

# Dial Indicators

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

## Dial Indicators

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

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.

### 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 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.



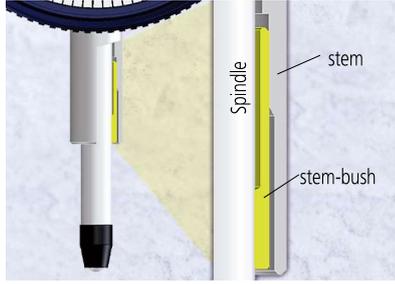
### Parts of a dial indicator



# Dial Indicators

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

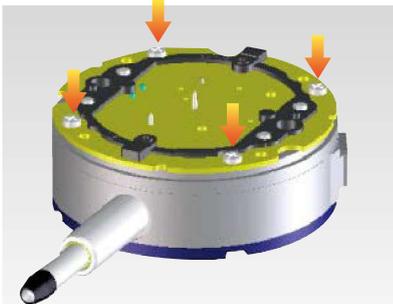


- No through screw-holes on the frame for high oil- and dust-resistance. The bezel clamp can be attached either to the right or left side.
- Improved Impact- and oil-resistant materials are employed in the bezel. Easier reading is due to the improved shape of the crystal face.

- 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: **21AZB149**) can be attached to either the right or left side providing high operability and smooth movement. This lever can be easily installed and removed without tools.
- Limit hand (1) can be moved without interfering with the bezel clamp (2).



- Greater rigidity in the bearing plate for reduced retrace error and 4-screw mounting for increased impact resistance.



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

# Dial Indicators

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## SERIES 2 — Standard Type, 0.01 mm Graduation

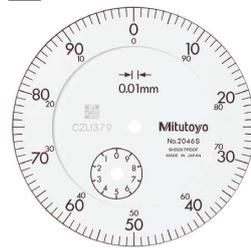
- Standard 0.01 mm graduation dial gages having a bezel with an outside diameter of 57 mm. All types come with limit markers and a bezel clamp as standard.
- The bezel clamp and lifting lever (optional) can be attached to either the right or left side. These parts can be easily installed and removed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



20465



**Continuous scale**



Graduation: 0.01 mm, Measuring range: 10 mm  
**20465**  
**20465-09**  
 Shockproof type



**Balanced scale**



Graduation: 0.01 mm, Measuring range: 10 mm  
**20475**



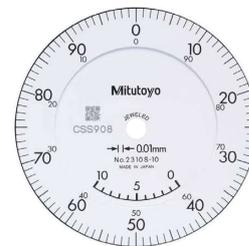
**Reverse reading type. Suitable for depth and step measurement.**



Graduation: 0.01 mm, Measuring range: 10 mm  
**29025**



**Continuous scale**



Graduation: 0.01 mm, Measuring range: 10 mm  
**23105-10**  
 With coaxial revolution counter  
 Jeweled bearing type



**Continuous scale**



Graduation: 0.01 mm, Measuring range: 5 mm  
**20445**  
**20445-09**  
 Shockproof



**Balanced scale**

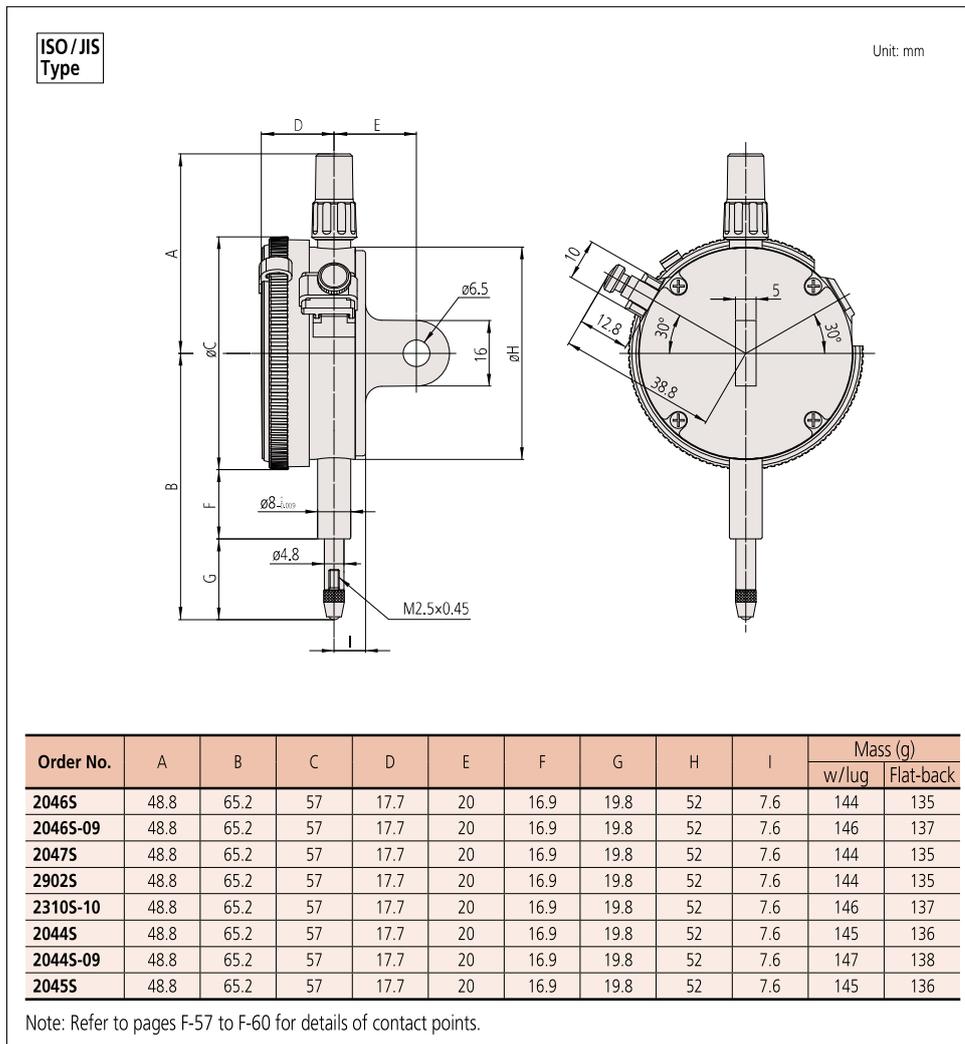


Graduation: 0.01 mm, Measuring range: 5 mm  
**20455**

# Dial Indicators

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

## DIMENSIONS



## FEATURES

Metric									
Order No.									
w/lug	Flat-back								
2046S	2046SB	✓							
2046S-09	2046SB-09	✓			✓				
2047S	2047SB		✓						
2902S	2902SB			✓					
2310S-10	2310SB-10	✓					✓	✓	
2044S	2044SB	✓							
2044S-09	2044SB-09	✓			✓				
2045S	2045SB		✓						

## SPECIFICATIONS

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



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

# Dial Indicators

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

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



2109S-10



Balanced scale



Graduation: 0.001 mm, Measuring range: 1 mm  
**2109S-10**  
 Shockproof type  
 Jeweled bearing type



Continuous scale



Graduation: 0.001 mm, Measuring range: 1 mm  
**2110S-10**  
 Double scale spacing type  
 Shockproof type  
 Jeweled bearing type



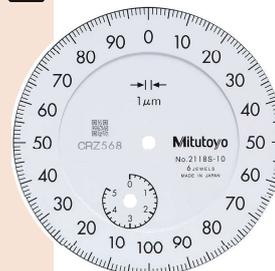
Balanced scale



Graduation: 0.001 mm, Measuring range: 2 mm  
**2113S-10**  
 Shockproof type  
 Jeweled bearing type



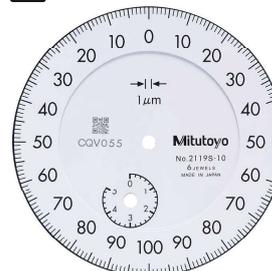
Continuous scale



Graduation: 0.001 mm, Measuring range: 5 mm  
**2118S-10**  
 Jeweled bearing type



Balanced scale



Graduation: 0.001 mm, Measuring range: 5 mm  
**2119S-10**  
 Jeweled bearing type



Continuous scale

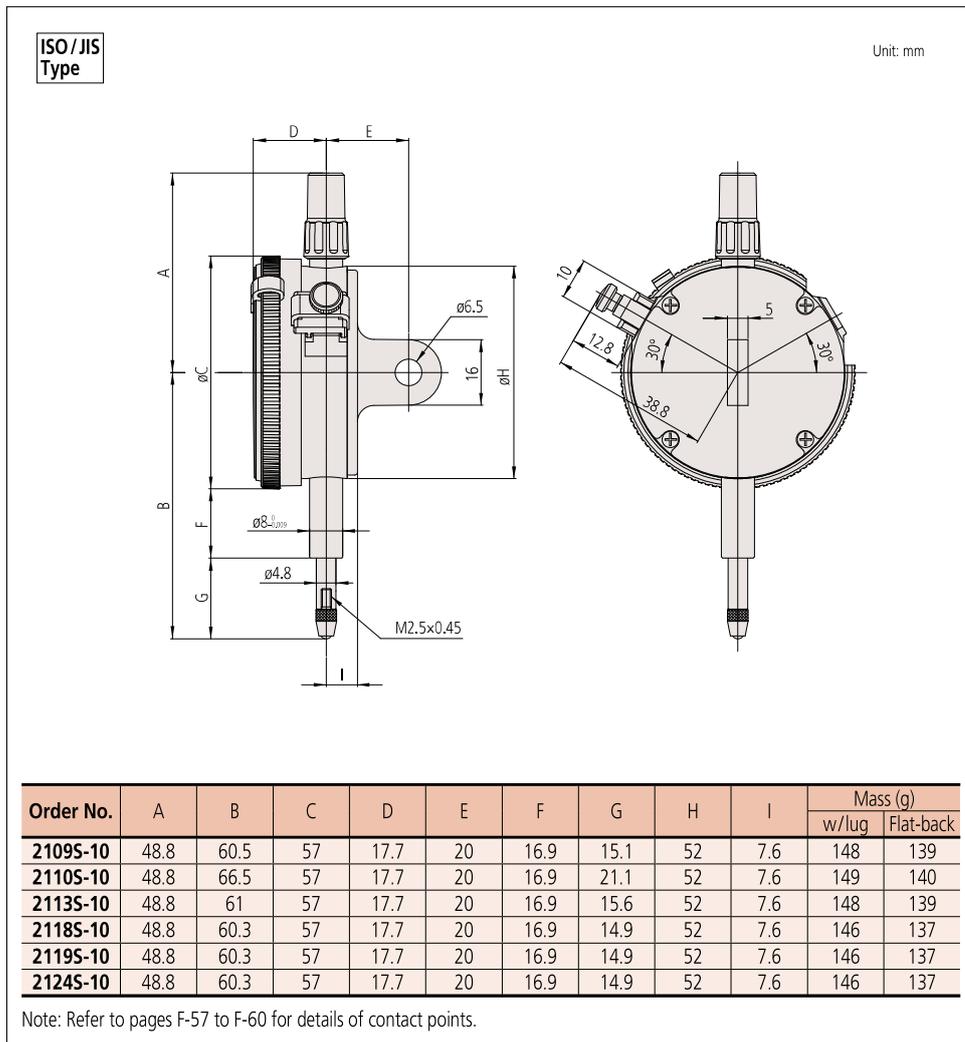


Graduation: 0.005 mm, Measuring range: 5 mm  
**2124S-10**  
 Jeweled bearing type

# Dial Indicators

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

## DIMENSIONS



## FEATURES

Metric							
Order No.							
w/lug	Flat-back						
2109S-10	2109SB-10	✓	✓	✓	✓	✓	
2110S-10	2110SB-10	✓	✓	✓	✓	✓	
2113S-10	2113SB-10	✓	✓	✓	✓	✓	
2118S-10	2118SB-10	✓	✓	✓	✓	✓	
2119S-10	2119SB-10	✓	✓	✓	✓	✓	
2124S-10	2124SB-10	✓	✓	✓	✓	✓	

## SPECIFICATIONS

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



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IP64

# Dial Indicators

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## SERIES 2 — Waterproof Type, 0.01 mm & 0.001 mm Graduation

- Waterproof type dial indicators having a bezel with an outside diameter of 57 mm.
- O-rings and rubber bellows are used to prevent water and oil penetration.
- All types come with limit markers and a bezel clamp as standard.
- The bezel clamp can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of a hard coating on the surface of the crystal makes the gage highly scratch- and chemical-resistant.



2046S-60

Continuous scale



Graduation: 0.01 mm, Measuring range: 10 mm **Waterproof**

Continuous scale



Graduation: 0.01 mm, Measuring range: 5 mm **Waterproof**



2109S-70

Balanced scale



Graduation: 0.001 mm, Measuring range: 1 mm **Waterproof**  
 **Shockproof**  
 **Jeweled bearing**

Continuous scale



Graduation: 0.001 mm, Measuring range: 1 mm **Waterproof**  
 **Double scale spacing**  
 **Shockproof**  
 **Jeweled bearing**

# Dial Indicators

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

## DIMENSIONS

ISO/JIS Type

Unit: mm

Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
<b>2046S-60</b>	48.8	70	57	17.7	20	12.3	29.2	52	7.6	146	137
<b>2044S-60</b>	48.8	70	57	17.7	20	12.3	29.2	52	7.6	147	138
<b>2109S-70</b>	48.8	65.3	57	17.7	20	12.3	24.5	52	7.6	149	140
<b>2110S-70</b>	48.8	67.5	57	17.7	20	12.3	26.7	52	7.6	150	141

Note 1: Refer to pages F-57 to F-60 for details of contact points.  
 Note 2: If the contact point of the waterproof model is replaced, the water resistance cannot be guaranteed.

## FEATURES

Metric							
Order No.		ISO	JIS	3	64	Diamond	Waterproof
w/lug	Flat-back	ISO	JIS	3	64	Diamond	Waterproof
<b>2046S-60</b>	<b>2046SB-60</b>	✓			✓		
<b>2044S-60</b>	<b>2044SB-60</b>	✓			✓		
<b>2109S-70</b>	<b>2109SB-70</b>		✓	✓	✓	✓	
<b>2110S-70</b>	<b>2110SB-70</b>	✓		✓	✓	✓	✓

## SPECIFICATIONS

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



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# Dial Indicators

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## SERIES 2 — Standard Type, Inch Reading

### SPECIFICATIONS

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

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

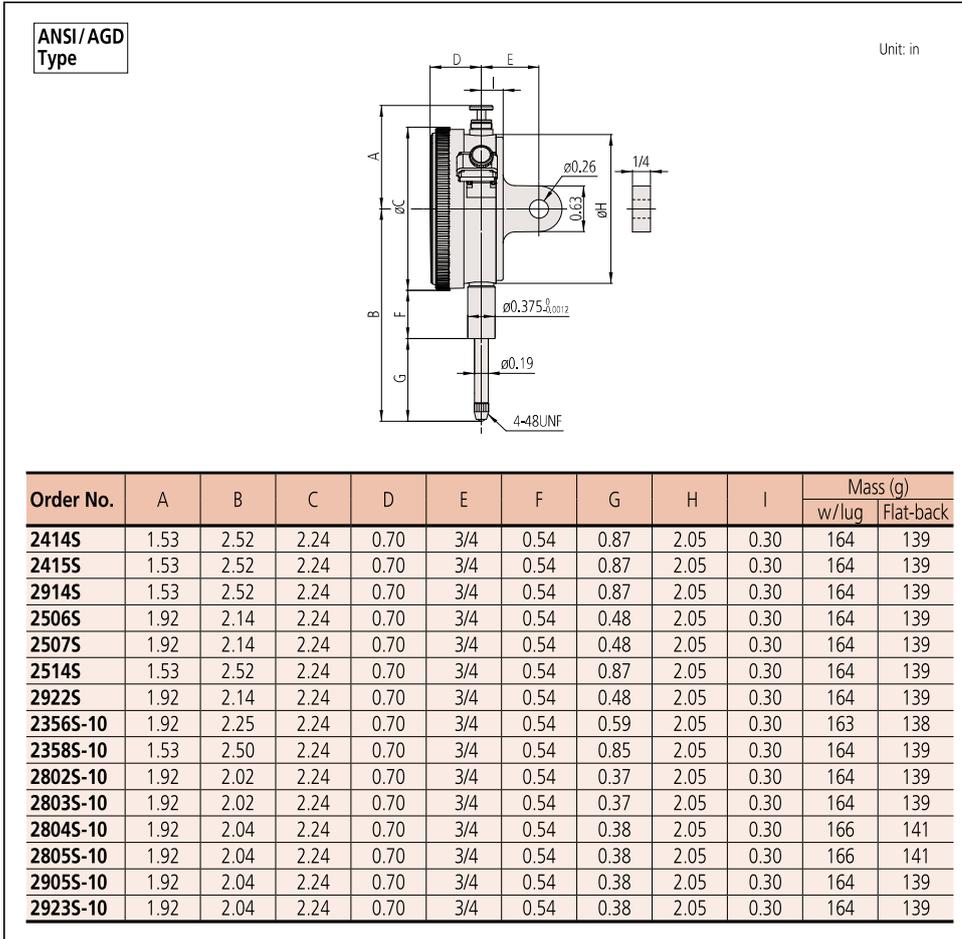
### FEATURES

Inch				
Order No.				
w/lug	Flat-back			
2414S	2414SB			
2415S	2415SB			
2914S	2914SB		✓	
2506S	2506SB			
2507S	2507SB			
2514S	2514SB			
2922S	2922SB			
2356S-10	2356SB-10			✓
2358S-10	2358SB-10			✓
2802S-10	2802SB-10	✓		✓
2803S-10	2803SB-10	✓		✓
2804S-10	2804SB-10	✓		✓
2805S-10	2805SB-10	✓		✓
2905S-10	2905SB-10	✓	✓	✓
2923S-10	2923SB-10	✓		✓

# Dial Indicators

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

## DIMENSIONS





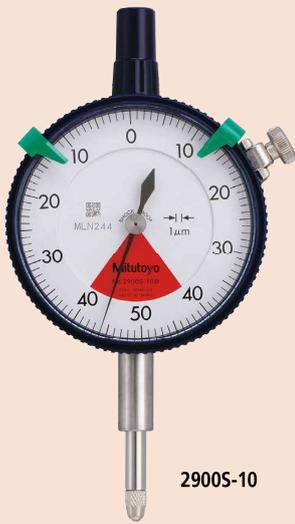
An inspection certificate is supplied as standard. Refer to page U-11 for details.

# Dial Indicators

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

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

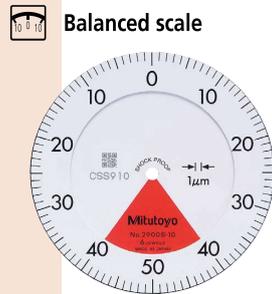
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- All types come with limit markers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



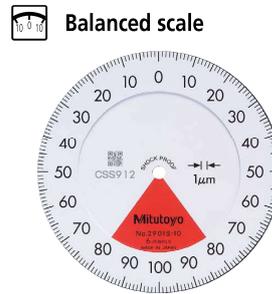
2900S-10



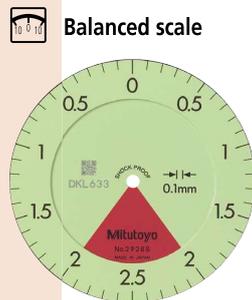
2929S



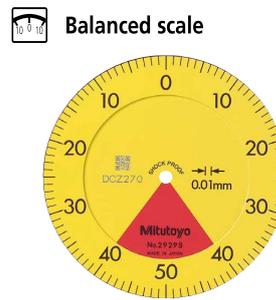
- Graduation: 0.001 mm, Measuring range: 0.08 mm
- 2900S-10**
- One revolution
  - Shockproof
  - Jeweled bearing
- 2900S-72**
- One revolution
  - Shockproof
  - Dustproof
  - Jeweled bearing



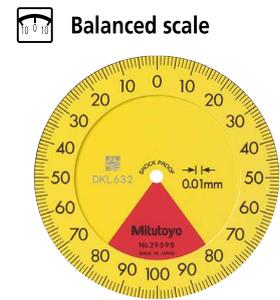
- Graduation: 0.001 mm, Measuring range: 0.16 mm
- 29015-10**
- One revolution
  - Shockproof
  - Jeweled bearing



- Graduation: 0.1 mm, Measuring range: 4 mm
- 2928S**
- One revolution
  - Shockproof



- Graduation: 0.01 mm, Measuring range: 0.8 mm
- 2929S**
- One revolution
  - Shockproof
- 2929S-62**
- One revolution
  - Shockproof
  - Dustproof



- Graduation: 0.01 mm, Measuring range: 1.6 mm
- 2959S**
- One revolution
  - Shockproof

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



2990T-10

# Dial Indicators

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

## DIMENSIONS

**ISO/JIS Type**

Unit: mm

**ANSI/AGD Type**

Unit: in

Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2928S	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6	145	136
2929S	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6	145	136
2929S-62	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6	145	136
2959S	48.8	65.2	57	17.7	20	16.9	19.8	52	7.6	145	136
2900S-10	48.8	66	57	17.7	20	16.9	20.6	52	7.6	149	140
2900S-72	48.8	66	57	17.7	20	16.9	20.6	52	7.6	149	140
2901S-10	48.8	66.1	57	17.7	20	16.9	20.7	52	7.6	149	140

Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2909S-62	1.92	2.04	2.24	0.70	3/4	0.54	0.39	2.05	0.30	163	138
2910S-10	1.92	2.02	2.24	0.70	3/4	0.54	0.36	2.05	0.30	164	139

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

## FEATURES

**Metric**

Order No.						
w/lug	Flat-back					
2928S	2928SB	✓	✓	✓		
2929S	2929SB	✓	✓	✓		
2929S-62	2929SB-62	✓	✓	✓		✓
2959S	2959SB	✓	✓	✓		
2900S-10	2900SB-10	✓	✓	✓		✓
2900S-72	2900SB-72	✓	✓	✓		✓
2901S-10	2901SB-10	✓	✓	✓		✓

**Inch**

Order No.						
w/lug	Flat-back					
2909S-62	2909SB-62	✓	✓	✓		✓
2910S-10	2910SB-10	✓	✓	✓		✓

## SPECIFICATIONS

**Metric**  ISO/JIS type

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

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

**Inch**  ANSI/AGD type

Order No.		Graduation (in)	Range (range/rev) (in)	Accuracy (in)			Repeat-ability (in)	Dial reading	Measuring force (N)
w/lug	Flat-back			First 1 Rev/2.5 Rev/10 Rev		Retrace			
2909S-62	2909SB-62	0.0005	0.04/0.05	±0.0005/—/—	0.00016	±0.0001	20-0-20	2.5 or less	
2910S-10	2910SB-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.



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

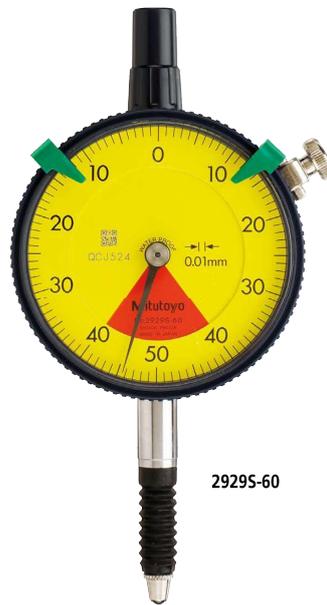


# Dial Indicators

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

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

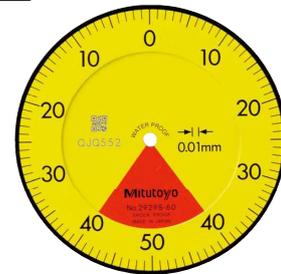
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- All types come with limit markers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



29295-60



Balanced scale



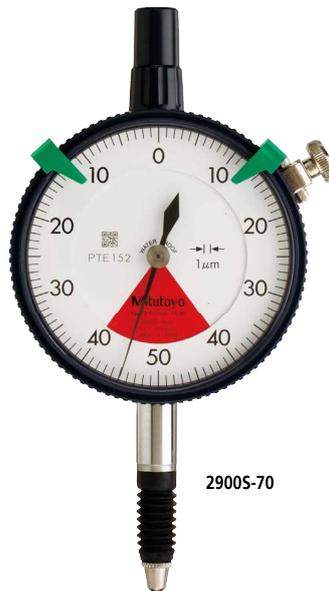
Graduation: 0.01 mm,  
Measuring range: 0.8 mm

29295-60

One revolution

Shockproof

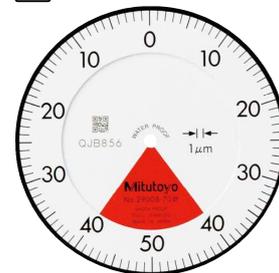
Waterproof



29005-70



Balanced scale



Graduation: 0.001 mm,  
Measuring range: 0.08 mm

29005-70

One revolution

Shockproof

Waterproof

Jeweled bearing

# Dial Indicators

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

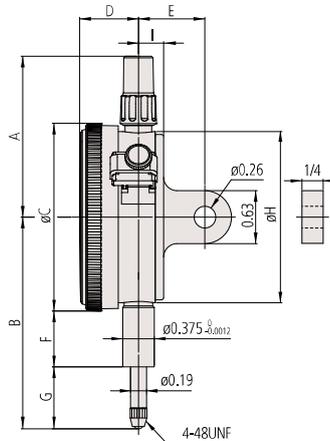
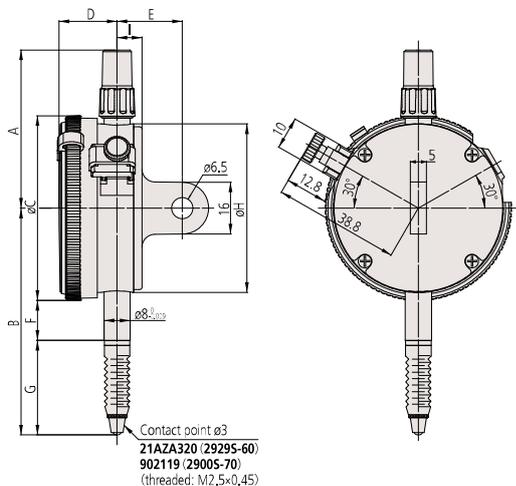
## DIMENSIONS

ISO / JIS Type

Unit: mm

ANSI / AGD Type

Unit: in



Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
29295-60	48.8	70	57	17.7	20	12.3	29.2	52	7.6	146	137
29005-70	48.8	67	57	17.7	20	12.3	26.2	52	7.6	150	141

Note 1: Refer to pages F-57 to F-60 for details of contact points.  
 Note 2: If the contact point of the waterproof model is replaced, the water resistance cannot be guaranteed.

Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
29105-72	1.92	2.02	2.24	0.70	3/4	0.54	0.36	2.05	0.30	150	141

Note 1: Refer to pages F-57 to F-60 for details of contact points.  
 Note 2: If the contact point of the waterproof model is replaced, the water resistance cannot be guaranteed.

## FEATURES

Metric							
Order No.	w/lug	Flat-back					
29295-60	29295B-60	✓	✓	✓	✓		
29005-70	29005B-70	✓	✓	✓	✓		✓

## SPECIFICATIONS

Metric										ISO/JIS type		
Order No.	w/lug	Flat-back	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (μm)					Dial reading	Measuring force (N)	
					Indication error			Hysteresis	Repeatability			
				1/10 Rev	1/2 Rev	1 Rev	Measuring range					
29295-60	29295B-60		0.01	0.8 (1)	5	—	—	8	3	3	40-0-40	2.0 or less
29005-70	29005B-70		0.001	0.08 (0.1)	2	—	—	3	2	0.5	40-0-40	2.0 or less

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

Inch							
Order No.	w/lug	Flat-back					
29105-72	29105B-72	✓	✓	✓	✓		✓

Inch										ANSI/AGD type	
Order No.	w/lug	Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy (in)			Repeatability (in)	Dial reading	Measuring force (N)	
					First 1 Rev/2.5 Rev/10 Rev	Retrace					
29105-72	29105B-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.



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



# Dial Indicators

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

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

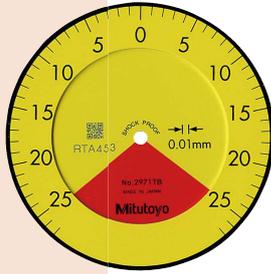
- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden spindle retraction caused by impact.
- This series has been developed to eliminate the possibility of reading errors due to miscounting multiple revolutions.
- The stem and spindle are made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



2972TB



Balanced scale



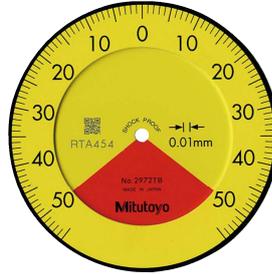
Graduation: 0.01 mm,  
Measuring range: 0.5 mm

2971TB

- One revolution
- Shockproof
- Dustproof



Balanced scale



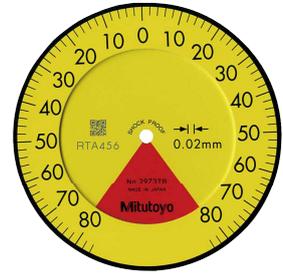
Graduation: 0.01 mm,  
Measuring range: 1 mm

2972TB

- One revolution
- Shockproof
- Dustproof



Balanced scale



Graduation: 0.02 mm,  
Measuring range: 1.6 mm

2973TB

- One revolution
- Shockproof
- Dustproof

# Dial Indicators

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

## DIMENSIONS

**ISO/JIS Type**

Unit: mm

**ANSI/AGD Type**

Unit: in

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

Metric									
Order No.	A	B	C	D	F	G	H	I	Mass (g)
2971TB	43.2	65.6	57	16.5	21	16.8	55	7.6	70
2972TB	43.2	66	57	16.5	21	17.2	55	7.6	
2973TB	43.2	66.3	57	16.5	21	17.5	55	7.6	

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

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

## FEATURES

Metric					
Order No.	w/lug	Flat-back	10/10	10/10	10/10
2971TB	—	✓	✓	✓	✓
2972TB	—	✓	✓	✓	✓
2973TB	—	✓	✓	✓	✓

Inch					
Order No.	w/lug	Flat-back	10/10	10/10	10/10
2976TB	—	✓	✓	✓	✓
2977TB	—	✓	✓	✓	✓
2978TB	—	✓	✓	✓	✓

## SPECIFICATIONS

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

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

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



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

# Dial Indicators

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

## SERIES 2 — Long Stroke Type

- Long stroke dial indicators with a  $\varnothing 57$  mm bezel. All the models are equipped with limit markers and a bezel clamp as standard. (inch models are exception)
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and the spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is employed.
- The grand gear is made of stainless steel with high resistance to wear and deformation.
- Application of a hard coating on the surface of the crystal makes the gage highly scratch- and chemical-resistant.
- The bezel clamp and lifting lever\* (optional) can be attached to either the right or left side. These parts can be easily installed and removed without any tools.

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



2050S

Continuous scale



Graduation: 0.01 mm,  
Measuring range: 20 mm

**2050S**  
 With damper at lowest rest point

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

**2050S-60**  
 Waterproof

Continuous scale



Graduation: 0.01 mm,  
Measuring range: 30 mm

**2052S**  
 With damper at lowest rest point

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

Continuous scale



Graduation: 0.01 mm,  
Measuring range: 30 mm

**2330S-10**  
 With coaxial revolution counter

With damper at lowest rest point  
 Jeweled bearing



2050S-60

Continuous scale



Graduation: 0.01 mm,  
Measuring range: 20 mm

**2320S-10**  
 With coaxial revolution counter

With damper at lowest rest point  
 Jeweled bearing

Reverse reading



Graduation: 0.01 mm,  
Measuring range: 30 mm

**2952S**  
 With damper at lowest rest point

# Dial Indicators

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

## FEATURES

Metric									
Order No.	w/lug	Flat-back							
2050S	2050SB	✓					✓		
2050S-60	2050SB-60	✓					✓		
2050S-19	2050SB-19	✓				✓	✓	✓	
2320S-10	2320SB-10	✓					✓	✓	✓
2052S	2052SB	✓					✓		
2052S-19	2052SB-19	✓				✓	✓	✓	
2330S-10	2330SB-10	✓					✓	✓	✓
2952S	2952SB		✓				✓		

## SPECIFICATIONS

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

\* 2050S-60 and 2050SB-60 are waterproof 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).

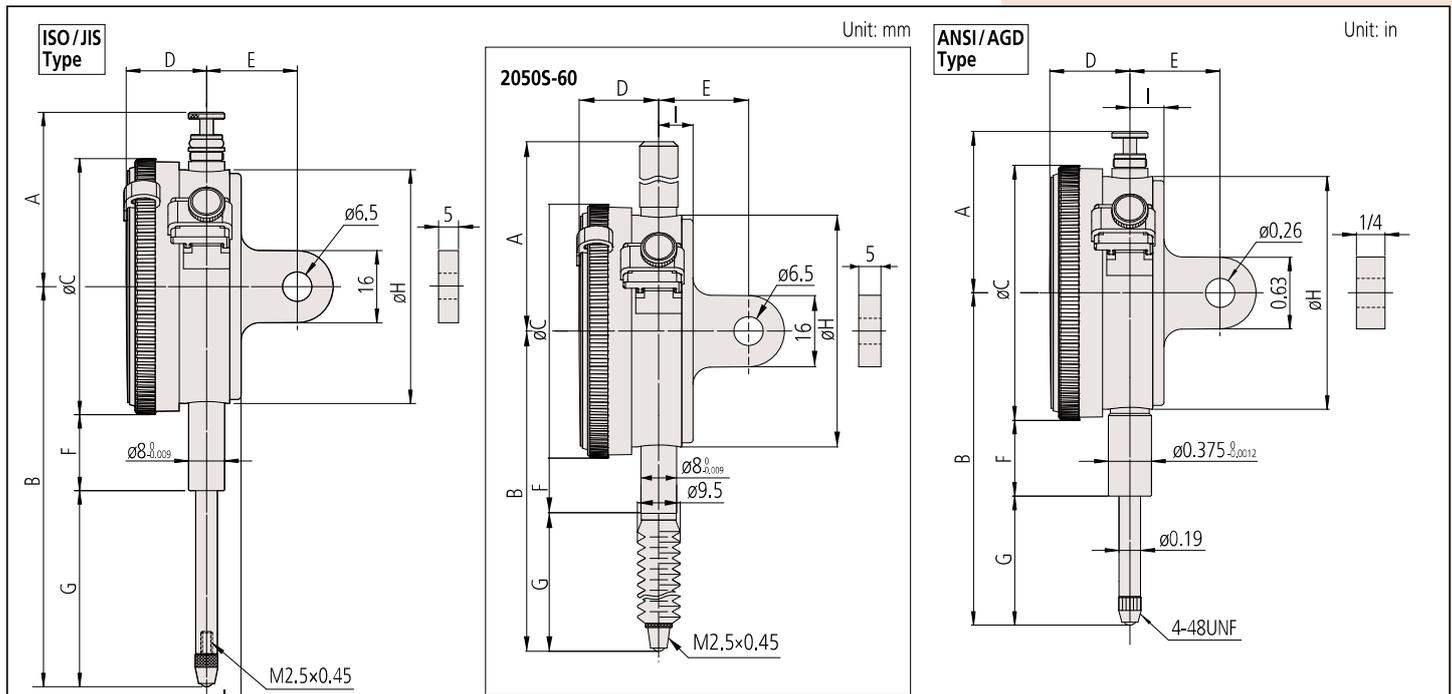
Note: Completed products inspection is performed in the vertical orientation (contact point downward) and the stated accuracy is guaranteed.

Inch									
Order No.	w/lug	Flat-back							
2416S	2416SB	✓							
2416S-06	2416SB-06	✓							
2416S-10	2416SB-10	✓					✓		
2417S	2417SB		✓						
2424S-19	2424SB-19	✓		✓			✓		✓
2776S	2776SB	✓							
2904S	2904SB						✓		

Inch		ANSI/AGD type									
Order No.	w/lug	Flat-back	Graduation (in)	Range (range/rev) (in)	Accuracy (in)		Repeat-ability (in)	Dial reading	Measuring force (N)		
					First 1 Rev/2.5 Rev/10 Rev	Retrace					
2416S	2416SB		0.001	1 (0.1)	±0.001/±0.001/±0.002	0.0002	±0.0002	±0-100	1.8 or less		
2416S-06	2416SB-06		0.001	1 (0.1)	±0.001/±0.001/±0.002	0.0002	±0.0002	±0-100	1.8 or less		
2416S-10	2416SB-10		0.001	1 (0.1)	±0.001/±0.001/±0.002	0.0002	±0.0002	±0-100	1.8 or less		
2417S	2417SB		0.001	1 (0.1)	±0.001/±0.001/±0.002	0.0002	±0.0002	0-50-0	1.8 or less		
2424S-19	2424SB-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		
2776S	2776SB		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		
2904S	2904SB		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.

## DIMENSIONS



Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2050S	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6	149	140
2050S-60	59.8	87.2	57	17.7	20	12.3	46.4	52	7.6	155	146
2050S-19	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6	149	140
2320S-10	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6	150	141
2052S	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6	152	143
2052S-19	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6	152	143
2330S-10	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6	153	144
2952S	38.8	88.7	57	17.7	20	16.9	43.3	52	7.6	152	143

Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
2416S	1.53	3.02	2.24	0.70	3/4	0.54	1.37	2.05	0.30	164	139
2416S-06	1.53	3.02	2.24	0.70	3/4	0.54	1.37	2.05	0.30	164	139
2416S-10	1.53	3.02	2.24	0.70	3/4	0.54	1.37	2.05	0.30	164	139
2417S	1.53	3.02	2.24	0.70	3/4	0.54	1.37	2.05	0.30	164	139
2424S-19	4.65	5.61	2.24	0.70	5/6	2.14	2.35	2.05	0.37	248	239
2776S	1.53	3.02	2.24	0.70	3/4	0.54	1.37	2.05	0.30	164	139
2904S	1.53	3.02	2.24	0.70	3/4	0.54	1.37	2.05	0.30	164	139

Note 1: Refer to pages F-57 to F-60 for details of contact points.

Note 2: If the contact point of the waterproof model is replaced, the water resistance cannot be guaranteed.

Note 1: Refer to pages F-57 to F-60 for details of contact points.

Note 2: If the contact point of the waterproof model is replaced, the water resistance cannot be guaranteed.



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

# Dial Indicators

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

## SERIES 1 — Compact Type, Extra Small Diameter

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



1911T-10

 **Balanced scale**



Graduation: 0.01 mm, Measuring range: 2.5 mm  **Jeweled bearing**

 **Balanced scale**



Graduation: 0.02 mm, Measuring range: 0.5 mm  **Jeweled bearing**



1003T

 **Balanced scale**



Graduation: 0.01 mm, Measuring range: 4 mm **1003T**





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

# Dial Indicators

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

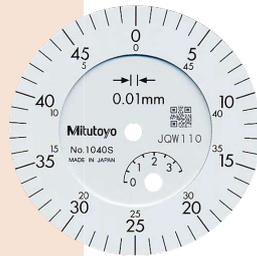
## SERIES 1 — Compact Type, Small Diameter

- Compact dial indicators ideal for restricted-space applications in gaging jigs.
- All models come with limit markers and a bezel clamp.
- Watertight assembly of bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide contact point is used.
- Application of a hard coating on the surface of the crystal makes the gage highly scratch- and chemical-resistant.



10445

Continuous scale



Graduation: 0.01 mm, Measuring range: 3.5 mm  
**10405**  
 Double scale spacing

Balanced scale



Graduation: 0.01 mm, Measuring range: 3.5 mm  
**10415**  
 Double scale spacing

Continuous scale



Graduation: 0.01 mm, Measuring range: 5 mm  
**10445**  
**10445-15**  
 Jeweled bearing

Balanced scale



Graduation: 0.01 mm, Measuring range: 5 mm  
**10455**



11095-10

Balanced scale



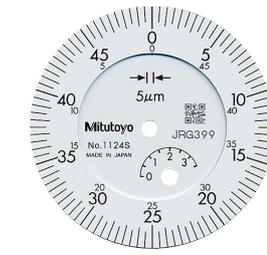
Graduation: 0.001 mm, Measuring range: 1 mm  
**11095-10**  
 Shockproof  
 Jeweled bearing

Balanced scale



Graduation: 0.002 mm, Measuring range: 1 mm  
**10135-10**  
 Shockproof  
 Jeweled bearing

Continuous scale



Graduation: 0.005 mm, Measuring range: 3.5 mm  
**11245**

# Dial Indicators

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



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



10445-60

Continuous scale



Graduation: 0.01 mm, 10445-60  
Measuring range: 5 mm Waterproof

## SPECIFICATIONS

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

## FEATURES

Metric		Features					
Order No.							
w/lug	Flat-back						
1013S-10	1013SB-10	✓	✓	✓	✓	✓	
1040S	1040SB	✓		✓			
1041S	1041SB		✓	✓			
1044S	1044SB	✓					
1044S-15	1044SB-15	✓				✓	
1044S-60	1044SB-60	✓				✓	
1045S	1045SB		✓				
1109S-10	1109SB-10		✓		✓	✓	
1124S	1124SB	✓					

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

Inch		Features			
Order No.					
w/lug	Flat-back				
1410S	1410SB	✓			
1411S	1411SB		✓		
1410S-10	1410SB-10	✓		✓	
1780S	1780SB	✓			
1781S	1781SB		✓		
1506S	1506SB	✓			
1507S	1507SB		✓		
1670S	1670SB	✓			
1671S	1671SB		✓		
1802S-10	1802SB-10	✓		✓	✓
1803S-10	1803SB-10	✓		✓	✓

## DIMENSIONS

**ANSI/AGD Type**

Unit: in

Order No.	A	B	C	D	E	F	G	H	I
1410S	1.28	1.87	1.57	0.57	3/4	0.50	0.58	1.50	0.26
1411S	1.28	1.87	1.57	0.57	3/4	0.50	0.58	1.50	0.26
1410S-10	1.28	1.87	1.57	0.57	3/4	0.50	0.58	1.50	0.26
1780S	1.28	1.74	1.57	0.57	3/4	0.50	0.44	1.50	0.26
1781S	1.28	1.74	1.57	0.57	3/4	0.50	0.44	1.50	0.26
1506S	1.28	1.74	1.57	0.57	3/4	0.50	0.44	1.50	0.26
1507S	1.28	1.74	1.57	0.57	3/4	0.50	0.44	1.50	0.26
1670S	1.28	1.71	1.57	0.57	3/4	0.50	0.42	1.50	0.26
1671S	1.28	1.71	1.57	0.57	3/4	0.50	0.42	1.50	0.26
1802S-10	1.28	1.63	1.57	0.57	3/4	0.50	0.33	1.50	0.26
1803S-10	1.28	1.63	1.57	0.57	3/4	0.49	0.33	1.50	0.26

Note 1: Refer to pages F-57 to F-60 for details of contact points.  
Note 2: If the contact point of the waterproof model is replaced, the water resistance cannot be guaranteed.

**ISO/JIS Type**

Unit: mm

Order No.	A	B	C	D	E	F	G	H	I
1013S-10	32.5	49	40	14.5	20	13.8	15.2	38	6.6
1040S	32.5	46	40	14.5	20	13.8	12.2	38	6.6
1041S	32.5	46	40	14.5	20	13.8	12.2	38	6.6
1044S	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1044S-15*3	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1044S-60	32.5	57	40	14.5	20	12.2	24.8	38	6.6
1045S	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1109S-10	32.5	49	40	14.5	20	13.8	15.2	38	6.6
1124S	32.5	46	40	14.5	20	13.8	12.2	38	6.6

\* 3 Use in the vertical orientation (contact point downward) for the low measuring force model.  
Note 1: Refer to pages F-57 to F-60 for details of contact points.  
Note 2: If the contact point of the waterproof model is replaced, the water resistance cannot be guaranteed.



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

# Dial Indicators

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

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

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

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

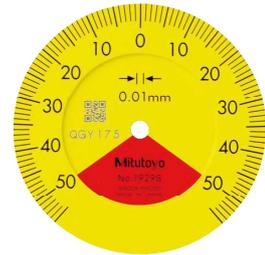


2990T-10



1929S

### Balanced scale



Graduation: 0.01 mm,  
Measuring range: 1 mm

1929S

One revolution

Shockproof

1929S-62

One revolution

Shockproof

Dustproof



1900S-10

### Balanced scale



Graduation: 0.001 mm,  
Measuring range: 0.1 mm

1900S-10

One revolution

Shockproof

Jeweled bearing

1900S-72

One revolution

Shockproof

Dustproof

Jeweled bearing

# Dial Indicators

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

## FEATURES

Metric						
Order No.						
w/lug	Flat-back					
1929S	1929SB	✓	✓			✓
1929S-62	1929SB-62	✓	✓		✓	✓
1900S-10	1900SB-10	✓	✓	✓		✓
1900S-72	1900SB-72	✓	✓	✓	✓	✓

Inch						
Order No.						
w/lug	Flat-back					
1909S-62	1909SB-62	✓	✓		✓	✓
1910S-72	1910SB-72	✓	✓	✓	✓	✓

## SPECIFICATIONS

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

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

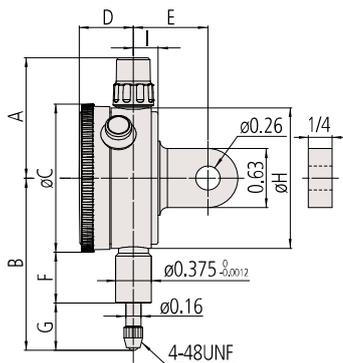
Inch		ANSI/AGD type									
Order No.		Graduation (in)	Range (range/rev) (in)	Accuracy (in)			Repeat-ability (in)	Dial reading	Measuring force (N)		
w/lug	Flat-back			First 1 Rev	2.5 Rev	10 Rev				Retrace	
1909S-62	1909SB-62	0.0005	0.04 (0.056)	±0.0005	—/—	—	0.00016	±0.0001	20-0-20	1.4 or less	
1910S-72	1910SB-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

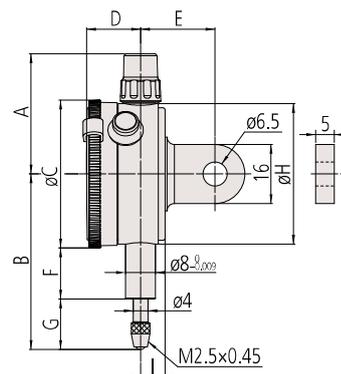
ANSI/AGD Type

Unit: in



ISO/JIS Type

Unit: mm



Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
1909S-62	1.28	1.64	1.57	0.57	0.75	0.50	0.35	1.50	0.26	90	70
1910S-72	1.28	1.61	1.57	0.57	0.75	0.50	0.31	1.50	0.26	90	70

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

Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
1929S	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6	90	70
1929S-62	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6	90	70
1900S-10	32.5	53.5	40	14.5	20	16.8	16.7	38	6.6	95	75
1900S-72	32.5	53.5	40	14.5	20	16.8	16.7	38	6.6	95	75

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



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

# Dial Indicators

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

## SERIES 3, 4 — Long Stroke Type, Large Diameter

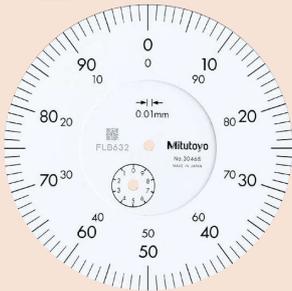
- Continuous scale
- Balanced scale

- Dial indicators with a large-diameter dial face for easy reading.
  - Models with longer measuring ranges are also available.
  - All types are supplied with limit markers and a bezel clamp as standard.
  - The stem and spindle are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
  - A carbide contact point is used.
  - The bezel clamp and lifting lever\* (optional) can be attached to either the right or left side. These parts can be easily installed and removed without tools.
- \* Can be attached only to **3046S, 3047S, 3050S, 3109S-10** and **4046S**.



4046S

- Continuous scale



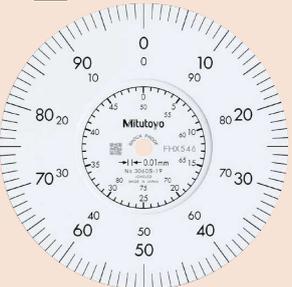
Graduation: 0.01 mm, Measuring range: 10 mm **3046S**

- Continuous scale



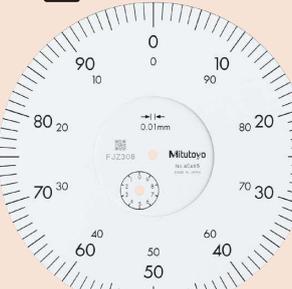
Graduation: 0.01 mm, Measuring range: 20 mm **3050S**

- Continuous scale

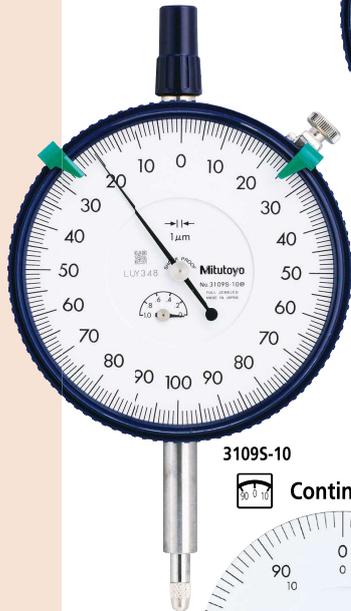


Graduation: 0.01 mm, Measuring range: 80 mm **3060S-19**

- Continuous scale

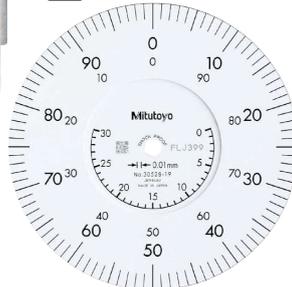


Graduation: 0.01 mm, Measuring range: 10 mm **4046S**



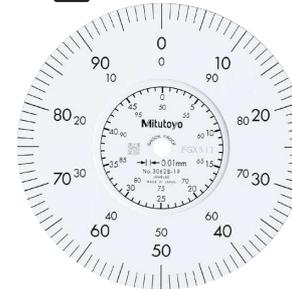
3109S-10

- Continuous scale



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

- Continuous scale



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



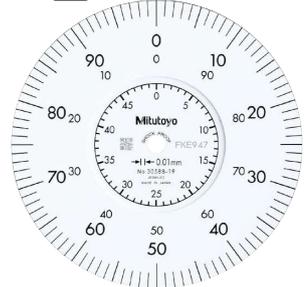
3058S-19

- Balanced scale



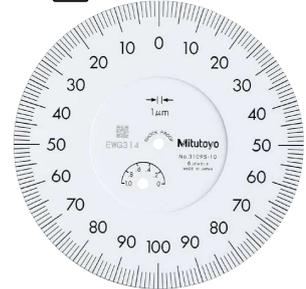
Graduation: 0.01 mm, Measuring range: 10 mm **3047S**

- Continuous scale



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

- Balanced scale



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

# Dial Indicators

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

## DIMENSIONS

**ISO / JIS Type**

Unit: mm

Order No.	A	B	C	D	E	F	G	H	I
3046S	61.2	75.5	78	17.7	21	15.9	20.6	71	9
3047S	61.2	75.5	78	17.7	21	15.9	20.6	71	9
3050S	52.6	94	78	17.7	21	25.9	29.1	71	9
3052S-19*	72.9	104.3	78	17.7	21	25.9	39.4	71	9
3058S-19*	81.9	142.3	78	17.7	21	43.9	59.4	71	9
3060S-19*	120.9	202.3	78	17.7	21	73.9	89.4	71	9
3062S-19*	141.9	243.3	78	17.7	21	94.9	109.4	71	9
3109S-10	61.2	79	78	17.7	21	25.9	14.1	71	9
4046S	61.2	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. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7 mm, use a washer (with outside diameter of at least 7 mm, inside diameter of 3 mm, and thickness of approx. 0.5 mm) placed between the contact point and the spindle. Note: Refer to pages F-57 to F-60 for details of contact points.

Unit: mm

**ANSI / AGD Type**

Unit: in

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

Unit: in

## FEATURES

Metric		<input type="checkbox"/> ISO / JIS type					
Order No.	Flat-back						
3046S	3046SB	✓					
3047S	3047SB		✓				
3050S	3050SB	✓			✓		
3052S-19	3052SB-19	✓		✓		✓	✓
3058S-19	3058SB-19	✓		✓		✓	✓
3060S-19	3060SB-19	✓		✓		✓	✓
3062S-19	3062SB-19	✓		✓		✓	✓
3109S-10	3109SB-10		✓	✓		✓	
4046S	4046SB	✓					

Inch		<input type="checkbox"/> ANSI / AGD type					
Order No.	Flat-back						
3414S	3414SB	✓					
3415S	3415SB		✓				
3416S	3416SB	✓					
3417S	3417SB		✓				
3424S-19	3424SB-19	✓		✓		✓	✓
3426S-19	3426SB-19	✓		✓		✓	✓
3428S-19	3428SB-19	✓		✓		✓	✓
3802S-10	3802SB-10		✓	✓		✓	
3803S-10	3803SB-10		✓	✓		✓	
4887S-19	4887SB-19	✓		✓		✓	✓

## SPECIFICATIONS

Metric		<input type="checkbox"/> ISO / JIS type										
Order No.	w/lug	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (µm)						Repeatability	Dial reading	Measuring force (N)
				Indication error			Hysteresis	Repeatability	Dial reading			
1/10 Rev	1/2 Rev	1 Rev	Measuring range									
3046S	3046SB	0.01	10 (1)	5	9	10	15	3	3	±0-100	1.4 or less	
3047S	3047SB	0.01	10 (1)	5	9	10	15	3	3	0-50-0	1.4 or less	
3050S	3050SB	0.01	20 (1)	8	10	15	20	5	4	±0-100	2.0 or less	
3052S-19	3052SB-19	0.01	30 (1)	10	12	15	25	7	5	±0-100	2.5 or less	
3058S-19	3058SB-19	0.01	50 (1)	10	12	15	30	8	5	±0-100	3.0 or less	
3060S-19* <sup>1</sup>	3060SB-19* <sup>1</sup>	0.01	80 (1)	12	17	20	45	9	5	±0-100	3.0 or less	
3062S-19* <sup>1</sup>	3062SB-19* <sup>1</sup>	0.01	100 (1)	12	17	20	50	9	5	±0-100	3.2 or less	
3109S-10	3109SB-10	0.001	1 (0.2)	2	3.5	4	5	2	0.5	0-100-0	1.5 or less	
4046S	4046SB	0.01	10 (1)	5	9	10	15	3	3	±0-100	1.4 or less	

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

Inch		<input type="checkbox"/> ANSI / AGD type									
Order No.	w/lug	Graduation (in)	Range (range/rev) (in)	Accuracy* <sup>2</sup> (in)			Repeatability (in)	Dial reading	Measuring force (N)		
				First 1 Rev	2.5 Rev/10 Rev	Retrace					
3414S	3414SB	0.001	0.5 (0.1)	±0.001/±0.001/±0.001			0.0002	±0.0002	±0-100	1.8 or less	
3415S	3415SB	0.001	0.5 (0.1)	±0.001/±0.001/±0.001			0.0002	±0.0002	0-50-0	1.8 or less	
3416S	3416SB	0.001	1 (0.1)	±0.001/±0.001/±0.002			0.0002	±0.0002	±0-100	1.8 or less	
3417S	3417SB	0.001	1 (0.1)	±0.001/±0.001/±0.002			0.0002	±0.0002	0-50-0	1.8 or less	
3424S-19	3424SB-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	
3426S-19* <sup>1</sup>	3426SB-19* <sup>1</sup>	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	
3428S-19* <sup>1</sup>	3428SB-19* <sup>1</sup>	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	3.2 or less	
3802S-10	3802SB-10	0.0001	0.025 (0.01)	±0.0001/±0.0001/—			0.0001	±0.00003	0-10	2.0 or less	
3803S-10	3803SB-10	0.0001	0.025 (0.01)	±0.0001/±0.0001/—			0.0001	0±0.00003	0-5-0	2.0 or less	
4887S-19* <sup>1</sup>	4887SB-19* <sup>1</sup>	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.



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

# Dial Indicators

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

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

### SPECIFICATIONS

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

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

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

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

### FEATURES

Metric								
Order No.		w/lug	Flat-back					
1230S-01	1230SB-01							
1231S-01	1231SB-01							
1044S-01	1044SB-01							
1045S-01	1045SB-01							
1010S-11	1010SB-11					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
1011S-11	1011SB-11					<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

Metric												
Order No.		w/lug	Flat-back									
2231S-01	2231SB-01											
2046S-01	2046SB-01											
2046S-11	2046SB-11					<input checked="" type="checkbox"/>						
2047S-01	2047SB-01											
2047S-11	2047SB-11					<input checked="" type="checkbox"/>						
2902S-01	2902SB-01											<input checked="" type="checkbox"/>
2050S-01	2050SB-01											
2056S-01	2056SB-01											
2109S-11	2109SB-11					<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>		
2119S-11	2119SB-11					<input checked="" type="checkbox"/>						

### Optional Accessories

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

# Dial Indicators

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



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

## SERIES 2 — Special Dial Indicators

### Adjustable hand dial indicator

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



2048S-10

### Continuous scale



Graduation: 0.01 mm,  
Measuring range: 10 mm

2048S-10

With coaxial revolution counter

Adjustable hand

Jeweled bearing

## DIMENSIONS

ISO/JIS Type

Unit: mm

**21AZA319**  
(threaded: M2.5x0.45)

Order No.	A	B	C	D	E	F	G	H	I	Mass (g)	
										w/lug	Flat-back
<b>2048S-10</b>	47.4	64.9	57	17.7	20	16.9	19.5	52	7.6	144	135

Note 1: Contact points, other than dedicated types, cannot be installed.  
 Note 2: The shoulder on a contact point (standard accessory) acts as a stop to prevent spindle overrun that may otherwise damage the indicator. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7 mm, use a washer (with outside diameter of at least 7 mm, inside diameter of 3 mm, and thickness of approx. 0.5 mm) placed between the contact point and the spindle.

## SPECIFICATIONS

Metric		<input type="checkbox"/> ISO/JIS type									
Order No.	Graduation (mm)	Range (range/rev) (mm)	Maximum permissible error (MPE) (μm)							Dial reading	Measuring force (N)
			Indication error			Hysteresis	Repeat-ability	Dial reading	Measuring force (N)		
w/lug	Flat-back	1/10 Rev	1/2 Rev	1 Rev	Measuring range					Retrace	Repeatability (in)
<b>2048S-10</b>	<b>2048SB-10</b>	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.

Inch		<input type="checkbox"/> ANSI/AGD type									
Order No.	Graduation (in)	Range (range/rev) (in)	Accuracy (in)			Repeat-ability (in)	Dial reading	Measuring force (N)			
			First 1 Rev/2.5 Rev/10 Rev	Retrace	Repeatability (in)						
w/lug	Flat-back	1/10 Rev	1/2 Rev	1 Rev	Measuring range	Retrace	Repeatability (in)	Dial reading	Measuring force (N)		
<b>2915S-10</b>	<b>2915SB-10</b>	0.001	0.5 (0.1)	±0.001/±0.001/±0.001	0.0002	±0.0002	±0-100	1.8 or less			
<b>2918S-10</b>	<b>2918SB-10</b>	0.001	0.5 (0.1)	±0.001/±0.001/±0.001	0.0002	±0.0002	0-50-0	1.8 or less			

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

## FEATURES

Metric						
Order No.						
w/lug	Flat-back					
<b>2048S-10</b>	<b>2048SB-10</b>	✓	✓		✓	✓

Inch						
Order No.						
w/lug	Flat-back					
<b>2915S-10</b>	<b>2915SB-10</b>	✓	✓		✓	✓
<b>2918S-10</b>	<b>2918SB-10</b>	✓	✓		✓	✓



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

## SERIES 2 — Special Dial Indicators

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

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



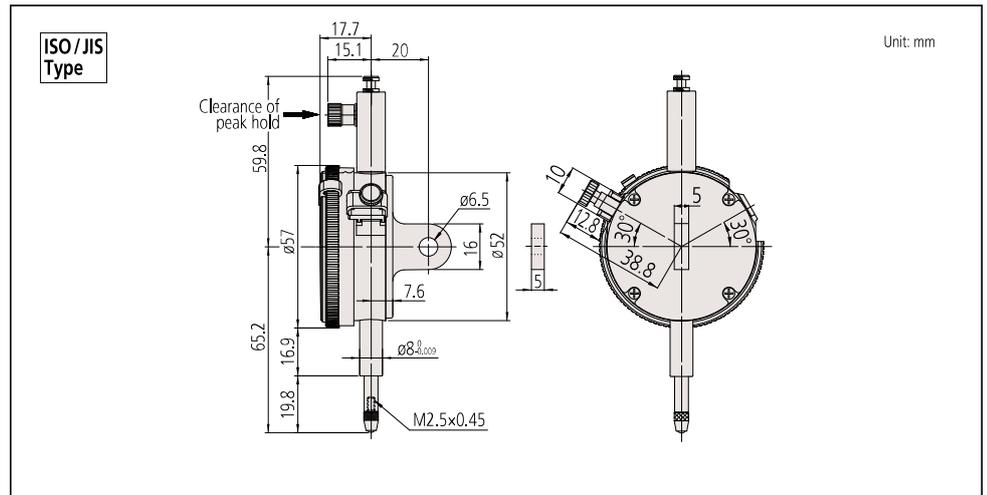
2046S-80

 Continuous scale



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

## DIMENSIONS



## FEATURES

Metric					
Order No.					
w/lug	Flat-back				
2046S-80	2046SB-80	✓		✓	

## SPECIFICATIONS

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

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

# Dial Indicators

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

## Back Plunger Type Dial Indicators SERIES 2

- Back Plunger type dial indicators are suitable for mounting onto leveling machine tool tables or inspection jigs, and for use in small spaces where the graduations of standard dial indicators are difficult to see.
- Mitutoyo's proprietary shock-proofing mechanism provides excellent durability and shock resistance.
- Model **2990T-10** provides 0.001 mm graduation.



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



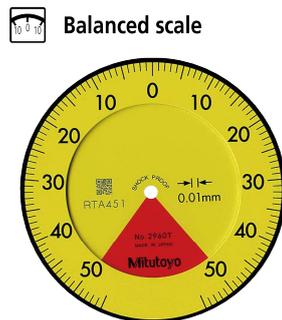
### Holding bar (optional)

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

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



2960T



Balanced scale

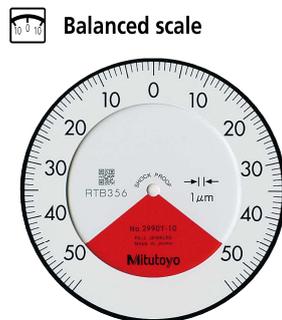
Graduation: 0.01 mm,  
Measuring range: 1 mm

2960T

- One revolution
- Shockproof
- Back Plunger



2990T-10



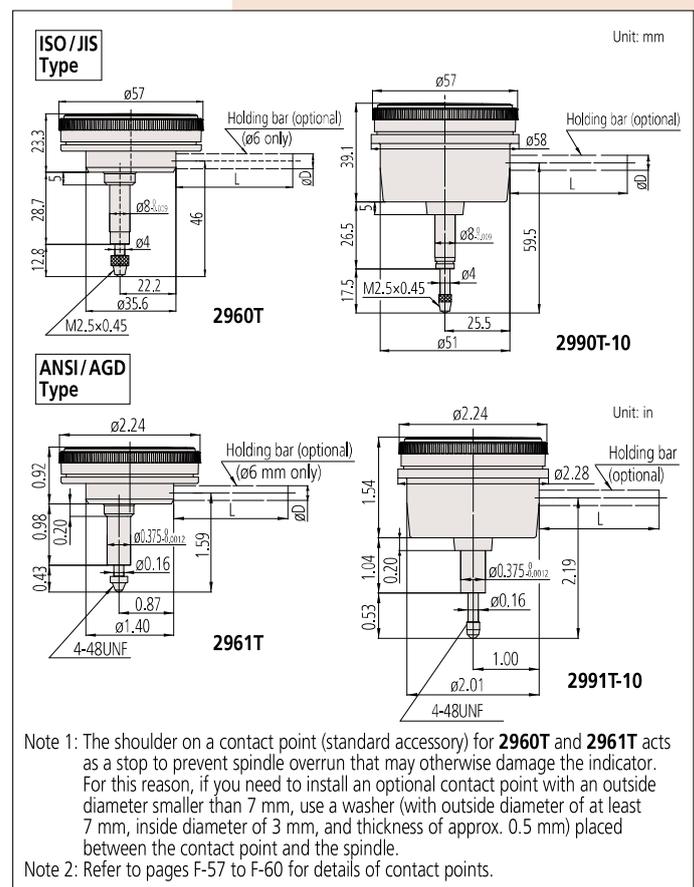
Balanced scale

Graduation: 0.01 mm,  
Measuring range: 1 mm

2990T-10

- One revolution
- Shockproof
- Back Plunger
- Jeweled bearing

## DIMENSIONS



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

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

Order No.	Graduation (in)	Range (range/rev) (in)	Accuracy (in)			Repeat-ability (in)	Dial reading	Measuring force (N)
			First 1 Rev/2.5 Rev/10 Rev		Retrace			
			±0.0005/—/—	±0.0016				
2961T	0.0005	0.04/0.05	±0.0005/—/—	0.00016	±0.0001	20-0-20	1.4 or less	
2991T-10	0.0001	0.008/0.01	±0.0002/—/—	0.0001	±0.00005	4-0-4	1.5 or less	

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

Order No.	ISO/JIS type	One revolution	Shockproof	Jeweled bearing	Back Plunger
2960T	✓	✓	✓	✓	✓
2990T-10	✓	✓	✓	✓	✓

Order No.	ISO/JIS type	One revolution	Shockproof	Jeweled bearing	Back Plunger
2961T	✓	✓	✓	✓	✓
2991T-10	✓	✓	✓	✓	✓



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



Holding bar

### Holding bar (optional)

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

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

### DIMENSIONS

**ANSI/AGD Type**

**ISO/JIS Type**

Order No.	A	B	C	E	F	G	H	Mass (g) (Bar excluded)
1166T	1.57	0.87	1.40	7/8	0.98	0.43	1.65	80
1167T	1.57	0.87	1.40	7/8	0.98	0.43	1.65	80
1168T	1.57	0.87	1.40	7/8	0.98	0.43	1.65	80
1961T	1.57	0.87	1.40	7/8	0.98	0.43	1.57	80

Order No.	A	B	C	E	F	G	H	Mass (g) (Bar excluded)
1160T	40	22.1	35.6	22.2	25	13.8	43.3	80
1162T	40	22.1	35.6	22.2	25	13.8	43.3	80
1960T	40	22.1	35.6	22.2	28.7	12.8	46	80

Note 1: Contact point (standard accessory) for all products in this page has a role as a top dead point stopper. For this reason, if you need to install an optional contact point with an outside diameter smaller than 7 mm, use a washer (with outside diameter of at least 7 mm, inside diameter of 3 mm, and thickness of approx. 0.5 mm) placed between the contact point and the spindle.  
Note 2: Refer to pages F-57 to F-60 for details of contact points.

### FEATURES

Order No.	ISO/JIS type	ANSI/AGD type	Reverse reading	Balanced scale	Shockproof	Back Plunger
1960T	✓	✓	✓	✓	✓	✓
1160T	✓	✓				✓
1162T					✓	✓

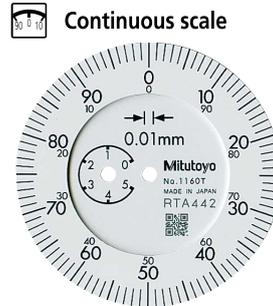
Order No.	ISO/JIS type	ANSI/AGD type	Reverse reading	Balanced scale	Shockproof	Back Plunger
1961T		✓	✓	✓		✓
1166T	✓					✓
1167T		✓				✓
1168T					✓	✓

## Back Plunger Type Dial Indicators SERIES 1

- Back Plunger type dial indicators are suitable for mounting onto leveling machine tool tables or inspection jigs, and for use in situations where standard dial indicators are difficult to read.
- Model **1960T** and **1961T**, which uses Mitutoyo's proprietary shock-proofing mechanism, has excellent durability and shock resistance.



1160T

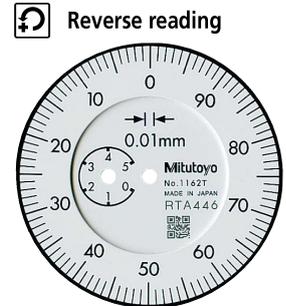


Continuous scale

Graduation: 0.01 mm, Measuring range: 5 mm

1160T

Back Plunger

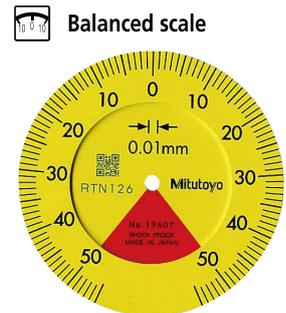


Reverse reading

Graduation: 0.01 mm, Measuring range: 5 mm

1162T

Back Plunger



Balanced scale

Graduation: 0.01 mm, Measuring range: 1 mm

1960T

One revolution

Shockproof

Back Plunger

### SPECIFICATIONS

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

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

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

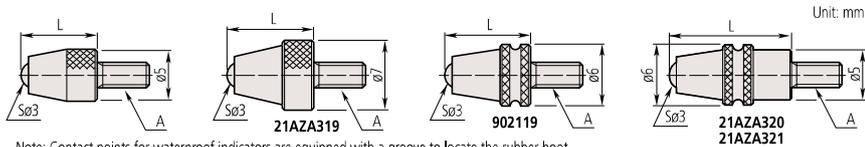
# Dial Indicators

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

## Optional Accessories for Digimatic and Dial Indicators and Linear Gages

### Contact points, extension rod

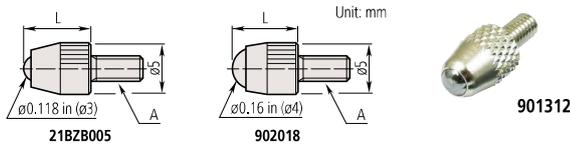
#### Standard contact point



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

A: M2.5x0.45

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

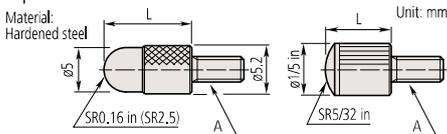


A: 4-48UNF

L (inch)	Material	Carbide	Plastic
1/4		<b>21BZB005</b>	<b>902018</b>

#### Shell Type Point

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



A: M2.5x0.45

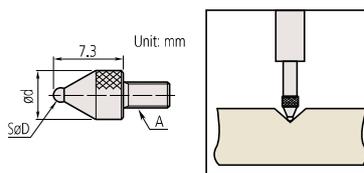
Order No.	L (mm)
<b>101386</b>	5
<b>101118</b>	10
<b>137393</b>	15
<b>101387</b>	20
<b>101388</b>	25
<b>21AAA254</b>	30

A: 4-48UNF

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

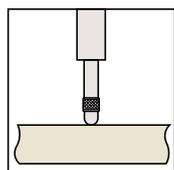
#### Ball point

Optimal for workpieces with deep indentations.

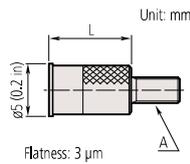


A: M2.5x0.45

Order No.	SøD (mm)	ød (mm)
<b>21AAA349</b>	1, carbide	5
<b>21AAA350</b>	1.5, carbide	5
<b>101122</b>	1.8, steel	5
<b>21AAA351</b>	2.5, carbide	5
<b>21AAA352</b>	4, carbide	5



## Flat Point

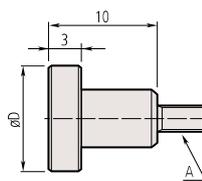


A: M2.5×0.45

Order No.	L
131365	8
21AAA340	10



131365



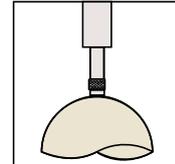
A: M2.5×0.45

Order No.	øD
101117	10
21AAA341	15
21AAA342	20
21AAA343	25
21AAA344	30



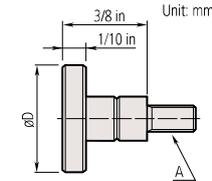
101117

Flatness: 5 µm



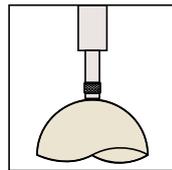
A: 4-48UNF

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

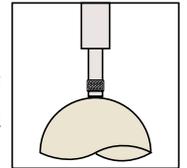
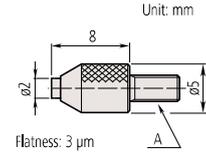


A: 4-48UNF

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



## Flat Point (Carbide)

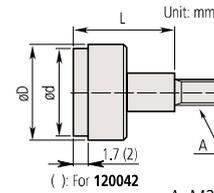


A: M2.5×0.45

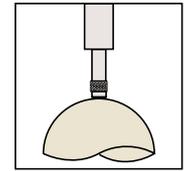
Order No.
120056



120056



( ) : For 120042



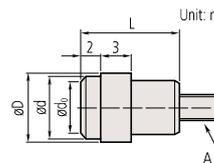
A: M2.5×0.45

Order No.	øD	ød	L
120041	5.2	4.3*1	5
120042	7	6.5*1	10
120043	10.5	9.5*1	10
21AAA345	17	15*2	10
21AAA346	22	20*2	10
21AAA347	27	25*2	10
21AAA348	32	30*2	10

Flatness: \*1: 3 µm, \*2: 5 µm



120043



137255

A: M2.5×0.45

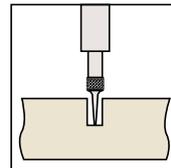
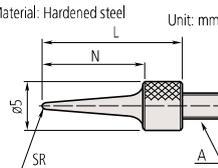
Order No.	ød <sub>0</sub>	ød	øD	L
137255	3	6.4	7	10
137399	4.5	8	9	10

Flatness: 3 µm

## Needle Point

Suitable for probing the bottom of a groove or hole.

Material: Hardened steel



A: M2.5×0.45

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

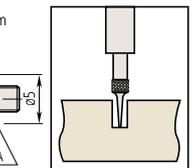
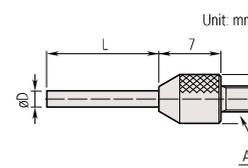


101121

A: 4-48UNF

Order 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)



A: M2.5×0.45

Order 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



137257

# Dial Indicators

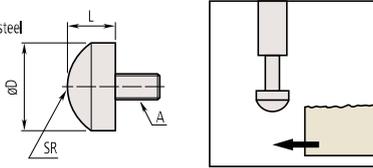
Comparison measuring instruments which ensure high quality, high accuracy and reliability.

## Optional Accessories for Digimatic and Dial Indicators and Linear Gages

### Spherical Point

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

Material:  
Hardened steel



A: M2.5x0.45

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

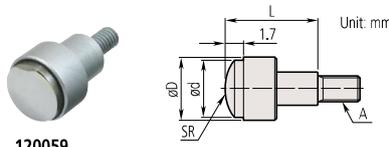


101119

A: 4-48UNF

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

### Spherical Point (Carbide)



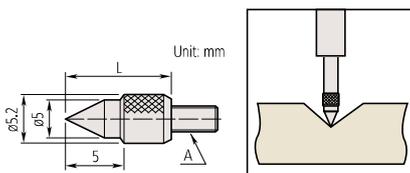
120059

A: M2.5x0.45

Order No.	øD	ød	L	SR
120058	5.2	4.3	5	5
120059	7.5	6.5	10	7
120060	10.5	9.5	10	10

### Conical Point

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



A: M2.5x0.45

Order No.	Tip angle	L
101120	60°	10



101120

A: 4-48UNF

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



101385

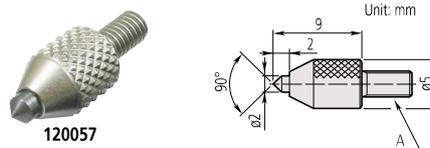
A: M2.5x0.45

Order No.	Tip angle	L
101385	90°	5

A: 4-48UNF

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

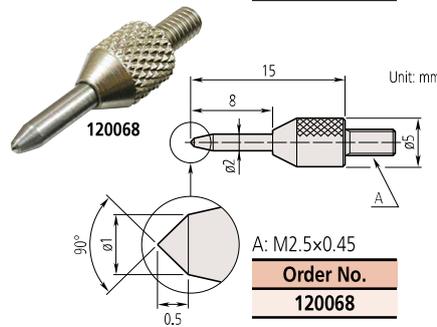
### Conical Point (Carbide)



120057

A: M2.5x0.45

Order No.
120057



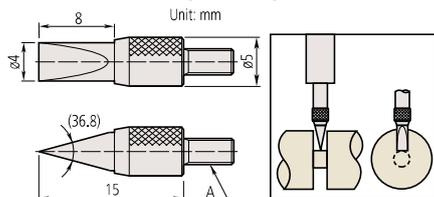
120068

A: M2.5x0.45

Order No.
120068

### Knife Edge Point (Carbide)

Suitable for measuring narrow groove diameter, etc.



A: M2.5x0.45

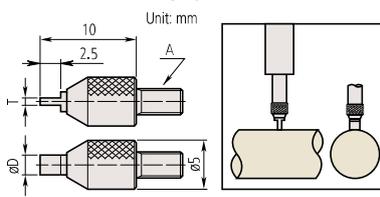
Order No.
120067



120067

### Blade Point (Carbide)

Suitable for measuring cylinders.



A: M2.5x0.45

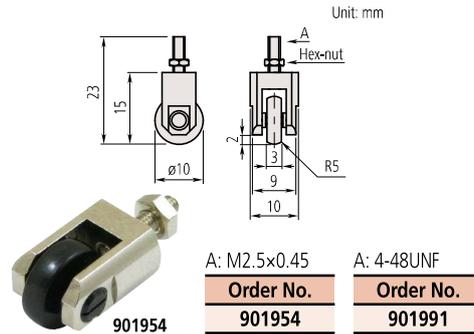
Order No.	T	øD
120061	0.4	2
120062	0.6	2
120063	1	4



120062

## Roller Point

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



A: M2.5x0.45	A: 4-48UNF
<b>Order No.</b> 901954	<b>Order No.</b> 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 point for extending the use of an indicator to many applications.



A: M2.5x0.45

Order No.	Contact points included
<b>7822</b>	Flat Point ( <b>131365</b> , ø5 mm)
	Flat Point ( <b>101117</b> , ø10 mm)
	Needle Point ( <b>101121</b> )
	Spherical Point ( <b>101119</b> )
	Shell Type Point ( <b>101118</b> ) (R2.5x10)
	Shell Type Point ( <b>101387</b> ) (R2.5x10)

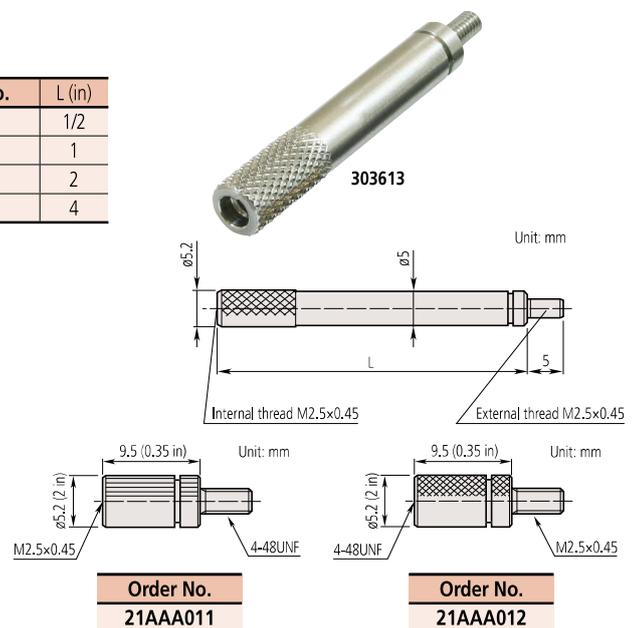
## Extension Rod

A: M2.5x0.45

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

A: 4-48UNF

Order No.	L (in)
<b>139167</b>	1/2
<b>301655</b>	1
<b>301657</b>	2
<b>301659</b>	4

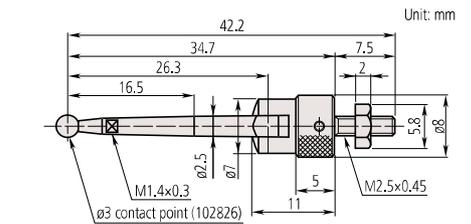


Order No.
<b>21AAA011</b>

Order No.
<b>21AAA012</b>

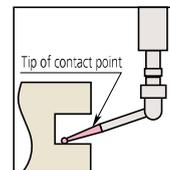
## Lever Point

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



A: M2.5x0.45
<b>Order No.</b> 900391

A: 4-48UNF
<b>Order No.</b> 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)

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

# Dial Indicators

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

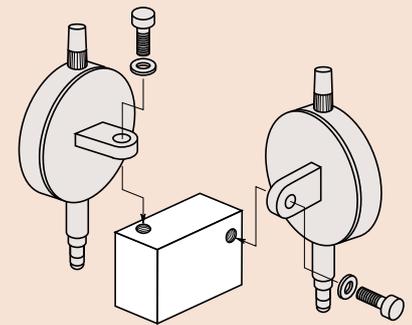
## Interchangeable Backs Optional Accessory for Digimatic and Dial Indicators

### SPECIFICATIONS

Description	Image	Order No.		
		SERIES 1 (ø31, ø36, ø40 mm)	SERIES 2 (ø57 mm)	SERIES 3, 4 (ø78, 92 mm)
Lug-on-Center Back		<b>101210</b> : metric type <b>101307</b> : inch type <b>190561</b> : for 1911T-10, 1913-10 <b>190139</b> : 1921T-10, 1923T-10, 1925T-10 <b>137905</b> : for 1003T	<b>101040</b> : metric type <b>101306</b> : inch type <b>21AZB230</b> : for water-proof of S type (mm) <b>21BZB104</b> : for water-proof of S type (inch)	<b>100691</b> : metric type <b>100797</b> : inch type
Flat Back		<b>101211</b> : a=2.2 <b>136872</b> : for water-proof type <b>191559</b> : for 1911TB-10, 1913TB-10, 1921TB-10, 1923TB-10, 1925TB-10 <b>137906</b> : for 1003TB	<b>101039</b> : a=2.5 <b>21AZB231</b> : for water-proof of S type <b>192910</b> : (F type waterproof model)	<b>100836</b> : a=3.0
Magnetic Back		<b>Special order</b>	<b>900928</b>	<b>900929</b>
Back with Offset Lug		<b>Special order</b>	<b>101167</b>	<b>100837</b>
Back with Post		<b>193172</b> Custom made	<b>101169</b>	<b>100839</b>
Back with Screw Mount		<b>193173</b> : M6x1, Custom made <b>193174</b> : #1/4-28UNF, Custom made	<b>136023</b> : M6x1 <b>101170</b> : #1/4-28UNF	<b>136024</b> : M6x1 <b>100840</b> : #1/4-28UNF
Adjustable Back		<b>136025</b> : M6x1 <b>129721</b> : #1/4-20UNC	<b>136026</b> : M6x1 <b>101168</b> : #1/4-20UNC	<b>136027</b> : M6x1 <b>100838</b> : #1/4-20UNC
Back with Adjustable Bracket		—	<b>901963</b>	—

- A dial or Digimatic indicator may be held in position by clamping on either the stem or the lug on the back of the indicator. The back of the indicator may need to be interchanged with another type for special applications. A wide variety of backs is available for Mitutoyo Digimatic and dial indicators.
- Most lugged backs 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.

### Typical application



Note 1: If back lids are replaced when using a waterproof or dustproof model, the water resistance will not be guaranteed.  
Note 2: When installing to **297XTB** Series, 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.

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

### Spindle Lifting Lever (F type)

**21BZA205**\*1\*3

Use for F type SERIES 1 dial indicators.



**902011**\*3

Use for F type SERIES 2 dial indicators  
(up to 10 mm/0.4 in range).



**903424**\*1\*3

Use for F type SERIES 2 dial indicators (up to  
20 mm/0.8 in range) and SERIES 3 and 4 dial  
indicators (up to 10 mm/0.4 in range).



### Spindle Lifting Lever (S type)

**902100**\*1

Use for S type SERIES 1 and F type SERIES 2 (up  
to 10 mm/0.4 in range) 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)

**21EZA198**\*1\*3



\*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.

# Dial Indicators

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

## Spindle Lifting Cable

- The spindle can be moved up and down using the lifting lever or the release.

### Lifting cable

Stroke: 10 mm



**21JZA301:** with auto-stop function (300 mm)

**21JZA295:** without auto-stop function (500 mm)

Note: This accessory is not applicable to dial indicators with a range of 20 mm or more. Applicable models are: **2048S(B)-10**, **2046S(B)-80**, **1911T(B)-10**, **1913T(B)-10**, **1921T(B)-10**, **1923T(B)-10**, **1925T(B)-10**, **2971TB**, **2972TB**, **2973TB**, **2976TB**, **2977TB**, **2978TB** and waterproof type.

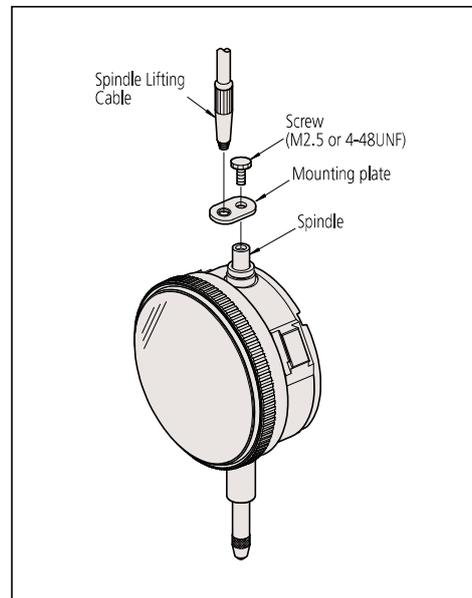
## Spindle Lifting Lever

### 137693

Suitable for 4.8 mm spindle diameter.



## Typical application



## Limit Stickers

- Stuck onto the dial indicator's dial face or crystal, these stickers indicate the tolerance limits. They are available in three colors: red, green, and yellow. They are available only for Series 2 dial indicators (55.6 mm or 57 mm bezel/outside diameter).



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 dial indicators with a range of 10 mm or less.



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

Color	Order No.	
	Standard	Waterproof
Black	193051	193595
White	193051W	193595W
Red	193051R	193595R
Green	193051G	193595G
Blue	193051B	193595B
Yellow	193051Y	193595Y
Orange	193051D	193595D
Pink	193051P	193595P
Navy	193051S	193595S

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

# Dial Indicators

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

## Dial Indicator Repair Tool Kit

### Set order No. 7823EU

Set Configuration



- (1) Spindle rest (**129730**)
- (2) Pin remover (**129732**)
- (3) Punch (**129733**)
- (4) Bearing adjuster (**129734**)
- (5) Pinion rest (**129735**)
- (6) Reamer (ø1: 1/50 taper) (**129736**)
- (7) Reamer (ø0.6: 1/50 taper) (**193702**)
- (8) Reamer for pointer (ø0.5: 1/20 taper) (**21JAA273**)
- (9) Pointer removing tool (**126628**)
- (10) Soft touch pliers (**21JAA371**)
- (11) Nippers (**901179**)
- (12) Pin rest (**129731**)
- (13) Hammer (**901178**)
- (14) Stick (**21JAA314**)
- (15) Brush (**901177**)
- (16) Bamboo brush (**901176**)
- (17) Pin-vise (**901175**)
- (18) Screwdriver (Phillips/flat blade) (**901174**)
- (19) Tweezers (**129729**)
- (20) Screwdriver (Phillips) (**901173**)
- (21) Pointer removing tip (ø0.8) (**126630**)
- (22) Pointer removing tip (ø0.5) (**126630B**)
- (23) Pointer removing tip (ø1.6) (**126630C**)
- (24) Adjustable nut (**100699**)

### Typical applications

#### Remove the long hand

Position the pointer removing tool (No. 9) on the hole diameter of the minute hand. Push the pivot with the pointer removing tool to remove the long hand.

#### Remove the little hand

Remove the little hand with the nippers (No. 11).

#### Adjust a bearing

Press the steel or jeweled bearing into its housing using the bearing adjuster (No. 4).

#### Remove or replace a pin

Place the spindle on the groove of the spindle rest (No. 1). Remove the pin with the pin remover (No. 2) and the hammer (No. 13). Tap the pin directly with the hammer (No. 13) to replace the pin.

#### Replace the long or little hand

Screw the pinion rest (No. 5) into the pin rest (No. 12). Support the pinion with the fixed pinion rest, and replace the hand with the punch (No. 3) and hammer (No. 13). Reaming is necessary when replacing with a new hand. Use reamers as follows:

- The hands of TI-X Series\*1 dial test indicators do not require reaming.
- Use the reamer for pointer (No. 8) (ø0.5: 1/20 taper) for S type and T type dial indicators\*2.
- Depending on the shaft diameter, use reamer (No. 6) (ø1: 1/50 taper) or reamer (No. 7) (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 order No. includes an "S" or "T".

## Dial Indicator Crystal Setter



### Order No. 7000

- Used for fitting a crystal on dial indicators (1003, 1911, 1913-10, 1003T, 1911T-10, 1913T-10, and 4046S) and dial test indicators (pocket type) with a non-integrated molded crystal.
  - 8 sizes of crystal setting pads are supplied as standard.
  - Typical applications  
Nos. 2 and 3: Bezel outside diameter of approx. ø28  
Nos. 3 and 4: Bezel outside diameter of approx. ø35
  - Size of crystal setting pads (mm)  
(1) ø19.5 (2) ø22.5 (3) ø25.5 (4) ø28.5  
(5) ø32.5 (6) ø35 (7) ø38 (8) ø50
  - Crystal setting pads set (including No. 1 to No. 8): **21JAA032**
- Note: Crystal setting pads for large dial indicators (SERIES 3 and 4) are available by special order.

### 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.

Order No. of dial indicators	Order No. of swaged assemblies
<b>2046S</b>	<b>21AZB132</b>
<b>2109S-10</b>	<b>21AZB138</b>
<b>2046F</b>	<b>903457</b>
<b>2109F</b>	<b>903464</b>