximum permissible limit (MPL)	Power source	Mass (g)
			Overall*2	Hysteresis	Repeatability	Measuring force (N)		
543-856	0.5 in/ 12.7 mm	0.00002/ 0.00005/ 0.0001/ 0.0005/ 0.001 in, 0.005/ 0.001/ 0.01 mm (selectable)	±0.00010	0.00008	0.00008	1.5 or less	AC adapter (5.9 V)	200
543-856B (flat back)								170
543-852	1 in/ 25.4 mm					1.8 or less		240
543-854	2 in/ 50.8 mm		±0.00016			2.3 or less		330
543-858			±0.00012					

- Display: 7-digit display, sign, and analog bar with 2-color backlight
- Response speed: Unlimited

*1 These values apply to normal measurements at 20 °C.
*2 Overall magnification and linearity
*3 To denote your AC power cable add the following suffixes to the code No.: **A** for UL/CSA and PSE, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100 V.

Product catalog E12049

Video

Optional Accessories

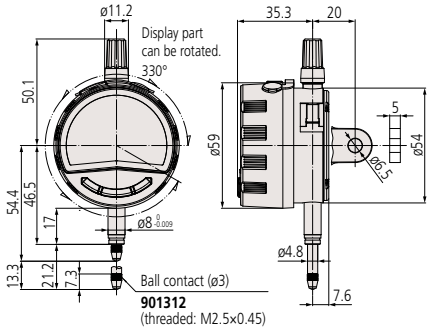
Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
06AGL011	SF	Connection cable (1 m)
06AGL021	SF	Connection cable (2 m)
06AGQ001F	SF	USB Input Tool Direct (2 m)
02AZG011	SF	Connection cable for **U-WAVE-T** (160 mm)
02AZG021	SF	Connection cable for **U-WAVE-T** For foot switch
264-622	IP67	**U-WAVE-TM**
264-623	Buzzer	**U-WAVE-TM**
02AZD810D	—	**U-WAVE-R**
264-626	IP67	**U-WAVE-TMB**
264-627	Buzzer	**U-WAVE-TMB**
02AZF700	—	Connecting unit for **U-WAVE-TM/TMB** (for **ID-F/ID-C** Series 12.7 mm/0.5 inch type only)
02AZF670	—	**U-WAVE-TM/TMB** mounting bracket: for Digimatic Indicators

- Lifting
  Lifting lever:
  21EZA198 (12.7 mm/0.5 inch type)
  Lifting cable:
  21JZA295 Stroke 12.7 mm: 12.7 mm/0.5 inch type
  With auto-stop function:
  21JZA301 (overall length 300 mm) 12.7 mm/0.5 inch type
  Lifting knob:
  21EZA105 (12.7 mm/0.5 inch type)
  21EZA197 (25.4 mm/1 inch type)
  21EZA200 (50.8 mm/2 inch type)
  Lifting lever: **21EAA426**
  (supplied with 25.4 mm and 50.8 mm models as standard.)
- Auxiliary spindle spring:
  02ACA571 (25.4 mm/1 inch type)
  02ACA773 (50.8 mm/2 inch type)
- Measurement data collection software
  USB-ITPAK V3.0: **06AGR543**
- Contact points for Mitutoyo's Digimatic indicators (optional)
  Refer to pages 07-63 to 07-68 for details.
- Interchangeable back covers (optional)
  Refer to pages 07-69 to 07-70 for details.
- Measuring stands (optional)
  Refer to pages 07-97 to 07-103 for details.

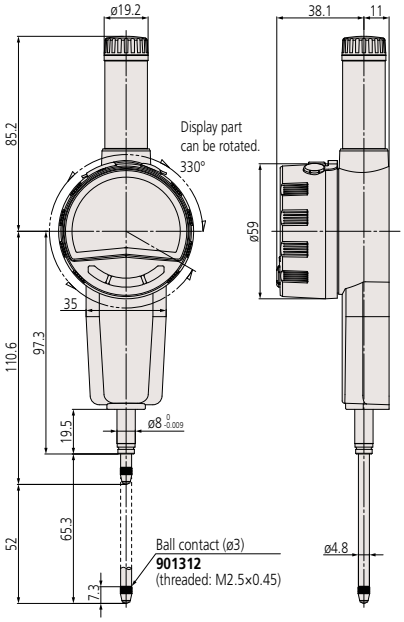
DIMENSIONS

ISO/JIS Type — Unit: mm

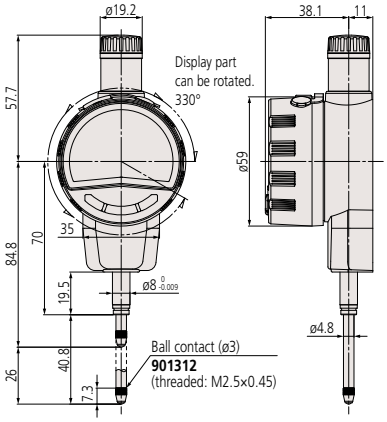
543-855



543-853, 543-857

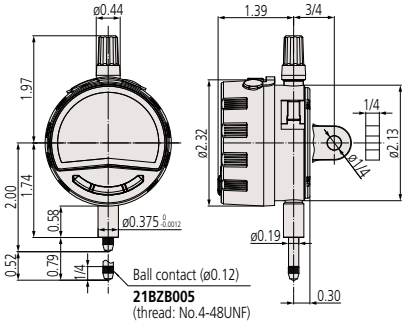


543-851

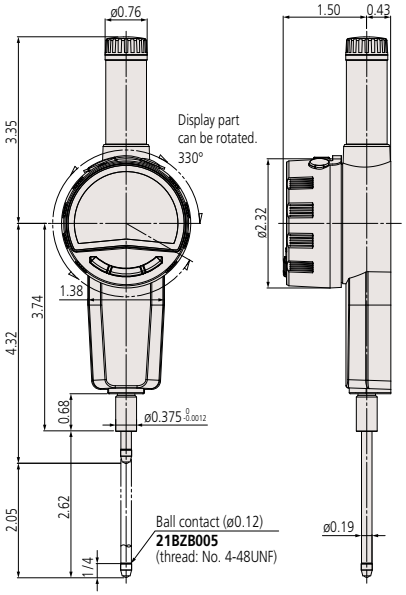


ASME/ANSI/AGD Type — Unit: in

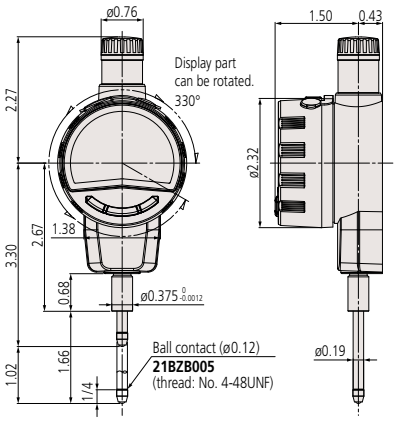
543-856



543-854, 543-858



543-852



ABSOLUTE Digimatic Indicator ID-CNX (Digimatic S1 supported) SERIES 543 — Standard Type

- **ID-C** Series is a next-generation indicator with many new functions, supporting bidirectional communication. With the addition of the appropriate data cable and software, remote zero setting and gage setting can all be implemented from a connected PC, thereby improving your work efficiency.
- The digital display and analog bar indications help you to intuitively read the approach to the origin and tolerance values.
- The next calibration due date can be set with an alarm to improve instrument management.
- The ABS (ABSOLUTE) scale restores the last origin position* automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems. (Refer to page 09-3)

* Refer to "Precautions for use" on page 07-2.

Measuring range 12.7 mm
543-700B

Measuring range 25.4 mm
543-720B

SPECIFICATIONS

Metric ISO/JIS Type

Code No. w/lug	Code No. Flat back	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm) Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Maximum permissible limit (MPL) Measuring force (N)	Mass (g) w/lug	Mass (g) Flat back
543-700	**543-700B**	12.7	0.0005/0.001/0.01 (selectable)	0.003	0.003	0.002	0.002	1.5 or less	175	165
543-705*2	**543-705B***2							0.4 to 0.7	170	160
—	**543-720B**	25.4						1.8 or less	—	195
—	**543-730B**	50.8		0.005	0.005			2.3 or less	—	260
543-710	**543-710B**	12.7	0.01	0.02	0.02	0.02	0.01	0.9 or less	170	160
543-715*2	**543-715B***2							0.2 to 0.5	165	155
—	**543-725B**	25.4						1.8 or less	—	190
—	**543-735B**	50.8		0.04	0.04			2.3 or less	—	245

Inch/Metric ISO/JIS Type

Code No. w/lug	Code No. Flat back	Range	Resolution	Maximum permissible error (MPE)*3 (mm) Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Maximum permissible limit (MPL) Measuring force (N)	Mass (g) w/lug	Mass (g) Flat back
543-701	**543-701B**	0.5 in/12.7 mm	0.00002/0.00005/0.0001/0.0005 in, 0.0005/0.001/0.01 mm (selectable)	0.003	0.003	0.002	0.002	1.5 or less	175	165
543-706*2	**543-706B***2							0.4 to 0.7	170	160
—	**543-721B**	1 in/25.4 mm						1.8 or less	—	195
—	**543-731B**	2 in/50.8 mm		0.005	0.005			2.3 or less	—	260
543-711	**543-711B**	0.5 in/12.7 mm	0.0005 in/0.01 mm	0.02	0.02	0.02	0.01	0.9 or less	170	160
543-716*2	**543-716B***2							0.2 to 0.5	165	155
—	**543-726B**	1 in/25.4 mm						1.8 or less	—	190
—	**543-736B**	2 in/50.8 mm		0.04	0.04			2.3 or less	—	245

Inch/Metric ASME/ANSI/AGD Type

Code No. w/lug	Code No. Flat back	Range	Resolution	Maximum permissible error (MPE)*3 (in) Overall*4	Hysteresis	Repeatability	Maximum permissible limit (MPL) Measuring force (N)	Mass (g) w/lug	Mass (g) Flat back
543-702	**543-702B**	0.5 in/12.7 mm	0.00002/0.00005/0.0001/0.0005 in, 0.0005/0.001/0.01 mm (selectable)	±0.00012	0.00008	0.00008	1.5 or less	195	165
543-707*2	**543-707B***2						0.4 to 0.7	190	160
—	**543-722B**	1 in/25.4 mm					1.8 or less	—	195
—	**543-732B**	2 in/50.8 mm		±0.00020			2.3 or less	—	260
543-712	**543-712B**	0.5 in/12.7 mm	0.0005 in/0.01 mm	±0.0010	0.0010	0.0005	0.9 or less	190	160
543-717*2	**543-717B***2						0.2 to 0.5	185	155
—	**543-727B**	1 in/25.4 mm					1.8 or less	—	190
—	**543-737B**	2 in/50.8 mm		±0.0015			2.3 or less	—	245

- Display: 7-digit display, sign, and analog bar
- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)
- Battery life: Approx. 2,700 hours of continuous use. Approx. 2.5 years under normal use. (Depends on use of the indicator. The above values are reference values.)
- Response speed: Unlimited (except for scanning measurement)

*1 These values apply to normal measurements at 20 °C (Resolution: 0.0005 mm, Calculation coefficient: A=1)
*2 Low measuring force *3 These values apply to normal measurements at 20 °C. *4 Overall magnification and linearity

MeasurLink® ENABLED Data Management Software by Mitutoyo

ABSOLUTE™

DIGIMATIC S1

Functions

- Peak detection (MAX/MIN)
- Runout range measurement (MAX - MIN)
- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment
- Resolution switching (For 0.0005 mm or 0.00002 inch resolution type)
- Simple calculation: f(x) =Ax
- Function Lock
- Calibration schedule warning
- Auto power OFF
- Data output
- Display value holding (when no external device is connected)
- 330° rotary display
- Low battery/voltage alarm display
- Error alarm display

Example of ID-CNX installed on optional bore gage

Note: Direction setting, etc. is necessary when **ID-CNX** is used with a bore gage. Refer to the operation manual for details.

Spindle orientation for measurement

- Standard models with measuring range 12.7 mm: Usable in all orientations.
- Models with measuring range 25.4 or 50.8 mm: Usable between the contact point pointing downward and spindle in horizontal orientation. To use the contact point pointing upward, the auxiliary spindle spring (optional) is required.
- Low measuring force model: See "Setting measuring force on low measuring force models" below.

Setting measuring force on low measuring force models

The measuring force of models with low measuring force can be set by combining standard accessory springs and weights.

• 543-715(B)/716(B)/717(B)

Spindle orientation	Spring	Weight (approximately 0.1 N)	Maximum measuring force (N)
Pointing vertically downward	Yes	Yes	0.5 or less
	Yes	No	0.4 or less
	No	Yes	0.3 or less
	No	No	0.2 or less
Horizontal	Yes	No	0.3 or less

Note: Operation using configurations other than shown above is not guaranteed.

• 543-705(B)/706(B)/707(B)

Spindle orientation	Spring	Weight (approximately 0.1 N)	Maximum measuring force (N)
Pointing vertically downward	Yes	Yes	0.7 or less
	Yes	No	0.6 or less
	No	Yes	0.4 or less
	No	No	Not guaranteed

Note: Operation using configurations other than shown above is not guaranteed.

Product catalog E12049

Video

Optional Accessories

Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
06AGL011	SF	Connection cable (1 m)
06AGL021	SF	Connection cable (2 m)
06AGQ001F	SF	USB Input Tool Direct (2 m)
02AZG011	SF	Connection cable for **U-WAVE-T** (160 mm)
02AZG021	SF	Connection cable for **U-WAVE-T** For foot switch
264-622	IP67	**U-WAVE-TM**
264-623	Buzzer	**U-WAVE-TM**
02AZD810D	—	**U-WAVE-R**
264-626	IP67	**U-WAVE-TMB**
264-627	Buzzer	**U-WAVE-TMB**
02AZF700	—	Connecting unit for **U-WAVE-TM**/**TMB** (for **ID-F**/**ID-C** Series 12.7 mm/0.5 inch type only)
02AZF670	—	**U-WAVE-TM**/**TMB** mounting bracket: for Digimatic Indicators

Connecting unit fitted to an indicator (12.7 mm type)

Typical application of **U-WAVE-TM**/**TMB** mounting bracket (with **543-725B**)

- Lifting
  Lifting lever:
  21EZA198 (12.7 mm/0.5 inch type)
  Lifting cable:
  21JZA295 Stroke 12.7 mm: 12.7 mm/0.5 inch type
  (This cannot be used on low measuring force model.)
  With auto-stop function:
  21JZA301 (overall length 300 mm) 12.7 mm/0.5 inch type
  (This cannot be used on low measuring force model.)
  Lifting knob:
  21EZA105 (12.7 mm/0.5 inch type)
  (This cannot be used on low measuring force model.)
  21EZA197 (25.4 mm/1 inch type)
  21EZA200 (50.8 mm/2 inch type)
  Lifting lever: **21EAA426**
  (supplied with 25.4 mm and 50.8 mm models as standard.)
- Auxiliary spindle spring:
  02ACA571 (25.4 mm/1 inch type*)
  02ACA773 (50.8 mm/2 inch type*)

*Required when orienting the indicator upside down.

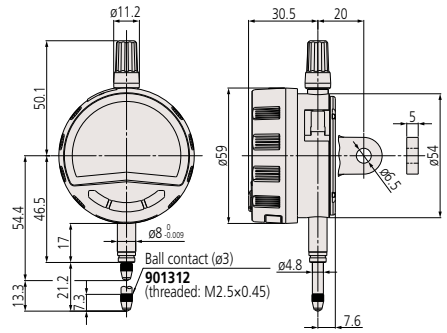
- Measurement data collection software
  USB-ITPAK V3.0: **06AGR543**
- Contact points for Mitutoyo's Digimatic indicators (optional)
  Refer to pages 07-63 to 07-68 for details.
- Interchangeable back covers (optional)
  Refer to pages 07-69 to 07-70 for details.
- Measuring stands (optional)
  Refer to pages 07-97 to 07-103 for details.

DIMENSIONS

12.7 mm range models

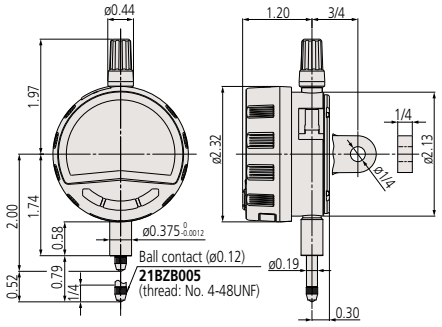
Unit: mm

ISO/JIS Type



Unit: in

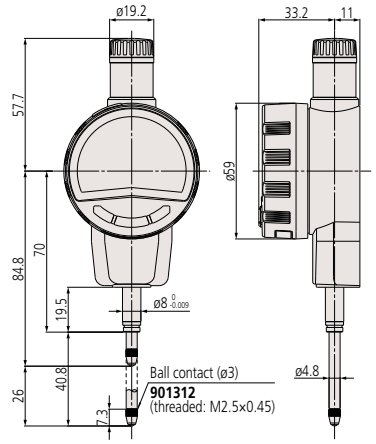
ASME/ANSI/AGD Type



25.4 mm range models

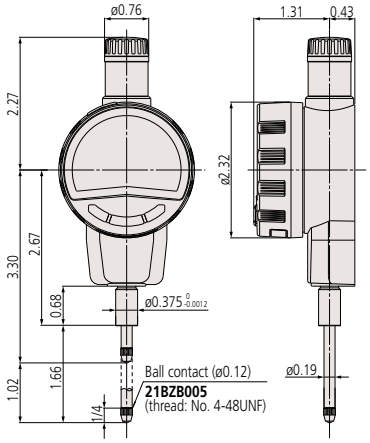
Unit: mm

ISO/JIS Type



Unit: in

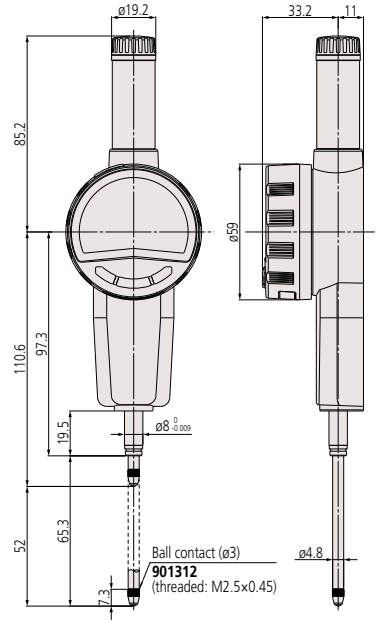
ASME/ANSI/AGD Type



50.8 mm range models

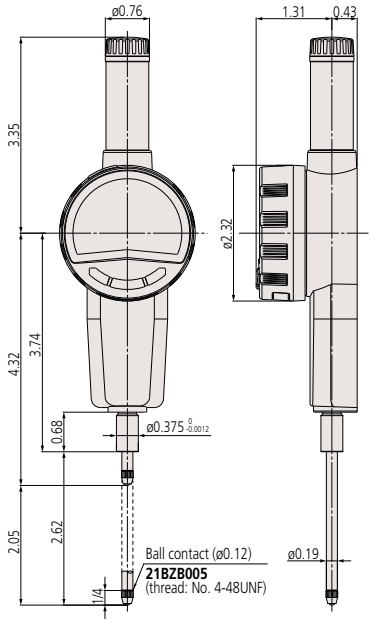
Unit: mm

ISO/JIS Type



Unit: in

ASME/ANSI/AGD Type



Note: Products with a code No. suffixed "**B**" have a plain back, and other models have a center-lug back. Refer to pages 07-69 to 07-70 for details of the backs.

Mitutoyo

ABSOLUTE Digimatic Indicator ID-N/B SERIES 543 — with Dust/Water Protection Conforming to IP66

- Slim body design (body width: only 35 mm). Rated to IP66: Can be used confidently even in adverse environments.
- The ABS (ABSOLUTE) scale restores the last origin position* automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.
- Back plunger design (**ID-B**) is widely used for dial indicators. A 5 mm-stroke plunger with a higher degree of accuracy has been implemented by adopting a direct reading scale for plunger displacement.
- Tolerance judgment can be performed by setting upper and lower tolerance limits.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems. (Refer to page 09-3)

* Refer to "Precautions for use" on page 07-2.

543-575 543-585

SPECIFICATIONS

Metric ISO/JIS Type

Code No.	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Remarks
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)	
543-570	12.7	0.01	0.02	0.02	0.02	0.01	2.5 or less	Slim type
543-580	5.08						2.0 or less	Back Plunger type
543-575	12.7	0.001/0.01 (selectable)	0.003/0.01	0.003/0.01	0.002	0.002	2.5 or less	Slim type
543-585	5.08						2.0 or less	Back Plunger type

Inch/Metric ASME/ANSI/AGD Type

Code No.	Range (in)	Resolution	Maximum permissible error (MPE)*1 (in)			Maximum permissible limit (MPL)	Remarks
			Overall*2	Hysteresis	Repeatability	Measuring force (N)	
543-571	0.5	0.0005 in/ 0.01 mm	±0.0010	0.0010	0.0005	2.5 or less	Slim type
543-581	0.2					2.0 or less	Back Plunger type
543-576	0.5	0.00005/ 0.0005 in, 0.001/ 0.01 mm (selectable)	±0.00010	0.00010	0.00010	2.5 or less	Slim type
543-586	0.2					2.0 or less	Back Plunger type

- Power source: SR44 battery (1 pc.), **938882** included as standard (for operational checks)

*1 These values apply to normal measurements at 20 °C.
*2 Overall magnification and linearity

Bifurcated connection cable with zero-setting terminal (optional)

21EAA210 (1 m), **21EAA211** (2 m)
Two of the wires inside the cable are separated for zero setting without touching the SET switch on the main body.
Use these wires in combination with commercially available switches. Zero setting is performed by briefly connecting these two wires together (less than a second), and ABS preset & recall by connecting for a second or more.

SPC cable

Bifurcated connection cable with zero-setting terminal

MeasurLink® ENABLED Data Management Software by Mitutoyo

ABSOLUTE™

IP66

PROPRIETARY INSPECTION CERTIFICATE

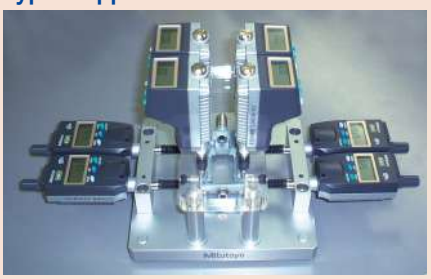
TÜVRheinland CERTIFIED Dust- and Water-Protected www.tuv.com ID 0000007161

Applicable models: **543-57X**

TÜVRheinland CERTIFIED Dust- and Water-Protected www.tuv.com ID 0000007162

Applicable models: **543-58X**

Typical application



Functions

- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment
- Display readout reversal
- Resolution switching (For 0.001 mm or 0.00005 in resolution type)
- Data output
- Display value holding (when no external device is connected)
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
21EAA194	G	Connection cable (1 m)
21EAA190	G	Connection cable (2 m)
06AFM380G	G	USB Input Tool Direct (2 m)
02AZD730G	IP67	**U-WAVE-T**
02AZD880G	Buzzer	**U-WAVE-T**
02AZD790G	G	Connection cable for **U-WAVE-T** (160 mm)
02AZE140G	G	Connection cable for **U-WAVE-T** For foot switch
264-622	IP67	**U-WAVE-TM**
264-623	Buzzer	**U-WAVE-TM**
02AZD810D	—	**U-WAVE-R**
264-626	IP67	**U-WAVE-TMB**
264-627	Buzzer	**U-WAVE-TMB**
02AZF675	—	**U-WAVE-TM/TMB** mounting bracket: for **ID-N** (Slim Type)*

* Cannot be used with **ID-B** (Back Plunger Type) since it may apply stress to the cable.

Typical application

Rated to IP66 water-and dust-proofing standard, and oil resistance improved.

Optional Accessories

- Lug
  21EZA145 (ISO/JIS type)
  21EZA146 (ASME/ANSI/AGD type)
- Contact points for Mitutoyo's Digimatic indicators (optional)
  Refer to pages 07-63 to 07-68 for details.
- Lifting knob (only for **ID-N**)
  21EZA105 (ISO/JIS type)
  21EZA150 (ASME/ANSI/AGD type)
  Spindle can be manually lifted. Remove the spindle cap for **ID-N** and attach the lifting knob to the spindle. Note that water resistance is not maintained in this configuration.

Typical application using the lifting knob

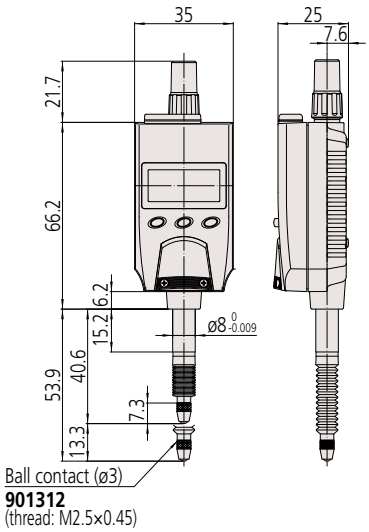
- Rubber boot
  For oil resistance (NBR) **21EAA423** (for **ID-N**)
  21AAB562 (for **ID-B**)
  For durability (silicone) **238774** (for **ID-N**)
  21EAA212 (for **ID-B**)

DIMENSIONS

Slim Type
ID-N

Unit: mm

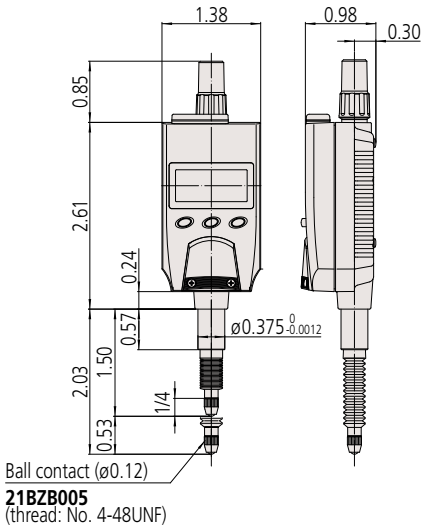
ISO/JIS Type



901312
(thread: M2.5×0.45)

Unit: in

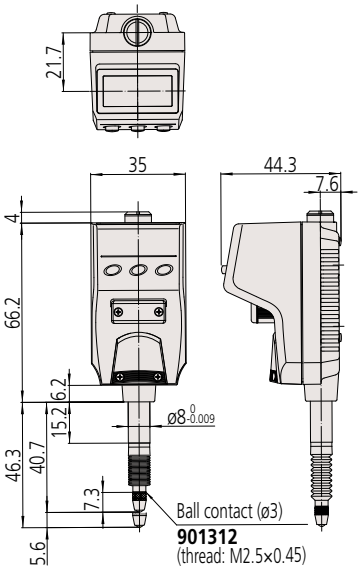
ASME/ANSI/AGD Type



21BZB005
(thread: No. 4-48UNF)

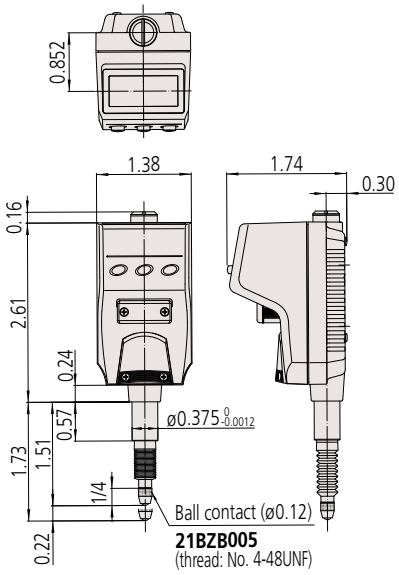
Back plunger Type
ID-B

ISO/JIS Type



901312
(thread: M2.5×0.45)

ASME/ANSI/AGD Type



21BZB005
(thread: No. 4-48UNF)

Mitutoyo

ABSOLUTE Digimatic Indicator ID-SX2 SERIES 543

- A standard model of indicator that is reliable and easy to use with basic functions.
- This model consumes less power than other advanced models and can operate longer without frequent battery replacement.
- The ABS (ABSOLUTE) scale restores the last origin position* automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems. (Refer to page 09-3)

* Refer to "Precautions for use" on page 07-2.

543-781-10

MeasurLink® ENABLED Data Management Software by Mitutoyo

ABSOLUTE™

IP53

PROPRIETARY INSPECTION CERTIFICATE

Applicable models:
See **SPECIFICATIONS**

Functions

- Origin set (Zero-setting)
- Measuring direction switching
- Data output
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
905338	F	Connection cable (1 m)
905409	F	Connection cable (2 m)
06AFM380F	F	USB Input Tool Direct* (2 m)
02AZD790F	F	Connection cable for **U-WAVE-T** (160 mm)
02AZE140F	F	Connection cable for **U-WAVE-T** For foot switch
264-622	IP67	**U-WAVE-TM**
264-623	Buzzer	**U-WAVE-TM**
02AZD810D	—	**U-WAVE-R**
264-626	IP67	**U-WAVE-TMB**
264-627	Buzzer	**U-WAVE-TMB**
02AZF670	—	**U-WAVE-TM/TMB** mounting bracket: for Digimatic Indicators

* Please separately purchase **USB-ITPAK** since there is no data output switch on the measurement instrument. (Refer to pages 09-15 to 09-17 for details.)

- Lifting
  Lifting lever **21EZA198**
  Lifting knob **21EZA105**
  Lifting cable **21JZA295**
  With auto-stop function:
  21JZA301 (overall length 300 mm)
- Contact points for Mitutoyo's Digimatic indicators (optional)
  Refer to pages 07-63 to 07-68 for details.
- Interchangeable back covers (optional)
  Refer to pages 07-69 to 07-70 for details.
- Measuring stands (optional)
  Refer to pages 07-97 to 07-103 for details.

SPECIFICATIONS

Metric ISO/JIS Type

Code No.	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm) Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Maximum permissible limit (MPL) Measuring force (N)	Back type	Battery life*2	Mass (g)	Dust/Water protection level*3
543-790-10	12.7	0.001	0.003	0.003	0.002	0.002	1.5 or less	With lug	Approx. 18,000 hours (Continuous use) Approx. 5 years (Normal use)	150	IP42
543-790B-10								Flat		140	
543-794-10							2.5 or less	With lug		155	IP53
543-794B-10								Flat		155	
543-781-10		0.01	0.02	0.02	0.02	0.01	1.5 or less	With lug	Approx. 20,000 hours (Continuous use) Approx. 5 years (Normal use)	150	IP42
543-781B-10								Flat		140	

Inch/Metric ISO/JIS Type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (mm) Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Maximum permissible limit (MPL) Measuring force (N)	Back type	Battery life*2	Mass (g)	Dust/Water protection level*3
543-791-10	0.5 in/ 12.7 mm	0.00005 in/ 0.001 mm	0.003	0.003	0.002	0.002	1.5 or less	With lug	Approx. 18,000 hours (Continuous use) Approx. 5 years (Normal use)	150	IP42
543-791B-10								Flat		140	
543-795-10							2.5 or less	With lug		155	IP53
543-795B-10								Flat		155	
543-782-10		0.0005 in/ 0.01 mm	0.02	0.02	0.02	0.01	1.5 or less	With lug	Approx. 20,000 hours (Continuous use) Approx. 5 years (Normal use)	150	IP42
543-782B-10								Flat		140	

Inch/Metric ASME/ANSI/AGD Type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (in) Overall*4	Hysteresis	Repeatability	Maximum permissible limit (MPL) Measuring force (N)	Back type	Battery life*2	Mass (g)	Dust/Water protection level*3
543-792-10	0.5 in/ 12.7 mm	0.00005 in/ 0.001 mm	±0.00010	0.00010	0.00010	1.5 or less	With lug	Approx. 18,000 hours (Continuous use) Approx. 5 years (Normal use)	165	IP42
543-792B-10							Flat		140	
543-793-10		0.0001 in/ 0.001 mm					With lug		165	
543-793B-10							Flat		140	
543-796-10		0.00005 in/ 0.001 mm				2.5 or less	With lug		155	IP53
543-796B-10							Flat		155	
543-783-10		0.0005 in/ 0.01 mm	±0.0010	0.0010	0.0005	1.5 or less	With lug	Approx. 20,000 hours (Continuous use) Approx. 5 years (Normal use)	165	IP42
543-783B-10							Flat		140	

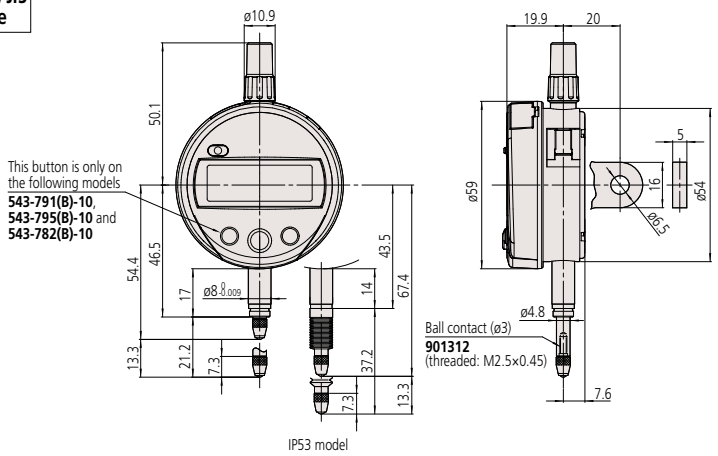
- Display: 6-digit display, sign
- Usable orientation: All
- Position detection method: ABSOLUTE electrostatic linear encoder
- Power source: SR44 battery (1 pc.), **938882** included as standard (for operational checks)
- Response speed: Unlimited (except for scanning measurement)

*1 These values apply to normal measurements at 20 °C.
*2 The battery life varies, depending on the number of times a Digimatic indicator is used as well as the way it is used. The values listed above are approximations.
*3 This is only valid when the data socket cover is in place. Does not apply if the cover is removed, a lifting accessory is attached, or a connection cable is attached.
*4 Overall magnification and linearity

DIMENSIONS

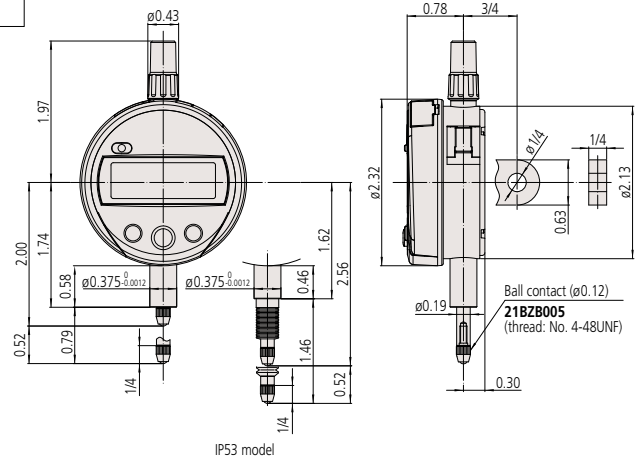
ISO / JIS Type

Unit: mm



ASME / ANSI / AGD Type

Unit: in



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ABSOLUTE™

PROPRIETARY INSPECTION CERTIFICATE

ABSOLUTE Digimatic Indicator ID-U SERIES 575 — Slim and Economical Design

- Cost-effective and user-friendly type with basic functions.
- Battery life: approx. 20,000 hours in continuous use.
- The ABS (ABSOLUTE) scale restores the last origin position* automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems. (Refer to page 09-3)

* Refer to "Precautions for use" on page 07-2.

575-121

Function

- Origin set (Zero-setting)
- Measuring direction switching
- Data output
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
905338	F	Connection cable (1 m)
905409	F	Connection cable (2 m)
06AFM380F	F	USB Input Tool Direct* (2 m)
02AZD730G	IP67	**U-WAVE-T**
02AZD880G	Buzzer	**U-WAVE-T**
02AZD790F	F	Connection cable for **U-WAVE-T** (160 mm)
02AZE140F	F	Connection cable for **U-WAVE-T** For foot switch
02AZD810D	—	**U-WAVE-R**
02AZE200	—	**U-WAVE-T** mounting bracket

* Please separately purchase **USB-ITPAK** since there is no data output switch on the measurement instrument. (Refer to pages 09-15 to 09-17 for details.)

- Spindle lifting cable (stroke: 10 mm): **21JZA295**
- With auto-stop function: **21JZA301** (overall length 300 mm)
- Contact points for Mitutoyo's Digimatic indicators (optional) Refer to pages 07-63 to 07-68 for details.
- Measuring stands (optional) Refer to pages 07-97 to 07-103 for details.

SPECIFICATIONS

Metric ISO/JIS Type

Code No.	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)
575-121	25.4	0.01	0.02	0.02	0.02	0.01	1.8 or less

Inch/Metric ISO/JIS Type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)
575-122	1 in/ 25.4 mm	0.0005 in/ 0.01 mm	0.02	0.02	0.02	0.01	1.8 or less

Inch/Metric ASME/ANSI/AGD type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (in)			Maximum permissible limit (MPL)
			Overall*2	Hysteresis	Repeatability	Measuring force (N)
575-123	1 in/ 25.4 mm	0.0005 in/ 0.01 mm	±0.0010	0.0010	0.0005	1.8 or less

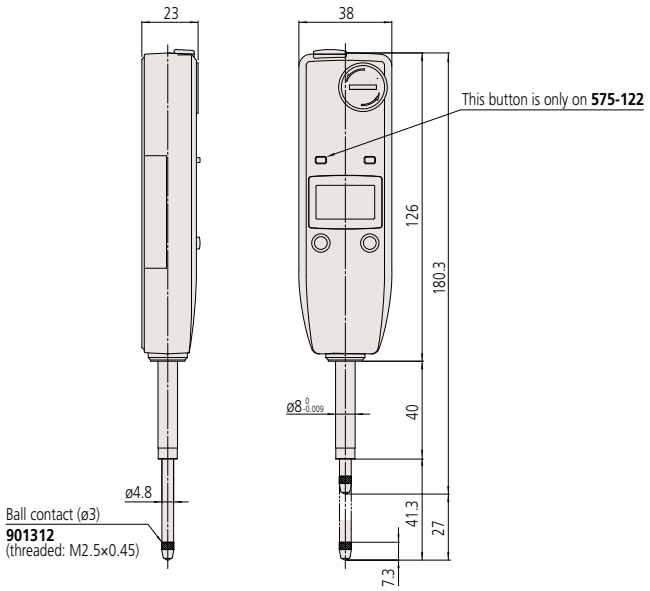
- Display: 5-digit display, sign
- Power source: SR44 battery (1 pc.), **938882** included as standard (for operational checks)
- Battery life: Approx. 20,000 hours of continuous use. Approx. 5 years under normal use.
  Note: It varies depending on use frequency and method. Please take the values as rough indications.
- Lifting lever: **21EAA426** (standard accessory)

*1 These values apply to normal measurements at 20 °C.
*2 Overall magnification and linearity

DIMENSIONS

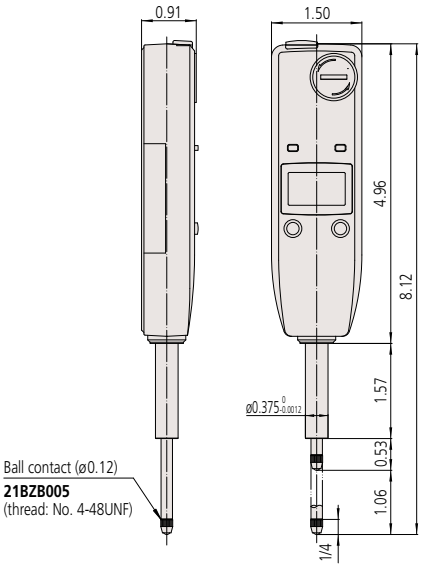
ISO / JIS Type

Unit: mm



ASME / ANSI / AGD Type

Unit: in



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ABSOLUTE™

PROPRIETARY INSPECTION CERTIFICATE

ABSOLUTE Digimatic Indicator ID-CAX SERIES 543 — Peak-Value Hold Type

- The Peak Hold-Type Digimatic Indicator. GO/NG judgment is performed by setting the upper and lower tolerances for max., min. and runout values.*1
- Five buttons, status icons, and clear button indications allow easy operation and various functions.
- Wide display and new analog bar graph are standard on all models.
- The ABS (ABSOLUTE) scale restores the last origin position*2 automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems. (Refer to page 09-3)
- By using the parameter setup kit (optional) and the dedicated software, the functions and the parameters can be configured using a computer.

*1 Tolerance judgment results cannot be output.
*2 Refer to "Precautions for use" on page 07-2.

543-300-10

Functions

- Peak detection (MAX/MIN)
- Runout (MAX - MIN) Hold

Note: Peak detection
1) Sampling rate: 50 readings/s
2) Capturing speed: 50 µm/s (max.)

- Zeroset (INC system)
- Preset function (ABS system)
- Measuring direction switching
- Tolerance judgment (3 pairs of ABS, INC memory function)
- Resolution selection
- Simple calculation f(x) =Ax
- Analog bar resolution selection
- Key lock
- in/mm conversion (inch/mm type)
- Display hold (when no external device is connected)
- Data output
- External PC setting input
- Display rotation (330°)
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
905338	F	Connection cable (1 m)
905409	F	Connection cable (2 m)
06AFM380F	F	USB Input Tool Direct (2 m)
02AZD790F	F	Connection cable for **U-WAVE-T** (160 mm)
02AZE140F	F	Connection cable for **U-WAVE-T** For foot switch
264-622	IP67	**U-WAVE-TM**
264-623	Buzzer	**U-WAVE-TM**
02AZD810D	—	**U-WAVE-R**
264-626	IP67	**U-WAVE-TMB**
264-627	Buzzer	**U-WAVE-TMB**
02AZF670	—	**U-WAVE-TM/TMB** mounting bracket: for Digimatic Indicators

- Lifting
  Lifting lever **21EZA198**
  Lifting knob **21EZA105**
- Parameter setup kit: **21EZA313**

Note: Parameter setting software (can be downloaded for free from the Mitutoyo website) is also required.

Parameter setup kit

Parameter setting software

- Contact points for Mitutoyo's Digimatic indicators (optional)
  Refer to pages 07-63 to 07-68 for details.
- Interchangeable back covers (optional)
  Refer to pages 07-69 to 07-70 for details.
- Measuring stands (optional)
  Refer to pages 07-97 to 07-103 for details.

SPECIFICATIONS

Metric ISO/JIS Type

Code No.	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Battery life (normal use)*2	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)		
543-300-10	12.7	0.001/0.01 (selectable)	0.003	0.003	0.003	0.002	1.5 or less	Approx. 1 year	180
543-300B-10 (flat back)									170

Inch/Metric ISO/JIS Type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Battery life (normal use)*2	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)		
543-301-10	0.5 in/ 12.7 mm	0.00005/ 0.0001/ 0.0005 in, 0.001/ 0.01 mm (selectable)	0.003	0.003	0.003	0.002	1.5 or less	Approx. 1 year	180
543-301B-10 (flat back)									170

Inch/Metric ASME/ANSI/AGD type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (in)			Maximum permissible limit (MPL)	Battery life (normal use)*2	Mass (g)
			Overall*3	Hysteresis	Repeatability	Measuring force (N)		
543-302-10	0.5 in/ 12.7 mm	0.00005/ 0.0001/ 0.0005 in, 0.001/ 0.01 mm (selectable)	±0.00010	0.00010	0.00010	1.5 or less	Approx. 1 year	195
543-302B-10 (flat back)								170

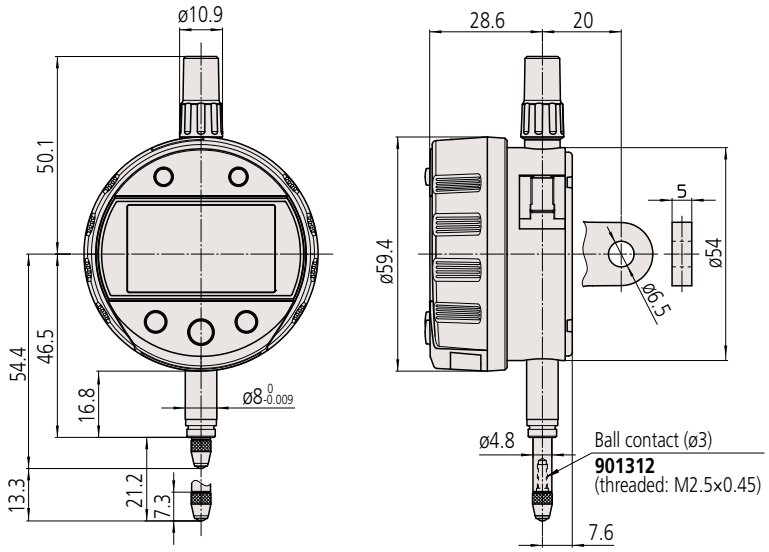
- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)

*1 These values apply to normal measurements at 20 °C.
*2 Applies only if not connected to a data processor. Battery life depends on use of the indicator. Use the above value as a guide only.
*3 Overall magnification and linearity

DIMENSIONS

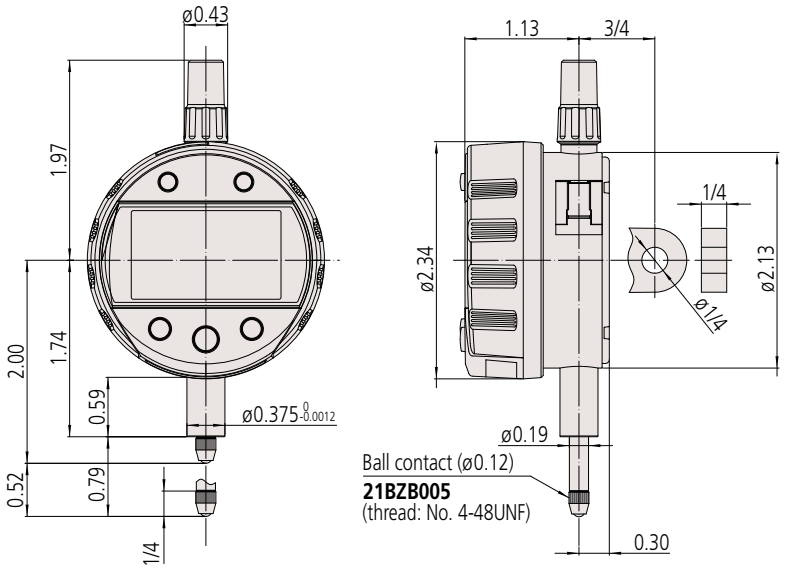
ISO / JIS Type

Unit: mm



ASME / ANSI / AGD Type

Unit: in



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ABSOLUTE™

PROPRIETARY INSPECTION CERTIFICATE

ABSOLUTE Digimatic Indicator ID-CGX SERIES 543 — Bore Gage Type

- Dedicated to inside diameter measurement with minimum-value holding and tolerance judgment functions*.
  Use together with a Mitutoyo bore gage (refer to pages 08-31 to 08-48 for details).
- Five buttons, status icons, and clear button indications allow easy operation and various functions.
- Wide display and analog bar graph are standard on all models.
- Up to three sets of master values and upper/lower tolerance values can be stored to simplify the master setting.
- By using the parameter setup kit (optional) and the dedicated software, the functions and the parameters can be configured using a computer.

* Tolerance judgment results cannot be output.

543-310B-10

Example of use with a bore gage (sold separately)

SPECIFICATIONS

Metric ISO/JIS Type

Code No.	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Battery life (normal use)*2	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)		
543-310B-10	12.7	0.001/0.01 (selectable)	0.003	0.003	0.003	0.002	1.5 or less	Approx. 1 year	170

Inch/Metric ISO/JIS Type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Battery life (normal use)*2	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)		
543-311B-10	0.5 in/ 12.7 mm	0.00005/ 0.0001/ 0.0005 in, 0.001/ 0.01 mm (selectable)	0.003	0.003	0.003	0.002	1.5 or less	Approx. 1 year	170

Inch/Metric ASME/ANSI/AGD type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (in)			Maximum permissible limit (MPL)	Battery life (normal use)*2	Mass (g)
			Overall*3	Hysteresis	Repeatability	Measuring force (N)		
543-312B-10	0.5 in/ 12.7 mm	0.00005/ 0.0001/ 0.0005 in, 0.001/ 0.01 mm (selectable)	±0.00010	0.00010	0.00010	1.5 or less	Approx. 1 year	170

- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)

*1 These values apply to normal measurements at 20 °C.
*2 Applies only if not connected to a data processor. Battery life depends on use of the indicator. Use the above value as a guide only.
*3 Overall magnification and linearity
Note: Flat-back type only.

Functions

- Minimum value detection

Note: Peak detection
1) Sampling rate: 50 readings/s
2) Capturing speed: 50 µm/s (max.)

- Preset (3 Preset values can be stored)
- Tolerance judgment (3 sets of upper and lower limits can be stored)
- Resolution selection
- Analog bar resolution selection
- Key lock
- Display hold (when no external device is connected)
- Data saving/calling (when no external device is connected)
- Data output
- External PC setting input
- Display rotation (330°)
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Refer to page 07-13.

- Parameter setup kit (optional)
  Refer to page 07-13 for details.

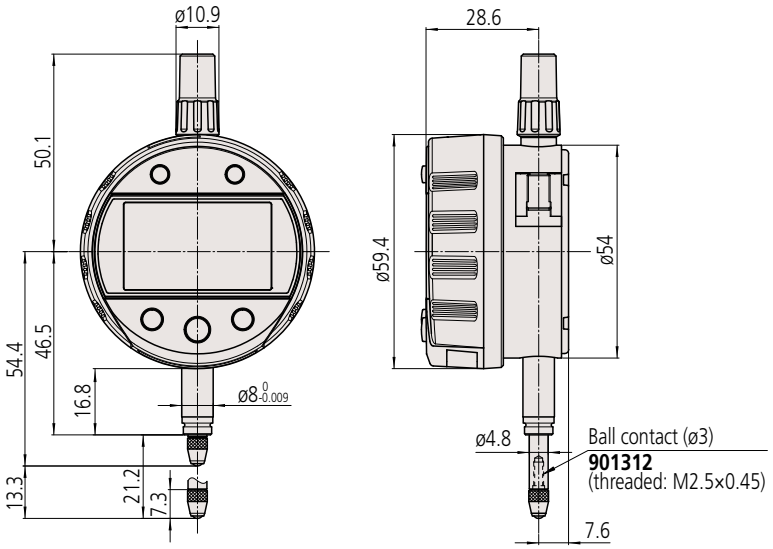
The ABSOLUTE Digimatic Bore Gage

ABSOLUTE Digimatic Bore Gages, which integrate the display with a bore gage measuring unit, are also available. Refer to pages 08-49 and 08-50 for details.

DIMENSIONS

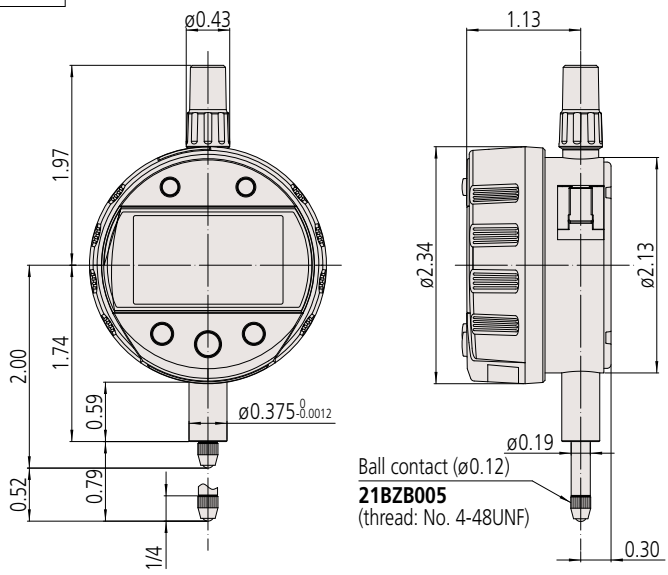
ISO / JIS Type

Unit: mm



ASME / ANSI / AGD Type

Unit: in



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Data Management Software by Mitutoyo

ABSOLUTE™

PROPRIETARY INSPECTION CERTIFICATE

ABSOLUTE Digimatic Indicator ID-CRX SERIES 543 — Calculation Type

- This expandable indicator incorporates an internal calculation function that operates from plunger displacement. Using dedicated fixtures and setting the calculation coefficients, you can read your measurements directly without the need for conversions.
- By using the parameter setup kit (optional) and the dedicated software, the functions and the parameters can be configured using a computer.
- Five buttons, status icons, and clear button indications allow easy operation and various functions.

543-342B-10

SPECIFICATIONS

Metric ISO/JIS Type

Code No.	Range (mm)	Resolution (selectable)	Maximum permissible error (MPE)*1*2 (mm)				Maximum permissible limit (MPL)	Battery life (normal use)*4	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)		
543-340B-10	12.7	12 steps*4	0.003	0.003	0.003	0.002	1.5 or less	Approx. 1 year	170
543-590B-10	25.4						1.8 or less*3		190
543-595B-10	50.8		0.006	0.006			2.3 or less*3		260

Inch/Metric ISO/JIS Type

Code No.	Range	Resolution (selectable)	Maximum permissible error (MPE)*1*2 (mm)				Maximum permissible limit (MPL)	Battery life (normal use)*4	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)		
543-341B-10	0.5 in/ 12.7 mm	12 steps*4	0.003	0.003	0.003	0.002	1.5 or less	Approx. 1 year	170
543-591B-10	1 in/ 25.4 mm						1.8 or less*3		190
543-596B-10	2 in/ 50.8 mm		0.006	0.006			2.3 or less*3		260

Inch/Metric ASME/ANSI/AGD type

Code No.	Range	Resolution (selectable)	Maximum permissible error (MPE)*1*2 (in)			Maximum permissible limit (MPL)	Battery life (normal use)*4	Mass (g)
			Overall*5	Hysteresis	Repeatability	Measuring force (N)		
543-342B-10	0.5 in/ 12.7 mm	12 steps*4	±0.00010	0.00010	0.00010	1.5 or less	Approx. 1 year	170
543-592B-10	1 in/ 25.4 mm					1.8 or less*3		190
543-597B-10	2 in/ 50.8 mm		±0.00025			2.3 or less*3		260

- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)

*1 These values apply to normal measurements at 20 °C.
*2 Valid for resolution set to 0.001 mm/0.00005 in and coefficients A=1, B=0 and C=0.
*3 Applies for a spindle orientation between the spindle pointing vertically downward to the spindle horizontal.
*4 Applies only if not connected to a data processor. Battery life depends on use of the indicator. Use the above value as a guide only.
*5 Overall magnification and linearity
Note: Flat-back type only.

Typical application

Functions

- Calculation f (x') =Ax'+B+Cx'$^{-1}$ (x'=x+offset)
- Peak detection (MAX/MIN)
- Runout (MAX - MIN) Hold

Note: Peak detection
1) Sampling rate: 10 readings/s
2) Capturing speed: 10 µm/s (max.)
Settings can be changed to:
1) Sampling rate: 50 readings/s
2) Capturing speed: 50 µm/s (max.)

- Zero-setting (INC system)
- Preset (ABS system)
- Tolerance judgment (3 pairs of ABS, INC memory function)
- Analog bar resolution selectable
- Key lock
- Display hold (when no external device is connected)
- Data output
- External PC setting input
- Display rotation (330°)
- Low battery voltage alarm display
- Error alarm display
- Resolution switching*

Resolution (mm)		
0.0002	0.005	0.1
0.0005	0.01	0.2
0.001	0.02	0.5
0.002	0.05	1

Resolution (in)		
0.00001	0.0002	0.005
0.00002	0.0005	0.01
0.00005	0.001	0.02
0.0001	0.002	0.05

* Since the calculation resolution is one micrometer (0.001 mm), using sub-micrometer resolution settings may result in the 4th-place digit being unreliable, particularly when B is set to a very low value and C=0. It does not change at all with certain combinations of calculation coefficient (for example, A=1, B=C=0). The 3rd-place digit representing micrometers (if displayed) is always reliable.

Optional Accessories

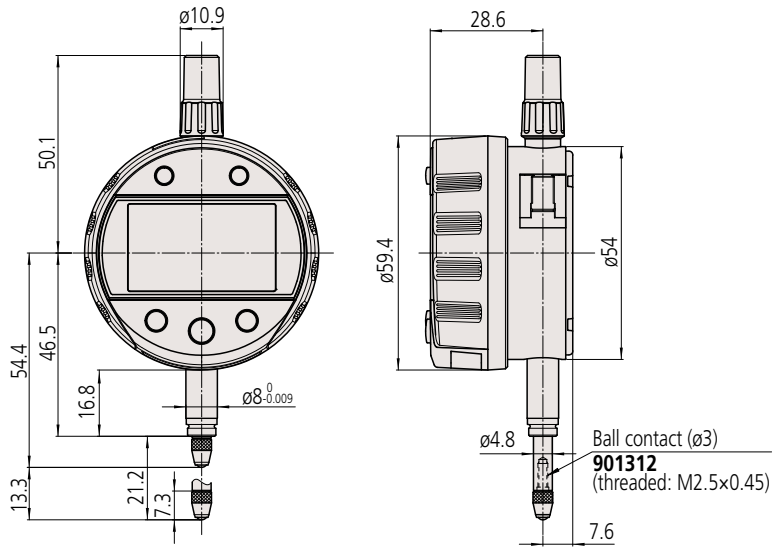
Refer to page 07-13.

- Lifting
  Lifting lever **21EZA198** (12.7 mm/0.5 inch type)
  Lifting knob **21EZA105** (12.7 mm/0.5 inch type)
  21EZA197 (25.4 mm/1 inch type)
  21EZA200 (50.8 mm/2 inch type)
- Parameter setup kit (optional)
  Refer to page 07-13 for details.

DIMENSIONS

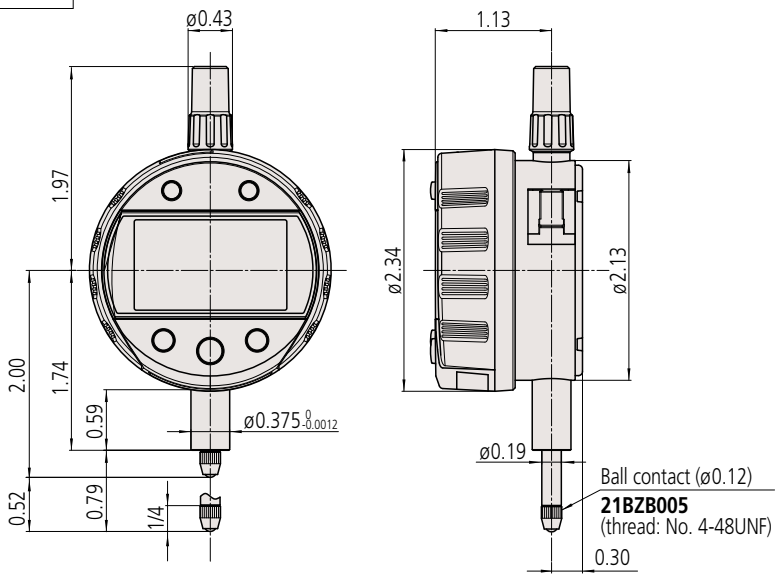
ISO / JIS Type

Unit: mm

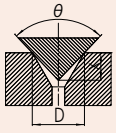
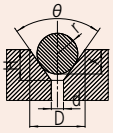
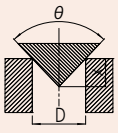
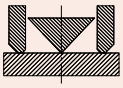
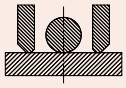
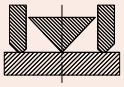


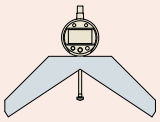
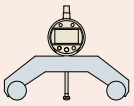
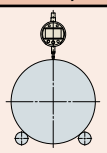
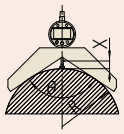
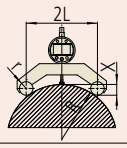
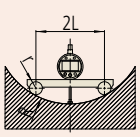
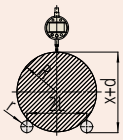
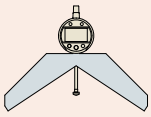
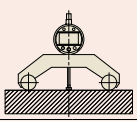
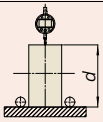
ASME / ANSI / AGD Type

Unit: in



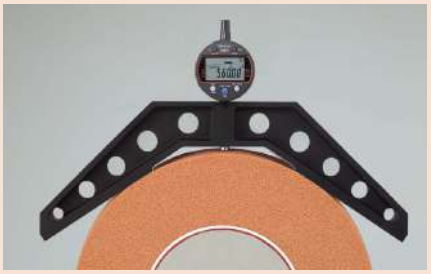
Examples of measuring various features

Item		D=Countersink diameter/Groove width; H=Countersink depth/Groove depth			
Fixture type*1					
Contact point		Cone	Ball		Cone
Measuring method x: Spindle displacement					
Calculation		D=Ax	D=Ax+B	H=Ax+B	D=Ax
Coefficient values	A	$-2tan\frac{\theta}{2}$	$-2tan\frac{\theta}{2}$	-1	$-2tan\frac{\theta}{2}$
	B	0	$2r\left(\frac{1}{\cos\frac{\theta}{2}}-tan\frac{\theta}{2}\right)$	$r\left(\frac{1}{\sin\frac{\theta}{2}}-1\right)-\frac{d}{2tan\frac{\theta}{2}}$	0
	C	0	0	0	0
Origin offset value (function ON/OFF)	d	0 (OFF)	0 (OFF)	0 (OFF)	0 (OFF)
ORIGIN-set position (x=0 position)					
Displayed measurement value at ORIGIN-set position (Value displayed when x=0)		0	Value of coefficient B	0	0

Item		R=Outside radius of round object		R=Inside radius of round object	R=Outside radius of round object
Fixture type*1					
Contact point		—			
Measuring method x: Spindle displacement					
Calculation		R=Ax	R=Ax+B+Cx^{-1}		R=A(x+d)+B+C(x+d)$^{-1}$
Coefficient values	A	$-\frac{sin\frac{\theta}{2}}{1-sin\frac{\theta}{2}}$	$\frac{1}{2}$	$-\frac{1}{2}$	$\frac{1}{2}$
	B	0	$-r$	r	$-r$
	C	0	$\frac{L^2}{2}$	$-\frac{L^2}{2}$	$\frac{L^2}{2}$
Origin offset value (function ON/OFF)	d	0 (OFF)	0 (OFF)	0 (OFF)	d (ON)
ORIGIN-set position (x=0 position)					
Displayed measurement value at ORIGIN-set position (Value displayed when x=0)		0	Err 30*2 (Overflow error of Display value)		Depends on value of d

*1 A dedicated fixture for a workpiece can be made to order.
*2 The error is cleared when the measured value returns to the displayable range as a result of moving the spindle.

Typical applications



ABSOLUTE™ PROPRIETARY INSPECTION CERTIFICATE

IP54

Functions

- Signal output
  (–NG/OK/+NG, N-ch open drain, logical invert is available)
- Remote control (peak start preset/zero-set)
- Peak detection (MAX/MIN)
- Runout range measurement (MAX - MIN)
- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment (3 pairs of ABS, INC memory function)
- Resolution switching
- Simple calculation: f(x) =Ax
- Key lock
- Calibration mode (Signal output in Digimatic code format)
- Error alarm display

Optional Accessories

- Lifting*
  Lifting lever **21EZA198**
  Lifting knob **21EZA105**

* Dust-water protection is not guaranteed.

- Digimatic power supply unit: **21EZA345**
  To denote your AC power cable add the following suffixes to the code No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for KC. **No suffix** is required for JIS/100VAC.
  Used in the calibration mode when executing automatic inspection using i-Checker **IC2000**.
  In such a case, purchase connection cable **21EAA194** (1 m), or **21EAA190** (2 m).

Note: It can't be used as a power source when using in the normal mode.

- Contact points for Mitutoyo's Digimatic indicators (optional)
  Refer to pages 07-63 to 07-68 for details.
- Interchangeable back covers (optional)
  Refer to pages 07-69 to 07-70 for details.

Output signals and display

Wire	– NG	OK	+ NG	ABS data composition error
Orange (– NG)	Low	High	High	High
Green (OK)	High	Low	High	High
Brown (+ NG)	High	High	Low	High
LED	Red	Green	Red	Red flashing
Display	◀	○	▶	"x.xxE" indication

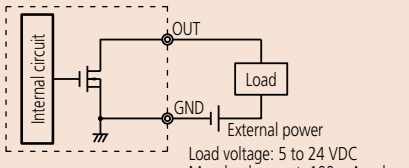
Note: Logical invert is available.

I/O Specifications

Wire	Signal	I/O	Description
Black	– V (GND)	—	Connected to minus (-) terminal
Red	+ V	—	Power supply (5 to 24 VDC)
Orange	– NG	O	Tolerance judgment result output: Only the terminal corresponding to a judgment result is set to the low level.
Green	OK	O	
Brown	+ NG	O	
Yellow	PRESET_RECALL ZERO	I	External input terminal: If the relevant terminal is set to the low level, its signal becomes true.
Blue	PEAK_START	I	
Shield	FG	—	Connected to GND (Earth)

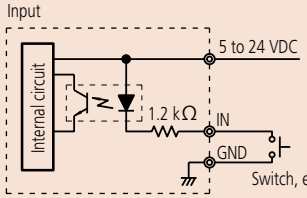
Note: Measurement data cannot be output.

Output



Load voltage: 5 to 24 VDC
Max. load current: 100 mA or less

Input



Input current: Max. 20 mA

ABSOLUTE Digimatic Indicator ID-CJX
SERIES 543 — Signal Output Function Type

- Enables the GO/NG judgment result to be output to external equipment. Output is enabled by directly connecting to an external device such as a sequencer, contributing to automation of measurement processes. It also supports logical invert of signal output.
- The GO/NG judgment result is also indicated by the green/red LED and the signs on display.
- A peak detection function is equipped for measuring and judging peak values such as runout.
- The ABS (ABSOLUTE) scale restores the last origin position* automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.

* Refer to "Precautions for use" on page 07-2.

543-350-10

SPECIFICATIONS

Metric ISO/JIS Type

Code No.	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)	
543-350-10	12.7	0.001/0.01 (selectable)	0.003	0.003	0.003	0.002	2.5 or less	295
543-350B-10 (flat back)								285

Inch/Metric ISO/JIS Type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)	
543-351-10	0.5 in/ 12.7 mm	0.00005/ 0.0001/ 0.0005 in, 0.001/ 0.01 mm (selectable)	0.003	0.003	0.003	0.002	2.5 or less	295
543-351B-10 (flat back)								285

Inch/Metric ASME/ANSI/AGD type

Code No.	Range	Resolution	Maximum permissible error (MPE)*1 (in)			Maximum permissible limit (MPL)	Mass (g)
			Overall*2	Hysteresis	Repeatability	Measuring force (N)	
543-352-10	0.5 in/ 12.7 mm	0.00005/ 0.0001/ 0.0005 in, 0.001/ 0.01 mm (selectable)	±0.00010	0.00010	0.00010	2.5 or less	295
543-352B-10 (flat back)							285

*1 These values apply to normal measurements at 20 °C.
*2 Overall magnification and linearity
Note 1: Display readout does not rotate.
Note 2: MAX/MIN holding: sample rate is 100 readings/s; max. rate of change of reading is 100 µm/s or less.
Note 3: Standard contact point: **901312** (ISO/JIS type), **21BZB005** (ANSI/AGD type)

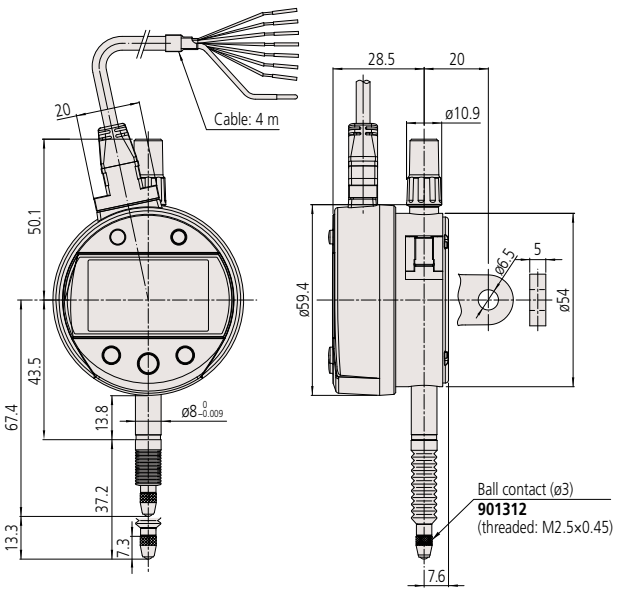
Mitutoyo

ABSOLUTE Digimatic Indicator ID-CJX
SERIES 543 — Signal Output Function Type

DIMENSIONS

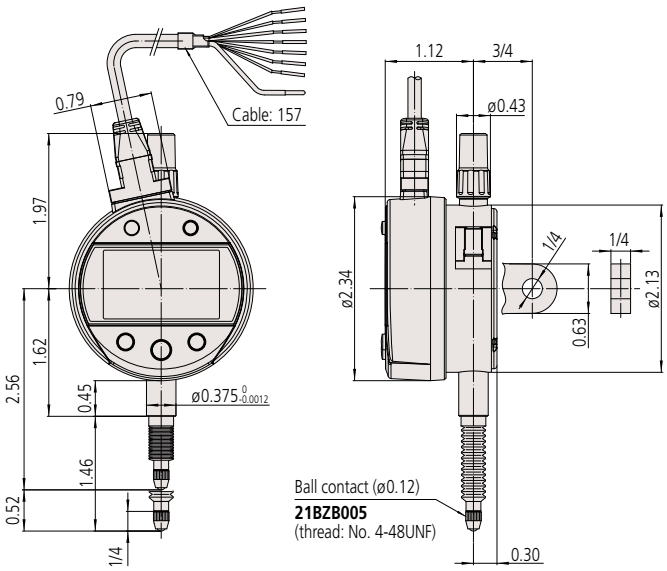
ISO / JIS Type

Unit: mm



ASME / ANSI / AGD Type

Unit: in



MeasurLink® ENABLED
Data Management Software by Mitutoyo

PROPRIETARY INSPECTION CERTIFICATE

Digimatic Indicator ID-H
SERIES 543 — High Accuracy and High Functionality Type

- This digital indicator offers the excellent accuracy, functionality and high resolution expected with top-of-the-line indicators.
- Take advantage of its high accuracy backed up by 0.5 µm resolution, remote control functionality via a handheld controller (or an RS-232C interface) and easy runout measurements with the well-established analog bar display.
- The maximum, minimum, or runout value (MAX - MIN) can be measured.
- An advanced, remote control system can be implemented with the built-in RS-232C interface and a PC.
- With the optional remote controller, operations such as zero-setting and presetting can be made without touching the indicator body, thereby enabling more stable and high accuracy measurement.

Remote controller (optional)

543-563

Application example using comparator stand

Comparator stand
215-505-10

Optional Accessories

Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
936937	D	Connection cable (1 m)
965014	D	Connection cable (2 m)
06AFM380D	D	USB Input Tool Direct (2 m)
02AZD730G	IP67	**U-WAVE-T**
02AZD880G	Buzzer	**U-WAVE-T**
02AZD790D	D	Connection cable for **U-WAVE-T** (160 mm)
02AZE140D	D	Connection cable for **U-WAVE-T** For foot switch
02AZD810D	—	**U-WAVE-R**
02AZE200	—	**U-WAVE-T** mounting bracket

- Remote controller: **21EZA099**
- Lifting cable: **21JZA295** (stroke 30 mm)
- With auto-stop function:
  21JZA301 (overall length 300 mm)
- Lifting knob: **21EZA101**

- RS-232C Connection cable (2 m): **21EAA131**
- Lug-on-center back:
  101040 (ISO/JIS type)
  101306 (ASME/ANSI/AGD type)
- Contact points for Mitutoyo's Digimatic indicators (optional)
  Refer to pages 07-63 to 07-68 for details.
- Granite comparator stands (optional)
  Refer to page 07-101 for details.
- Comparator stands (optional)
  Refer to page 07-102 for details.

SPECIFICATIONS

Metric ISO/JIS Type

Code No.*2	Range (mm)	Resolution (mm)	Maximum permissible error (MPE)*1 (mm)				Maximum permissible limit (MPL)	Mass (g)
			Partial measuring range P_{MPE}	Total measuring range E_{MPE}	Hysteresis H_{MPE}	Repeatability R_{MPE}	Measuring force (N)	
543-561	30.48	0.0005/ 0.001 (selectable)	0.0015	0.0015	0.0015	0.001	2.0 or less	290
543-563	60.96		0.0025	0.0025	0.0025		2.5 or less	305

Inch/Metric ASME/ANSI/AGD Type

Code No.*2	Range	Resolution	Maximum permissible error (MPE)*1 (in)			Maximum permissible limit (MPL)	Mass (g)
			Overall*3	Hysteresis	Repeatability	Measuring force (N)	
543-562	1.2 in/ 30.48 mm	0.00002/ 0.00005/ 0.0001 in, 0.0005/ 0.001 mm (selectable)	±0.00006	0.00006	0.00004	2.0 or less	300
543-564	2.4 in/ 60.96 mm		±0.00010	0.00010		2.5 or less	

- Display: 7-digit display, sign, and analog bar with 2-color backlight
- Power source: 5.9 V DC (via AC adapter) **06AGZ369***
  * To denote your AC power cable add the following suffixes to the code No.: **JA** for UL/CSA and PSE, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC
- Position detection method: Photoelectric-type reflection linear encoder
- Response speed: Approx. 1000 mm/s
- Lifting lever: **21EAA426** (standard accessory)

*1 These values apply to normal measurements at 20 °C.
*2 To denote your AC power cable add the following suffixes to the code No.: **A** for UL/CSA, **D** for CEE, **DC** for CCC, **E** for BS, **K** for KC, **No suffix** is required for JIS/100 V
*3 Overall magnification and linearity
Note 1: The indicator can output SPC (Digimatic) data consisting of up to 6 digits in full. If the data consists of 7 digits the first digit is not output (example: 123.4565 mm is output as 23.4565 mm).
Note 2: Regarding origin setting, refer to "Precautions for use" on page 07-2.
Note 3: The orientation for use can be from vertical (contact point pointing downward) to horizontal (spindle in horizontal orientation).

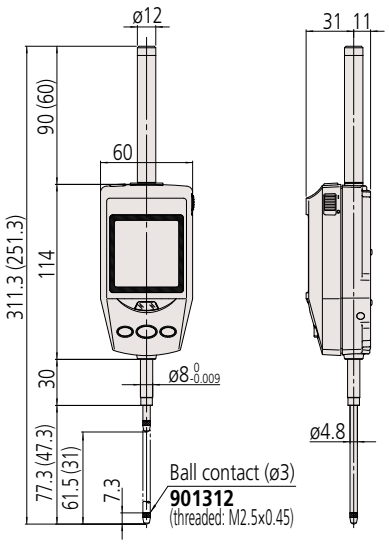
Mitutoyo

Digimatic Indicator ID-H
SERIES 543 — High Accuracy and High Functionality Type

DIMENSIONS

ISO / JIS Type

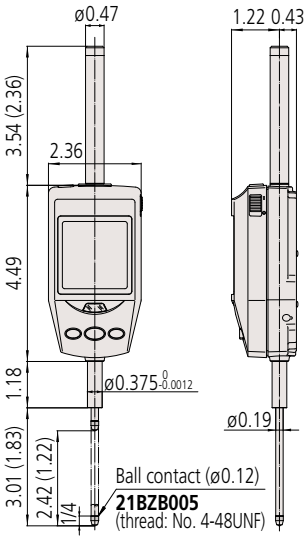
Unit: mm



Note: ( ) = **543-561**

ASME / ANSI / AGD Type

Unit: in



Note: ( ) = **543-562**

MeasurLink® ENABLED
Data Management Software by Mitutoyo

EC Counter
SERIES 542 — Low-cost, Modular Type Display Unit

Functions
- Preset
- Tolerance judgment (3 steps)

- The counter can be connected to a gage that has a data output function, such as a Digimatic indicator or linear gage.
- 3 sets of limiting values can be displayed and output.
- Compact size (DIN 96×48 mm)

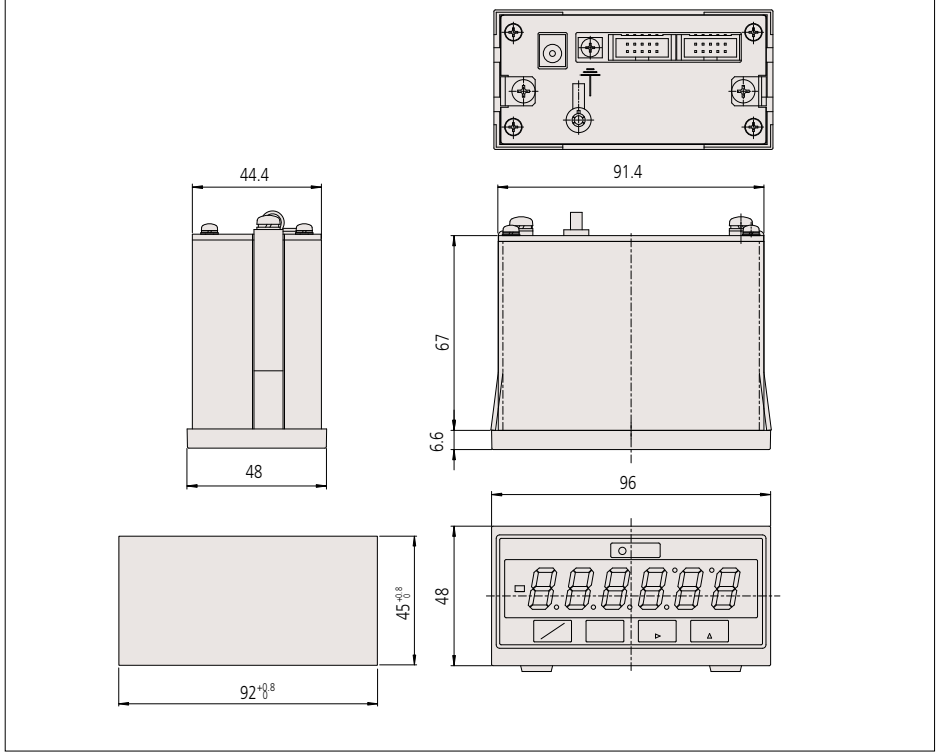
542-007

SPECIFICATIONS

Code No.		542-007*
Resolution ( ) indicates maximum display range		0.01 mm (±9999.99)/0.0005 in (±99.9995 in)/0.001 in (±999.999 in) 0.001 mm (±9999.999)/0.00005 in (±9.99995 in)/0.0001 in (±99.999 in) [automatic setting by gage]
Tolerance judgment display		LED display (3 steps: Amber, Green, Red)
External output (switching type)	Tolerance judgment output	–NG, OK, +NG (open-collector)
	Data output	Digimatic output
Control input		External PRESET, external HOLD
Operating temperature		0 to 40 °C (RH 20 to 80%, no condensation)
Storage temperature		–10 to 50 °C (RH 20 to 80%, no condensation)
External dimensions		96 (W) ×48 (H) ×84.6 (D) mm
Power Source		AC adapter: **12BAR954** AC cable: **12BAK729** (Japan), **12BAK730** (U.S.), **12BAK731** (EU), **12BAK734** (UK), **12BAK732** (China), **12BAK733** (Korea)
Standard Accessories		AC adapter, AC cable, rubber feet
Mass		500 g

DIMENSIONS

Unit: mm



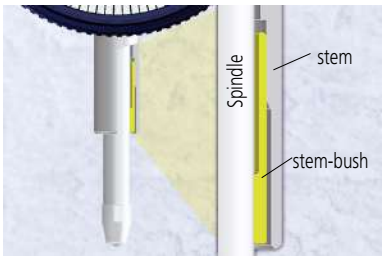
Mitutoyo

Dial Indicators

Mitutoyo 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.

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.

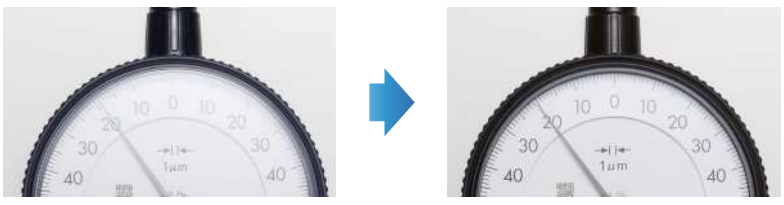


- Revolutionary stem-bush design for trouble-free stem clamping (longer clamping range; maximum tightening torque at the clamping point with M5 screw: 150 N•cm).

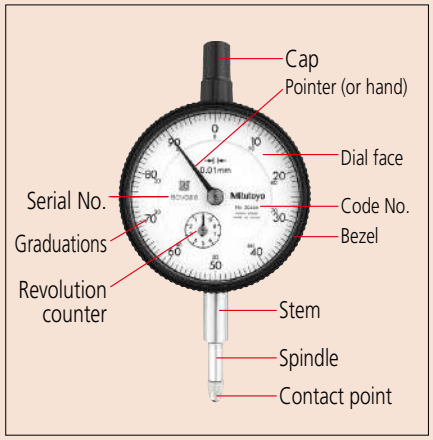
- The spindle lifting lever (optional: **21EZA198**) can be attached to either the right or left side providing high operability and smooth movement. This lever can be easily installed and removed.

- The optional limit hands (1) can be moved without interfering with the optional bezel clamp (2).

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



<Conventional model> <New model>



Parts of a dial indicator

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.

SERIES 2 — Standard Type, 0.01 mm Graduation

- This model is the most popular Mitutoyo indicator with excellent accuracy and durability. Standard 0.01 mm graduation dial indicators have a bezel with an outside diameter of 57 mm.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.

2046A

SPECIFICATIONS

Metric

ISO/JIS type

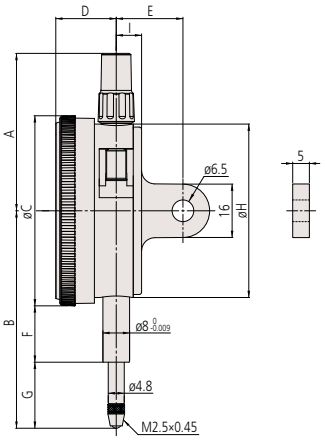
Code No.		Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Dial reading	Measuring force (N)
				Indication error				Hysteresis	Repeat-ability		
w/lug	Flat-back			1/10 Rev	1/2 Rev	1 Rev	Measuring range				
2046A	**2046AB**	0.01	10 (1)	5	9	10	13	3	3	±0-100	1.4 or less
2046A-09	**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.

DIMENSIONS

ISO/JIS Type

Unit: mm



Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2046A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	144	135
2046A-09	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	146	137
2047A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	144	135
2902A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	144	135
2310A-10	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	146	137
2044A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	145	136
2044A-09	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	147	138
2045A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	145	136

Note: Refer to pages 07-63 to 07-68 for details of contact points.

SERIES 2 — Standard Type, 0.01 mm Graduation

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

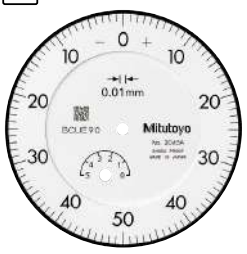
Continuous scale

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

FEATURES

Metric

ISO/JIS type

Code No. w/lug	Code No. Flat-back								
2046A	2046AB	✔			✔		✔		
2046A-09	2046AB-09	✔			✔				
2047A	2047AB		✔				✔		
2902A	2902AB			✔			✔		
2310A-10	2310AB-10	✔						✔	✔
2044A	2044AB	✔					✔		
2044A-09	2044AB-09	✔			✔				
2045A	2045AB		✔				✔		

Optional Accessories

• Limit hand (2 pcs.): **21AZB195**

• Bezel clamp: **21AZB148**

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

- Standard 0.001 mm and 0.005 mm graduation dial indicators have a bezel with an outside diameter of 57 mm. These indicators provide excellent accuracy and durability.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The indicator uses jeweled bearings, providing excellent indication sensitivity and durability.

2109A-10

SPECIFICATIONS

Metric

ISO/JIS type

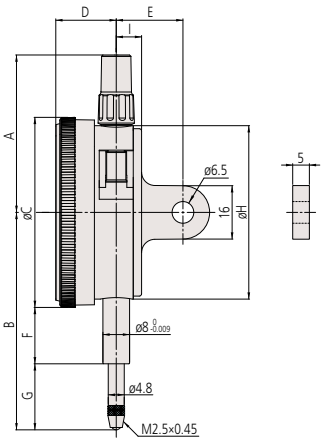
Code No.		Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Dial reading	Measuring force (N)
				Indication error				Hysteresis	Repeat-ability		
w/lug	Flat-back			1/10 Rev	1/2 Rev	1 Rev	Measuring range				
2109A-10	**2109AB-10**	0.001	1 (0.2)	2	3	4	5	2	0.5	0-100-0	1.5 or 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.

DIMENSIONS

ISO/JIS Type

Unit: mm

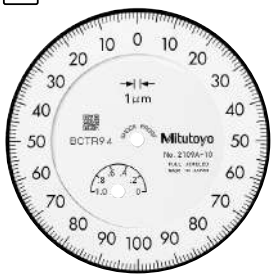


Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2109A-10	47.2	60.5	57	18.1	20	16.9	15.1	52	7.6	148	139
2110A-10	47.2	66.5	57	18.1	20	16.9	21.1	52	7.6	149	140
2113A-10	47.2	61	57	18.1	20	16.9	15.6	52	7.6	148	139
2118A-10	47.2	60.7	57	18.1	20	16.9	15.3	52	7.6	146	137
2119A-10	47.2	60.7	57	18.1	20	16.9	15.3	52	7.6	146	137
2124A-10	47.2	60.7	57	18.1	20	16.9	15.3	52	7.6	146	137

Note: Refer to pages 07-63 to 07-68 for details of contact points.

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

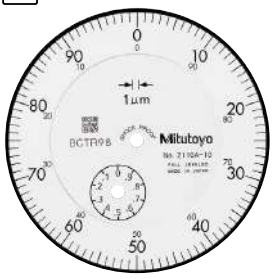
Balanced scale



Graduation: 0.001 mm,
Measuring range: 1 mm

2109A-10
Shockproof
Jeweled bearing

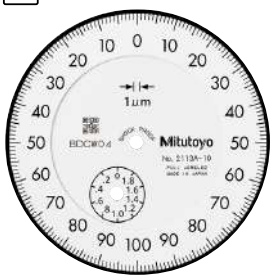
Continuous scale



Graduation: 0.001 mm,
Measuring range: 1 mm

2110A-10
Double scale spacing
Shockproof
Jeweled bearing

Balanced scale



Graduation: 0.001 mm,
Measuring range: 2 mm

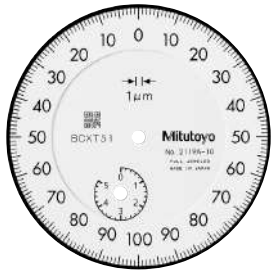
2113A-10
Shockproof
Jeweled bearing

Continuous scale

Graduation: 0.001 mm,
Measuring range: 5 mm

2118A-10
Jeweled bearing

Balanced scale



Graduation: 0.001 mm,
Measuring range: 5 mm

2119A-10
Jeweled bearing

Continuous scale

Graduation: 0.005 mm,
Measuring range: 5 mm

2124A-10
Jeweled bearing

FEATURES

Metric

ISO/JIS type

Code 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	✔				✔	

Optional Accessories

- Limit hand (2 pcs.), Bezel clamp
Refer to page 07-27 for details.

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

- Standard 0.01 mm and 0.001 mm graduation dial indicators have a highly water-resistant bezel with an outside diameter of 57 mm.
- O-rings and rubber bellows are used to prevent water and oil penetration.
- Excellent in accuracy and durability.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.

2046A-60

SPECIFICATIONS

Metric

ISO/JIS type

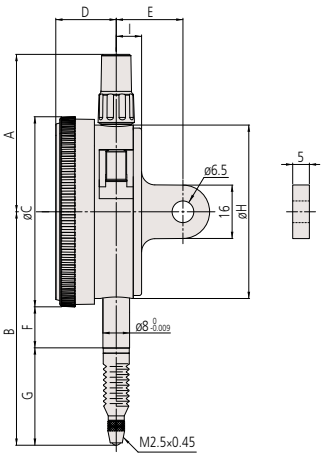
Code No.		Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Dial reading	Measuring force (N)
				Indication error				Hysteresis	Repeat-ability		
w/lug	Flat-back			1/10 Rev	1/2 Rev	1 Rev	Measuring range				
2046A-60	**2046AB-60**	0.01	10 (1)	5	9	10	13	3	3	±0-100	2.5 or less
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.

DIMENSIONS

ISO/JIS Type

Unit: mm



Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2046A-60	47.2	74.7	57	18.1	20	12.3	33.9	52	7.6	147	138
2044A-60	47.2	70	57	18.1	20	12.3	29.2	52	7.6	147	138
2109A-70	47.2	65.3	57	18.1	20	12.3	24.5	52	7.6	149	140
2110A-70	47.2	67.5	57	18.1	20	12.3	26.7	52	7.6	150	141

Note: Refer to pages 07-63 to 07-68 for details of contact points.

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

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

FEATURES

Metric

ISO/JIS type

Code No.								
w/lug	Flat-back							
2046A-60	2046AB-60	✔			✔	✔		
2044A-60	2044AB-60	✔			✔	✔		
2109A-70	2109AB-70		✔	✔	✔		✔	
2110A-70	2110AB-70	✔		✔	✔		✔	✔

Optional Accessories

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

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

21AZB148

SERIES 2 — Standard Type, Inch Reading

SPECIFICATIONS

Inch

ANSI/AGD type

Code 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

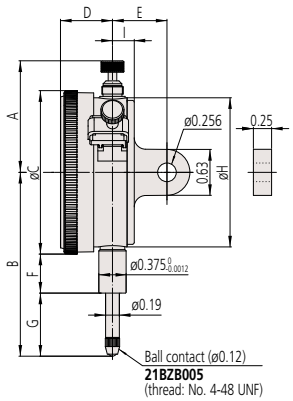
Code No.								
w/lug	Flat-back							
2414A	**2414AB**				✔		✔
2415A	**2415AB**					✔	✔
2914A	**2914AB**		✔				✔
2506A	**2506AB**				✔		✔
2507A	**2507AB**					✔	✔
2514A	**2514AB**				✔		✔
2922A	**2922AB**					✔	✔
2356A-10	**2356AB-10**			✔	✔		✔
2358A-10	**2358AB-10**			✔	✔		✔
2802A-10	**2802AB-10**	✔		✔	✔		
2803A-10	**2803AB-10**	✔		✔		✔	
2804A-10	**2804AB-10**	✔		✔	✔		
2805A-10	**2805AB-10**	✔		✔		✔	
2905A-10	**2905AB-10**	✔	✔	✔			
2923A-10	**2923AB-10**	✔		✔		✔	

SERIES 2 — Standard Type, Inch Reading

DIMENSIONS

ANSI / AGD Type

Unit: in



Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2414A	1.53	2.52	2.24	0.71	3/4	0.54	0.87	2.05	0.30	164	139
2415A	1.53	2.52	2.24	0.71	3/4	0.54	0.87	2.05	0.30	164	139
2914A	1.53	2.52	2.24	0.71	3/4	0.54	0.87	2.05	0.30	164	139
2506A	1.86	2.14	2.24	0.71	3/4	0.54	0.48	2.05	0.30	164	139
2507A	1.86	2.14	2.24	0.71	3/4	0.54	0.48	2.05	0.30	164	139
2514A	1.53	2.52	2.24	0.71	3/4	0.54	0.87	2.05	0.30	164	139
2922A	1.86	2.14	2.24	0.71	3/4	0.54	0.48	2.05	0.30	164	139
2356A-10	1.86	2.25	2.24	0.71	3/4	0.54	0.59	2.05	0.30	163	138
2358A-10	1.53	2.50	2.24	0.71	3/4	0.54	0.85	2.05	0.30	164	139
2802A-10	1.86	2.02	2.24	0.71	3/4	0.54	0.37	2.05	0.30	164	139
2803A-10	1.86	2.02	2.24	0.71	3/4	0.54	0.37	2.05	0.30	164	139
2804A-10	1.86	2.04	2.24	0.71	3/4	0.54	0.38	2.05	0.30	166	141
2805A-10	1.86	2.04	2.24	0.71	3/4	0.54	0.38	2.05	0.30	166	141
2905A-10	1.86	2.04	2.24	0.71	3/4	0.54	0.38	2.05	0.30	164	139
2923A-10	1.86	2.04	2.24	0.71	3/4	0.54	0.38	2.05	0.30	164	139

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

One revolution type Back Plunger dial gages are also available. (Refer to pages 07-59 to 07-62 for details.)

2990A-10

- The one revolution dial indicator prevents the possibility of reading errors.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The red dead zone in the middle of the dial face is separated from the bezel and doesn't cover the graduations. Therefore, users can always see the range where accuracy is not guaranteed even if the bezel is rotated.

2900A-10

SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (μm) Indication error 1/10 Rev	1/2 Rev	1 Rev	Measuring range	Hysteresis	Repeat-ability	Dial reading	Measuring force (N)
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

Inch

Code No. w/lug	Code No. Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy (in) First 1 Rev/2.5 Rev/10 Rev	Retrace	Repeat-ability (in)	Dial reading	Measuring force (N)
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.

Special specifications

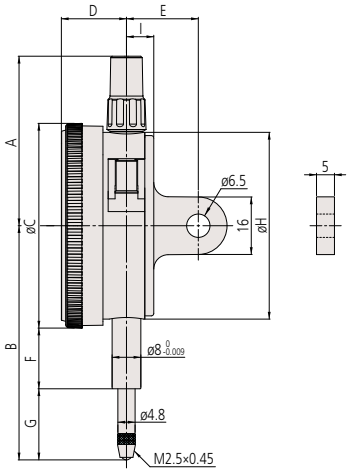
Upon request, we can manufacture custom types with changed graduation numbers, graduation lines, dead zones, etc. Please contact your local Mitutoyo Sales Office for more information.

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

DIMENSIONS

ISO / JIS Type

Unit: mm

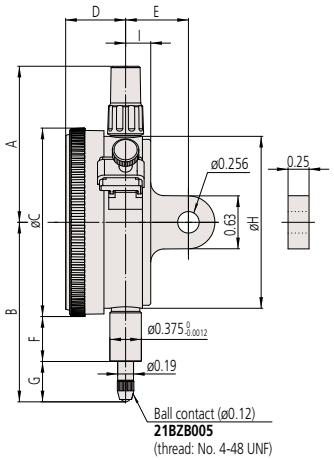


Code No.	A	B	C	D	E	F	G	H	I	Mass (g) w/lug	Mass (g) Flat-back
2928A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	145	136
2929A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	145	136
2929A-62	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	145	136
2959A	47.2	65.2	57	18.1	20	16.9	19.8	52	7.6	145	136
2900A-10	47.2	66	57	18.1	20	16.9	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 07-63 to 07-68 for details of contact points.

ANSI / AGD Type

Unit: in



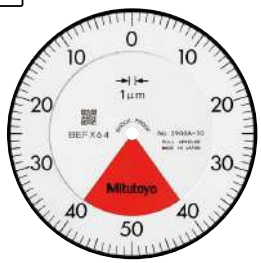
Code No.	A	B	C	D	E	F	G	H	I	Mass (g) w/lug	Mass (g) Flat-back
2909A-62	1.86	2.04	2.24	0.71	3/4	0.54	0.39	2.05	0.30	163	138
2910A-10	1.86	2.02	2.24	0.71	3/4	0.54	0.36	2.05	0.30	164	139

Note: Refer to pages 07-63 to 07-68 for details of contact points.

Optional Accessories

- Limit hand (2 pcs.), Bezel clamp
  Refer to page 07-31 for details.

Balanced scale

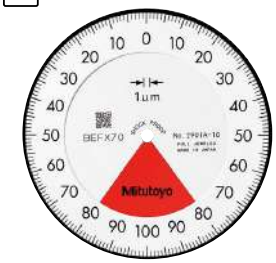


Graduation: 0.001 mm, Measuring range: 0.08 mm

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

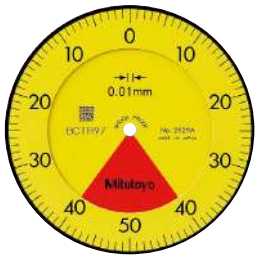
2901A-10
- One revolution
- Shockproof
- Jeweled bearing

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

FEATURES

Metric ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. 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

Code No. w/lug	Code No. Flat-back						
2909A-62	2909AB-62	✔	✔	✔		✔	
2910A-10	2910AB-10	✔	✔	✔			✔

IP64

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

- The one revolution dial indicator with improved water resistance prevents the possibility of reading errors.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- It is highly durable thanks to a hardened stainless-steel stem and spindle, carbide probe, and a large gear made of wear- and deformation-resistant materials.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The red dead zone in the middle of the dial face is separated from the bezel and doesn't cover the graduations. Therefore, users can always see the range where accuracy is not guaranteed even if the bezel is rotated.

2929A-60

SPECIFICATIONS

ISO/JIS type ANSI/AGD type

Metric

Code No.		Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Dial reading	Measuring force (N)
				Indication error				Hysteresis	Repeat-ability		
w/lug	Flat-back			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

Inch

Code 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.

Special specifications

Upon request, we can manufacture custom types with changed graduation numbers, graduation lines, dead zones, etc. Please contact your local Mitutoyo Sales Office for more information.

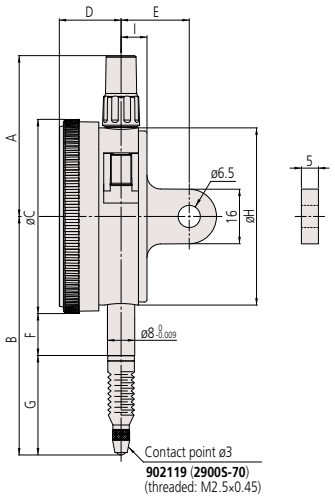
Optional Accessories

- Limit hand (2 pcs.), Bezel clamp
  Refer to page 07-31 for details.

DIMENSIONS

ISO / JIS Type

Unit: mm

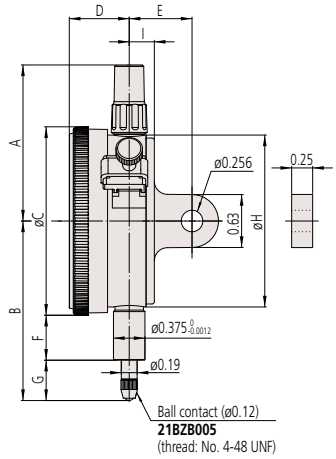


Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2929A-60	47.2	70	57	18.1	20	12.3	29.2	52	7.6	146	137
2900A-70	47.2	67	57	18.1	20	12.3	26.2	52	7.6	150	141

Note: Refer to pages 07-63 to 07-68 for details of contact points.

ANSI / AGD Type

Unit: in



Code 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 07-63 to 07-68 for details of contact points.

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

Balanced scale

Graduation: 0.001 mm,
Measuring range: 0.08 mm

2900A-70

- One revolution
- Shockproof
- Waterproof
- Jeweled bearing

Balanced scale

Graduation: 0.01 mm,
Measuring range: 0.8 mm

2929A-60

- One revolution
- Shockproof
- Waterproof

FEATURES

Metric

ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back						
2929A-60	2929AB-60	✔	✔	✔	✔		
2900A-70	2900AB-70	✔	✔	✔	✔		✔

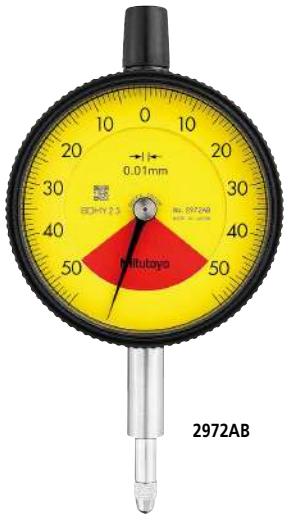
Inch

Code No. w/lug	Code No. Flat-back						
2910A-72	2910AB-72	✔	✔	✔		✔	✔

PROPRIETARY INSPECTION CERTIFICATE

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

- The one revolution dial indicator (lightweight type) prevents the possibility of reading errors.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- Lightweight type (70 g).
- It is highly durable thanks to a hardened stainless-steel stem and spindle, carbide probe, and a large gear made of wear- and deformation-resistant materials.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The red dead zone in the middle of the dial face is separated from the bezel and doesn't cover the graduations. Therefore, users can always see the range where accuracy is not guaranteed even if the bezel is rotated.



2972AB

SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm) Indication error 1/10 Rev	1/2 Rev	1 Rev	Measuring range	Hysteresis	Repeat-ability	Dial reading	Measuring force (N)
—	**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

Inch

Code No. w/lug	Code No. Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy (in) First 1 Rev/2.5 Rev/10 Rev	Accuracy (in) Retrace	Repeat-ability (in)	Dial reading	Measuring force (N)
—	**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.

Special specifications

Upon request, we can manufacture custom types with changed graduation numbers, graduation lines, dead zones, etc. Please contact your local Mitutoyo Sales Office for more information.

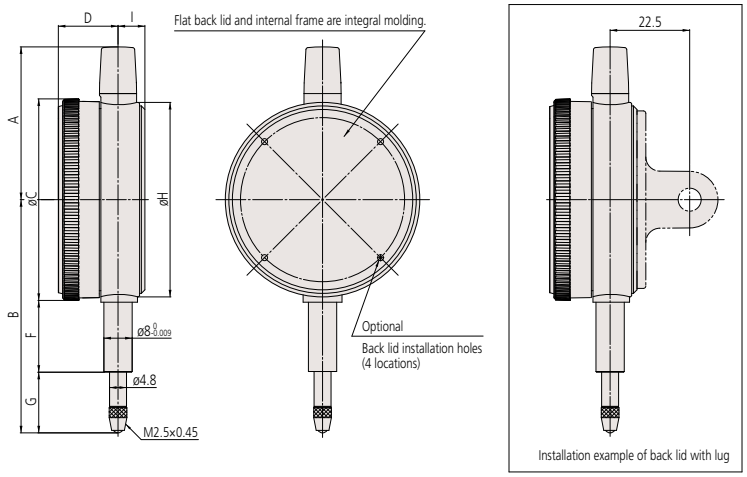
Mitutoyo

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

DIMENSIONS

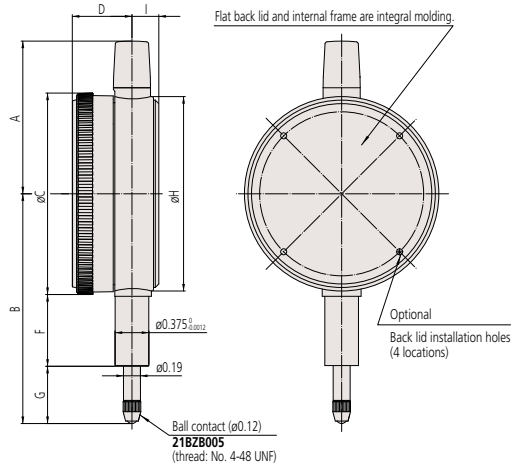
ISO / JIS Type

Unit: mm



ANSI / AGD Type

Unit: in



Note 1: When installing an optional back (refer to pages 07-69 to 07-70 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

Code 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

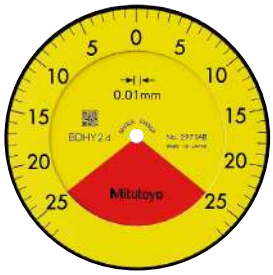
Code No.	A	B	C	D	F	G	H	I	Mass (g)
2976AB	1.70	2.55	2.24	0.67	0.80	0.63	2.17	0.30	70
2977AB	1.70	2.56	2.24	0.67	0.80	0.64	2.17	0.30	
2978AB	1.70	2.57	2.24	0.67	0.80	0.65	2.17	0.30	

Note: Refer to pages 07-63 to 07-68 for details of contact points.

Optional Accessory

• Limit hand (2 pcs.): **21AZB195**

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

FEATURES

Metric ISO/JIS type ANSI/AGD type

Code No.					
w/lug	Flat-back				
—	**2971AB**	✔	✔	✔	✔
—	**2972AB**	✔	✔	✔	✔
—	**2973AB**	✔	✔	✔	✔

Inch

Code No.					
w/lug	Flat-back				
—	**2976AB**	✔	✔	✔	✔
—	**2977AB**	✔	✔	✔	✔
—	**2978AB**	✔	✔	✔	✔

SERIES 2 — Long Stroke Type

- Long stroke dial indicators with measuring range of 20 mm or more have a ø57 mm bezel.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The lifting lever (optional) cannot be used with models that are water-proof or which have a measurement range of 30 mm.

SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code No.		Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Dial reading	Measuring force (N)
				Indication error				Hysteresis	Repeat-ability		
w/lug	Flat-back			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

Code 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			
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 (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 (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.

Optional Accessories

• Limit hand (2 pcs.): **21AZB195**

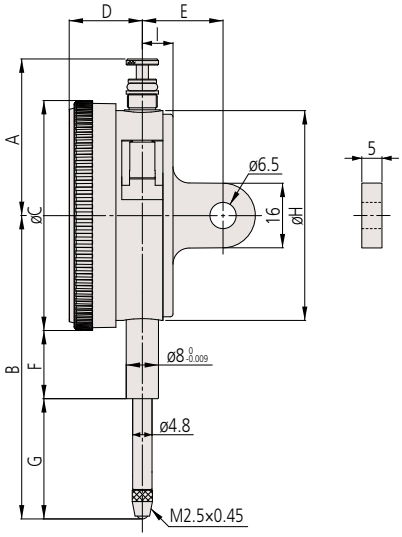
• Bezel clamp: **21AZB148** (for metric type)
21RZA065 (for inch type)
21RZA067 (for **2424A(B)-19**)

21AZB148

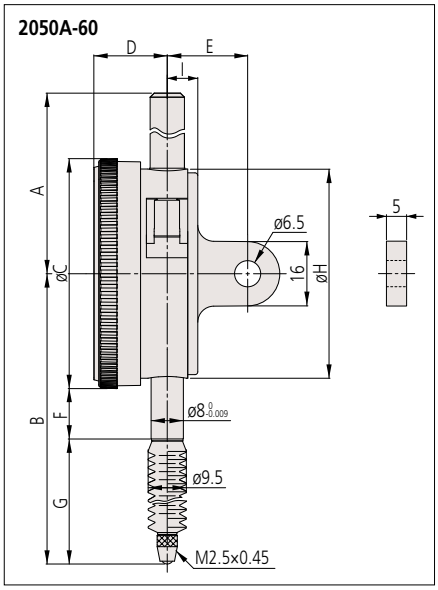
DIMENSIONS

ISO / JIS Type

Unit: mm



2050A-60



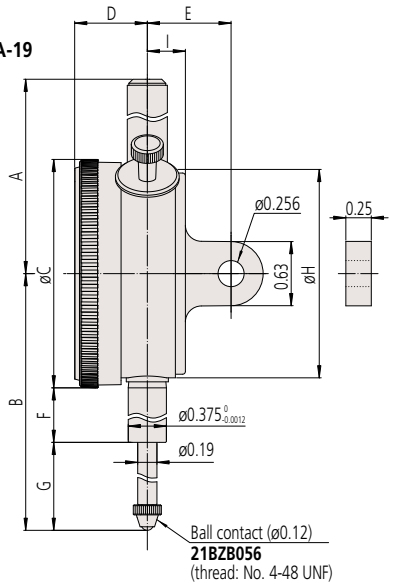
Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2050A	38.5	75.2	57	18.1	20	16.9	29.8	52	7.6	149	140
2050A-60	58.2	87.2	57	18.1	20	12.3	46.4	52	7.6	155	146
2050A-19	38.5	75.2	57	18.1	20	16.9	29.8	52	7.6	149	140
2320A-10	38.5	75.2	57	18.1	20	16.9	29.8	52	7.6	150	141
2052A	38.5	88.7	57	18.1	20	16.9	43.3	52	7.6	152	143
2052A-19	38.5	88.7	57	18.1	20	16.9	43.3	52	7.6	152	143
2330A-10	38.5	88.7	57	18.1	20	16.9	43.3	52	7.6	153	144
2952A	38.5	88.7	57	18.1	20	16.9	43.3	52	7.6	152	143

Note: Refer to pages 07-63 to 07-68 for details of contact points.

ANSI / AGD Type

2424A-19

Unit: in



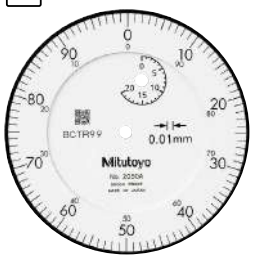
Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2416A	1.53	3.02	2.24	0.71	3/4	0.54	1.37	2.05	0.30	164	139
2416A-06	1.53	3.02	2.24	0.71	3/4	0.54	1.37	2.05	0.30	164	139
2416A-10	1.53	3.02	2.24	0.71	3/4	0.54	1.37	2.05	0.30	164	139
2417A	1.53	3.02	2.24	0.71	3/4	0.54	1.37	2.05	0.30	164	139
2424A-19	4.67	5.61	2.24	0.71	5/6	2.14	2.35	2.05	0.37	248	239
2776A	1.53	3.02	2.24	0.71	3/4	0.54	1.37	2.05	0.30	164	139
2904A	1.53	3.02	2.24	0.71	3/4	0.54	1.37	2.05	0.30	164	139

Note: Refer to pages 07-63 to 07-68 for details of contact points.

Mitutoyo

SERIES 2 — Long Stroke Type

Continuous scale



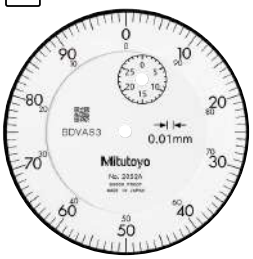
Graduation: 0.01 mm,
Measuring range: 20 mm

2050A
- With damper at lowest rest point

2050A-19
- Shockproof
- Jeweled bearing
- With damper at lowest rest point

2050A-60
- Waterproof

Continuous scale

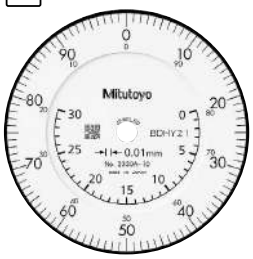


Graduation: 0.01 mm,
Measuring range: 30 mm

2052A
- With damper at lowest rest point

2052A-19
- Shockproof
- Jeweled bearing
- With damper at lowest rest point

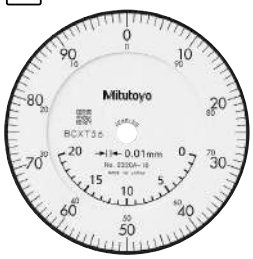
Continuous scale



Graduation: 0.01 mm,
Measuring range: 30 mm

2330A-10
- With coaxial revolution counter
- With damper at lowest rest point
- Jeweled bearing

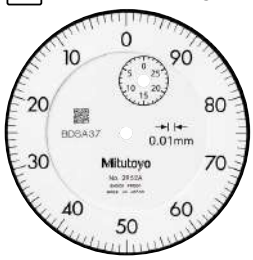
Continuous scale



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

FEATURES

Metric — ISO/JIS type / ANSI/AGD type

Code No. w/lug	Code No. Flat-back								
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			✔			✔		

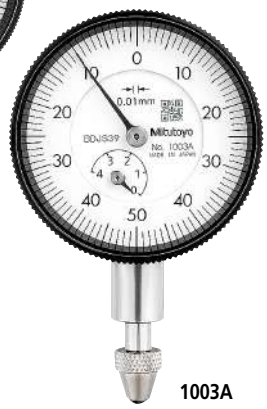
Inch

Code No. w/lug	Code No. Flat-back							
2416A	2416AB	✔						
2416A-06	2416AB-06	✔						
2416A-10	2416AB-10	✔				✔		
2417A	2417AB		✔					
2424A-19	2424AB-19	✔		✔		✔		✔
2776A	2776AB	✔						
2904A	2904AB				✔			

SERIES 1 — Compact Type, Extra Small Diameter

- These compact, space-saving dial indicators make it easy to incorporate into gaging jigs.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.

1911A-10



1003A

SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm) Indication error 1/10 Rev	1/2 Rev	1 Rev	Measuring range	Hysteresis	Repeat-ability	Dial reading	Measuring force (N)
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

Code No. w/lug	Code No. Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy (in) First 1 Rev/2.5 Rev/10 Rev	Retrace	Repeat-ability (in)	Dial reading	Measuring force (N)
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/±0.005/—	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.

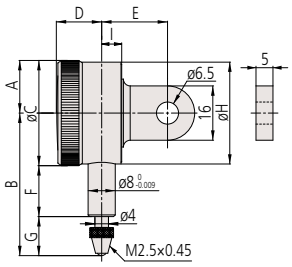
SERIES 1 — Compact Type, Extra Small Diameter

DIMENSIONS

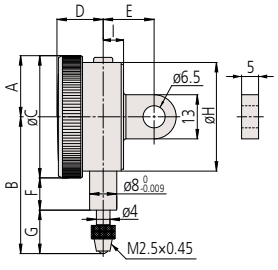
ISO/JIS Type Unit: mm

ANSI/AGD Type Unit: in

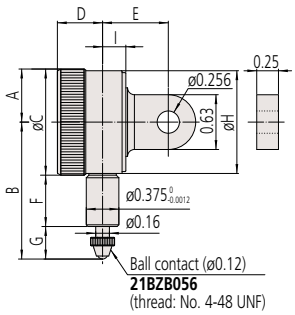
1911A-10/1913A-10



1003A



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



Metric Unit: mm

Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
1911A-10	15.5	42	31	12.7	19.4	15.1	11.5	30	6	55	51
1913A-10	15.5	39.5	31	12.7	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

Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
1921A-10	0.61	1.58	1.22	0.5	3/4	0.59	0.37	1.18	0.27	55	51
1923A-10	0.61	1.51	1.22	0.5	3/4	0.59	0.31	1.18	0.27	55	51
1925A-10	0.61	1.48	1.22	0.5	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. When replacing it with an optional contact point with a connector not exceeding ø7 mm in outside diameter, insert a washer (with ø7 mm outside diameter, ø3 mm inside diameter, and approximately 0.5 mm thickness) above the contact point.

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

Balanced scale

Graduation: 0.01 mm,
Measuring range: 2.5 mm

1911A-10

Jeweled bearing

Balanced scale

Graduation: 0.002 mm,
Measuring range: 0.5 mm

1913A-10

Jeweled bearing

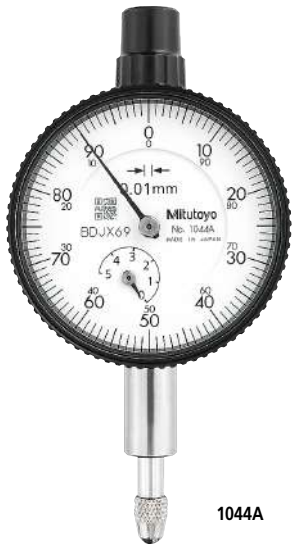
Balanced scale

Graduation: 0.01 mm,
Measuring range: 4 mm

1003A

SERIES 1 — Compact Type, Small Diameter

- Compact dial indicators ideal for restricted-space applications in gaging jigs.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.



1044A

SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm) Indication error 1/10 Rev	1/2 Rev	1 Rev	Measuring range	Hysteresis	Repeat-ability	Dial reading	Measuring force (N)
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

Code No. w/lug	Code No. Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy (in) First 1 Rev/2.5 Rev/10 Rev	Retrace	Repeat-ability (in)	Dial reading	Measuring force (N)
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

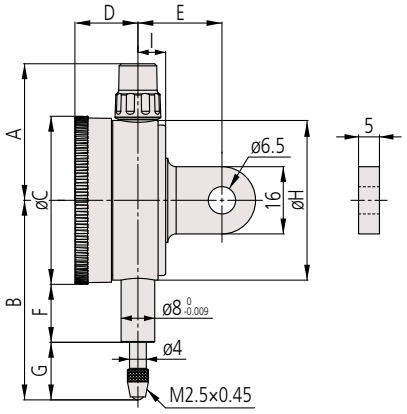
Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

SERIES 1 — Compact Type, Small Diameter

DIMENSIONS

ISO / JIS Type

Unit: mm

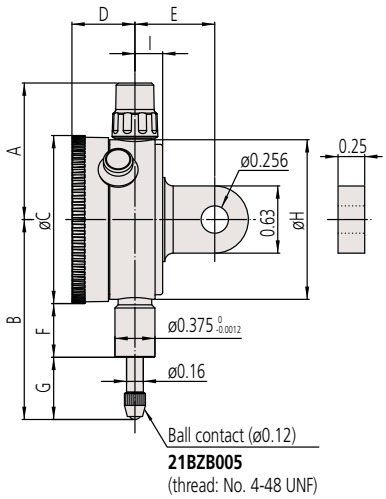


Code No.	A	B	C	D	E	F	G	H	I
1013A-10	32.5	49	40	15	20	13.8	15.2	38	6.6
1040A	32.5	46	40	15	20	13.8	12.2	38	6.6
1041A	32.5	46	40	15	20	13.8	12.2	38	6.6
1044A	32.5	47.5	40	15	20	13.8	13.7	38	6.6
1044A-15*	32.5	47.5	40	15	20	13.8	13.7	38	6.6
1044A-60	32.5	57	40	15	20	12.2	24.8	38	6.6
1045A	32.5	47.5	40	15	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

* Use in the vertical orientation (contact point downward) for the low measuring force model.
Note: Refer to pages 07-63 to 07-68 for details of contact points.

ANSI / AGD Type

Unit: in



Code 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 07-63 to 07-68 for details of contact points.

Optional Accessories

• Limit hand (2 pcs.): **21AAB363**

• Bezel clamp: **21RZA149**

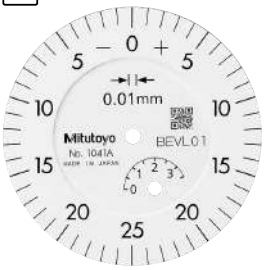
Continuous scale

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

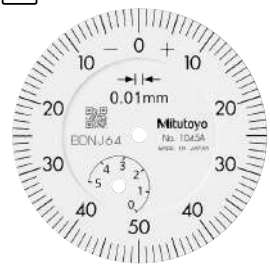
Graduation: 0.01 mm, Measuring range: 5 mm

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

Continuous scale

Graduation: 0.01 mm, Measuring range: 5 mm

1044A-60

Waterproof

FEATURES

Metric — ISO/JIS type — ANSI/AGD type

Code No. w/lug	Code No. 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

Code No. w/lug	Code No. 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

- The one revolution dial indicator (compact type) prevents the possibility of reading errors.
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.
- The red dead zone in the middle of the dial face is separated from the bezel and doesn't cover the graduations. Therefore, users can always see the range where accuracy is not guaranteed even if the bezel is rotated.

1929A

One revolution type Back Plunger dial gages are also available. (Refer to pages 07-59 to 07-62 for details.)

2990A-10

SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (μm) Indication error 1/10 Rev	1/2 Rev	1 Rev	Measuring range	Hysteresis	Repeat-ability	Dial reading	Measuring force (N)
1929A	**1929AB**	0.01	1 (1.4)	7	—	—	11	4	3	50-0-50	1.4 or less
1929A-62	**1929AB-62**	0.01	1 (1.4)	7	—	—	11	4	3	50-0-50	1.4 or less
1900A-10	**1900AB-10**	0.001	0.1 (0.14)	2.5	—	—	5	2	1	50-0-50	1.5 or less
1900A-72	**1900AB-72**	0.001	0.1 (0.14)	2.5	—	—	5	2	1	50-0-50	1.5 or less

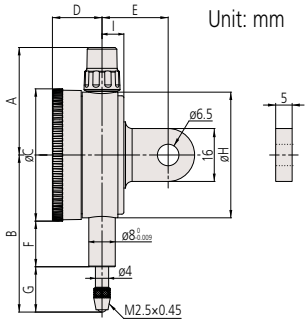
Inch

Code No. w/lug	Code No. Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy (in) First 1 Rev/2.5 Rev/10 Rev	Retrace	Repeat-ability (in)	Dial reading	Measuring force (N)
1909A-62	**1909AB-62**	0.0005	0.04 (0.056)	±0.0005/—/—	0.00016	±0.0001	20-0-20	1.4 or less
1910A-72	**1910AB-72**	0.0001	0.006 (0.008)	±0.0001/—/—	0.0001	±0.00003	3-0-3	1.5 or less

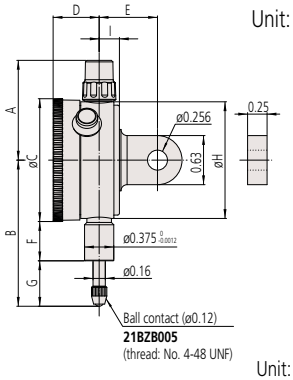
Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

DIMENSIONS

ISO/JIS Type Unit: mm



ANSI/AGD Type Unit: in



21BZB005
(thread: No. 4-48 UNF)

Metric Unit: mm

Code No.	A	B	C	D	E	F	G	H	I	Mass (g) w/lug	Mass (g) 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

Inch Unit: in

Code No.	A	B	C	D	E	F	G	H	I	Mass (g) w/lug	Mass (g) 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 07-63 to 07-68 for details of contact points.

Special specifications

Upon request, we can manufacture custom types with changed graduation numbers, graduation lines, dead zones, etc. Please contact your local Mitutoyo Sales Office for more information.

Optional Accessories

- Limit hand (2 pcs.), Bezel clamp
  Refer to page 07-49 for details.

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

Balanced scale

Graduation: 0.01 mm,
Measuring range: 1 mm

1929A
- One revolution
- Shockproof

1929A-62
- One revolution
- Shockproof
- Dustproof

FEATURES

Metric ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back					
1929A	1929AB	✔	✔			✔
1929A-62	1929AB-62	✔	✔		✔	✔
1900A-10	1900AB-10	✔	✔	✔		✔
1900A-72	1900AB-72	✔	✔	✔	✔	✔

Inch

Code No. w/lug	Code No. Flat-back					
1909A-62	1909AB-62	✔	✔		✔	✔
1910A-72	1910AB-72	✔	✔	✔	✔	✔

SERIES 3, 4 — Long Stroke Type, Large Diameter

- Dial indicators with a large-diameter dial face for easy reading.
- The indicator is highly durable thanks to its oil- and water-tight design, quenched hardened stainless-steel, carbide contact point, and a grand gear made of wear- and deformation-resistant material.
- Application of an anti-reflective and hard surface coating improves scale visibility along with scratch and chemical resistance.

3109A-10

4046A

3058A-19

Optional Accessories

- Limit hand (2 pcs.), Bezel clamp
Refer to page 07-31 for details.

SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm) Indication error 1/10 Rev	1/2 Rev	1 Rev	Measuring range	Hysteresis	Repeat-ability	Dial reading	Measuring force (N)
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*1	3060AB-19*1	0.01	80 (1)	12	17	20	45	9	5	±0-100	3.0 or less
3062A-19*1	3062AB-19*1	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

Inch

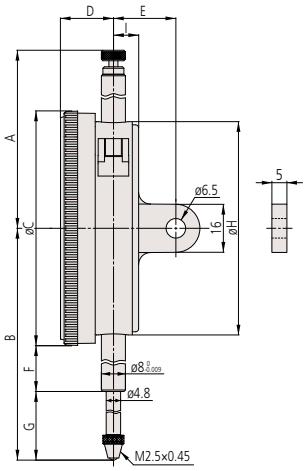
Code No. w/lug	Code No. Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy*2 (in) First 1 Rev/2.5 Rev/10 Rev	Retrace	Repeat-ability (in)	Dial reading	Measuring force (N)
3414A	3414AB	0.001	0.5 (0.1)	±0.001/±0.001/±0.001	0.0002	±0.0002	±0-100	1.8 or less
3415A	3415AB	0.001	0.5 (0.1)	±0.001/±0.001/±0.001	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

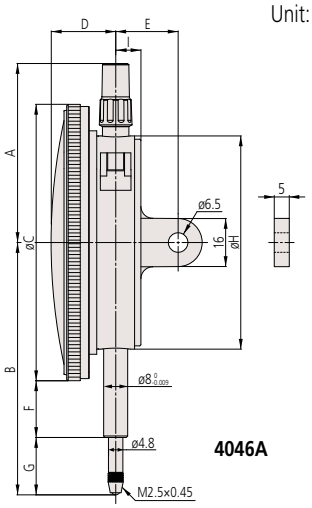
*1 Use in a vertical orientation (contact point downward) for the long stroke model.
*2 Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

DIMENSIONS

ISO / JIS Type

Unit: mm





Code No.	A	B	C	D	E	F	G	H	I
3046A	59.6	75.5	78	17.7	21	15.9	20.6	71	9
3047A	59.6	75.5	78	17.7	21	15.9	20.6	71	9
3050A	52.6	94	78	17.7	21	25.9	29.1	71	9
3052A-19*	72.9	104.3	78	17.7	21	25.9	39.4	71	9
3058A-19*	81.9	142.3	78	17.7	21	43.9	59.4	71	9
3060A-19*	120.9	202.3	78	17.7	21	73.9	89.4	71	9
3062A-19*	141.9	243.3	78	17.7	21	94.9	109.4	71	9
3109A-10	59.6	79	78	17.7	21	25.9	14.1	71	9
4046A	59.6	84	92	21.5	21	18.9	19.1	71	9

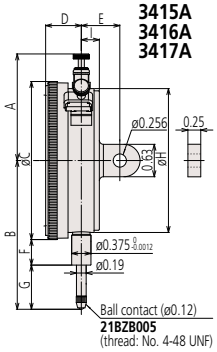
* The shoulder on a contact point (standard accessory) acts as a stop to prevent spindle overrun that may otherwise damage the indicator. When replacing it with an optional contact point with a connector not exceeding ø7 mm in outside diameter, insert a washer (with ø7 mm outside diameter, ø3 mm inside diameter, and approximately 0.5 mm thickness) above the contact point.

Note: Refer to pages 07-63 to 07-68 for details of contact points.

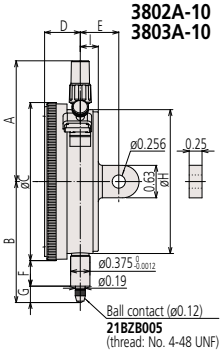
ANSI / AGD Type

Unit: in

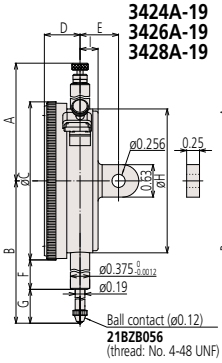
3414A
3415A
3416A
3417A



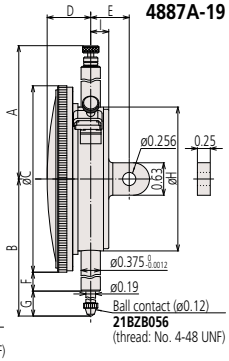
3802A-10
3803A-10



3424A-19
3426A-19
3428A-19



4887A-19



Code No.	A	B	C	D	E	F	G	H	I
3414A	2.07	2.89	3.07	0.70	3/4	0.50	0.86	2.80	0.35
3415A	2.07	2.89	3.07	0.70	3/4	0.50	0.86	2.80	0.35
3416A	2.07	3.39	3.07	0.70	3/4	0.50	1.36	2.80	0.35
3417A	2.07	3.39	3.07	0.70	3/4	0.50	1.36	2.80	0.35
3424A-19*	3.31	5.88	3.07	0.70	3/4	1.99	2.35	2.80	0.35
3426A-19*	4.84	7.80	3.07	0.70	3/4	2.91	3.35	2.80	0.35
3428A-19*	5.67	9.63	3.07	0.70	3/4	3.74	4.35	2.80	0.35
3802A-10	2.41	2.35	3.07	0.70	3/4	0.50	0.32	2.80	0.35
3803A-10	2.41	2.35	3.07	0.70	3/4	0.50	0.32	2.80	0.35
4887A-19*	4.84	7.80	3.62	0.85	3/4	2.63	3.35	2.80	0.35

* The shoulder on a contact point (standard accessory) acts as a stop to prevent spindle overrun that may otherwise damage the indicator. When replacing it with an optional contact point with a connector not exceeding ø7 mm in outside diameter, insert a washer (with ø7 mm outside diameter, ø3 mm inside diameter, and approximately 0.5 mm thickness) above the contact point.

Note: Refer to pages 07-63 to 07-68 for details of contact points.

SERIES 3, 4 — Long Stroke Type, Large Diameter

Continuous scale

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

Balanced scale

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

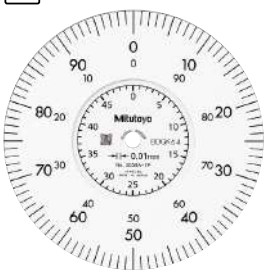
Continuous scale

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

Continuous scale

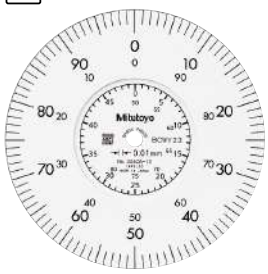
Graduation: 0.01 mm, Measuring range: 30 mm **3052A-19**

Continuous scale



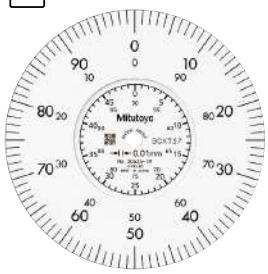
Graduation: 0.01 mm, Measuring range: 50 mm **3058A-19**

Continuous scale



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

Continuous scale

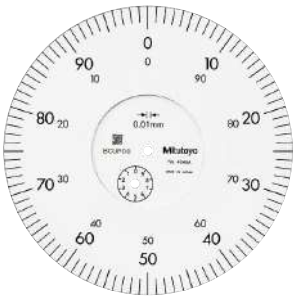


Graduation: 0.01 mm, Measuring range: 100 mm **3062A-19**

Balanced scale

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

Continuous scale



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

FEATURES

Metric ISO/JIS type

Code No. w/lug	Code No. Flat-back						
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 ANSI/AGD type

Code No. w/lug	Code No. Flat-back					
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	✔		✔	✔	✔

ANSI/AGD Type Metric Dial Indicators with ø3/8 inch Stem and #4-48UNF-Thread Contact Point Compatible Type

Optional Accessories

- Backs (See pages 07-69 to 07-70)
- Contact points (See pages 07-63 to 07-68)

SPECIFICATIONS

Metric SERIES **1** ☐ ANSI/AGD type

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Accuracy (µm) First 1 Rev/2.5 Rev/10 Rev	Accuracy (µm) Retrace	Repeatability (µm)	Dial reading	Measuring force (N)
1230A-01	**1230AB-01**	0.01	2.5 (1)	±10/±10/—	3	±2	0-100	1.4 or less
1231A-01	**1231AB-01**	0.01	2.5 (1)	±10/±10/—	3	±2	0-50-0	1.4 or less
1044A-01	**1044AB-01**	0.01	5 (1)	±10/±10/±13	3	±3	±0-100	1.4 or less
1045A-01	**1045AB-01**	0.01	5 (1)	±10/±10/±13	3	±3	0-50-0	1.4 or less
1010A-11	**1010AB-11**	0.002	0.5 (0.2)	±2/±2/—	2	±1	0-20	1.5 or less
1011A-11	**1011AB-11**	0.002	0.5 (0.2)	±2/±2/—	2	±1	0-10-0	1.5 or less

Metric SERIES **2**

Code No. w/lug	Code No. Flat-back	Graduation (mm)	Range (range/rev) (mm)	Accuracy (µm) First 1 Rev/2.5 Rev/10 Rev	Accuracy (µm) Retrace	Repeatability (µm)	Dial reading	Measuring force (N)
2231A-01	**2231AB-01**	0.01	2.5 (1)	±10/±10/—	3	±3	0-50-0	1.4 or less
2046A-01	**2046AB-01**	0.01	10 (1)	±10/±10/±13	3	±3	±0-100	1.4 or less
2046A-11	**2046AB-11**	0.01	10 (1)	±10/±10/±13	3	±3	±0-100	1.4 or less
2047A-01	**2047AB-01**	0.01	10 (1)	±10/±10/±13	3	±3	0-50-0	1.4 or less
2047A-11	**2047AB-11**	0.01	10 (1)	±10/±10/±13	3	±3	0-50-0	1.4 or less
2902A-01	**2902AB-01**	0.01	10 (1)	±10/±10/±13	3	±3	100-0	1.4 or less
2050A-01	**2050AB-01**	0.01	20 (1)	±10/±10/±15/±20 (20 Rev)	4	±3	±0-100	2.0 or less
2056A-01	**2056AB-01**	0.01	25 (1)	±10/±10/±15/±20 (20 Rev)/ ±25 (Over 20 Rev)	4	±3	±0-100	2.5 or less
2109A-11	**2109AB-11**	0.001	1 (0.2)	±3/±3/±4	2	±0.3	0-10-0	1.5 or less
2119A-11	**2119AB-11**	0.001	5 (0.2)	±7/±7/±8/±10 (20 Rev)/ ±10 (Over 20 Rev)	2.5	±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 ☐ ANSI/AGD type

Code No. w/lug	Code No. 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

Code No. w/lug	Code No. 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**				✔					

SERIES 2 — Special Dial Indicators

Adjustable hand dial indicator

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

2048A-10

Optional Accessories

- Limit hand (2 pcs.), Bezel clamp
Refer to page 07-27 for details.

SPECIFICATIONS

Metric

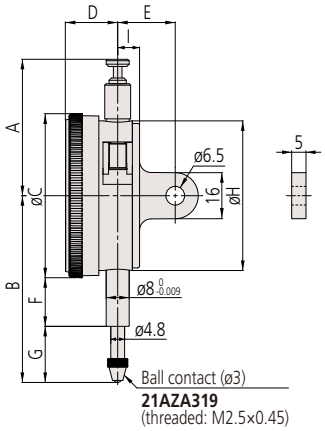
Code No.		Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Dial reading	Measuring force (N)
				Indication error				Hysteresis	Repeat-ability		
w/lug	Flat-back			1/10 Rev	1/2 Rev	1 Rev	Measuring range				
2048A-10	**2048AB-10**	0.01	10 (1)	5	9	10	15	3	3	±0-100	1.4 or less

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

DIMENSIONS

ISO/JIS Type

Unit: mm



Code 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: The shoulder on a contact point (standard accessory) acts as a stop to prevent spindle overrun that may otherwise damage the indicator. When replacing it with an optional contact point with a connector not exceeding ø7 mm in outside diameter, insert a washer (with ø7 mm outside diameter, ø3 mm inside diameter, and approximately 0.5 mm thickness) above the contact point.

Continuous scale

Graduation: 0.01 mm,
Measuring range: 10 mm

2048A-10

With coaxial revolution counter

Adjustable hand

Jeweled bearing

FEATURES

Metric

Code No.						
w/lug	Flat-back					
2048A-10	**2048AB-10**	✔	✔		✔	✔

SERIES 2 — Special Dial Indicators

Optional Accessories
• Limit hand (2 pcs.), Bezel clamp
Refer to page 07-27 for details.

• 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 nut in the direction of the arrow indicated in the dimensional drawing for **2046A-80**.

2046A-80

SPECIFICATIONS

Metric

ISO/JIS type

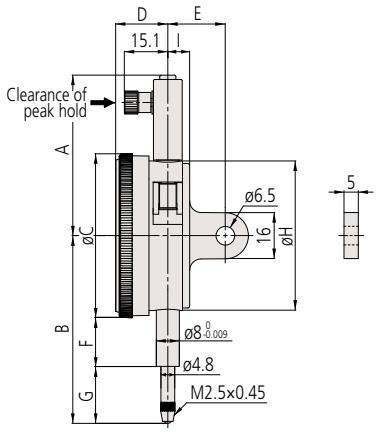
Code No.		Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Dial reading	Measuring force (N)
				Indication error				Hysteresis	Repeat-ability		
w/lug	Flat-back			1/10 Rev	1/2 Rev	1 Rev	Measuring range				
2046A-80	**2046AB-80**	0.01	10 (1)	5	9	10	15	—	—	±0-100	5.0 or less

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

DIMENSIONS

ISO/JIS Type

Unit: mm



Code No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2046A-80	55.8	65.2	57	18.1	20	16.9	19.8	52	7.6	158	149

Continuous scale

Graduation: 0.01 mm,
Measuring range: 10 mm

2046A-80

Peak retaining

FEATURES

Metric

Code No.					
w/lug	Flat-back				
2046A-80	**2046AB-80**	✔		✔	

Back Plunger Type Dial Indicators SERIES 2

- The one revolution dial indicator (back plunger type) prevents the possibility of reading errors.
- Back plunger type dial indicators are suitable for mounting onto levelling machine tool tables or inspection jigs, and for use in situations where standard dial indicators are difficult to read.
- Mitutoyo's unique shockproof mechanism provides excellent durability and shock resistance.
- Model **2990A-10** provides 0.001 mm graduation.
- The red dead zone in the middle of the dial face is separated from the bezel and doesn't cover the graduations. Therefore, users can always see the range where accuracy is not guaranteed even if the bezel is rotated.

2960A

Holding bar (optional)

Code 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.)
  Refer to page 07-41 for details.

SPECIFICATIONS

Metric ISO/JIS type ANSI/AGD type

Code 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

Inch

Code No.	Graduation (in)	Range (range/rev) (in)	Accuracy (in)		Repeatbility (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

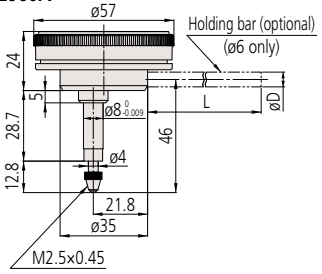
Note 1: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.
Note 2: The bezel clamp cannot be used.

DIMENSIONS

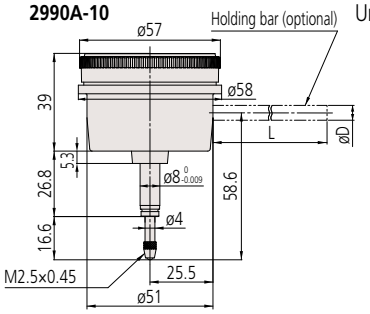
Unit: mm

ISO/JIS Type

2960A



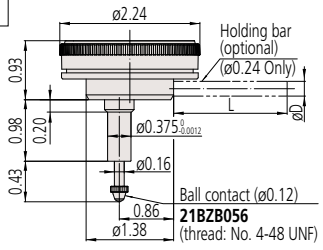
2990A-10



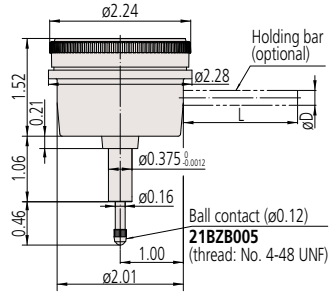
Unit: in

ANSI/AGD Type

2961A



2991A-10

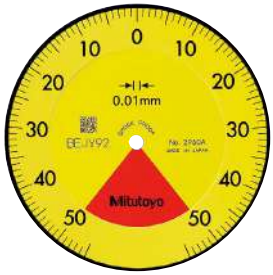


Note 1: The shoulder on a contact point (standard accessory) for **2960A** and **2961A** acts as a stop to prevent spindle overrun that may otherwise damage the indicator. When replacing it with an optional contact point with a connector not exceeding ø7 mm in outside diameter, insert a washer (with ø7 mm outside diameter, ø3 mm inside diameter, and approximately 0.5 mm thickness) above the contact point.
Note 2: Refer to pages 07-63 to 07-68 for details of contact points.

Special specifications

Upon request, we can manufacture custom types with changed graduation numbers, graduation lines, dead zones, etc. Please contact your local Mitutoyo Sales Office for more information.

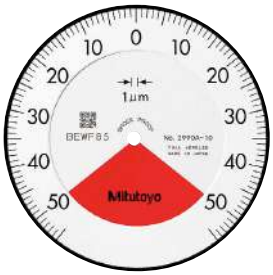
Balanced scale



Graduation: 0.01 mm,
Measuring range: 1 mm

2960A
- One revolution
- Shockproof
- Back Plunger

Balanced scale



Graduation: 0.001 mm,
Measuring range: 1 mm

2990A-10
- One revolution
- Shockproof
- Back Plunger
- Jeweled bearing

FEATURES

Metric — ISO/JIS type — ANSI/AGD type

Code No.					
2960A	✔	✔	✔		✔
2990A-10	✔	✔	✔	✔	✔

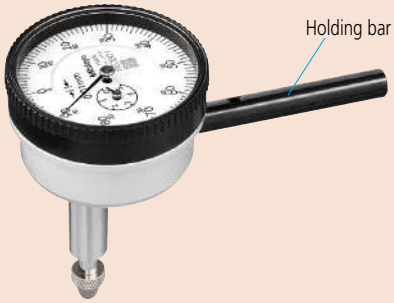
Inch

Code No.					
2961A	✔	✔	✔		✔
2991A-10	✔	✔	✔	✔	✔

Back Plunger Type Dial Indicators SERIES 1

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

1160A



SPECIFICATIONS

Metric

ISO/JIS type ANSI/AGD type

Code 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

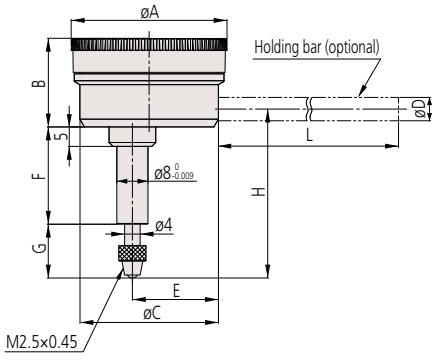
Inch

Code No.	Graduation (in)	Range (range/rev) (in)	Accuracy (in)		Repeatbility (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.

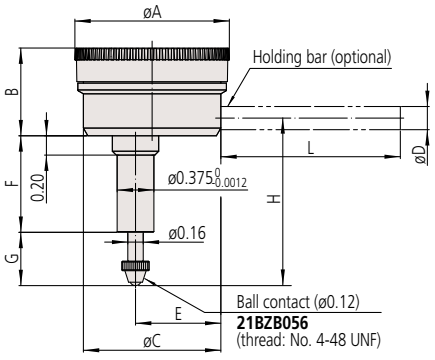
DIMENSIONS

ISO/JIS Type Unit: mm



Code No.	A	B	C	E	F	G	H	Mass (g) (Bar excluded)
1160A	40	22.7	35	21.8	25	13.8	43.3	80
1162A	40	22.7	35	21.8	25	13.8	43.3	80
1960A	40	22.7	35	21.8	28.7	12.8	46	80

ANSI/AGD Type Unit: in



Code No.	A	B	C	E	F	G	H	Mass (g) (Bar excluded)
1166A	1.57	0.89	1.38	7/8	0.98	0.51	1.67	80
1167A	1.57	0.89	1.38	7/8	0.98	0.51	1.67	80
1168A	1.57	0.89	1.38	7/8	0.98	0.51	1.67	80
1961A	1.57	0.89	1.38	7/8	0.98	0.43	1.59	80

Note 1: Contact point (standard accessory) for all products in this page has a role as a top dead point stopper. When replacing it with an optional contact point with a connector not exceeding ø7 mm in outside diameter, insert a washer (with ø7 mm outside diameter, ø3 mm inside diameter, and approximately 0.5 mm thickness) above the contact point.
Note 2: Refer to pages 07-63 to 07-68 for details of contact points.

Holding bar (optional)

Code 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 Accessories

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

Continuous scale

Graduation: 0.01 mm,
Measuring range: 5 mm

1160A
Back Plunger

Reverse reading

Graduation: 0.01 mm,
Measuring range: 5 mm

1162A
Back Plunger

Balanced scale

Graduation: 0.01 mm,
Measuring range: 1 mm

1960A
One revolution
Shockproof
Back Plunger

FEATURES

Metric

ISO/JIS type ANSI/AGD type

Code No.						
1960A		✔	✔	✔		✔
1160A	✔					✔
1162A					✔	✔

Inch

Code No.						
1961A		✔	✔	✔		✔
1166A	✔					✔
1167A		✔				✔
1168A					✔	✔

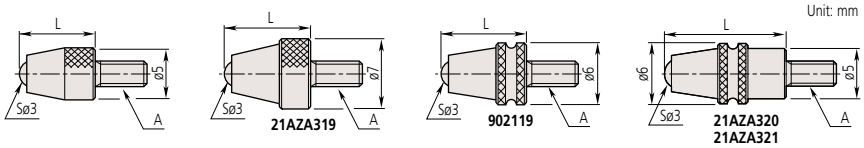
Optional Accessories for Digimatic and Dial Indicators and Linear Gages

Contact points, extension rod

- The thread of all contact points is M2.5 (P=0.45)×5 mm.
- After replacement, it must be tightened firmly to prevent looseness during use (recommended tightening torque: 50 N·cm).
- Carbide and ruby contact points are highly resistant to wear.

Standard contact point

Unit: mm



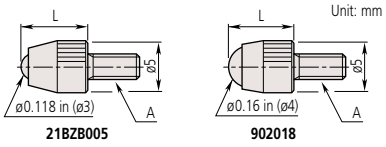
Note: Contact points for water-proof indicators are equipped with a groove to locate the rubber boot.

A: M2.5×0.45

Material / L (mm)	Carbide		Ruby	Plastic
	Without groove	With groove (water-proof type)	Without groove	Without groove
7.3	**901312**	—	**120047**	**901994**
8.3	**21AZA319**	**902119**	—	—
12.1	—	**21AZA320**	—	—
14	**21JAA225**	—	—	—
15	**120049**	—	**120051**	—
17	**21JAA224**	—	—	—
19.3	—	**21AZA321**	—	—
20	**137391**	—	**137392**	—
22	**21JAA226**	—	—	—
25	**120053**	—	**120055**	—
30	**21AAA252**	—	**21AAA253**	—

901312

Unit: mm



902119

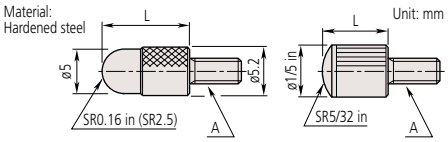
A: 4-48UNF

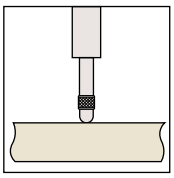
Material / L (in)	Carbide	Plastic
1/4	**21BZB005**	**902018**

Shell Type Point

Contact point with a large radius.
Optimal for use on flat surfaces.

101118





A: M2.5×0.45

Code No.	L (mm)
101386	5
101118	10
137393	15
101387	20
101388	25
21AAA254	30

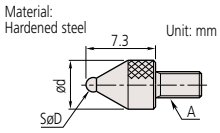
A: 4-48UNF

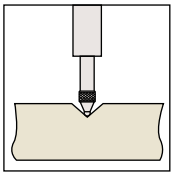
Code No.	L (in)
193697	3/32
101184	5/32
21AAA031	1/4
21AAA032	3/8
101185	1/2
21AAA033	5/8
101186	3/4
21AAA034	7/8
101187	1
21AAA035	1 1/4
21AAA036	1 1/2
21AAA037	1 3/4
21AAA038	2
21AAA039	2 1/4
21AAA040	2 1/2
21AAA041	2 3/4
21AAA042	3

Ball point

Optimal for workpieces with deep indentations.

101122





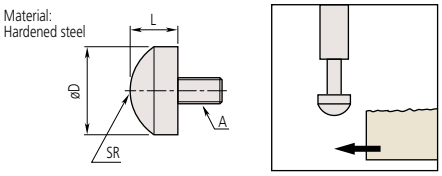
A: M2.5×0.45

Code No.	SøD (mm)	ød (mm)	Spherical tip material
21AAA349	1	5	Carbide
21AAA350	1.5	5	
101122	1.8	5	Hardened steel
21AAA351	2.5	5	Carbide
21AAA352	4	5	

Spherical Point

A large radius makes this contact point optimal for use where the workpiece needs to slide from the side.

101119



A: M2.5×0.45

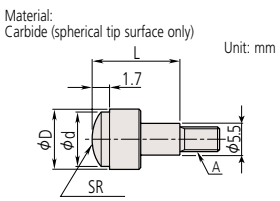
Code No.	øD (mm)	L (mm)	SR (mm)
111460	5.5	3	5
125258	7.9	5	5
101119	10	5	7

A: 4-48UNF

Code No.	øD (in)	L (in)	SR (in)
101205	1/2	1/8	0.35
101204	3/8	3/32	0.28

Spherical Point (Carbide)

21AZB752

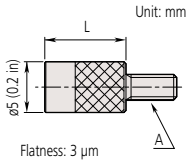


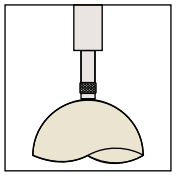
A: M2.5×0.45

Code No.	øD	ød	L	SR
21AZB751	5.2	4.3	5	5
21AZB752	7.5	6.5	10	7
21AZB753	10.5	9.5	10	10

Flat Point

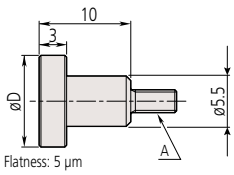
131365

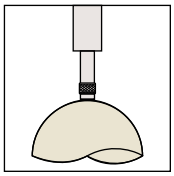


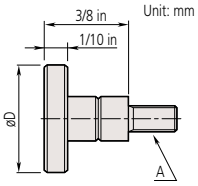


Material:
Hardened steel

101117







A: M2.5×0.45

Code No.	L
131365	8
21AAB715	10

A: 4-48UNF

Code No.	L (in)
133017	5/16
21AAA043	1/2
21AAA044	3/4
21AAA045	1

A: M2.5×0.45

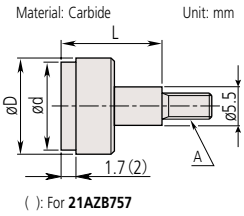
Code No.	øD
101117	10
21AAB711	15
21AAB712	20
21AAB713	25
21AAB714	30

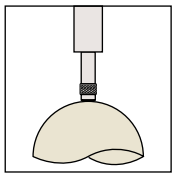
A: 4-48UNF

Code No.	øD (in)
101188	1/2
101189	3/8

Flat Point (Carbide)

21AZB758



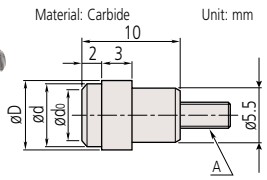


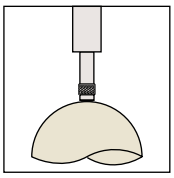
A: M2.5×0.45

Code No.	øD	ød	L
21AZB756	5.2	4.3*1	5
21AZB757	7	6.5*1	10
21AZB758	10.5	9.5*1	10
21AZB760	17	15*2	10
21AZB761	22	20*2	10
21AZB762	27	25*2	10
21AZB763	32	30*2	10

Flatness: *1: 3 µm, *2: 5 µm

21AZB754



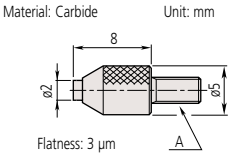


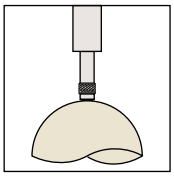
A: M2.5×0.45

Code No.	ød0	ød	øD
21AZB754	3	6.4	7
21AZB755	4.5	8	9

Flatness: 3 µm

21AZB759





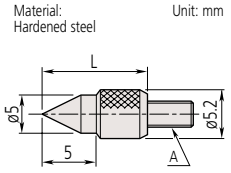
A: M2.5×0.45

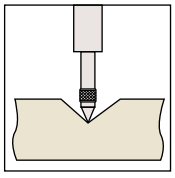
Code No.
21AZB759

Conical Point

Used for positioning the measurement point.
Since it can damage a workpiece easily, it is not suitable for use on soft materials.

101120





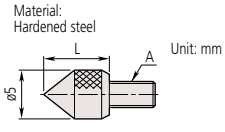
A: M2.5×0.45

Code No.	Tip angle	L
101120	60°	10

A: 4-48UNF

Code No.	Tip angle	L (in)
101190	60°	1/2

101385



A: M2.5×0.45

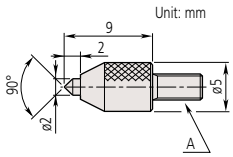
Code No.	Tip angle	L
101385	90°	5

A: 4-48UNF

Code No.	Tip angle	L (in)
101191	90°	1/4

Conical Point (Carbide)

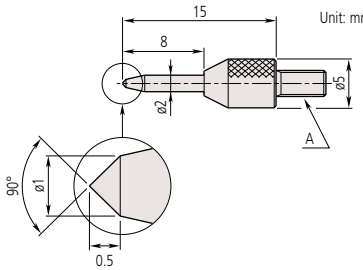
21AZB764



A: M2.5×0.45

Code No.
21AZB764

21AZB765



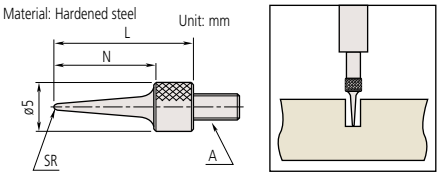
A: M2.5×0.45

Code No.
21AZB765

Needle Point

Suitable for probing the bottom of a groove or hole.

101121



A: M2.5×0.45

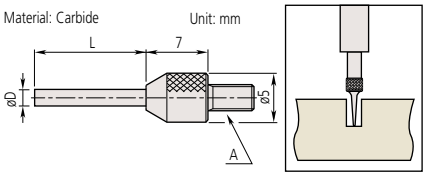
Code No.	N	L	SR
101121	11	15	0.4
137413	13	17	0.2
21AAA255	21	25	0.4
21AAA256	31	35	0.4

A: 4-48UNF

Code No.	L (in)	SR (in)
21AAA030	0.6	0.016
21AAA046	1	0.016
21AAA047	1 1/2	0.016
21AAA048	2	0.016

Needle Point (Carbide)

137257



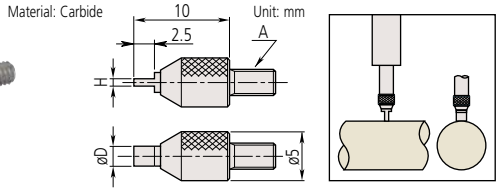
A: M2.5×0.45

Code No.	øD	L
120066	0.45	3
21AAA329	0.45	5
120065	1	3
21AAA330	1	5
21AAA331	1	8
21AAA332	1	10
21AAA333	1	20
21AAA334	1	40
21AAA335	1.5	5
21AAA336	1.5	10
120064	1.5	13
21AAA337	1.5	20
21AAA338	1.5	40
137257	2	8
21AAA257	2	18
21AAA258	2	28
21AAA339	2	40

Blade Point (Carbide)

Suitable for measuring cylinders.

21AZB768



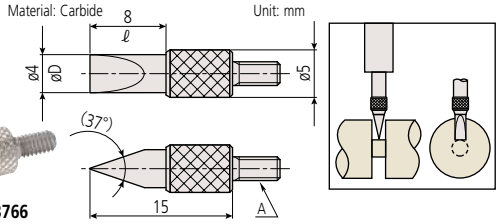
A: M2.5×0.45

Code No.	H	øD
21AZB767	0.4	2
21AZB768	0.6	2
21AZB769	1	4

Knife Edge Point (Carbide)

Suitable for measuring narrow groove diameter, etc.

21AZB766



A: M2.5×0.45

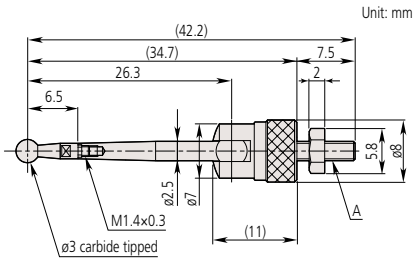
Code No.
21AZB766

Optional Accessories for Digimatic and Dial Indicators and Linear Gages

Lever Point

Suitable for use* on perpendicular faces, such as those within mold cavities. Lever can be adjusted to the required angle.

* Perform measurement in the same posture and conditions as for the reference setting so that variation due to lever deflection is reduced. Gently bring the contact point into touch with the workpiece. Use a dial indicator with as small a measuring force as possible.

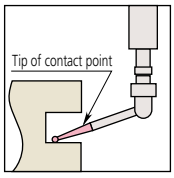


A: M2.5×0.45

Code No.
900391

A: 4-48UNF

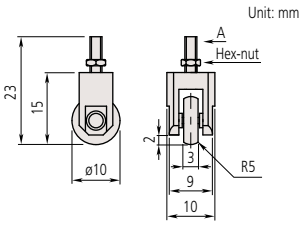
Code No.
900393



The tip of contact point is interchangeable.
Interchangeable contact points (optional)
ø1 mm contact point: **102824**
ø2 mm contact point: **102825**
ø3 mm contact point: **102826** (provided as standard)

Roller Point

Suitable for use on a moving workpiece surface, or where the workpiece needs to slide from the side.



A: M2.5×0.45

Code No.
901954

A: 4-48UNF

Code No.
901991

Roller material: Hardened steel
Roller runout: 10 µm or better
Note 1: For a different roller diameter, contact your local Mitutoyo sales office.
Note 2: High-accuracy roller with 5 µm runout is also available. (Special order item)

Interchangeable Contact Point Set

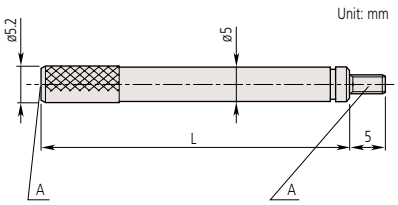
This set consists of six types of popular contact points for extending the use of an indicator to many applications.

Set code No. **7822**

M2.5×0.45

Code No.	Contact points included
131365	Flat Point (ø5 mm)
101117	Flat Point (ø10 mm)
101121	Needle Point
101119	Spherical Point
101118	Shell Type Point (R2.5×10)
101387	Shell Type Point (R2.5×20)

Extension Rod

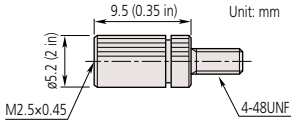


A: M2.5×0.45

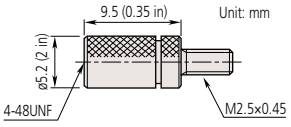
Code No.	L
303611	10
21AAA259A	15
303612	20
21AAA259B	25
303613	30
21AAA259C	35
21AAA259D	40
21AAA259E	45
21AAA259F	50
21AAA259G	55
304146	60
21AAA259H	65
21AAA259J	70
21AAA259L	75
21AAA259M	80
304147	90
303614	100

A: 4-48UNF

Code No.	L (in)
139167	1/2
301655	1
301657	2
301659	4



Code No.
21AAA011

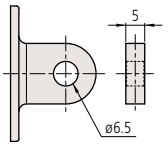
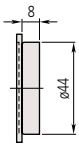
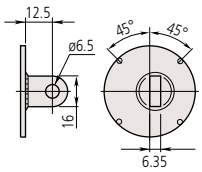
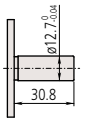
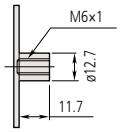
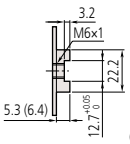


Code No.
21AAA012

Interchangeable Back Covers
Optional Accessories for Digimatic and Dial Indicators

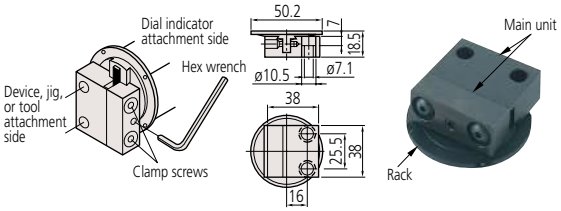
Various back covers

- A wide variety of indicator back cover types is available for Mitutoyo Digimatic and dial indicators.
- Most lugged back covers can be rotated by 90° because they have four retaining screws. However, **190561** and **137905** (for compact dial indicators) are only equipped with two retaining screws, therefore the lug orientation cannot be changed.

Description		
Lug-on-Center Back Clamped by securing the lug section.	 Unit: mm	
Flat Back Cannot be clamped by means of the back cover.	 Unit: mm	
Magnetic Back (Magnetic force: 10 N) Can be easily attached to the flat surfaces of iron plates or machine tools with a magnet.	 Unit: mm	
Back with Offset Lug One side of the lug section is on the center line.	 Unit: mm	
Back with Post Used by clamping the ø12.7 pillar section.	 Unit: mm	
Back with Screw Mount Clamped with a screw with its thread as a guide.	 Unit: mm	
Adjustable Back Can be slid with the groove as a guide. Clamped with a screw.	 Unit: mm	

Back with Adjustable Bracket
Can be attached to a device, jig, or tool and easily fine-tuned vertically with a hex wrench. (Travel range: Approx. 20 mm)

Unit: mm



Attachment procedure
1. Attach only the back cover with rack to the dial indicator.
2. Attach the main unit to a device, jig, or tool with M6 hexagon socket head cap screws.
3. Insert the back cover with rack into the main unit.
4. Use the supplied hex wrench (3/32") to fine-tune and fix with clamp screws.

Selection table for various back covers

- If the back cover of water-proof model is replaced, the water resistance will not be guaranteed.
- When mounting a back cover to lightweight type Series (**297*AB**), separately prepare 4 fixing screws (**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.

Dial Indicators

Metric

	Bezel diameter	31 mm	36 mm	40 mm	40 mm (W/D proof models)	55.6/57 mm	55.6 mm (W/D proof models)	57 mm (W/D proof models)	78/92 mm
Back Covers	Lug-on-Center Back	**190561**	**137905**	**101210**	**101210**	**101040**		**21AZB230**	**100691**
	Flat Back	**191559**	**137906**	**101211**	**136872**	**101039**	**192910**	**21AZB231**	**100836**
	Magnetic Back	—				**900928**			**900929**
	Back with Offset Lug	—				**101167**			—
	Back with Post	—		**193172**		**101169**			—
	Back with Screw Mount	—		**193173** (M6×1)		**136023** (M6×1)			—
	Adjustable Back	—		**136025** (M6×1)		**136026** (M6×1)			—
	Back with Adjustable Bracket	—				**901963**			—

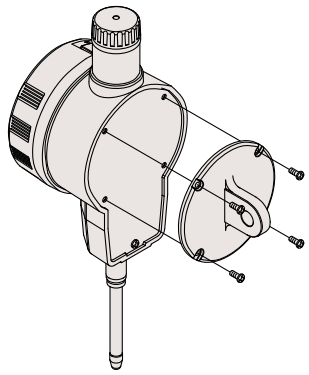
Inch

	Bezel diameter	1.22 in	1.57 in	1.57 in (W/D proof models)	2.19/2.24 in	2.19 in (W/D proof models)	2.24 in (W/D proof models)	3.07/3.62 in
Back Covers	Lug-on-Center Back	**190139**	**101307**	**101307**	**101306**		**21BZB104**	**100797**
	Flat Back	**191559**	**101211**	**136872**	**101039**	**192910**	**21AZB231**	**100836**
	Magnetic Back	—			**900928**			**900929**
	Back with Offset Lug	—			**101167**			—
	Back with Post	—	**193172**		**101169**			—
	Back with Screw Mount	—			**101170** (#1/4-28UNF)			—
	Adjustable Back	—	**129721** (#1/4-20UNC)		**101168** (#1/4-20UNC)			—
	Back with Adjustable Bracket	—			**901963**			—

Digimatic Indicators

	Series/model	•**ID-FNX** Series (12.7 mm models) •**ID-CNX** Series (12.7 mm models) •**ID-CAX** Series •**ID-SX** Series		•**ID-FNX** Series (25.4, 50.8 mm models)* •**ID-CNX** Series (25.4, 50.8 mm models)*		•**ID-CJX** Series •**ID-SPX** Series	
	Type	ISO/JIS	ASME/ANSI/AGD	ISO/JIS	ASME/ANSI/AGD	ISO/JIS	ASME/ANSI/AGD
Back Covers	Lug-on-Center Back	**101040**	**101306**	**101040**	**101306**	**21AZB230**	**21BZB104**
	Flat Back	**101039**		—		**21AZB231**	
	Magnetic Back	**900928**					
	Back with Offset Lug	**101167**					
	Back with Post	**101169**					
	Back with Screw Mount	**136023** (M6×1)	**101170** (#1/4-28UNF)	**136023** (M6×1)	**101170** (#1/4-28UNF)	**136023** (M6×1)	**101170** (#1/4-28UNF)
	Adjustable Back	**136026** (M6×1)	**101168** (#1/4-20UNC)	**136026** (M6×1)	**101168** (#1/4-20UNC)	**136026** (M6×1)	**101168** (#1/4-20UNC)
	Back with Adjustable Bracket	**901963**					

* For the **ID-CNX**, **ID-FNX** Series (25.4, 50.8 mm/1, 2 inch models), attach the back covers as shown below.

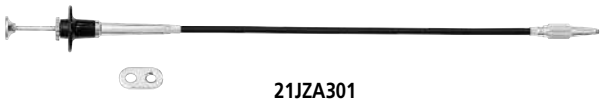


Spindle Lifting Lever and Cable
Optional Accessories for Digimatic and Dial Indicators

Spindle Lifting Cable

- The spindle can be moved up and down using the lifting lever or the lifting cable.
- Attaching the dial indicator to a stand improves measurement accuracy and efficiency.

Lifting cable
Stroke: 10 mm



21JZA301

21JZA295

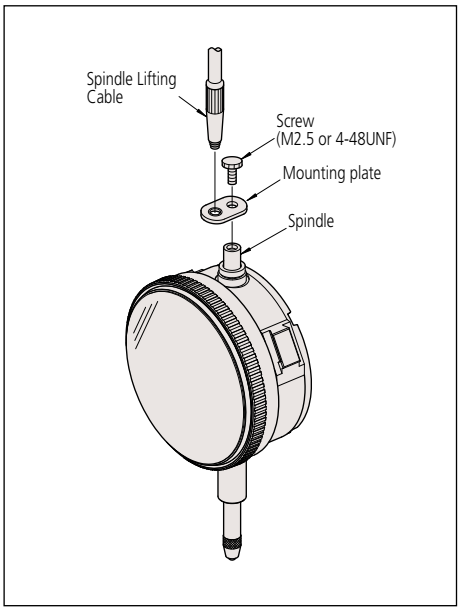
21JZA301: with auto-stop function (300 mm)
21JZA295: without auto-stop function (500 mm)

Note 1: This accessory is not applicable to dial indicators with a range of 20 mm or more, special models (**2048A(B)-10, 2046A(B)-80**), certain models of 1 series (**1911A(B)-10**, **1913A(B)-10**, **1921A(B)-10**, **1923A(B)-10**, **1925A(B)-10**, **2971AB**, **2972AB**, **2973AB**, **2976AB**, **2977AB**, **2978AB**), back plunger type and water-proof type.
Note 2: The lifting cable is attached to the spindle. Therefore, its weight is added to the measuring force. (Approximately 0.3 N max.)

Spindle Lifting Lever

21EAA426
Suitable for 4.8 mm spindle diameter.

Typical application



Spindle Lifting Lever (A type)

902100[*1]
Use for A type SERIES **1** dial indicators.

21EZA198[*2]
Use for A type SERIES **2**, **3**, and **4** dial indicators (up to 10 mm/0.4 in).

21AZB149: Lever
101171: Stop screw

21AZB150[*2]
Use for A type SERIES **2** and **3** dial indicators (from 10 mm/0.4 in up to 20 mm/0.8 in).

Spindle Lifting Lever (S type)

902100[*1]
Use for S type SERIES **1** dial indicators.

21AZB149[*2]
Use for S type SERIES **2**, **3**, and **4** dial indicators (up to 10 mm/0.4 in).

21AZB150[*2]
Use for S type SERIES **2** and **3** dial indicators (from 10 mm/0.4 in up to 20 mm/0.8 in).

Spindle Lifting Lever (for ID-SS, ID-SX, ID-CX, ID-CNX)

21EZA198[*1*3]

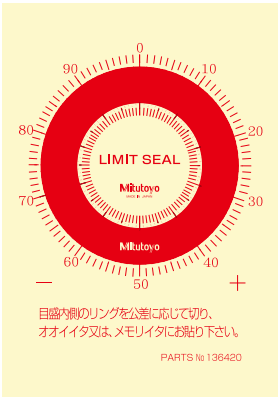
21AZB149: Lever
101171: Stop screw

*1 Before use, replace the stop screw with the standard accessory.
*2 Use the stop screw already fixed to the dial indicator body.
*3 Stop screw is for mm model.

Limit Stickers

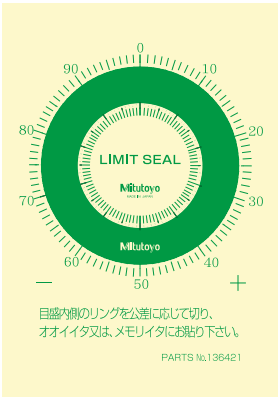
- Place limit stickers on a SERIES **2** indicator dial face or crystal to indicate tolerance limits. Stickers are available in: red, green, and yellow.

Red



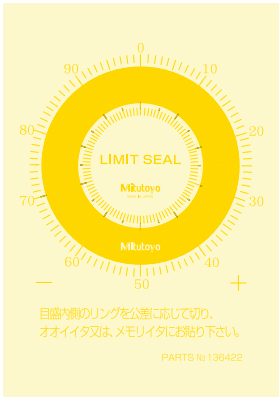
136420
(10 sheets/set)

Green



136421
(10 sheets/set)

Yellow



136422
(10 sheets/set)

Color-coded Spindle Caps

- 9 color-coded spindle caps are available for compact/standard dial indicators with a range of 10 mm or less.

Color	Code No.	
	Standard	Water-proof
Black	**21AAB675**	**21AAB676**
White	**21AAB675W**	**21AAB676W**
Red	**21AAB675R**	**21AAB676R**
Green	**21AAB675G**	**21AAB676G**
Blue	**21AAB675B**	**21AAB676B**
Yellow	**21AAB675Y**	**21AAB676Y**
Orange	**21AAB675D**	**21AAB676D**
Pink	**21AAB675P**	**21AAB676P**
Navy	**21AAB675S**	**21AAB676S**

Note: This accessory is not applicable to **1003A(B)**, **1911A(B)-10**, **1913A(B)-10**, **1921A(B)-10**, **1923A(B)-10**, **1925A(B)-10**, **2971AB**, **2972AB**, **2973AB**, **2976AB**, **2977AB**, and **2978AB**.

Note: When attaching to small dial indicators, the measuring range height will be 8 mm taller.

Dial Indicator Repair Tools
Optional Accessories for Dial Indicators

Replacing bezels and graduation plates

A bezel and graduation plate must be swaged together so that the graduation plate always rotates with the bezel. Assemblies comprised of a swaged bezel and graduation plate are available for some models.

Code No. of dial indicators	Code No. of swaged assemblies
2046A	**21AZB650**
2109A-10	**21AZB693**

Special repairing technique is necessary for repair work. Note that we cannot guarantee accuracy if critical parts are disassembled.
We recommend that you use our repair service to operate the instrument with peace of mind.

Pointer removing tip (ø0.8) (**126630**)

Pointer removing tip (ø0.5) (**126630B**)

Pointer removing tip (ø1.6) (**126630C**)

Pointer removing tool (**126628**)

Adjustable nut (**100699**)

Pinion rest (**129735**)

Pin rest (**129731**)

Spindle rest (**129730**)

Reamer for pointer (ø0.5: 1/20 taper) (**21JAA273**)

Punch (**129733**)

Reamer (ø0.6: 1/50 taper) (**193702**)

Bearing adjuster (**129734**)

Reamer (ø1: 1/50 taper) (**129736**)

Pin remover (**129732**)

Typical applications

Remove the long hand
Select an appropriate pointer removing tip for the diameter of the hole of the long hand, and attach it to the pointer removing tool using the adjustable nut.
Push the pivot with the pointer removing tool to remove the long hand.

Remove or replace a pin
Place the spindle on the V-groove of the spindle rest. Remove the pin using the pin remover and a commercially available hammer.
To press-fit the pin, tap it directly using a hammer, etc.

Replace the long or little hand
Screw the pinion rest into the pin rest.
Support the pinion with the pinion rest and press-fit the pointer using the punch and a commercially available hammer, etc. When replacing with a new pointer on an old type of dial indicator or test indicator, reaming is necessary before press-fitting. Use a commercially available pin device (for ø0.8 to 1.2) with one of the following reamers attached.

- Pointers of dial indicators (**A** type) and **TI-X** Series*1 do not require a reamer.
- Use the reamer for pointer (ø0.5: 1/20 taper) for **S** type and **T** type dial indicators*2.
- Depending on the shaft diameter, use reamer (ø1: 1/50 taper) or reamer (ø0.6: 1/50 taper) for **F** type dial indicators and other than **TI-X** Series dial test indicators.

*1 Dial test indicator whose model No. ends in "**X**".
*2 Dial indicator whose code No. includes an "**S**" and "**T**".

SERIES 513 — Dial Test Indicator Features

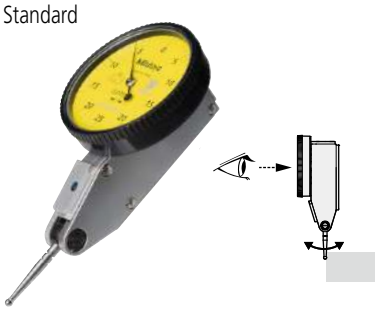
Provides easy access to narrow or recessed areas that cannot be reached with conventional dial indicators.

- Five types are available: standard, standard (20° Tilted face), vertical, horizontal, and universal, allowing users to select the model most suited to their needs.
- Newly designed contact point holder prevents backlash and permits smooth pointer operation.
- Ruby tip has wear-resistance several times greater than a carbide tip and, since it is nonconductive, it can be used safely on an electrical discharge machine.
- The pointer and carbide contact point are weakly magnetic.

  Note 1: Magnetic material is used for some internal parts.
- Contact point length is printed on dial face to avoid accuracy issues.

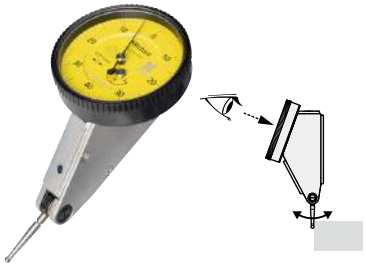
  Note 2: Attaching a contact point of incorrect length will lead to measurement failure.
- Glare-free flat crystal face allows easy reading of graduations. Multi-layer and composite coatings provide a more stain-resistant, anti-reflective crystal.
- Bonding the bezel and crystal together leaves no gap for cutting fluid or oil to penetrate through to the dial face. (Note that this type is NOT water-proof.)
- The main unit is equipped with three dovetails to which the stem with dovetail groove ø6 (standard accessory) can be attached. This greatly improves convenience as the attachment location can be adjusted as needed.
- Metric Dial Test Indicator is inspected according to JIS B 7533:2015. Standard, 20° tilted face, and vertical types are inspected with the dial face in the upward orientation, while the horizontal type is inspected with the dial face in the vertical orientation to guarantee their accuracy.

Standard



Vertical

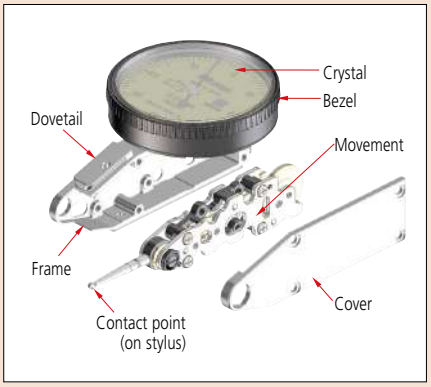
Standard
(20° Tilted face)



Horizontal

Universal

Naming of parts



Feature icons

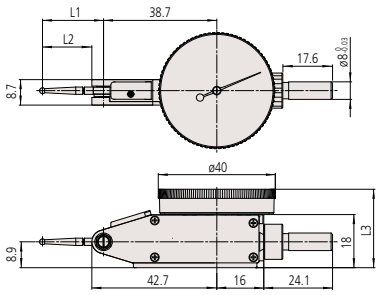
Icon	Feature description
	High accuracy
	With revolution counter
	Long contact point
	Standard
	Double scale spacing
	Compact (Small face diameter)
	Carbide contact point
	Ruby contact point (Non-conductive and abrasion resistant)

Dial Test Indicator
SERIES 513 — Standard Type

DIMENSIONS

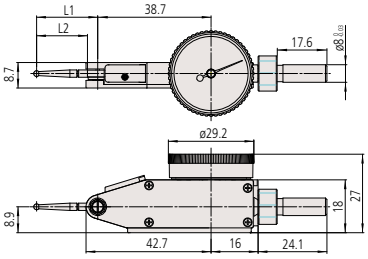
Standard

Unit: mm



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

Compact



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

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

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

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

513-907-10E (inch)

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

513-404-10E
Contact point No. 103006

513-415-10E
Contact point No. 136013

513-465-10E
Contact point No. 103011

513-402-10E
Contact point No. 133195

Graduation: 0.01 mm
Range: 0.8 mm

513-404-10E / 10A / 10T
Standard
Carbide contact point

Graduation: 0.01 mm
Range: 0.5 mm

513-424-10E / 10A / 10T
Standard
Double scale spacing
Carbide contact point

Graduation: 0.01 mm
Range: 0.5 mm

513-414-10E / 10A / 10T
Long contact point
Carbide contact point
Double scale spacing

Graduation: 0.01 mm
Range: 1.0 mm

513-415-10E / 10A / 10T
Long contact point
Carbide contact point

Graduation: 0.002 mm
Range: 0.2 mm

513-405-10E / 10A / 10T
Standard
Carbide contact point

Graduation: 0.002 mm
Range: 0.6 mm

513-425-10E / 10A
With revolution counter
Carbide contact point

Graduation: 0.002 mm
Range: 0.2 mm

513-465-10E
Compact
Carbide contact point

Graduation: 0.001 mm
Range: 0.14 mm

513-401-10E
High accuracy
Carbide contact point

Graduation: 0.0005 in
Range: 0.03 in

513-402-10E / 10T
Standard
Carbide contact point

Graduation: 0.0001 in
Range: 0.008 in

513-403-10E / 10T
Standard
Carbide contact point

Note: **513-4XX-10** is indicated on the dial face and the inspection certificate.
The code No. with suffix (E/T/A) is a set item which includes accessories. The main unit is not available as a standalone item.

Dial Test Indicator
SERIES 513 — Standard Type

SPECIFICATIONS

Metric

Code No.			Graduation (mm)	Range (mm)	Dial reading	Maximum permissible error (MPE)*1 (μm)					Mass (g)	Measuring force (N)	High accuracy	With revolution counter	Long contact point	Standard	Double scale spacing	Compact	Carbide contact point	Ruby contact point
Basic set	Plus set	Full set				Measuring range	One rev.	10 scale divisions	Hysteresis	Repeatability											
513-424-10E	513-424-10A	513-424-10T	0.01	0.5	0-25-0	6	–	5	4	3	45	0.3 or less				✔	✔		✔	
513-478-10E	–	–														✔	✔			✔
513-466-10E	–	–									41						✔	✔	✔	
513-414-10E	513-414-10A	513-414-10T				10			5		45	0.2 or less			✔		✔		✔	
513-426-10E	513-426-10A	–		1.5		16	10					0.4 or less		✔			✔		✔	
513-404-10E	513-404-10A	513-404-10T		0.8	0-40-0	9			4			0.3 or less				✔			✔	
513-474-10E	–	–														✔				✔
513-464-10E	–	–									41							✔	✔	
513-415-10E	513-415-10A	513-415-10T		1.0	0-50-0	10	–		5		45	0.2 or less			✔				✔	
513-477-10E	–	–													✔					✔
513-405-10E	513-405-10A	513-405-10T	0.002	0.2	0-100-0	4		2	3	1		0.3 or less				✔			✔	
513-475-10E	–	–														✔				✔
513-465-10E	–	–									41							✔	✔	
513-425-10E	513-425-10A	–		0.6		7	5		4		45	0.4 or less		✔					✔	
513-401-10E	–	–	0.001	0.14	0-70-0	4	–		3			0.3 or less	✔						✔	
513-471-10E	–	–											✔							✔
513-908-10E*2	–	–	0.01	0.8	0-40-0	9	–	5	4	3	45					✔			✔	

Inch

Code No.			Graduation (in)	Range (in)	Dial reading	Maximum permissible error (MPE)*1 (in)			Mass (g)	Measuring force (N)	High accuracy	With revolution counter	Long contact point	Standard	Double scale spacing	Compact	Carbide contact point	Ruby contact point
Basic set	Plus set	Full set				One rev.	Hysteresis	Repeatability										
513-402-10E	–	513-402-10T	0.0005	0.03	0-15-0	±0.0005	0.0002	±0.0002	45	0.3 or less				✔			✔	
513-472-10E	–	–												✔				✔
513-412-10E	–	513-412-10T								0.2 or less			✔				✔	
513-479-10E	–	–											✔					✔
513-462-10E	–	–							41	0.3 or less						✔	✔	
513-407-10E	–	513-407-10T	0.00005	0.008	0-4-0	±0.0001	0.0001	±0.00004	45								✔	
513-403-10E	–	513-403-10T	0.0001											✔			✔	
513-473-10E	–	–												✔				✔
513-463-10E	–	–							41							✔	✔	
513-907-10E*3	–	–	0.0005	0.03	0-15-0	±0.0005	0.0002	±0.0002	45					✔			✔	

Metric / Inch

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

Inch / Metric

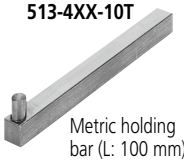
Code No.			Graduation	Range	Dial reading	Maximum permissible error (MPE)*1 (in)			Mass (g)	Measuring force (N)	High accuracy	With revolution counter	Long contact point	Standard	Double scale spacing	Compact	Carbide contact point	Ruby contact point
Basic set	Plus set	Full set				One rev.	Hysteresis	Repeatability										
513-406-10E	–	513-406-10T	0.0005 in /0.01 mm	0.03 in /0.7 mm	0-15-0 /0-35-0	±0.0005	0.0002	±0.0002	45	0.3 or less							✔	

*1 We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.
*2 A set consisting of **513-404-10E** and **7014-10**.
*3 A set consisting of **513-402-10E** and **7014E-10**.
Note: Stem with dovetail groove is not included in the mass.

Set Configuration: Metric and Metric / Inch

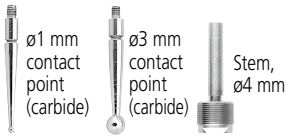
Full set **513-4XX-10T**

Swivel clamp (**900321**, for ø4 mm stem, ø8 mm stem, and dovetail)



Metric holding bar (L: 100 mm)

Plus set **513-4XX-10A**

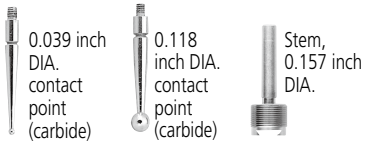


Basic set **513-4XX-10E**

513-4XX-10 is indicated on the dial face.

Set Configuration: Inch and Inch / Metric

Full set **513-4XX-10T**

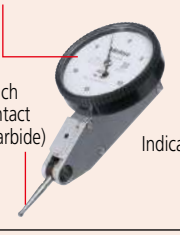


Swivel clamp (**900322**, for 0.157 inch DIA. stem, 0.375 inch DIA. stem, and dovetail)

Inch holding bar (L: 4 in)

Basic set **513-4XX-10E**

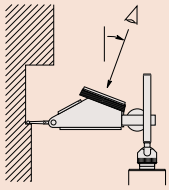
513-4XX-10 is indicated on the dial face.



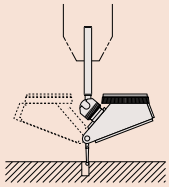
PROPRIETARY INSPECTION CERTIFICATE

Example of use of a test indicator with a tilted dial face

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



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



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

513-454-10E / 10A / 10T
Contact point No. 103006

Carbide contact point

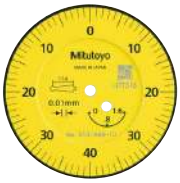
Graduation: 0.01 mm
Range: 0.8 mm

513-452-10E / 10T
Contact point No. 133195

Carbide contact point

Graduation: 0.0005 in
Range: 0.03 in

513-444-10E / 10A / 10T
Contact point No. 103006



With revolution counter
Carbide contact point

Graduation: 0.01 mm
Range: 1.6 mm

513-445-10E / 10A / 10T
Contact point No. 103011

With revolution counter
Carbide contact point

Graduation: 0.002 mm
Range: 0.4 mm

513-484-10E / 10A / 10T
Contact point No. 103006

Carbide contact point

Graduation: 0.01 mm
Range: 0.8 mm

513-485-10E
Contact point No. 103011

Carbide contact point

Graduation: 0.002 mm
Range: 0.2 mm

Note: **513-4XX-10** is indicated on the dial face and the inspection certificate.
The code No. with suffix (E/A/T) is a set item which includes accessories. The main unit is not available as a standalone item.

Mitutoyo

Dial Test Indicators

With revolution counter | Long contact point | Carbide contact point

SPECIFICATIONS

Metric Standard (20° tilted face) type

Code No.			Graduation (mm)	Range (mm)	Dial reading	Maximum permissible error (MPE)* (µm)					Mass (g)	Measuring force (N)				Remarks
Basic set	Plus set	Full set				Measuring range	One rev.	10 scale divisions	Hysteresis	Repeatability						
513-444-10E	513-444-10A	513-444-10T	0.01	1.6	0-40-0	16	10	5	5	3	48	0.3 or less	✔		✔	
513-445-10E	513-445-10A	513-445-10T	0.002	0.4	0-100-0	6	5	2	4	1			✔		✔	

Inch Standard (20° tilted face) type

Code No.			Graduation (in)	Range (in)	Dial reading	Maximum permissible error (MPE)* (in)				Mass (g)	Measuring force (N)				Remarks
Basic set	Plus set	Full set				One rev.	First 2.5 rev.	Hysteresis	Repeatability						
—	513-442-10A	513-442-10T	0.0005	0.06	0-15-0	±0.0005	±0.0005	0.0002	±0.0002	48	0.3 or less	✔		✔	
—	513-442-16A	513-442-16T									0.3 or less	✔		✔	Black dial
—	513-446-10A	513-446-10T									0.2 or less	✔	✔	✔	
—	513-446-16A	513-446-16T									0.2 or less	✔	✔	✔	Black dial
—	513-443-10A	513-443-10T	0.0001	0.016	0-4-0	±0.0002	±0.0002	0.0001	±0.00004		0.3 or less	✔		✔	
—	513-443-16A	513-443-16T									0.3 or less	✔		✔	Black dial

Metric Vertical type

Code No.			Graduation (mm)	Range (mm)	Dial reading	Maximum permissible error (MPE)* (µm)					Mass (g)	Measuring force (N)				Remarks
Basic set	Plus set	Full set				Measuring range	One rev.	10 scale divisions	Hysteresis	Repeatability						
513-456-10E	—	—	0.01	0.5	0-25-0	6	—	5	4	3	46	0.3 or less			✔	
513-454-10E	513-454-10A	513-454-10T		0.8	0-40-0	9	—								✔	
513-455-10E	513-455-10A	513-455-10T	0.002	0.2	0-100-0	4	—	2	3	1					✔	

Inch Vertical type

Code No.			Graduation (in)	Range (in)	Dial reading	Maximum permissible error (MPE)* (in)				Mass (g)	Measuring force (N)				Remarks
Basic set	Plus set	Full set				One rev.	First 2.5 rev.	Hysteresis	Repeatability						
513-452-10E	—	513-452-10T	0.0005	0.03	0-15-0	±0.0005	—	0.0002	±0.0002	46	0.3 or less			✔	
513-453-10E	—	513-453-10T	0.0001	0.008	0-4-0	±0.0001	—	0.0001	±0.00004		0.3 or less			✔	

Metric Horizontal Type

Code No.			Graduation (mm)	Range (mm)	Dial reading	Maximum permissible error (MPE)* (µm)					Mass (g)	Measuring force (N)				Remarks
Basic set	Plus set	Full set				Measuring range	One rev.	10 scale divisions	Hysteresis	Repeatability						
513-486-10E	—	—	0.01	0.5	0-25-0	6	—	5	4	3	53	0.3 or less			✔	
513-484-10E	513-484-10A	513-484-10T		0.8	0-40-0	9	—								✔	
513-485-10E	—	—	0.002	0.2	0-100-0	4	—	2	3	1					✔	

Inch Horizontal Type

Code No.			Graduation (in)	Range (in)	Dial reading	Maximum permissible error (MPE)* (in)				Mass (g)	Measuring force (N)				Remarks
Basic set	Plus set	Full set				One rev.	First 2.5 rev.	Hysteresis	Repeatability						
—	513-482-10A	513-482-10T	0.0005	0.03	0-15-0	±0.0005	—	0.0002	±0.0002	53	0.3 or less			✔	

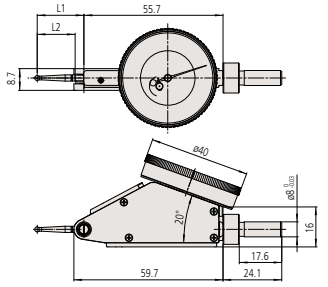
* Standard (20° Tilted Face) Type, Vertical Type: We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.
Horizontal Type: We guarantee the accuracy of completed products by inspecting them with the dial face vertical.

Note: **513-4XX-1X** is indicated on the dial face and the inspection certificate.
The code No. with suffix (E/A/T) is a set item which includes accessories. The main unit is not available as a standalone item.

DIMENSIONS

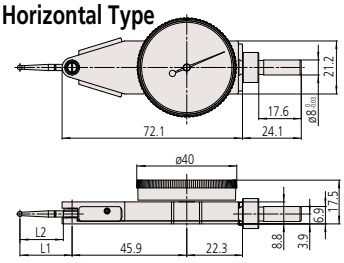
Standard (20° Tilted Face) Type

Unit: mm



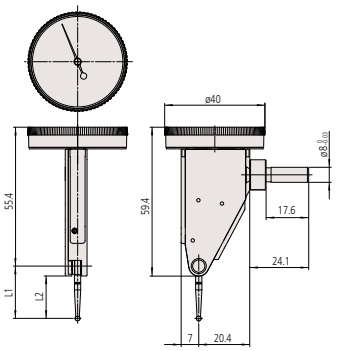
Code No.	L1	L2
513-445-10E	18.7	15.2
513-444-10E	20.9	17.4

Horizontal Type



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

Vertical Type



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

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

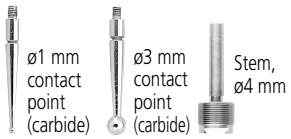
Set Configuration: Metric

Full set 513-4XX-10T

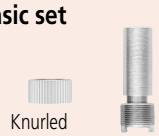
Swivel clamp (**900321**, for ø4 mm stem, ø8 mm stem, and dovetail)

Metric holding bar (L: 100 mm)

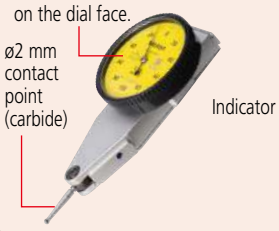
Plus set 513-4XX-10A



Basic set 513-4XX-10E



513-4XX-10 is indicated on the dial face.



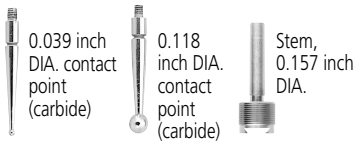
Set Configuration: Inch

Full set 513-4XX-1XT

Swivel clamp (**900322**, for 0.157 inch DIA. stem, 0.375 inch DIA. stem, and dovetail)

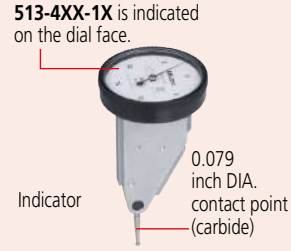
Inch holding bar (L: 4 in)

Plus set 513-4XX-1XA



Basic set 513-4XX-10E

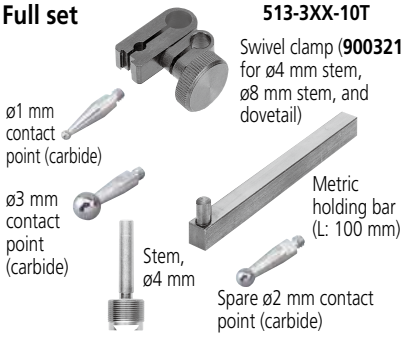
513-4XX-1X is indicated on the dial face.



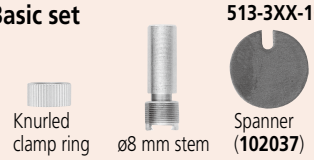
PROPRIETARY INSPECTION CERTIFICATE

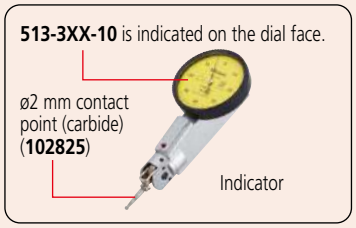
Set Configuration: Metric

Full set — **513-3XX-10T**



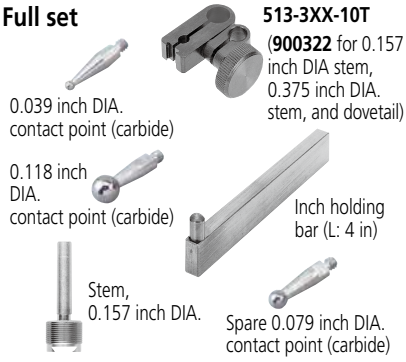
Basic set — **513-3XX-10E**



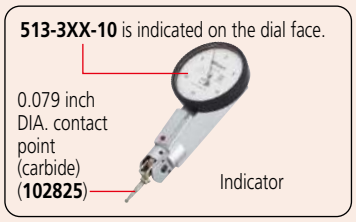


Set Configuration: Inch

Full set — **513-3XX-10T** (**900322** for 0.157 inch DIA stem, 0.375 inch DIA. stem, and dovetail)



Basic set — **513-3XX-10E**



Optional Accessories

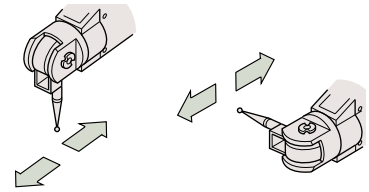
- Swivel clamps (See page 07-84)
- Holding bars (See page 07-85)
- Stems (See page 07-85)

102824: ø1 mm contact point (carbide)
102825: ø2 mm contact point (carbide)
102826: ø3 mm contact point (carbide)

Dial Test Indicator
SERIES 513 — Universal Type

513-304-10E

Universal Type



- The direction of the probe movement can be freely changed by rotating the contact point section of the indicator.

SPECIFICATIONS

Metric

Code No.		Graduation (mm)	Range (mm)	Dial reading	Maximum permissible error (MPE)* (µm)					Mass (g)	Measuring force (N)	High accuracy	With revolution counter	Long contact point	Standard	Double scale spacing	Compact	Dustproof	Carbide contact point	Ruby contact point
Basic set	Full set				Measuring range	One rev.	10 scale divisions	Hysteresis	Repeatability											
513-304 -10E	513-304-10T	0.01	0.8	0-40-0	9	—	5	4	3	71	0.3 or less								✔	

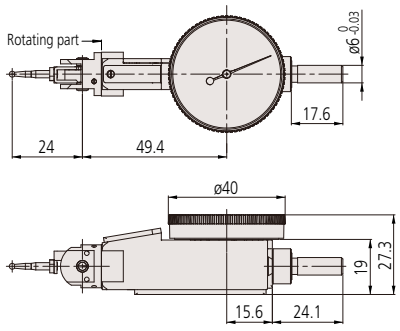
Inch

Code No.		Graduation (in)	Range (in)	Dial reading	Maximum permissible error (MPE)* (in)			Mass (g)	Measuring force (N)	High accuracy	With revolution counter	Long contact point	Standard	Double scale spacing	Compact	Dustproof	Carbide contact point	Ruby contact point
Basic set	Full set				One rev.	Hysteresis	Repeatability											
513-302-10E	513-302-10T	0.0005	0.03	0-15-0	±0.0005	0.0003	±0.0003	71	0.3 or less								✔	

* The accuracy is guaranteed when used with the dial face facing upward and the contact point oriented as shown in the figure.
Note: **513-3XX-10** is indicated on the dial face and the inspection certificate.
The code No. with suffix (E/T) is a set item which includes accessories. The main unit is not available as a standalone item.

DIMENSIONS

Unit: mm



513-304-10E

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

Mitutoyo

Pocket Type Dial Test Indicator SERIES 513

- This test indicator series is slimmer than standard test indicators without a clutch lever, making it more suitable for measuring deep points.
- Contact point length is printed on dial face to avoid accuracy issues.

  Note 1: Attaching a contact point of incorrect length will lead to measurement failure.
- Glare-free flat crystal face allows easy reading of graduations. Multi-layer composite coatings make the crystal more anti-reflective and stain resistant.
- Bonding the bezel and crystal together leaves no gap for cutting fluid or oil to penetrate through to the dial face. (Note that this type is NOT water-proof.)
- Clutch type (with a clutch lever)

  Note 2: See page 07-83 for notes on differences with models that do not have a clutch lever.
- A ø2 mm carbide contact point is supplied as standard.
- Metric Dial Test Indicator is inspected according to JIS B 7533:2015. We guarantee accuracy by inspecting with the dial face facing upward.

513-517-10E/
513-517-10T

Standard
Compact
Carbide contact point

Graduation: 0.01 mm
Range: 0.8 mm

513-515-10E/
513-515-10T

Long contact point
Compact
Carbide contact point

Graduation: 0.01 mm
Range: 1 mm

513-501-10E/
513-501-10T

High accuracy
Compact
Carbide contact point

Graduation: 0.001 mm
Range: 0.14 mm

513-514-10E/
513-514-10T

Long contact point
Double scale spacing
Compact
Carbide contact point

Graduation: 0.01 mm
Range: 0.5 mm

513-503-10E/
513-503-10T

Standard
Compact
Carbide contact point

Graduation: 0.002 mm
Range: 0.2 mm

Set Configuration: Metric

Full set **513-5XX-10T**

Swivel clamp (**900321**, for ø4 mm stem, ø8 mm stem, and dovetail)

Metric holding bar (L: 100 mm)

Stem, ø4 mm

Holding bar

Basic set **513-5XX-10E**

Stem, ø8 mm

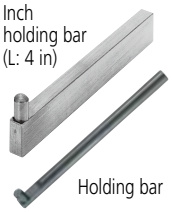
Spanner

513-5XX-10 is indicated on the dial face.

Set Configuration: Inch

Full set **513-5XX-10T**

Swivel clamp (**900322**, for 0.157 inch DIA. stem, 0.375 inch DIA. stem, and dovetail)



Inch holding bar (L: 4 in)

Holding bar

0.039 inch DIA. contact point (carbide)

0.118 inch DIA. contact point (carbide)

Stem, 0.157 inch DIA.

Basic set **513-5XX-10E**

Stem, 0.375 inch DIA.

Spanner

513-5XX-10 is indicated on the dial face.

513-518-10E /
513-518-10T

Compact
Carbide contact point

Graduation: 0.001 in
Range: 0.04 in

513-512-10E /
513-512-10T

Long contact point
Double scale spacing
Compact
Carbide contact point

Graduation: 0.0005 in
Range: 0.02 in

513-504-10E /
513-504-10T

Compact
Carbide contact point

Graduation: 0.0001 in
Range: 0.01 in

SPECIFICATIONS

Metric

Code No.		Graduation (mm)	Range (mm)	Dial reading	Maximum permissible error (MPE)* (µm)					Mass (g)	Measuring force (N)	High accuracy	With revolution counter	Long contact point	Standard	Double scale spacing	Compact	Carbide contact point	Ruby contact point
Basic set	Full set				Measuring range	One rev.	10 scale divisions	Hysteresis	Repetability										
513-517-10E	**513-517-10T**	0.01	0.8	0-40-0	9	–	5	4	3	50	0.3 or less				✔		✔	✔	
513-514-10E	**513-514-10T**	0.01	0.5	0-25-0	10	–	5	5	3	51	0.3 or less			✔		✔	✔	✔	
513-515-10E	**513-515-10T**	0.01	1	0-50-0	10	–	5	5	3	51	0.3 or less			✔			✔	✔	
513-503-10E	**513-503-10T**	0.002	0.2	0-100-0	4	–	2	3	1	50	0.4 or less				✔		✔	✔	
513-501-10E	**513-501-10T**	0.001	0.14	0-70-0	4	–	2	3	1	50	0.5 or less	✔					✔	✔	

Inch

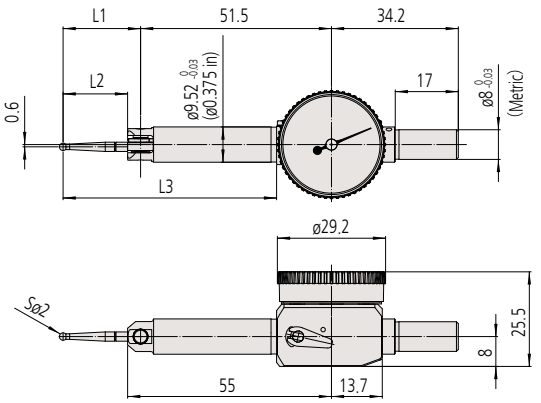
Code No.		Graduation (in)	Range (in)	Dial reading	Maximum permissible error (MPE)* (in)				Mass (g)	Measuring force (N)	High accuracy	With revolution counter	Long contact point	Standard	Double scale spacing	Compact	Carbide contact point	Ruby contact point
Basic set	Full set				One rev.	First 2.5 rev.	Hysteresis	Repetability										
513-518-10E	**513-518-10T**	0.001	0.04	0-20-0	±0.001	–	0.0002	±0.0004	50	0.3 or less						✔	✔	
513-512-10E	**513-512-10T**	0.0005	0.02	0-10-0	±0.0005	–	0.0002	±0.0002	51	0.3 or less			✔		✔	✔	✔	
513-504-10E	**513-504-10T**	0.0001	0.01	0-5-0	±0.0002	–	0.0001	±0.00004	50	0.3 or less						✔	✔	

* We guarantee the accuracy of completed products by inspecting them with the dial face facing upward.
Note 1: Be sure to perform calibration with reference gage, etc. after exchanging the contact point. The inside parts may be damaged when the contact point is exchanged due to the breakage. In the case the of the significant deterioration in the operation, repair is required.
Note 2: Stem is not included in the mass.
Note 3: **513-5XX-10** is indicated on the dial face and the inspection certificate.
The code No. with suffix (E/T) is a set item which includes accessories. The main unit is not available as a standalone item.

Pocket Type Dial Test Indicator
SERIES 513

DIMENSIONS

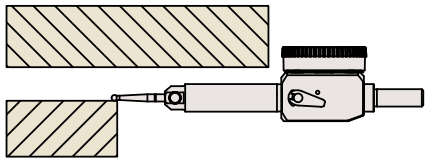
Unit: mm



Code No.	L1	L2	L3
513-517-10E	20.9	17.4	57.6
513-514-10E	36.8	33.3	73.5
513-515-10E	44.5	41	81.2
513-503-10E	14.7	11.2	51.4
513-501-10E	12.1	8.6	48.7

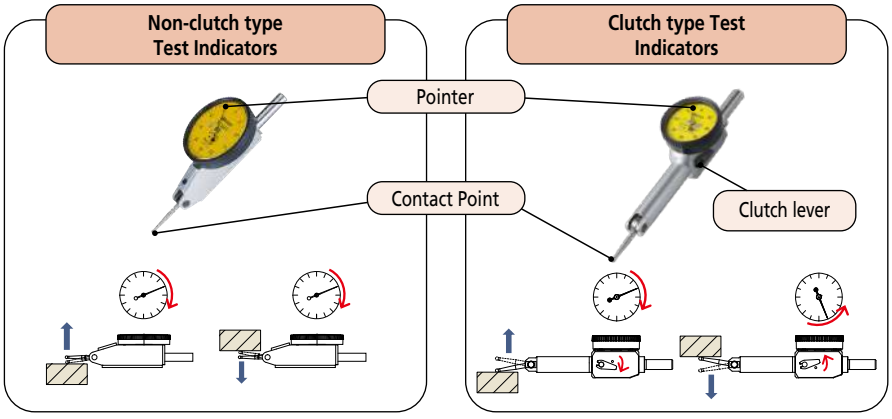
Note: A slight difference may occur depending on the center of the contact point, graduation plate, and stem fixing position, etc.

Pocket type can be fixed at the body (at ø9.52 (ø0.375 in))



The slim body allows measurements in shallow space.

There are two types of Mitutoyo Dial Test Indicator:
The non-clutch type (without a clutch lever) and the clutch type (with a clutch lever)

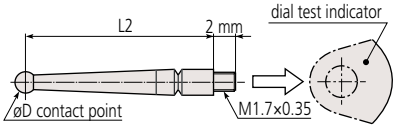


In the non-clutch type, although the contact point may move either in the upward or downward direction, the pointer always rotates clockwise.
In the clutch type, if the clutch lever is set in one position the contact point moves in the upward direction and the pointer rotates clockwise. Conversely, if the lever is set in the other position the contact point moves in the downward direction and the pointer rotates counterclockwise.

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

Contact point (for Metric Models Only*)

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



ø0.5 mm contact point (Steel)

190547 (L2=11.2 mm)
21CAB109 (L2=15.2 mm)
190549 (L2=17.4 mm)
190654 (L2=18.7 mm)
21CAB111 (L2=33.9 mm)
190656 (L2=41.0 mm)

ø0.7 mm contact point (Steel)

190548 (L2=11.2 mm)
21CAB110 (L2=15.2 mm)
190550 (L2=17.4 mm)
190653 (L2=18.7 mm)
21CAB112 (L2=33.9 mm)
190655 (L2=41.0 mm)

ø1 mm contact point (Carbide)

103017 (L2=11.2 mm)
131314 (L2=15.2 mm)
103013 (L2=17.4 mm)
137558 (L2=18.7 mm)
131316 (L2=33.9 mm)
136235 (L2=41.0 mm)

ø2 mm contact point (Carbide)

103010 (L2=11.2 mm)
103011 (L2=15.2 mm)
103006 (L2=17.4 mm)
137557 (L2=18.7 mm)
131324 (L2=33.9 mm)
136013 (L2=41.0 mm)

ø2 mm contact point (Ruby)

21CZA209 (L2=11.2 mm)
21CZB068 (L2=15.2 mm)
21CZA201 (L2=17.4 mm)
21CZA210 (L2=18.7 mm)
21CZA211 (L2=41.0 mm)

ø3 mm contact point (Carbide)

103018 (L2=11.2 mm)
131315 (L2=15.2 mm)
103014 (L2=17.4 mm)
137559 (L2=18.7 mm)
131317 (L2=33.9 mm)
136236 (L2=41.0 mm)

Swivel Clamps

For ø6 mm stem, ø8 mm stem, and dovetail

902053

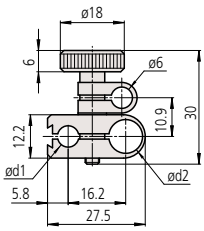
For ø4 mm stem, ø8 mm stem, and dovetail

900321

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

900322

Unit: mm

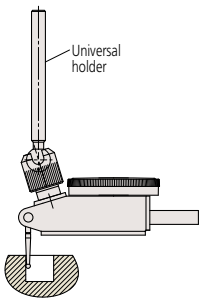


Code No.	d1	d2
902053	6	8
900321	4	8
900322	0.157 in	0.375 in

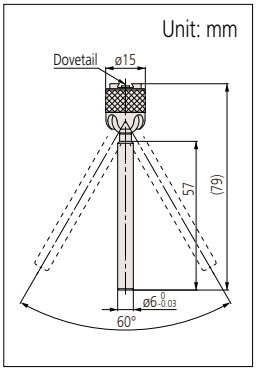
Universal Holder (dovetail clamp)

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

21CZA233 (ø8 mm stem)
21CZA231 (0.25 inch DIA. stem)
21CZA229 (ø6 mm stem)



Unit: mm



Mitutoyo

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

Spanner

102037

Holding Bars

9×9 mm

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

ø8 mm (0.315 inch DIA) **900211** (Length: 115 mm/4.528 in)

0.25 in×0.5 in

953639 (Length: 2 in)
900306 (Length: 4 in)

Stems with Knurled Clamp Ring

ø4 mm
(0.157 inch DIA.)

21CZB131

ø8 mm

21CZB129

0.375 inch DIA.

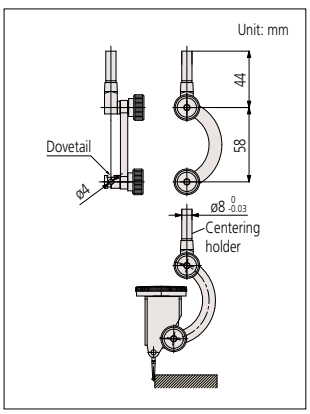
21CZB130

Stem DIA. ød	Stem with dovetail (Individual item)	Nut (Individual item)	Full set (Stem with dovetail+Nut)
	Code No.		
ø4	**21CAB106**	**190322**	**21CZB131**
ø6	**21CAB103**	**190322**	**21CZB128**
ø8	**21CAB104**	**190322**	**21CZB129**
ø0.375 in	**21CAB105**	**190322**	**21CZB130**

Centering Holder

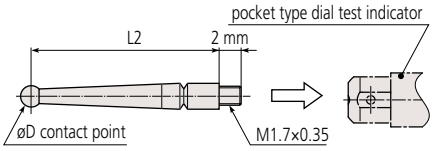
- Allows large diameter cylinders or holes to be centered on a machine tool.

901959 (ø8 mm stem)
901997 (0.25 inch DIA. stem)



Optional Accessories for Pocket Type Dial Test Indicators

Contact point (for Metric Models Only)



ø0.5 mm contact point (Steel)

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

ø0.7 mm contact point (Steel)

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

ø1 mm contact point (Carbide)

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

ø2 mm contact point (Carbide)

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

ø2 mm contact point (Ruby)

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

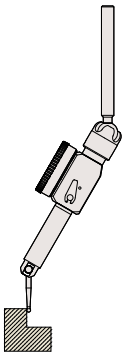
ø3 mm contact point (Carbide)

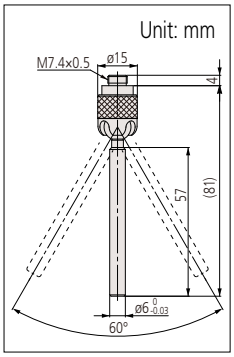
136758 (L2=8.6 mm)
103018 (L2=11.2 mm)
103014 (L2=17.4 mm)
137747 (L2=33.3 mm)
136236 (L2=41.0 mm)

Universal Holder (screw clamp)

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

21CZA234 (ø8 mm stem)
21CZA232 (0.25 inch DIA. stem)
21CZA230 (ø6 mm stem)





Swivel Clamps

For ø6 mm stem, ø8 mm stem, and dovetail

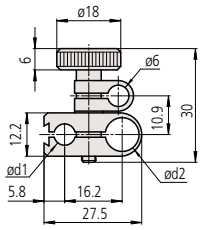
902053

For ø4 mm stem and ø8 mm stem, and dovetail

900321

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

900322



Unit: mm

Code No.	d1	d2
902053	6	8
900321	4	8
900322	0.157 in	0.375 in

Spanner

301336

Holding Bars

9×9 mm **900209** (Length: 100 mm)

ø8 mm (0.315 inch DIA) **900211** (Length: 115 mm)

0.25×0.5 in **953639** (Length: 2 in)
900306 (Length: 4 in)

Note: Suitable for height gages with a scriber section of 12.7×6.35 mm.

Stems

ø4 mm (0.157 inch DIA.)

102036

ø8 mm (0.315 inch DIA.)

102822

0.375 inch DIA.

102081

Mitutoyo

i-Checker IC2000
SERIES 170

- The i-Checker makes it easier to continuously perform high-accuracy inspection of various indicators.
- A wide variety of optional accessories enable the inspection and calibration of many types of gages including dial indicators, lever-type dial indicators, dial test indicators, bore gages, Digimatic indicators, linear gages and lever gage heads that use various stem diameters and support systems.
- Can directly inspect indicators with a stroke of up to 100 mm.
- The pointer of the analog indicator is positioned just before the measuring point automatically in the semi-automatic mode.
- Digital indicators equipped with a data output function are checked very efficiently due to spindle positioning at the inspection points and recording of measurement results being under fully automatic control.

IC2000

SPECIFICATIONS

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

*1 Automatic measurement requires the indicator's connection cable. Additionally some form of indicator, along with the normally connected accessory (the optional accessory for the indicator such as a Digimatic power-supply unit in an EF counter) will be required.
*2 The indicator measured via RS-232C has the capability to receive data from the main unit and output the counter value.

Dial Indicators

Dial Test Indicators

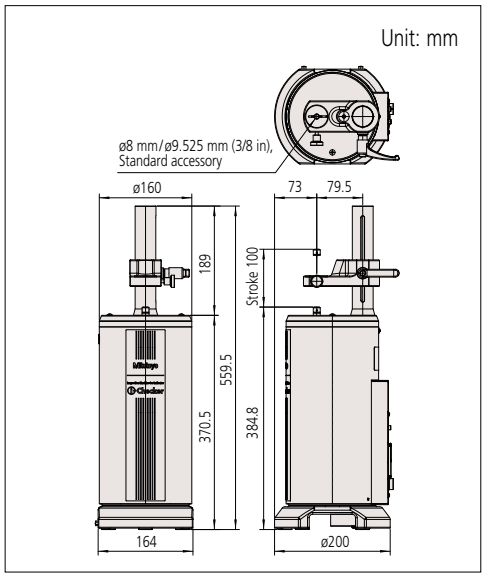
Digimatic Indicators

Linear gages

Bore Gages

Lever gage heads

DIMENSIONS



Typical application for Dial Test Indicator Accessory Set

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

Product catalog E12015

Video

SERIES 170 — UDT-2 Calibration Tester

- **UDT-2** is an accuracy tester for 0.01 mm resolution/graduation dial indicators, dial test indicators and bore gages.
- With the optional stand, inspection of dial bore gages becomes possible.
- Measuring range: 0 to 25 mm.
  Accepts ø6 mm, ø8 mm, 1/4 in and 3/8 in indicator stems.

170-102-12

Typical application

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

Optional accessory

Stand for bore gage inspection (**12AAK824**)
Note: Can be used for the inspection of bore gages SERIES **511** standard type and with micrometer head up to 400 mm. (Refer to pages 08-37 and 08-44 for details.)

SPECIFICATIONS

Metric

Code No.	Micrometer head		Accuracy (µm)	
	Graduation (mm)	Range (mm)	Feed accuracy (25 mm stroke)	Hysteresis
170-102-12	0.001	0 - 25	±2	0.5

Inch

Code No.	Micrometer head		Accuracy (in)	
	Graduation (in)	Range (in)	Feed accuracy (25 mm stroke)	Hysteresis
170-101-10	0.0001	0 - 1	±0.0001	0.00002

SERIES 521 — Calibration Tester

- Accuracy tester for 0.01 mm graduation dial indicators and dial test indicators. Can also be used to adjust the sensitivity of electronic micrometers.
- Universal bracket accepts any dial indicator, dial test indicator or electronic gage without any additional accessory. Clamping capacity: ø4 mm to ø10 mm.

521-103

Calibrating a dial test indicator

SPECIFICATIONS

Metric

Code No.	Micrometer head		Accuracy (µm)	
	Graduation (mm)	Range (mm)	Indication accuracy	Hysteresis
521-103	0.0002	0 - 1	±0.2	0.2
521-105	0.0002	0 - 5	±0.8	0.8

Inch

Code No.	Micrometer head		Accuracy (in)	
	Graduation (in)	Range (in)	Indication accuracy	Hysteresis
521-104	0.00001	0 - 0.05	±0.00001	0.00001
521-106	0.00001	0 - 0.2	±0.00003	0.00003

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Thickness Gages SERIES 547, 7

Standard Type (Resolution: 0.01 mm)

- Thickness gages can quickly measure the thickness of thin products such as paper and felt.
- Using a ceramic contact and anvil, there is no need to worry about rust. (except for **547-401A**)

547-301A

547-321A

- Display: 6-digit display, sign (7-digit for models with 0.0005 mm resolution)
- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)
- Battery life: Approx. 2.5 years under normal use Approx. 2,700 hours of continuous use
- Response speed: Unlimited (except for scanning measurement)
- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment
- Resolution switching (For models with 0.0005 mm resolution)
- Function Lock
- Calibration schedule warning function
- Data output
- Display value holding (when no external device is connected)
- 330° rotary display
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Refer to page 07-90.

- Measurement Data Management **USB-ITPAK V3.0**: **06AGR543**

SPECIFICATIONS

Metric

Code No.	Resolution (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)	Parallelism of Contact point, Anvil (µm)
547-301A	0.01	0 - 10	30	ø10 Flat	10
547-321A	0.01	0 - 10	120	ø10 Flat	10

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
547-301A	±20	1.5 or less	245	Standard, ceramic point/anvil
547-321A	±20	1.5 or less	385	Deep throat, ceramic point/anvil

Inch/Metric

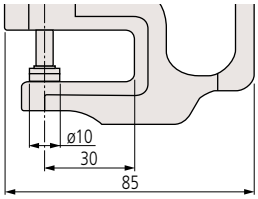
Code No.	Resolution	Range (in)	Measuring depth	Contact point, Anvil	Parallelism of Contact point, Anvil
547-526S*	0.0001 in/0.001 mm	0 - 0.47*	30 mm (1.18 in)	ø10 mm (ø0.39 in) Flat	0.0002 in/0.005 mm
547-300A	0.0005 in/0.01 mm	0 - 0.4	30 mm (1.18 in)	ø10 mm (ø0.39 in) Flat	0.005 in/0.01 mm
547-500S*	0.0005 in/0.01 mm	0 - 0.47*	30 mm (1.18 in)	ø10 mm (ø0.39 in) Flat	0.005 in/0.01 mm
547-320A	0.0005 in/0.01 mm	0 - 0.4	120 mm (4.72 in)	ø10 mm (ø0.39 in) Flat	0.005 in/0.01 mm
547-520S*	0.0005 in/0.01 mm	0 - 0.47*	120 mm (4.72 in)	ø10 mm (ø0.39 in) Flat	0.005 in/0.01 mm

Code No.	Accuracy	Measuring force (N)	Mass (g)	Remarks
547-526S*	±0.0002 in/±5 µm	1.5 or less	225	Standard, ceramic point/anvil
547-300A	±0.001 in/±20 µm	1.5 or less	245	Standard, ceramic point/anvil
547-500S*	±0.001 in/±20 µm	1.5 or less	225	Standard, ceramic point/anvil
547-320A	±0.001 in/±20 µm	1.5 or less	385	Deep throat, ceramic point/anvil
547-520S*	±0.001 in/±20 µm	1.5 or less	380	Deep throat, ceramic point/anvil

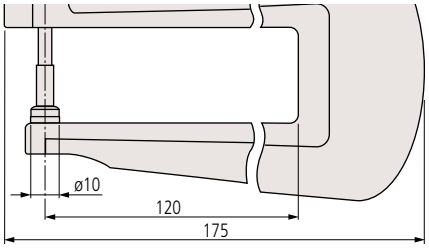
* Using **ID-SX** Digimatic indicator.

DIMENSIONS

547-301A, 547-526S, 547-300A, 547-500S



547-321A, 547-320A, 547-520S



Unit: mm

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Optional Accessories

Code No.	Type	Description
264-020	—	USB Input Tool Series USB Keyboard Signal Conversion Type **IT-020U**
06AGL011	SF	Connection cable (1 m)
06AGL021	SF	Connection cable (2 m)
06AGQ001F	SF	USB Input Tool Direct (2 m)
264-622	IP67	**U-WAVE-TM**
264-623	Buzzer	**U-WAVE-TM**
02AZD810D	—	**U-WAVE-R**
264-626	IP67	**U-WAVE-TMB**
264-627	Buzzer	**U-WAVE-TMB**
02AZF700	—	Connecting unit for **U-WAVE-TM**/**TMB** (for **ID-C**/**ID-F** Series 12.7 mm/0.5 inch type only)
02AZF670	—	**U-WAVE-TM**/**TMB** mounting bracket: for Digimatic Indicators

High Accuracy Type (Resolution: 0.0005 mm)

547-401A

SPECIFICATIONS

Metric

Code No.	Resolution (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)	Parallelism of Contact point, Anvil (µm)
547-401A	0.0005 (0.001/0.01 selectable)	0 - 12	21	ø6.3 Flat (Carbide)	3

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
547-401A	±3	3.5 or less	275	High accuracy, carbide point anvil

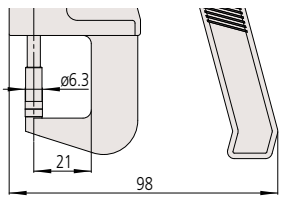
Inch/Metric

Code No.	Resolution	Range (in)	Measuring depth	Contact point, Anvil	Parallelism of Contact point, Anvil
547-400A	0.00002/0.00005/ 0.0001/0.0005 in 0.0005/0.001/ 0.01 mm (selectable)	0 - 0.47	21 mm (0.83 in)	ø6.3 mm (ø0.25 in) Flat	0.0001 in/0.003 mm

Code No.	Accuracy	Measuring force (N)	Mass (g)	Remarks
547-400A	±0.00012 in/±3 µm	3.5 or less	275	High accuracy, carbide point anvil

DIMENSIONS

547-401A, 547-400A Unit: mm



Mitutoyo

Thickness Gages
SERIES 547, 7

Standard Type (Graduation: 0.01 mm)

- Integrated moulding of the bezel and crystal ensures protection against water and oil penetration via the front face.

7301A

7321A

SPECIFICATIONS

Metric

Code No.	Graduation (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)	Parallelism of Contact point, Anvil (µm)
7327A	0.001	0 - 1	30	ø10 Flat	5
7301A	0.01	0 - 10	30	ø10 Flat	5
7305A	0.01	0 - 20	30	ø10 Flat	5
7321A	0.01	0 - 10	120	ø10 Flat	5
7323A	0.01	0 - 20	120	ø10 Flat	5

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
7327A	±5	1.5 or less	225	Fine dial reading, ceramic point/anvil
7301A	±15	1.4 or less	205	Standard, ceramic point/anvil
7305A	±20	2.0 or less	220	Standard, ceramic point/anvil
7321A	±15	1.4 or less	370	Deep throat, ceramic point/anvil
7323A	±22	2.0 or less	370	Deep throat, ceramic point/anvil

Inch

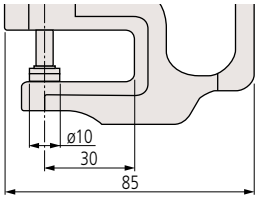
Code No.	Graduation (in)	Range (in)	Measuring depth (in)	Contact point, Anvil (in)	Parallelism of Contact point, Anvil (in)
7326A	0.0001	0 - 0.05	1.18	ø0.39 Flat	0.0002
7300A	0.001	0 - 0.5	1.18	ø0.39 Flat	0.0005
7304A	0.001	0 - 1	1.18	ø0.39 Flat	0.0005
7322A	0.001	0 - 1	4.72	ø0.39 Flat	0.0005

Code No.	Accuracy (in)	Measuring force (N)	Mass (g)	Remarks
7326A	±0.0002	2.0 or less	205	Fine dial reading, ceramic point/anvil
7300A	±0.001	1.8 or less	205	Standard, ceramic point/anvil
7304A	±0.002	1.8 or less	220	Standard, ceramic point/anvil
7322A	±0.002	1.8 or less	370	Deep throat, ceramic point/anvil

Note: The dial indicator needs to be reset when a contact point is replaced.

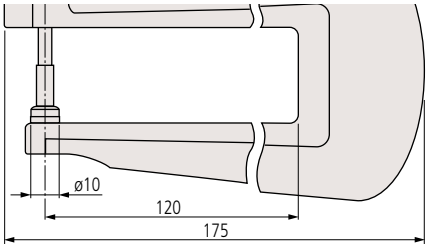
DIMENSIONS

7301A, 7305A, 7327A

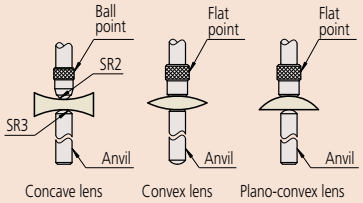


7321A, 7322A, 7323A

Unit: mm



Typical applications



- Display: 6-digit display, sign (7-digit for models with 0.0005 mm resolution)
- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)
- Battery life: Approx. 2.5 years under normal use Approx. 2,700 hours of continuous use
- Response speed: Unlimited (except for scanning measurement)
- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment
- Resolution switching (For models with 0.0005 mm resolution)
- Function Lock
- Calibration schedule warning function
- Data output
- Display value holding (when no external device is connected)
- 330° rotary display
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Refer to page 07-90.

- Measurement Data Management **USB-ITPAK V3.0**: **06AGR543**

Lens thickness measurement

- Thickness of concave-convex lenses and surfaces can be measured. (Contact point, Anvil: hardened steel)
- Anvils and contact points are interchangeable to enable concave surfaces to be measured.
- Provided with a ball point as standard.

547-313A **7313A**

SPECIFICATIONS

Metric

Code No.	Resolution (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)	Parallelism of Contact point, Anvil (µm)
547-313A	0.01	0 - 10	30	ø6 Flat (Contact point) ø4.8 Flat (Anvil)	12

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
547-313A	±20	1.5 or less	265	Lens thickness

Inch / Metric

Code No.	Resolution	Range (in)	Measuring depth	Contact point, Anvil	Parallelism of Contact point, Anvil
547-312A	0.0005 in/0.01 mm	0 - 0.4	30 mm (1.18 in)	ø6 mm (ø0.24 in) Flat (Contact point) ø4.8 mm (ø0.19 in) Flat(Anvil)	0.005 in/0.01 mm
547-512A*	0.0005 in/0.01 mm	0 - 0.47*	30 mm (1.18 in)	ø6 mm (ø0.24 in) Flat (Contact point) ø4.8 mm (ø0.19 in) Flat (Anvil)	0.005 in/0.01 mm

Code No.	Accuracy	Measuring force (N)	Mass (g)	Remarks
547-312A	±0.001 in/±20 µm	1.5 or less	265	Lens thickness
547-512A*	±0.001 in/±20 µm	1.5 or less	240	Lens thickness

* Using **ID-SX** Digimatic indicator.

Metric

Code No.	Graduation (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)	Parallelism of Contact point, Anvil (µm)
7313A	0.01	0 - 10	30	ø6 Flat (Contact point) ø4.8 Flat (Anvil)	5

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
7313A	±15	1.4 or less	215	Lens thickness

Inch

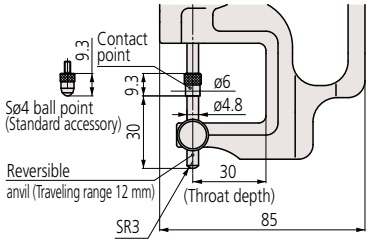
Code No.	Graduation (in)	Range (in)	Measuring depth (in)	Contact point, Anvil (in)	Parallelism of Contact point, Anvil (in)
7312A	0.001	0 - 0.5	1.18	ø0.24 Flat (Contact point) ø0.19 Flat (Anvil)	0.0005

Code No.	Accuracy (in)	Measuring force (N)	Mass (g)	Remarks
7312A	±0.001	1.8 or less	215	Lens thickness

Note: The dial indicator needs to be reset when a contact point is replaced.

DIMENSIONS

Unit: mm



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Thickness Gages
SERIES 547, 7

Pipe gage measurement

- Pipe wall thickness, thickness of curved boards can be measured. (Contact point, Anvil: hardened steel)

547-360A

7360A

- Display: 6-digit display, sign (7-digit for models with 0.0005 mm resolution)
- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)
- Battery life: Approx. 2.5 years under normal use Approx. 2,700 hours of continuous use
- Response speed: Unlimited (except for scanning measurement)
- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment
- Resolution switching (For models with 0.0005 mm resolution)
- Function Lock
- Calibration schedule warning function
- Data output
- Display value holding (when no external device is connected)
- 330° rotary display
- Low battery voltage alarm display
- Error alarm display

SPECIFICATIONS

Metric

Code No.	Resolution (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)
547-360A	0.01	0 - 10	20	ø3 Flat (Contact point) ø3.5 Ball (Anvil)

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
547-360A	±20	1.5 or less	230	Pipe gage

Inch / Metric

Code No.	Resolution	Range (in)	Measuring depth	Contact point, Anvil
547-361A	0.0005 in/0.01 mm	0 - 0.4	20 mm (0.79 in)	ø3 mm (ø0.12 in) Flat (Contact point) ø3.5 mm (ø0.14 in) Ball (Anvil)
547-561S	0.0005 in/0.01 mm	0 - 0.47*	20 mm (0.79 in)	ø3 mm (ø0.12 in) Flat (Contact point) ø3.5 mm (ø0.14 in) Ball (Anvil)

Code No.	Accuracy	Measuring force (N)	Mass (g)	Remarks
547-361A	±0.001 in/±20 µm	1.5 or less	230	Pipe gage
547-561S	±0.001 in/±20 µm	1.5 or less	215	Pipe gage

* Using **ID-SX** Digimatic indicator.

Metric

Code No.	Graduation (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)
7360A	0.01	0 - 10	20	ø3 Flat (Contact point) ø3.5 Ball (Anvil)

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
7360A	±15	1.4 or less	200	Pipe gage

Inch

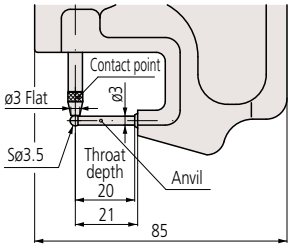
Code No.	Graduation (in)	Range (in)	Measuring depth (in)	Contact point, Anvil (in)
7361A	0.001	0 - 0.5	0.8	ø0.12 Flat (Contact point) ø0.14 Ball (Anvil)

Code No.	Accuracy (in)	Measuring force (N)	Mass (g)	Remarks
7361A	±0.001	1.8 or less	200	Pipe gage

Note: The dial indicator needs to be reset when a contact point is replaced.

DIMENSIONS

Unit: mm



Optional Accessories

Refer to page 07-90.

- Measurement Data Management **USB-ITPAK V3.0**: **06AGR543**

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- Display: 6-digit display, sign (7-digit for models with 0.0005 mm resolution)
- Power source: CR2032 battery (1 pc.), included as standard (for operational checks)
- Battery life: Approx. 2.5 years under normal use
  Approx. 2,700 hours of continuous use
- Response speed: Unlimited (except for scanning measurement)
- Zero-setting (INC system)
- Presetting (ABS system)
- Measuring direction switching
- Tolerance judgment
- Resolution switching (For models with 0.0005 mm resolution)
- Function Lock
- Calibration schedule warning function
- Data output
- Display value holding (when no external device is connected)
- 330° rotary display
- Low battery voltage alarm display
- Error alarm display

Optional Accessories

Refer to page 07-90.

- Measurement Data Management **USB-ITPAK V3.0**: **06AGR543**

Blade thickness measurement

- Measuring faces of the contact point and anvil are blade-shaped (thickness: 1 mm). Suitable for measuring narrow grooves.

547-315A **7315A**

SPECIFICATIONS

Metric

Code No.	Resolution (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)	Parallelism of Contact point, Anvil (µm)
547-315A	0.01	0 - 10	30	t=1 Blade	10

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
547-315A	±20	1.5 or less	260	Blade thickness

Inch / Metric

Code No.	Resolution	Range (in)	Measuring depth	Contact point, Anvil	Parallelism of Contact point, Anvil
547-316A	0.0005 in/0.01 mm	0 - 0.4	30 mm (1.18 in)	t=1 mm (0.04 in) Blade	0.005 in/0.01 mm
547-516A*	0.0005 in/0.01 mm	0 - 0.47*	30 mm (1.18 in)	t=1 mm (0.04 in) Blade	0.005 in/0.01 mm

Code No.	Accuracy	Measuring force (N)	Mass (g)	Remarks
547-316A	±0.001 in/±20 µm	1.5 or less	260	Blade thickness
547-516A*	±0.001 in/±20 µm	1.5 or less	240	Blade thickness

* Using **ID-SX** Digimatic indicator.

Metric

Code No.	Graduation (mm)	Range (mm)	Measuring depth (mm)	Contact point, Anvil (mm)	Parallelism of Contact point, Anvil (µm)
7315A	0.01	0 - 10	30	t=1 Blade	5

Code No.	Accuracy (µm)	Measuring force (N)	Mass (g)	Remarks
7315A	±15	1.4 or less	220	Blade thickness

Inch

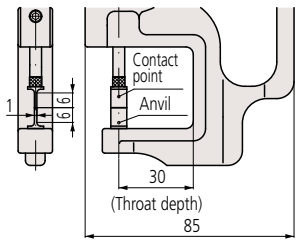
Code No.	Graduation (in)	Range (in)	Measuring depth (in)	Contact point, Anvil (in)	Parallelism of Contact point, Anvil (in)
7316A	0.001	0 - 0.5	1.18	t=0.04 Blade	0.0005

Code No.	Accuracy (in)	Measuring force (N)	Mass (g)	Remarks
7316A	±0.001	1.8 or less	220	Blade thickness

Note: The dial indicator needs to be reset when a contact point is replaced.

DIMENSIONS

Unit: mm



Mitutoyo

Contact Force Gage SERIES 546

- Contact Force Gages are widely used to determine the measuring force applied by an instrument to a workpiece, as well as contact forces of electrical relays, micro-switches, valves and precision springs.
- Thanks to the miniature anti-friction bearing in the fulcrum, stable measurement is guaranteed.
- 2 types are available: Standard and peak hold.

Standard type
546-112

Peak hold type
546-137

Measurement example of contact force on a relay

SPECIFICATIONS

mN-scale models

Standard

Code No.	Graduation (mN)	Range (mN)	Accuracy (graduation)
546-112	2	6 - 50	±0.5
546-113	5	10 - 100	
546-114	10	30 - 300	

Peak hold

Code No.	Graduation (mN)	Range (mN)	Accuracy (graduation)
—	—	—	—
546-133	5	10 - 100	±0.5
546-134	10	30 - 300	

Note: Please note that these products are only available in their standard forms; they cannot be customized for special sizes or specifications.

N-scale models

Standard

Code No.	Graduation (N)	Range (N)	Accuracy (graduation)
546-115	0.02	0.06 - 0.5	±0.5
546-116	0.05	0.1 - 1	
546-117	0.05	0.15 - 1.5	
546-118	0.1	0.3 - 3	
546-119	0.2	0.6 - 5	

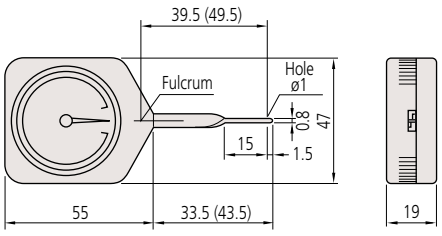
Peak hold

Code No.	Graduation (N)	Range (N)	Accuracy (graduation)
546-135	0.02	0.06 - 0.5	±0.5
546-136	0.05	0.1 - 1	
546-137	0.05	0.15 - 1.5	
546-138	0.1	0.3 - 3	
546-139	0.2	0.6 - 5	

Note: Please note that these products are only available in their standard forms; they cannot be customized for special sizes or specifications.

DIMENSIONS

Unit: mm



( ): **546-112**, **546-113**, **546-133**

Dial Snap Gage
SERIES 201

- Designed for quick Go/±No-go judgment of diameters of cylinders and shafts in machining processes.
- Enables single-handed comparative measurements of a cylinder diameter, etc. while workpiece processing is taking place.
- The dial indicator and protection cover are optional.
- Some digimatic/dial indicators cannot be used with the dial snap gage. Consult Mitutoyo before using dial indicators which are not recommended.
- Measuring faces: Carbide.
- Anvil positioning range: 25 mm/1 in. Adjustment nut: adjusts the setting anvil to the nominal size required within the measuring range.
- Clamp: clamps the setting anvil at the required position.

201-101

Note: The dial indicator and dial protection cover are optional.

Optional accessories

Dial protection cover: **21DZA000**

Recommended dial indicators/ Digimatic indicators (optional)

- Metric models:
  2046AB: Dial indicator (Graduation: 0.01 mm)
  2109AB-10: Dial indicator (Graduation: 0.001 mm)
  543-700B: Digimatic Indicator (Resolution: 0.0005/0.001/0.01 mm)
- Inch models:
  2414AB: Dial indicator (Graduation: 0.001 in)
  2805AB-10: Dial indicator (Graduation: 0.0001 in)
  543-702B: Digimatic Indicator (Resolution: 0.00002/0.00005/0.0001/0.0005 in (0.0005/0.001/0.01 mm))

SPECIFICATIONS

Metric

Code No.	Range (mm)	Parallelism (μm)	Measuring force* (N)
201-101	0 - 25	5	15±3
201-102	25 - 50		
201-103	50 - 75		
201-104	75 - 100		
201-105	100 - 125		
201-106	125 - 150		
201-107	150 - 175		
201-108	175 - 200		
201-109	200 - 225		
201-110	225 - 250		
201-111	250 - 275		
201-112	275 - 300		

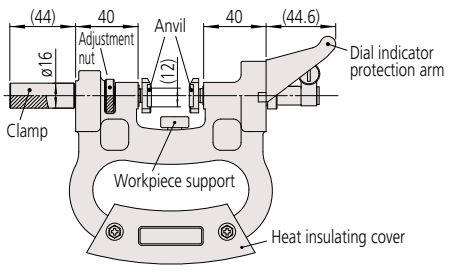
Inch

Code No.	Range (in)	Parallelism (in)	Measuring force* (N)
201-151	0 - 1	0.00025	15±3
201-152	1 - 2		
201-153	2 - 3		
201-154	3 - 4		
201-155	4 - 5		
201-156	5 - 6		
201-157	6 - 7		
201-158	7 - 8		
201-159	8 - 9		
201-160	9 - 10		
201-161	10 - 11		
201-162	11 - 12		

* Measuring force is that force present before an indicator is installed and is determined at the point where the spindle is retracted 1 mm from the rest position.

DIMENSIONS

Unit: mm



SERIES 7 — Magnetic Stands

- Mitutoyo magnetic stands clamp to iron or steel surfaces with a strong force and are indispensable for temporarily mounting a dial test indicator (or dial indicator) onto a machine tool or fixture for general alignment applications.
- Vertical/horizontal mounting holes and bushes are available for attaching dial test indicators and dial indicators.
- Models **7014-10**, **7014E-10**, **7015-10**, **7031-10**, **7032-10** and **7033-10** have a dovetail groove in the swivel holder for attaching dial test indicators that are equipped with a dovetail.

7010-10

7011-10

7012-10

7014-10
(magnetic clamping is non-switchable)

7033-10

7031-10

7032-10

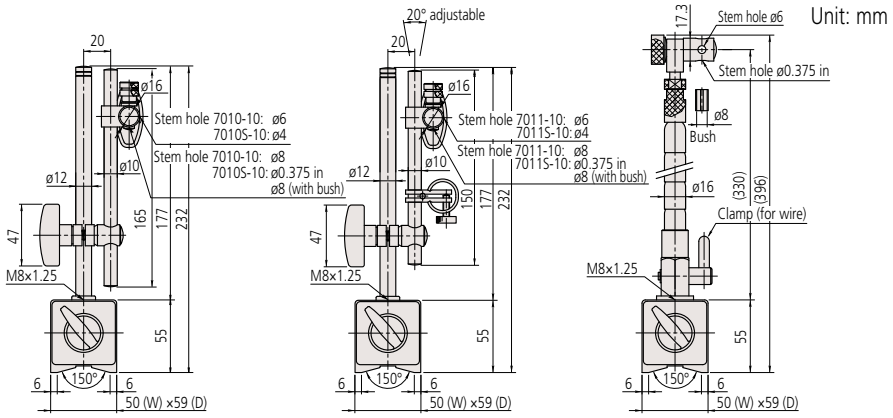
SPECIFICATIONS

Code No.	Description	Applicable holding stem sizes	Magnetic force*1	Remarks
7010-10[*2*3]	Magnetic stand	ø6 mm, ø8 mm	Approx. 600 N	—
7010S-10[*2*3]	Magnetic stand	ø4 mm, ø8 mm, ø0.375 in	Approx. 600 N	—
7011-10[*2*3]	Magnetic stand	ø6 mm, ø8 mm	Approx. 600 N	With fine adjustment
7011S-10[*2*3]	Magnetic stand	ø4 mm, ø8 mm, ø0.375 in	Approx. 600 N	With fine adjustment
7012-10[*4]	Magnetic stand	ø6 mm, ø8 mm, ø0.375 in	Approx. 600 N	—
7013-10	Magnetic stand base	—	Approx. 600 N	—
7014-10[*4]	Mini magnetic stand	ø6 mm, ø8 mm, with dovetail	Approx. 150 N	Without magnet ON/OFF
7014E-10[*2*3]	Mini magnetic stand	ø4 mm, ø0.375 in	Approx. 150 N	Without magnet ON/OFF
7015-10	Magnetic stand	ø6 mm, ø8 mm, ø0.375 in, with dovetail	Approx. 600 N	Without magnet ON/OFF
7031-10	Universal magnetic stand	ø6 mm, ø8 mm, ø0.375 in, with dovetail	Approx. 300 N	With mechanical locking system
7032-10	Universal magnetic stand	ø6 mm, ø8 mm, ø0.375 in, with dovetail	Approx. 600 N	With mechanical locking system
7033-10	Universal magnetic stand	ø6 mm, ø8 mm, ø0.375 in, with dovetail	Approx. 600 N	With mechanical locking system

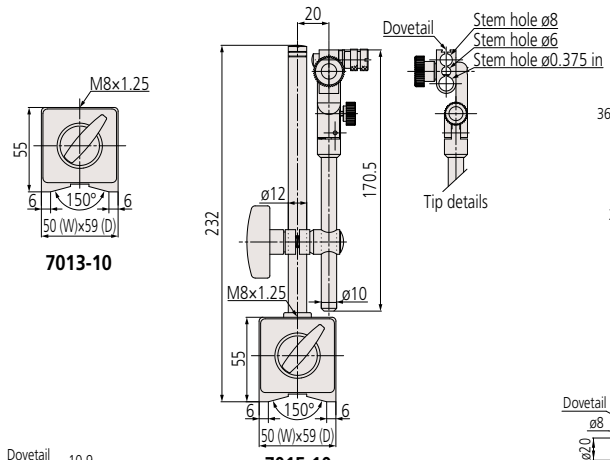
*1 The magnetic holding force applies to that needed for vertical separation from a thick and flat steel object.
*2 Back plunger type (**1160A**, etc.) cannot be attached.
*3 When attaching a compact dial indicator (outer frame diameter 31, 36 or 40 mm), select a back cover type with a lug.
*4 Use with a dial test indicator or SERIES **1** dial indicator (compact or lightweight type) is recommended.

DIMENSIONS

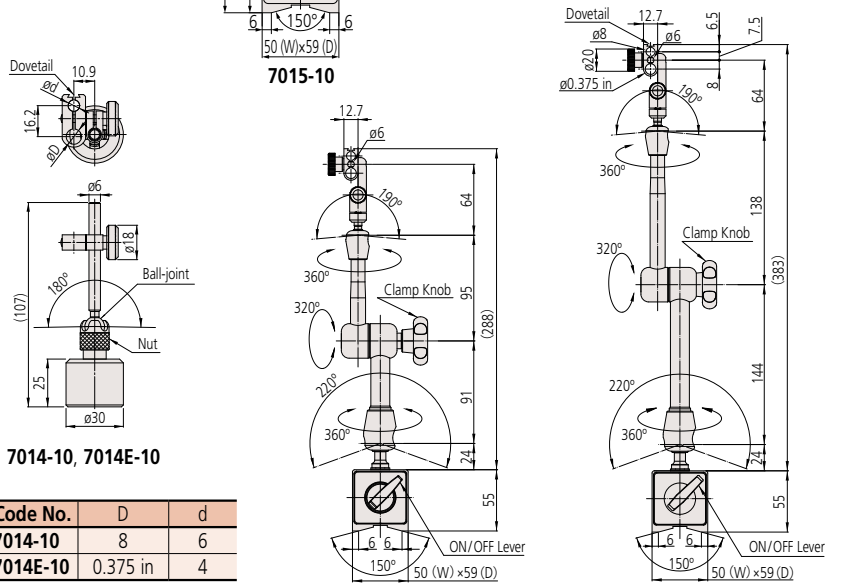
Unit: mm



7010-10, 7010S-10 **7011-10, 7011S-10** **7012-10**



7013-10 **7015-10** **7031-10**



7014-10, 7014E-10 **7032-10** **7033-10**

Code No.	D	d
7014-10	8	6
7014E-10	0.375 in	4

Dial Gage Stands
SERIES 7

- Dial Gage Stands are designed for comparison measurements of size using a dial indicator or Digimatic Indicator. An anvil is provided as standard.
- Anvil: ø58 mm serrated anvil, ø58 mm flat anvil, 90 mm square anvil and domed anvil (optional)
- Vertical fine adjustment is available with one-touch control thanks to the parallel spring suspension.

7002-10
(with ø58 mm non-serrated anvil)

SPECIFICATIONS

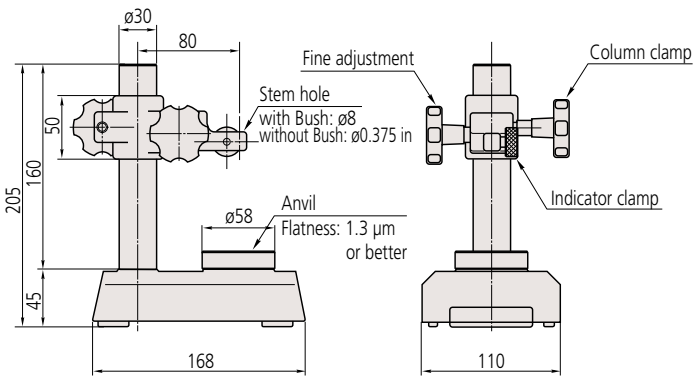
Metric

Code No.	Clamping range on column (mm)	Stem hole (mm)	Remarks
7001-10	0 to 95	ø8, ø0.375 in	With serrated anvil
7002-10			With flat anvil

Note 1: Perpendicularity of the stem hole to the anvil is better than 0.4 mm/100 mm
Note 2: Take note that when mounting high-accuracy Linear Gages (with resolution of 0.1 µm or better) to these stands, accuracy may be affected depending on the perpendicularity of the mounting hole to the top surface of the anvil (cosine effect).
Note 3: Compact dial indicators (bezel ø31, ø36) are not suitable for use with these stands.

DIMENSIONS

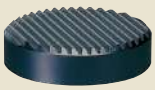
Unit: mm



7001-10, 7002-10
- Clamping range on column: 0 to 95 mm
- Flatness of reference surface: 1.3 µm

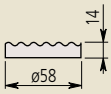
Optional Accessories

101462: Hardened steel serrated anvil
(standard accessory for **7001-10**)

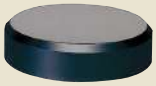


Unit: mm

Hardened steel

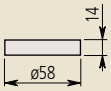


101461: Hardened steel non-serrated anvil
(standard accessory for **7002-10**)



Unit: mm

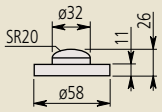
Hardened steel



101463: Hardened steel domed anvil* (optional)
* Not available for **7007-10**.

Unit: mm

Hardened steel



7007-10
(with 90 mm square semi-serrated anvil)

SPECIFICATIONS

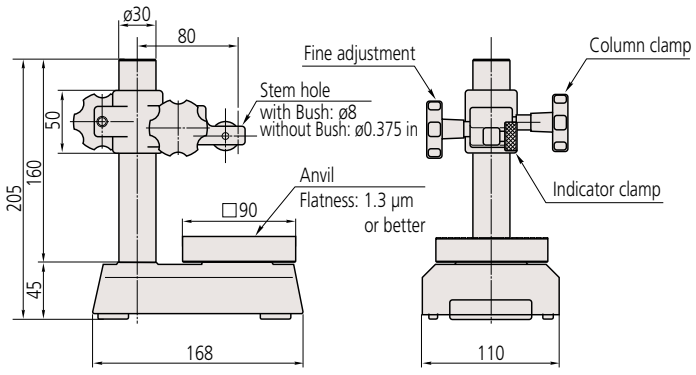
Metric

Code No.	Clamping range on column (mm)	Stem hole (mm)	Remarks
7007-10	0 to 90	ø8, ø0.375 in	With square anvil

Note 1: Perpendicularity of the stem hole to the anvil is better than 0.4 mm/100 mm
Note 2: Take note that when mounting high-accuracy Linear Gages (with resolution of 0.1 µm or better) to these stands, accuracy may be affected depending on the perpendicularity of the mounting hole to the top surface of the anvil (cosine effect).
Note 3: Compact dial indicators (bezel ø31, ø36) are not suitable for use with these stands.

DIMENSIONS

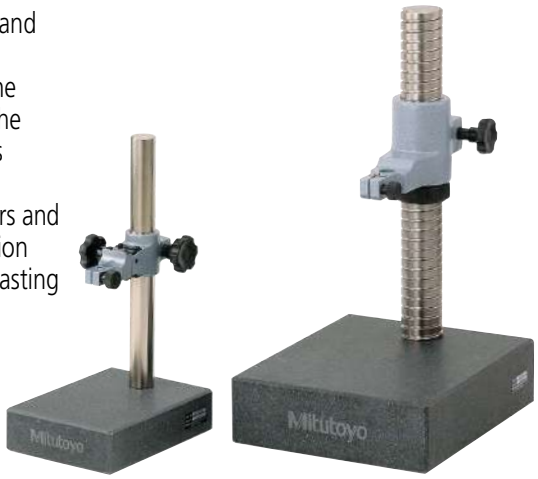
Unit: mm



7007-10
- Clamping range on column: 0 to 90 mm
- Flatness of reference surface: 1.3 µm

SERIES 215 — Granite Base Comparator Stands

- The plates are made of natural stone and will hardly deteriorate over time. (While the appearance of natural stone base varies according to the source, the high stability for which this material is known can always relied upon.)
- The rigid granite base is free from burrs and pileups due to its fine-grain composition and less viscousness compared with casting iron. The flatness is always accurate.



215-151-10 **215-156-10**

Optional Accessories

ø15 mm bush (for **215-156-10**, **215-505-10**):
21JAA331

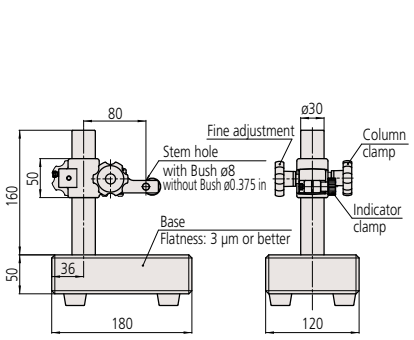
SPECIFICATIONS

Code No.	Granite base size (WxDxH) (mm)	Clamping range on column (mm)	Stem hole (mm)	Remarks
215-150-10	120×180×50	0 to 110	ø8, ø0.375 in	With fine adjustment of 1 mm range
215-151-10	150×200×50	0 to 250		
215-153-10	200×250×80	0 to 260		
215-156-10	300×250×80	0 to 275	ø8, ø0.375 in, ø20	With fine adjustment over entire travel

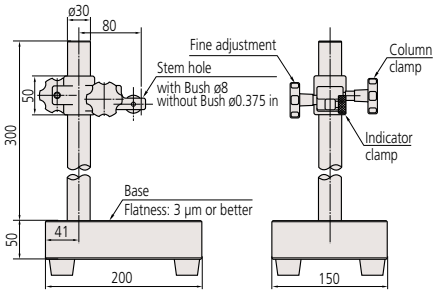
Note 1: Perpendicularity of the stem hole to the anvil is better than 0.2 mm/100 mm.
Note 2: Take note that when mounting high-accuracy Linear Gages (with resolution of 0.1 µm or better) to these stands, accuracy may be affected depending on the perpendicularity of the mounting hole to the top surface of the anvil (cosine effect).
Note 3: Compact dial indicators (bezel ø31, ø36) are not suitable for use with these stands.

DIMENSIONS

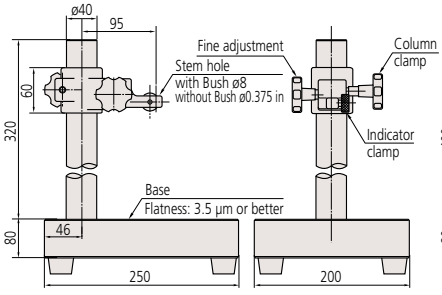
Unit: mm



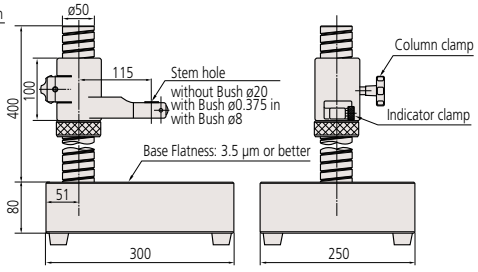
215-150-10
• Clamping range on column: 0 to 110 mm



215-151-10
• Clamping range on column: 0 to 250 mm



215-153-10
• Clamping range on column: 0 to 260 mm



215-156-10
• Clamping range on column: 0 to 275 mm

SERIES 215 — Cast Iron Base Comparator Stands

Example of attaching the Digimatic Indicator

Digimatic Indicator **ID-H**.

Optional Accessories

Refer to page 07-101.

- Comparator Stands are designed for comparison measurements of size using a dial indicator or Digimatic Indicator.
- The partially serrated anvil prevents very flat workpieces from wringing to it.

215-405-10

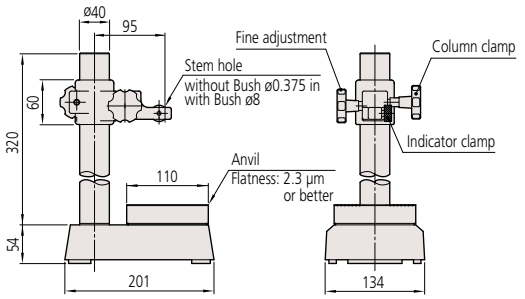
SPECIFICATIONS

Code No.	Anvil	Clamping range on column (mm)	Micromotion mechanism (Adjustment range)	Stem hole (mm)
215-405-10	Square semi-serrated anvil (110×110 mm)	0 to 235	Vertical fine adjustment (1 mm)	ø0.375 in, ø8 with Bush
215-505-10	Square semi-serrated anvil (150×150 mm)	0 to 275	Micromotion screw	ø20, ø0.375 in with Bush, ø8 with Bush

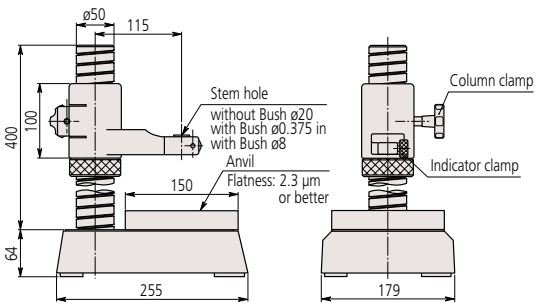
Note 1: Perpendicularity of the stem hole to the anvil is better than 0.4 mm/100 mm.
Note 2: Take note that when mounting high-accuracy Linear Gages (with resolution of 0.1 µm or better) to these stands, accuracy may be affected depending on the perpendicularity of the mounting hole to the top surface of the anvil (cosine effect).
Note 3: Compact dial indicators (bezel ø31, ø36) are not suitable for use with these stands.

DIMENSIONS

Unit: mm



215-405-10
• Clamping range on column: 0 to 235 mm



215-505-10
• Clamping range on column: 0 to 275 mm

Mitutoyo

SERIES 519 — Transfer Stands

- Transfer Stands are designed for comparison measurements of size using a dial indicator or Digimatic Indicator.

519-109-10
(with a serrated anvil)

SPECIFICATIONS

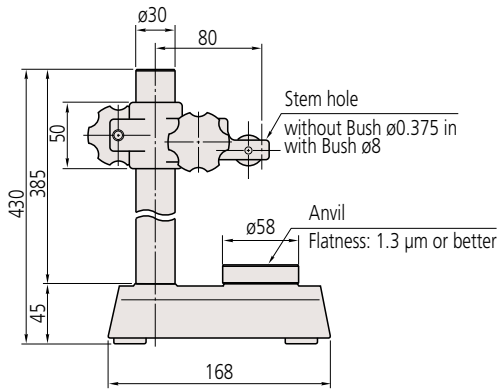
Metric

Code No.	Anvil	Clamping range on column (mm)	Micromotion adjustment range (mm)	Stem hole (mm)
519-109-10	With a serrated anvil (ø58 mm)	0 to 320	1	ø0.375 in, ø8 with Bush

Note 1: Perpendicularity of the stem hole to the anvil is better than 0.4 mm/100 mm.
Note 2: Take note that when mounting high-accuracy Linear Gages (with resolution of 0.1 µm or better) to these stands, accuracy may be affected depending on the perpendicularity of the mounting hole to the top surface of the anvil (cosine effect).
Note 3: Compact dial indicators (bezel ø31, ø36) are not suitable for use with these stands.

DIMENSIONS

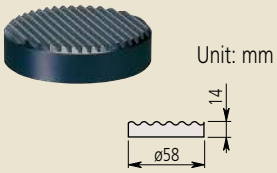
Unit: mm



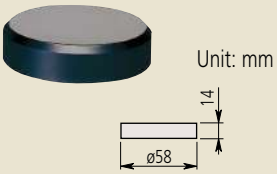
- Clamping range on column: 0 to 320 mm
- Flatness of the bottom surface: 0.003 mm

Optional Accessories

101462: Hardened steel serrated anvil (standard accessory)



101461: Hardened steel non-serrated anvil (optional)



101463: Hardened steel domed anvil (optional)