

Dial Test Indicators

SERIES 513

FEATURES

Contact point length is printed on dial face to avoid accuracy issues



Scratch and smudge-resistant, anti-glare crystal for easy-to-read dial



Newly designed contact point holder prevents backlash

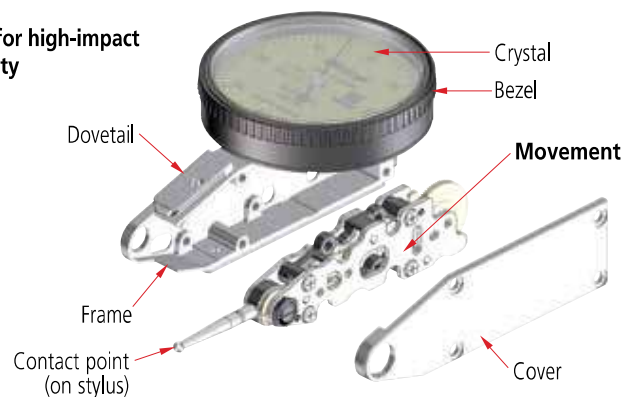


Includes NIST-traceable Certificate of Inspection - bidirectional



- One piece movement for high-impact resistance and durability
- Contact point length is printed on dial face to avoid accuracy issues
- Scratch and smudge-resistant, anti-glare crystal for easy-to-read dial
- Newly designed contact point holder prevents backlash
- Includes NIST-traceable Certificate of Inspection - bidirectional
- Limit hands (optional) can be attached to the bezel, allowing easy identification of the upper and lower limits of tolerance.
- A $\varnothing 8\text{mm}$ ($\varnothing 0.315$ in) plain stem (21CAB104) for the Metric models or a $\varnothing 9.52\text{mm}$ ($\varnothing 3/8$ in) plain stem (21CAB105) for the Inch models that attaches to any dovetail on the frame is supplied as a standard accessory. Other sizes are available as optional accessories:
 - $\varnothing 4\text{mm}$ ($\varnothing 0.157$ in) stem: **21CAB106**
 - $\varnothing 6\text{mm}$ ($\varnothing 0.236$ in) stem: **21CAB103**
- Optional ruby tip has wear-resistance several times greater than a carbide tip and, since it is nonconductive, it can be used safely on an electrical discharge machine.
- Using universal fonts, changing dial face color and reviewing the relationship between pointer and scale marks have drastically improved readability.
- The O-ring seal on the bezel provides smooth rotation and prevents dust and oil from penetrating the dial face.
- Bonding the bezel and crystal eliminates a gap for cutting fluid or oil to penetrate the dial face.
- A flange prevents the bezel from unintentionally being removed during handling.
- Four models are available, each with a different orientation of the dial to allow the best visibility in any situation.
 - Standard - dial is on top of the frame.
 - Vertical: dial is on the end of the frame.
 - Standard (20° tilted face): dial is on top of the frame but tilted 20° .
 - Horizontal: dial is on the side of the frame.
- The conventional method of mounting the stylus pivot bearing screw in the frame is prone to loosen with prolonged use. A unique sub-plate structure has been incorporated in all models to eliminate this issue.

One piece movement for high-impact resistance and durability



Four models are available:



Dial Test Indicators

SERIES 513 — Horizontal Type

FEATURES

- Performs easy and accurate measurement of narrow or recessed areas, plus inside and outside diameters that dial indicators cannot access.
- No-clutch structure for automatic reversal of measuring direction.
- One-piece bezel and crystal design with O-ring provide resistance to water and dust.
- The glare-free flat crystal face has a scratch-resistant coating.
- High sensitivity and quick response because of jeweled bearings.
- Standard carbide contact point provide.



513-424-10E



513-414-10E

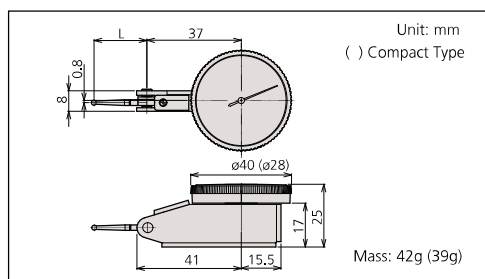


513-404-10E



513-402-10E

DIMENSIONS AND MASS



Optional Accessories

- : Swivel clamp
- : Holding bar
- : Stem
- : Contact points

Special Set: No. 513-908-10E (mm)

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

No. 513-907-10E (inch)

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



Description of Icon

Icon	Description
	With revolution counter
	Long contact point
	Jeweled bearing
	Double scale spacing, easy to read
	Compact
	Dustproof
	Anti-magnetic

Set Configuration: Test Indicators

Inch

Full set

Contact point, .039" DIA. carbide
 Contact point, .118" DIA. carbide
 Stem, .157" DIA. (21CAB106)

Swivel clamp (900322, for .157" DIA., 3/8" DIA., dovetail)
 Inch holding bar (L: 4") (900306)

Basic set

Contact point, .079" DIA. (Carbide)
 Indicator
 Knurled clamp ring
 Stem, 3/8" DIA. (Set No. 21CZB130)



Anti-magnet type



Double scale spacing type



Long contact point type



Jeweled bearing type



Compact type



With revolution counter type



SPECIFICATIONS

Inch

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	L (mm)						—	
	Basic set	Full set											—	—
.00005"	513-407-10E	513-407-10T	.008"	±.0001"	0-4-0	0.3N or less	19	✓	—	✓	—	—	—	—
.0005"	513-402-10E	513-402-10T	.03"	±.0005"	0-15-0	0.3N or less	19.9	✓	—	✓	—	—	—	—
.0005"	513-472-10E*		.03"	±.0005"	0-15-0	0.3N or less	19.9	✓	—	✓	—	—	—	—
.0005"	513-412-10E	513-412-10T	.03"	±.0005"	0-15-0	0.2N or less	33.9	✓	✓	✓	—	—	—	—
.0005"	513-479-10E*		.03"	±.0005"	0-15-0	0.2N or less	33.9	✓	✓	✓	—	—	—	—
.0005"	513-462-10E		.03"	±.0005"	0-15-0	0.3N or less	19.9	✓	—	✓	—	—	—	—
.0001"	513-403-10E	513-403-10T	.008"	±.0001"	0-4-0	0.3N or less	19	✓	—	✓	—	—	—	—
.0001"	513-473-10E*		.008"	±.0001"	0-4-0	0.3N or less	19	✓	—	✓	—	—	—	—
.0001"	513-463-10E		.008"	±.0001"	0-4-0	0.3N or less	15	✓	—	✓	✓	—	—	—

*Provided with a ø2mm ruby contact point as a substitute for ø2mm carbide contact point.

Metric

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	L (mm)						—	
	Basic set	Full set											—	—
0.01mm	513-424-10E	513-424-10T	0.5mm	5µm	0-25-0	0.3N or less	22.3	✓	✓	—	✓	—	—	—
0.01mm	513-414-10E	513-414-10T	0.5mm	10µm	0-25-0	0.2N or less	36.8	✓	✓	✓	✓	—	—	—
0.01mm	513-466-10E	-	0.5mm	5µm	0-25-0	0.3N or less	22.3	✓	✓	—	✓	✓	—	—
0.01mm	513-478-10E*	-	0.5mm	5µm	0-25-0	0.3N or less	22.3	✓	—	—	✓	—	—	—
0.01mm	513-404-10E	513-404-10T	0.8mm	8µm	0-40-0	0.3N or less	20.9	✓	—	—	✓	—	—	—
0.01mm	513-474-10E*	-	0.8mm	8µm	0-40-0	0.3N or less	20.9	✓	—	—	✓	—	—	—
0.01mm	513-464-10E	-	0.8mm	8µm	0-40-0	0.3N or less	20.9	✓	—	—	✓	✓	—	—
0.01mm	513-415-10E	513-415-10T	1mm	10µm	0-50-0	0.2N or less	44.5	✓	—	✓	✓	—	—	—
0.01mm	513-477-10E*	-	1mm	10µm	0-50-0	0.2N or less	44.5	✓	—	✓	✓	—	—	—
0.01mm	513-426-10E	-	1.5mm	16µm	0-25-0	0.4N or less	22.3	✓	✓	—	✓	—	—	✓
0.002mm	513-405-10E	513-405-10T	0.2mm	4µm	0-100-0	0.3N or less	14.7	✓	—	—	✓	—	—	—
0.002mm	513-465-10E	-	0.2mm	4µm	0-100-0	0.3N or less	14.7	✓	—	—	✓	✓	—	—
0.002mm	513-475-10H*	-	0.2mm	4µm	0-100-0	0.3N or less	18.7	✓	—	—	✓	—	—	—
0.002mm	513-425-10E	-	0.6mm	7µm	0-100-0	0.4N or less	14.7	✓	—	—	✓	—	—	✓
0.001mm	513-401-10E	-	0.14mm	4µm	0-70-0	0.3N or less	12.8	✓	—	—	✓	—	—	—
0.001mm	513-471-10E*	-	0.14mm	4µm	0-70-0	0.3N or less	12.8	✓	—	—	✓	—	—	—

*Provided with a ø2mm ruby contact point as a substitute for ø2mm carbide contact point.

Metric/inch

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	L (mm)			—			
	Basic set	Full set								—	—	—	—
0.002mm, .0001"	513-409-10E	513-409-10T	0.2mm, .0075"	3µm	0-10-0, 0-38-0	0.3N or less	14.7	✓	✓	—	—	—	—

Inch/Metric

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	L (mm)			—			
	Basic set	Full set								—	—	—	—
.0005", 0.01mm	513-406-10E	513-406-10T	.03", 0.7mm	±.0005"	0-15-0, 0-35-0	0.3N or less	19.9	✓	✓	—	—	—	—

Metric

Full set

Swivel clamp (900321, for ø4mm, ø8mm, dovetail)
 Metric holding bar (L: 100mm) (900209)

Plus set

Contact point, ø1mm carbide
 Contact point, ø3mm carbide
 Stem, ø4mm (21CAB106)

Basic set

Contact point, ø2mm (Carbide)
 Indicator
 Knurled clamp ring
 Stem, ø8mm (Set No. 21CZB129)

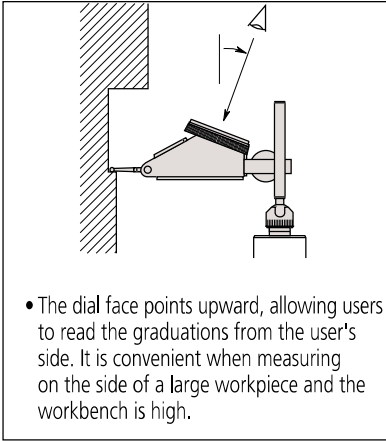
(ø 6 Stem)

Dial Test Indicators

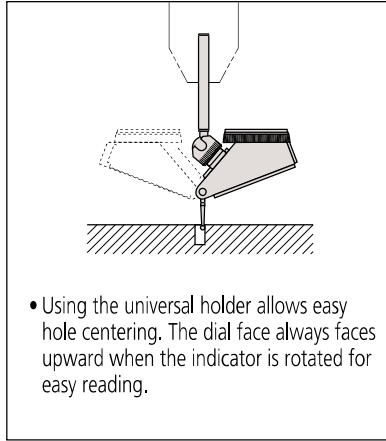
SERIES 513 — Horizontal (20° Tilted Face), Vertical and Parallel

FEATURES

- Specially designed for easy viewing of measurements.



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



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



513-452-10E



513-482-10A



513-444-10E



513-455-10E



513-484-10E



513-442-10A



513-446-10A



513-444-10E



513-445-10E



513-454-10E
513-484-10E



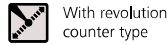
513-455-10E

Optional Accessories

- Swivel clamp
- Holding bar
- Stem
- Contact points



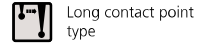
Anti-magnet type



With revolution counter type



Jeweled bearing type



Long contact point type

Set Configuration: Test Indicators

Inch

Full set

Contact point, .039" DIA. carbide

Contact point, .118" DIA. carbide

Stem, .157" DIA. (21CAB106)

Swivel clamp (900322, for .157" DIA., 3/8" DIA., dovetail)

Inch holding bar (L: 4") (900306)

Basic set

Contact point, .079" DIA. (Carbide)

Indicator

Knurled clamp ring

Stem, 3/8" DIA. (Set No. 21CZB130)

Metric

Full set

Swivel clamp (900321, for ø4mm, ø8mm, dovetail)

Metric holding bar (L: 100mm) (900209)

Plus set

Contact point, ø1mm carbide

Contact point, ø3mm carbide

Stem, ø4mm (21CAB106)

Basic set

Contact point, ø2mm (Carbide)

Indicator

Knurled clamp ring

Stem, ø8mm (Set No. 21CZB129)

(ø 6 Stem)

SPECIFICATIONS

Metric Horizontal (20° tilted face) type

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	Mass (g)	L (mm)			
	Basic set	Full set									
0.01mm	513-444-10E	513-444-10T	1.6mm	10µm	0-40-0	0.3N or less	48	20.9	✓	✓	✓
0.002mm	513-445-10E	513-445-10T	0.4mm	5µm	0-100-0	0.3N or less	48	14.7	✓	✓	✓

Inch Horizontal (20° tilted face) type

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	Mass (g)	L (mm)					Remarks
	Basic set	Full set											
.0005"	513-442-10A	513-442-10T	.06"	±.0005"	0-15-0	0.3N or less	48	19.9	✓	✓	✓	—	—
.0005"	513-442-16A	513-442-16T	.06"	±.0005"	0-15-0	0.3N or less	48	19.9	✓	✓	✓	—	Black dial
.0005"	513-446-10A	513-446-10T	.06"	±.0005"	0-15-0	0.2N or less	48	33.9	✓	✓	✓	✓	—
.0005"	513-446-16A	513-446-16T	.06"	±.0005"	0-15-0	0.2N or less	48	33.9	✓	✓	✓	✓	Black dial
.0001"	513-443-10A	513-443-10T	.016"	±.0002"	0-4-0	0.3N or less	48	15	✓	✓	✓	—	—
.0001"	513-443-16A	513-443-16T	.016"	±.0002"	0-4-0	0.3N or less	48	15	✓	✓	✓	—	Black dial

Metric Vertical type

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	Mass (g)	L (mm)		
	Basic set	Full set								
0.01mm	513-454-10E	513-454-10T	0.8mm	8µm	0-40-0	0.3N or less	50	20.9	✓	✓
0.002mm	513-455-10E	513-455-10T	0.2mm	3µm	0-100-0	0.3N or less	50	14.7	✓	✓

Inch Vertical type

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	Mass (g)	L (mm)		
	Basic set	Full set								
.0005"	513-452-10E	513-452-10T	.03"	±.0005"	0-15-0	0.3N or less	50	19.9	✓	✓
.0001"	513-453-10E	513-453-10T	.008"	±.0001"	0-4-0	0.3N or less	50	19	✓	✓

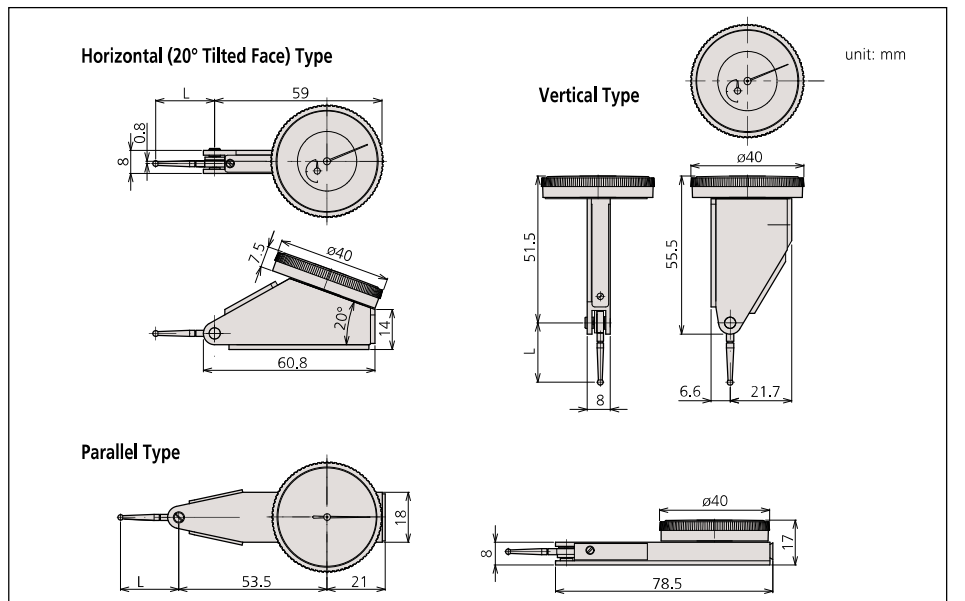
Metric Parallel type

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	Mass (g)	L (mm)		
	Basic set	Full set								
0.01mm	513-484-10E	513-484-10T	0.8mm	8µm	0-40-0	0.3N or less	68	20.9	✓	✓

Inch Parallel type

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	Mass (g)	L (mm)		
	Basic set	Full set								
.0005"	513-482-10A	513-482-10T	.03"	±.0005"	0-15-0	0.3N or less	68	20	✓	✓

DIMENSIONS

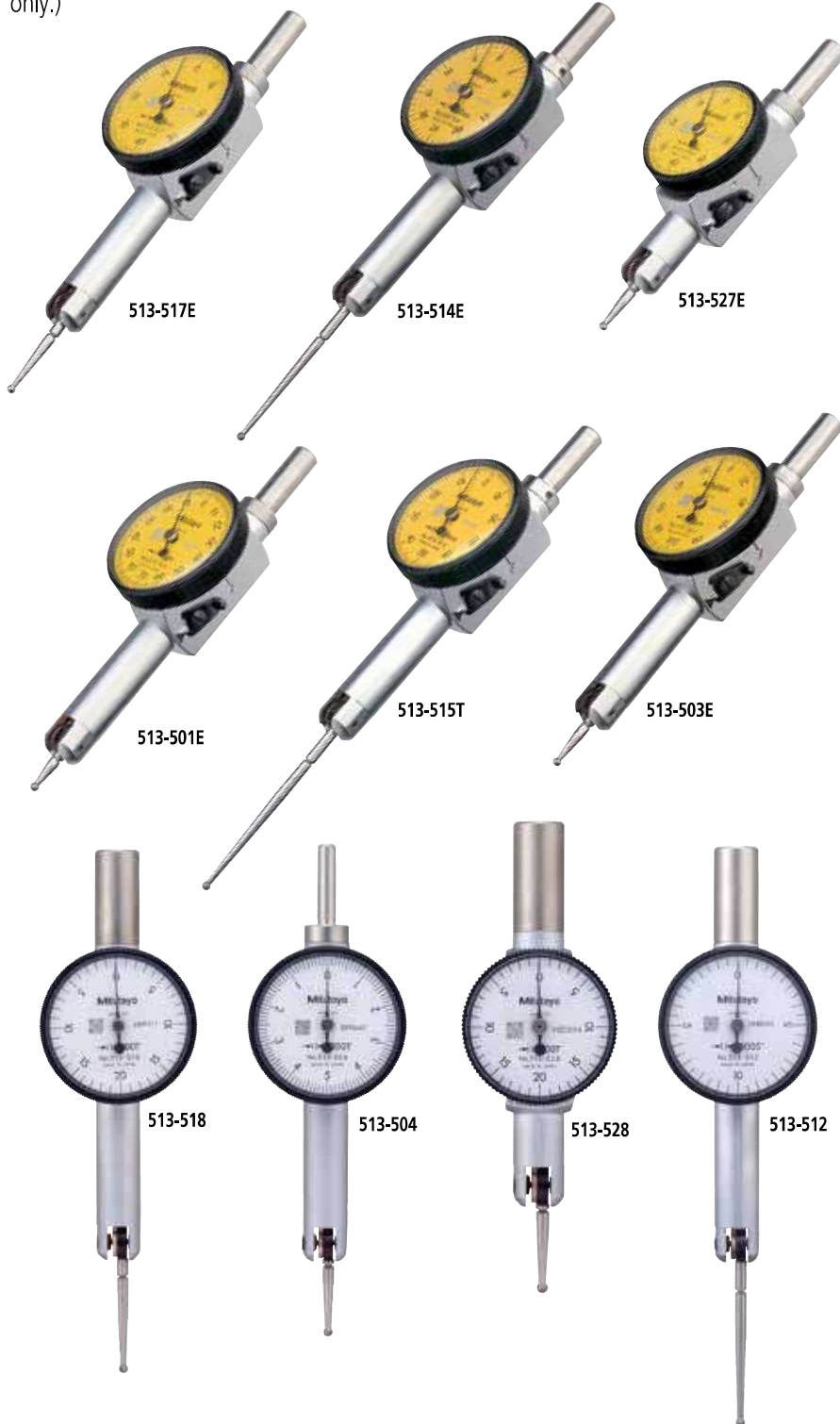


Pocket Dial Test Indicators

SERIES 513

FEATURES

- Jeweled bearings ensure high sensitivity and accuracy.
- Reversible measuring direction.
- Two holding bars are supplied. (Full sets only.)
- Fully adjustable bezel/dial face.
- Contact point is adjustable within 220°.
- Bezel is sealed with an O-ring to keep out water / oil.



513-514E



513-517E
513-527E



513-515T



513-503E



513-501E

Optional Accessories

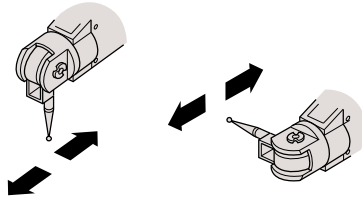
- : Swivel clamp
- : Holding bar
- : Stem
- : Contact points

Dial Test Indicators

SERIES 513 — Universal Type

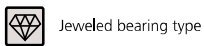
FEATURES

- Universal application for all directions. Not only the direction of the measuring point, but also the direction of measurement itself can be adjusted 360 degrees without moving the indicator.







513-304GE

SPECIFICATIONS

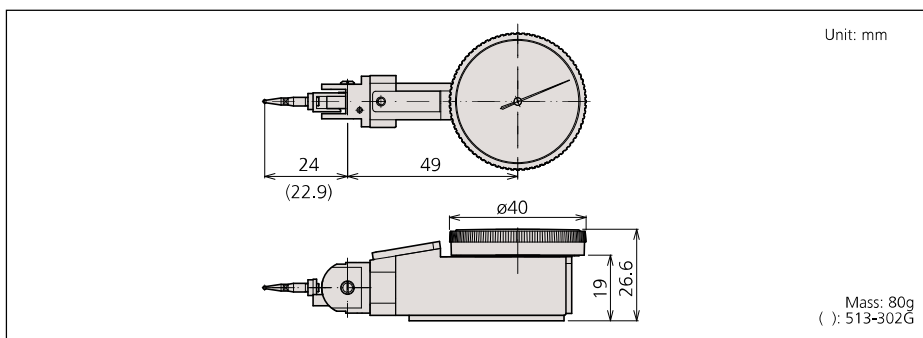


Jeweled bearing type

Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	
	Basic set	Full set					
0.01mm	513-304GE	513-304GT	0.8mm	8µm	0-40-0	0.3N or less	

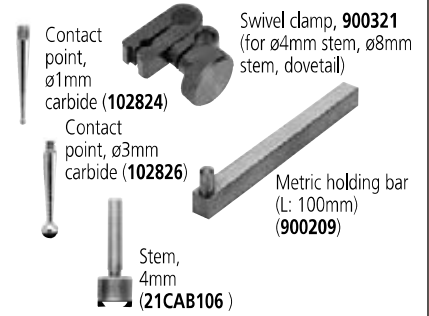
Graduation	Order No.		Range	Accuracy	Dial reading	Measuring force	
	Basic set	Full set					
.0005"	513-302G	513-302GT	.03"	±.0005"	0-15-0	0.3N or less	

DIMENSIONS AND MASS

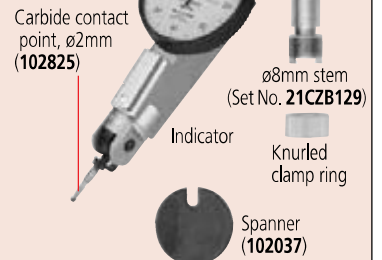


Set Configuration: Metric

Full set

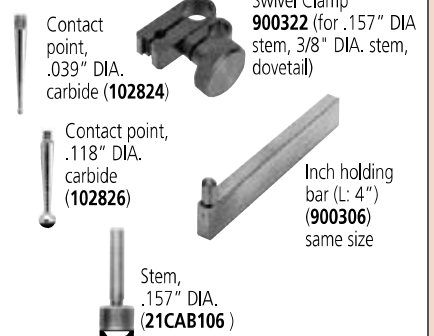


Basic set

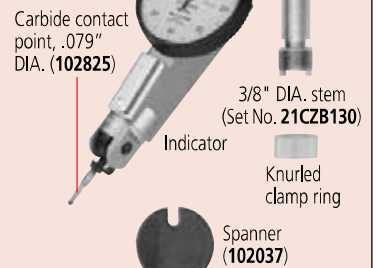


Set Configuration: Inch

Full set



Basic set

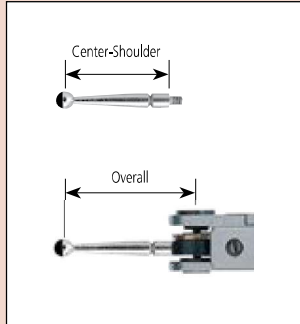


Optional Accessories

- : Swivel clamp
- : Holding bar
- : Stem

Contact Points and Clamp Holders

Optional Accessories for Dial Test Indicator



Inch

Length (mm)		Part No.						Ruby Ø2mm	Test Indicator Code No.		
Center-Shoulder	Overall	Ø0.5	Ø0.7	Ø1	Ø2	Ø3					
11.5	15.0	—	—	136076	136075	136077	21CZA213	513-403-10E 513-453-10E	513-443-10A 513-463-10E	513-473-10E ¹ 513-443-16A	
16.4	19.9	—	—	133196	133195	133197	21CZA204	513-401-10E 513-406-10E 513-452-10E	513-442-10A 513-462-10E	513-472-10E ¹ 513-442-16A 513-482-10A	
30.4	33.9	—	—	136291	136290	136292	21CZA214	513-412-10E 513-446-16A	513-446-10A		
15.2	18.7	—	—	131314	103011	131315	—	513-504 ¹	513-528 ¹		
23.0	26.5	—	—	103008	103007	103009	—	513-518 ¹			
33.9	37.4	—	—	131316	131324	131317	—	513-512 ¹			

Metric

Length (mm)		Part No.								
9.4	12.9	—	—	21CZA044	21CZA036	21CZA045	21CZA212	513-401-10E 513-405-10E 513-503E 513-527E	513-471-10E 513-425-10E 513-455-10E 513-455-10E	513-445-10E
11.2	14.7	190547	190548	103017	103010	103018	21CZA209	513-404-10E 513-464-10E 513-484-10E	513-444-10E 513-517E ¹	513-454-10E 513-474-10E ²
17.4	20.9	190549	190550	103013	103006	103014	21CZA201	513-424-10E 513-478-10H ³	513-426-10E	513-466-10E
18.7	22.2	190654	190653	137558	137557	137559	21CZA210	513-415-10E	513-515T ¹	
41.0	44.5	190656	190655	136235	136013	136236	21CZA211	513-414-10E	513-514E ¹	
33.3	36.8	—	—	137746	129949	137747	—	513-501E ¹		
8.6	12.0	—	—	136756	136104	136758	—	513-304GE ²	513-302G ²	
6.5	24.0	—	—	102824	102825	102826	—			

*1 Denotes Pocket Indicators

*2 Denotes Universal Indicator

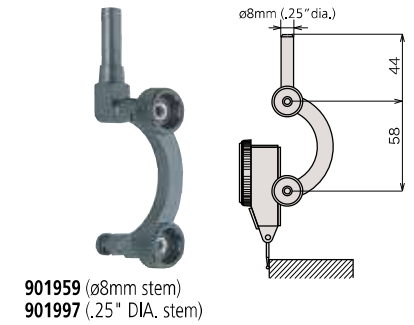
*3 Indicator Ships with Ruby Contact

Holding Bars (with 6mm mounting pin)



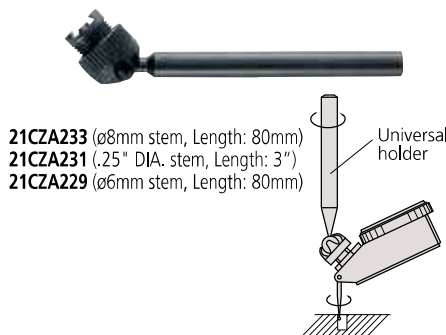
Centering Holder

- Allows large diameter cylinders or holes to be centered.



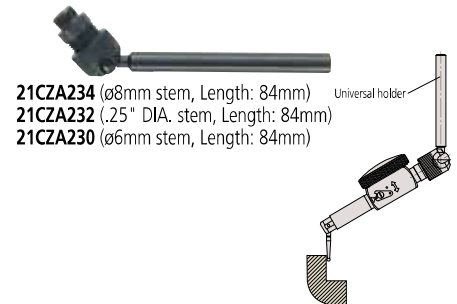
Universal Holder

- Allows the indicator to be set at a desired position.



Universal Holder (pocket type)

- Since the Dial Test Indicator can be swiveled to a desired angle, the holder is useful for centering workpieces and installing workpieces on a milling machine.



i-Checker

SERIES 170 – Inspection Instrument for Dial Indicator

The i-Checker is specially designed to calibrate dial indicators, dial test indicators, and other electronic comparison gage heads with a stroke of up to 100mm (4").

- $\pm(0.1+0.4L/100)$ μm indication accuracy.
- Directly inspects an indicator with a stroke of up to 100mm (4"). The dial test indicator, bore gage and lever-type inductive head can be inspected with optional accessories.

- Adjustment of the measurement position is easily accomplished due to semi-automatic measurement and fully automatic measurement functions.
- Creates and prints out a simple inspection certificate.
- Saves inspection results as a CSV file for analysis by software.

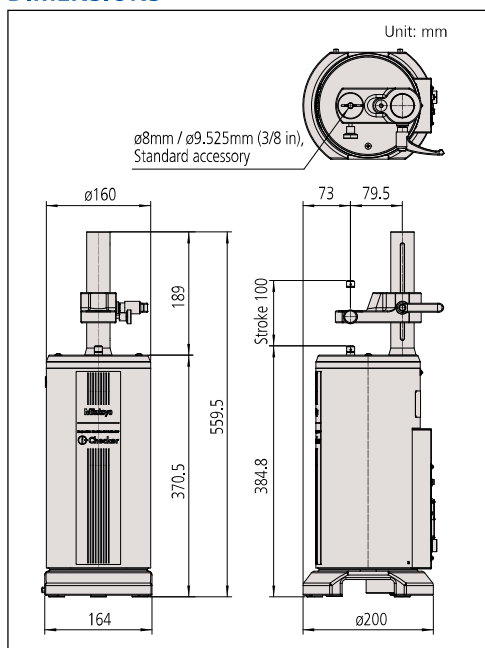


SPECIFICATIONS

Order No.	Remarks
64PKA148	comes with both 8mm and 3/8" bushing

Recommended PC Part No. **64PKA149E**

DIMENSIONS



Applicable Indicators

- Dial indicator
 - Hicator
 - Digimatic indicator***
 - Test indicator*
 - Bore gage**
 - Linear gage
- * Requires optional test indicator attachment set.
 ** Contact the nearest Mitutoyo sales office for testable indicators.
 *** Requires optional SPC cable for fully automatic measurement.



Using test indicator attachment set (02ASK000)



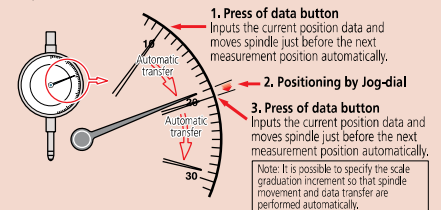
Technical Data

Measuring Range: 100mm / 4"
 Resolution: 0.01 μm / 0.4 μin
 Accuracy: $\pm(0.1+0.4L/100)$ μm in vertical position
 (at 20°C) $\pm(0.15+0.6L/100)$ μm in lateral position
 L = measuring length (mm)
 Drive method: Motor direct drive
 Measuring Unit: "STVC-4Z" linear encoder
 Thermal Expansion coefficient: 0.4 ppm / °C
 Measurement method: Semi / Full automatic*
 Dimensions: 116 x 205.5 x 559.5mm (W x D x H)
 Operating temperature range: 20°C \pm 0.5°C
 Power supply: 100 – 240VAC \pm 10%, 50/60 Hz
 Mass: 20kg / 44.1lbs
 * Automatic measurement requires the indicator's connection cable. Additionally, some form of indicator, along with a connecting machine (the optional accessory for indicator as a Digimatic power-supply unit on EF counter), will be needed.

Functions

Semi-automatic inspection of analog indicator

The pointer of the analog indicator is positioned just before the measuring point automatically via Mitutoyo's Semi-automatic Measurement function. After that, inspection begins simply by adjusting the pointer position with the jog-dial. Because of this function, measurement time is reduced and user fatigue is practically eliminated. Additionally all functions necessary for inspection are combined in the control box so that the operator need not rely on excessive eye movement to adjust the pointer.



Fully automatic inspection of digital indicator

The Automatic Measurement function, in tandem with a digital indicator, makes the spindle move so that measurement data is acquired automatically. Therefore, manual adjustment to the measurement position is unnecessary and the efficiency of every inspection is enhanced.

Create and printout a simplified inspection certificate

Create, edit and print your own inspection certificate. Data can be saved as a CSV file.

Optional Accessories

- 02ASK000: Test indicator attachment set ($\varnothing 6\text{mm}$ stem)
- 02ASK180: Test indicator attachment set ($\varnothing 8\text{mm}$ stem)
- 02ASK370: Test indicator holder ($\varnothing 6\text{mm}$ stem)
- 02ASK380: Test indicator holder ($\varnothing 8\text{mm}$ stem)
- 02ASU162: CG accessory set (type C) for bore gages*
- 21CZB128: $\varnothing 6\text{mm}$ dovetail grooved stem
- 21CZB129: $\varnothing 8\text{mm}$ dovetail grooved stem
- 02ASK040: Stem bush $\varnothing 6\text{mm}$
- 02ASJ856: Stem bush $\varnothing 8\text{mm}$
- 02ASK150: Stem bush $\varnothing 8\text{mm}$, short
- 02ASK050: Bush $\varnothing 9.5$ (Requires 02ASK070)
- 02ASK060: Stem bush $\varnothing 12\text{mm}$
- 02ASK070: Stem bush $\varnothing 15\text{mm}$
- 02ASK080: Stem bush $\varnothing 20\text{mm}$
- 02ASK710: Stem bush $\varnothing 28\text{mm}$
- 02ASK090: Stem bush 3/8"
- 02ASK130: Stem bush case
- 02ASK730: Reflector
- 937179T: Foot switch

* Not compatible with IC 1000 models



Optional Accessory

12AKK824: Stand for bore gage inspection



UDT-2 Dial Gage Testers

SERIES 170

The UDT-2 Dial Gage Tester consists of a specially designed 0-1" / 0-25mm micrometer head, with a large disc, and rigid holding fixtures. Gage tester to calibrate measuring accuracy of dial indicators, dial test indicators and dial bore gage.

FEATURES

- Clamping stem diameter—
170-102-10: 6mm and 8mm,
170-101-10: .25" and .375"
- With the optional stand (**12AAK824**), inspection of dial bore gages becomes possible.



170-102-10

SPECIFICATIONS

Metric			
Range	Order No.	Graduation	Accuracy
0 - 25mm	170-102-10	0.001mm	±1µm

Inch			
Range	Order No.	Graduation	Accuracy
0 - 1"	170-101-10	.0001"	±.0001"

Calibration Testers

SERIES 521

The Calibration Tester is specially designed to calibrate measuring accuracy of short-range dial indicators, dial test indicators, and other electronic comparison gage heads.

FEATURES

- Universal bracket accepts any dial indicator, dial test indicator, and lever head of Mu-Checker without any additional accessory.
- Clamping capacity: ø4mm - ø10mm / .157"-.394" dia.
- Dual color-indexed directional graduations to facilitate measurements.



Calibrating test indicator



521-103

SPECIFICATIONS

Metric			
Range	Order No.	Graduation	Accuracy
0 - 1mm	521-103	0.0002mm	±0.2µm
0 - 5mm	521-105	0.0002mm	±0.8µm

Inch			
Range	Order No.	Graduation	Accuracy
0 - .05"	521-104	.00001"	±.00001"
0 - .2"	521-106	.00001"	±.00003"