

F

DIGIMATIC INDICATORS
DIAL INDICATORS
DIAL TEST INDICATORS
INSTRUMENTS & STANDS

Digimatic Indicators



Dial Indicators



Dial Test Indicators



Instruments and Stands



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Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Solar Indicator ID-SS

- Solar power supply. An environmentally friendly measuring instrument that does not require batteries, eliminating the hassle and cost of battery replacement. Can operate under minimum light conditions of 40 lux – lower than the level of a warehouse.
- Built-in recharger. The large-capacity built-in recharger allows you to use the indicator for long periods of time under light conditions below the minimum level.*
- User-friendly buttons. All functions can be accessed by using the large buttons on the front of the indicator.
- Origin recorded even if display disappears. The indicator includes an ABSOLUTE sensor that allows the previously set origin to be stored even if the display disappears due to insufficient light, making it easy to resume measurement. This feature makes ID-SS ideal for long-time or multi-point measurement.

ABSOLUTE



543-501



543-506

ID-SS can be used in standard work environments. The following is excerpted from JIS Z9110:2010 General rules of recommended lighting levels; 5.4 Factories:

Luminance (lux)	Location (permissible work)
1500	Very detailed visual work
750	Detailed visual work; design and drawing work
500	Regular visual work such as work carried out in a factory; monitoring work such as using instrument panels and control panels
300	Administrative work carried out in a warehouse
200	Control rooms, bathrooms, and places where manual light work is carried out
150	Work such as loading, unloading, and shifting loads
100	Hallways, corridors, entrances and exits, and warehouses
50	Indoor emergency staircases

Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Measuring force:	1.5 N or less
Usable positions:	All
Power supply:	Solar battery (for indoor use)
Min. operating light:	40 lux*
Max. response speed:	No limit (scan-type measurement is not supported)
Stem dia:	8 mm
Standard contact point:	901312

* A built-in recharger allows a fully charged ID-SS to be used for about 3.5 hours under light conditions below the minimum level. The charging time differs depending on the environment, but it usually takes about 1.5 hours for a fully discharged ID-SS to fully recharge under light conditions of 500 lux.

Functions

Origin set (zero-set), Count direction switching, Data output, inch/mm reading

Alarm: Counting value composition error
Insufficient illumination intensity or charge

Optional Accessories

- 905338:** SPC data cable (1 m)
£32.90
- 905409:** SPC data cable (2 m)
£36.80
- 02AZD790F:** SPC data cable for U-WAVE-T (160 mm)
£52.20
- 02AZE140F:** SPC data cable for U-WAVE-T and footswitch (160/500 mm)
£107.00
- 21EZA198:** Plunger lifting lever
£5.10
- 21EZA105:** Plunger lifting knob
£10.90
- 540774:** Plunger lifting cable 12.7 mm and 25.4 mm
£20.50
- 264-504-5E:** Digimatic Mini-Processor DP-1VR
£342.00

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Interchangeable backs (refer to page F-41 for details)

Measuring stands (refer to pages F-70 to F-73 for details)

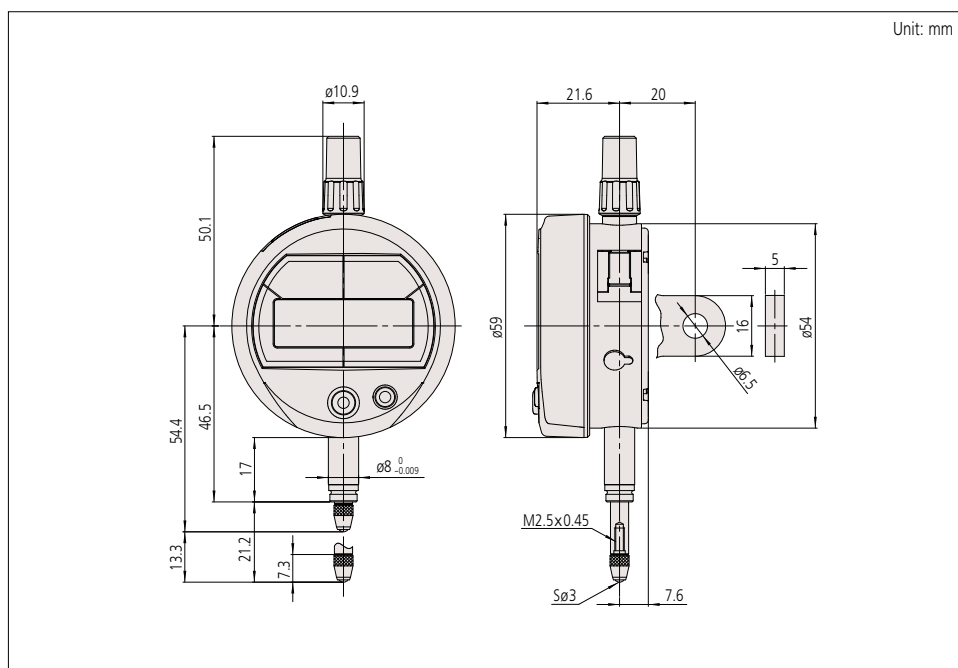


SPECIFICATIONS

Inch/Metric							
Code No.	Resolution	Range	Overall*	Hysteresis*	Repeatability*	Price	
With lug							
543-501	.00005" / 0.001 mm	.5" / 12.7 mm	±.0001" / 0.003 mm	.0001" / 0.002 mm	.0001" / 0.002 mm	£203.00	
543-506	.0005" / 0.01 mm		±.001" / 0.02 mm	.001" / 0.02 mm	.005" / 0.01 mm	£102.00	
Flat							
543-501B	.00005" / 0.001 mm	.5" / 12.7 mm	±.0001" / 0.003 mm	.0001" / 0.002 mm	.0001" / 0.002 mm	£203.00	
543-506B	.0005" / 0.01 mm		±.001" / 0.02 mm	.001" / 0.02 mm	.005" / 0.01 mm	£102.00	

* Quantizing error of ±1 count is excluded.

DIMENSIONS



Unit: mm

F

Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Indicators ID-N/B

- Our unique ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on.
- Rated to IP66: can be used satisfactorily even in adverse environments where the indicator is subject to splashing by cutting fluid or coolant.
- Slim body design (body width: only 35 mm) is advantageous in multipoint measurement situations where space is restricted. The LCD readout can also be rotated 180° to allow reading from the most convenient direction.
- Succeeded in digitalization of the Back Plunger type widely used for dial indicators for ID-B. A 5 mm-stroke plunger with a higher degree of accuracy has been implemented by adopting a direct reading scale for plunger displacement.
- The chance of overspeed errors has been eliminated thanks to the ABSOLUTE sensor.
- Built-in tolerance judgement function provides OK, +NG, or –NG judgement of measurement with respect to the preset upper and lower limit values, indicating the status of a measurement with the appropriate symbol. The symbols can be displayed much larger.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.
- There is a choice of convenient Interface Input Tools which enable the conversion of measurement data to keyboard signals and direct input to cells in off-the-shelf spreadsheet software such as Excel.

ABSOLUTE

IP66



543-576



543-506

SPECIFICATIONS

Inch/Metric				
Code No.	Resolution	Range	Accuracy*	Price
Slim type ID-N				
543-571	.0005", 0.01 mm	.5", 12.7 mm	.0008", 0.02 mm	£174.00
543-576	.0005"/.00005", 0.01 mm/0.001 mm		.0004"/.00012", 0.01 mm/0.003 mm	£246.00
Back plunger type ID-B				
543-581	.0005", 0.01 mm	.2", 5 mm	.0008", 0.02 mm	£186.00
543-586	.0005"/.00005", 0.01 mm/0.001 mm		.0004"/.00012", 0.01 mm/0.003 mm	£258.00

* Quantizing error of ±1 count is excluded.

Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic line encoder
Max. response speed:	Unlimited (measurement by scanning can not be performed)
Measuring force:	2.5 N or less (ID-N) 2.0 N or less (ID-B)
Stem dia:	3/8"
Standard contact point:	21BZA005
Battery:	SR44 (1 pc.), 938882
Battery life:	Approx. 7,000 hours under normal use

Functions

Zero-setting, Presetting, Direction switching, Tolerance judgement, Display hold, Data output, inch/mm reading (inch/mm models), LCD readout rotation
Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error



LCD readout rotation function.



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



Body width 35 mm.

Optional Accessories

- 21EAA194:** SPC data cable (1 m)
£40.00
- 21EAA190:** SPC data cable (2 m)
£45.00
- 02AZD790G:** SPC data cable for U-WAVE-T (160 mm)
£52.20
- 02AZE140G:** SPC data cable for U-WAVE-T and footswitch (160/500 mm)
£107.00
- 21EAA210:** Bifurcated connecting cable with zero-setting terminal (1 m)*
£102.00



- 21EAA211:** Bifurcated connecting cable with zero-setting terminal (2 m)*
£115.00
- 21EZA146:** Lug
£10.10
- 21EZA150:** Lifting knob (ID-N only)
£10.90
- 02ACA376:** Rubber boot for ID-N, NBR
£2.80
- 125317:** Rubber boot for ID-B, NBR
£3.80
- 238774:** Rubber boot for ID-N, silicone
£11.90
- 21EAA212:** Rubber boot for ID-B, silicone
£5.80

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

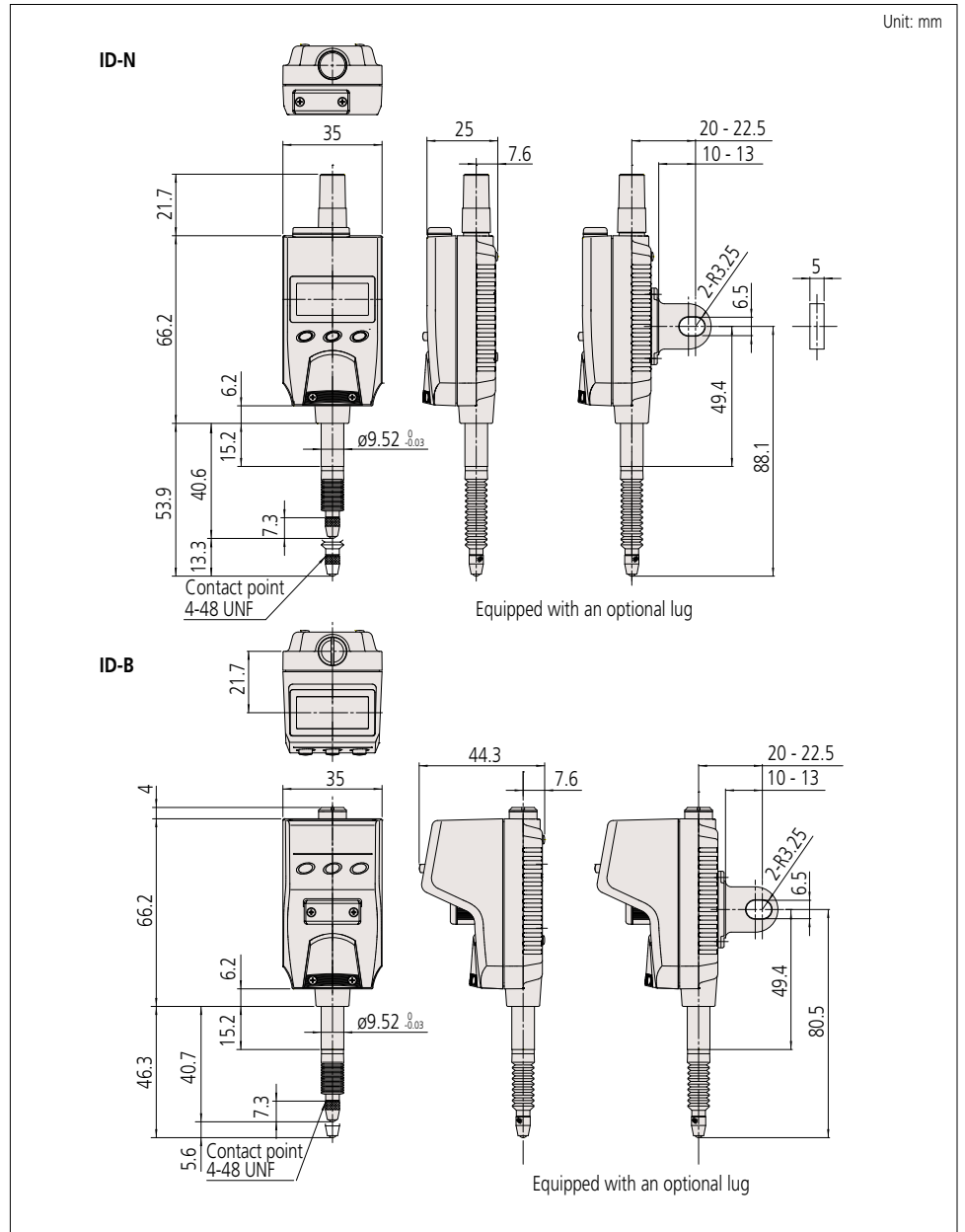
* Two of the wires inside the cable are separated for zero setting without touching the SET switch on the main body. Use these cables in combination with commercially available switches. Zero setting is performed by briefly connecting these two wires together (less than a second), and ABS preset & recall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



Lifting knob

Plunger can be manually lifted. Remove the plunger cap for ID-N and attach the lifting knob to the plunger. Note that water resistance is not maintained in this configuration.

DIMENSIONS



Sample applications



Digimatic Indicators

SERIES 543 – Digimatic High Accuracy/Functionality Indicator ID-H

- This new-generation digital indicator offers the excellent accuracy and functionality expected from the top class of indicator.
- Take advantage of its high accuracy backed up by 0.5 μm / .00002" resolution, remote control functionality via a handheld controller (or an RS-232C interface) and easy runout measurements with the well-established analogue bar display.
- Functionality meets the needs of diverse measurement applications.
- Measuring maximum value, minimum value and runout (difference between a maximum and a minimum value).
- With the optional remote controller, operations such as zero-setting and presetting can be made without touching the indicator body, thereby avoiding disturbance to the set-up.
- An advanced, remote control system can be implemented with the built-in RS-232 interface and a PC.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.



543-562E

543-564E

SPECIFICATIONS

Inch/Metric					
Code No.	Range	Resolution	Accuracy*	Measuring force	Price
543-562E	1.2" / 30.4 mm	.00002", .00005", .0001" / 0.0005 mm,	.00006" / 0.0015 mm	2.0N or less	£548.00
543-564E	2.4" / 60.9 mm	0.001 mm	.0001" / 0.0025 mm	2.5N or less	£631.00

* Quantizing error of ± 1 count is excluded.

Technical Data

Display:	7-digit LCD, sign, and analog bar with 2-colour backlight
Power supply:	6V DC (via AC adapter)
Positional detection method:	Photoelectric-type reflection linear encoder
Max. response speed:	1000 mm/sec
Plunger direction:	Up to direction in which plunger is horizontal
Standard contact point:	21BZB005
Lifting lever:	137693

Functions

Zero set, Preset, GO/ \pm NG judgement
 Max/Min value hold, Runout measurement
 Resolution switching
 Counting direction switching
 Data output, Data hold, Function lock
 inch/mm reading (inch/mm models)
 Alarm: Over speed error, Setting error, Overflow error



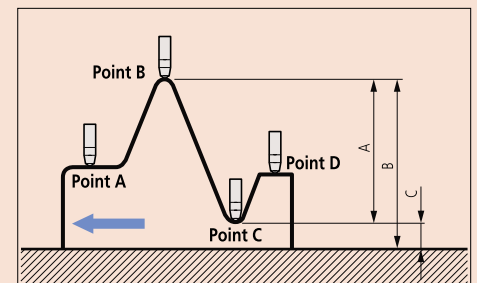
Remote controller (optional)

Application

Difference/Runout measurement

Example: Indicator travel from points A to D

Difference (or Total Runout) is displayed as A. Dimensions B (maximum value) and C (minimum value) can be recalled from memory with a simple key sequence.



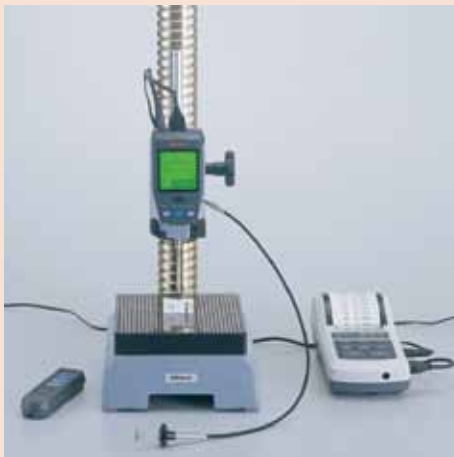
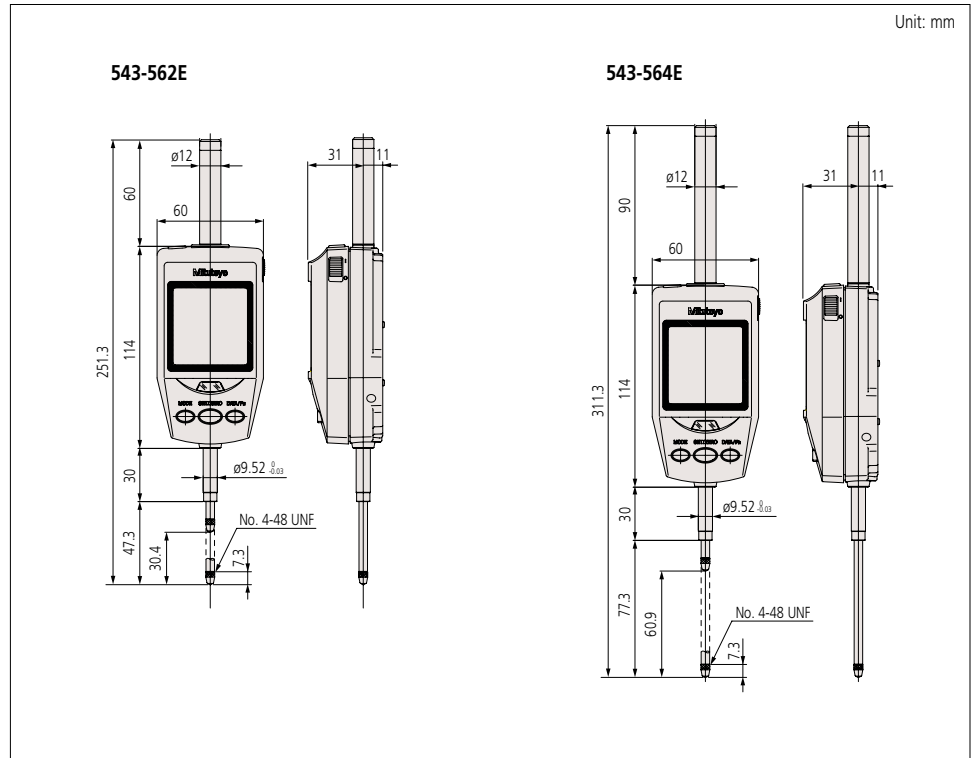
Optional Accessories

- 936937:** SPC data cable (1 m)
£32.90
- 965014:** SPC data cable (2 m)
£39.10
- 21EAA131:** Connecting cable for RS-232 (2 m)
£108.00
- 02AZD790D:** SPC data cable for U-WAVE-T (160 mm)
£52.20
- 02AZE140D:** SPC data cable for U-WAVE-T and footswitch (160/500 mm)
£107.00
- 540774:** Plunger lifting cable (stroke: 30 mm)
£20.50
- 21EZA101:** Plunger lifting knob
£18.80
- 101306:** Centre-lug back
£2.80
- 264-504-5E:** Digimatic Mini-Processor DP-1VR
£342.00
- 21EZA099:** Remote controller
£58.50

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Measuring stands (refer to pages F-70 to F-73 for details)

DIMENSIONS



Tolerance judgement



Analogue bar display



Maximum value / minimum value measurement



Resolution switching



Difference / runout measurement



Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Indicator ID-CX

- Employing the ABSOLUTE Linear Encoder, the ID-CX indicator always displays the absolute position of the plunger from the origin at power-on.
- Thanks to the ABSOLUTE Linear Encoder, reliability has been increased due to elimination of over-speed errors.
- Tolerance-judging measurement is available by setting upper and lower limit values. The tolerance judgement result can be enlarged.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE

IP42



543-391B

543-471B

543-491B

SPECIFICATIONS

Inch/Metric							
Code No.	Range	Overall* ¹	Hysteresis* ¹	Repeatability* ¹	Measuring force	Remarks	Price
Resolution: .0005" / .0001" / .00005" / 0.01 mm / 0.001 mm							
543-391B	.5" / 12.7 mm	.0001" / 0.003 mm	.0001" / 0.002 mm	.0001" / 0.002 mm	1.5N or less	—	£253.00
543-395B	.5" / 12.7 mm				0.4N - 0.7N	Low measuring force	£293.00
543-471B	1" / 25.4 mm				1.8N or less* ²	—	£364.00
543-491B	2" / 50.8 mm				2.3N or less* ²	—	£394.00
Resolution: .0005" / 0.01 mm							
543-401B	.5" / 12.7 mm	.001" / 0.02 mm	.001" / 0.02 mm	.0005" / 0.02 mm	0.9N or less	—	£198.00
543-475B	1" / 25.4 mm				1.8N or less* ²	—	£289.00

*¹ Quantizing error of ±1 count is excluded.

*² Plunger direction is up to direction in which plunger is horizontal.

Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited (measurement by scanning cannot be performed)
Stem dia.:	8 mm
Standard contact point:	901312
Battery:	SR44 (1 pc.), 938882
Battery life:	Approx. 7,000 hours under normal use
Dust/water protection level:	IP42

Functions

Preset, Zeraset, GO/±NG judgement, Counting direction switching, Power ON/OFF, Simplified calculation, Function lock, Data hold, Data output, inch/mm reading
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

Optional Accessories

905338:	SPC data cable (1 m)	£32.90
905409:	SPC data cable (2 m)	£36.80
02AZD790F:	SPC data cable for U-WAVE-T (160 mm)	£52.20
02AZE140F:	SPC data cable for U-WAVE-T and footswitch (160/500 mm)	£107.00
21EZA198:	Plunger lifting lever (12.7 mm / .5" type)	£5.10
21EZA105:	Plunger lifting knob (12.7 mm / .5" type)* ¹	£10.90
21EZA197:	Plunger lifting knob (25.4 mm / 1" type)	£39.50
21EZA200:	Plunger lifting knob (50.8 mm / 2" type)	£38.00
540774:	Plunger lifting cable (12.7 mm and 25.4 mm)	£20.50
02ACA571:	Auxiliary plunger spring (25.4 mm / 1" type)* ²	£5.10
02ACA773:	Auxiliary plunger spring (50.8 mm / 2" type)* ²	£5.40
264-504-5E:	Digimatic Mini-Processor DP-1VR	£342.00

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Interchangeable backs (refer to page F-41 for details)

Measuring stands (refer to pages F-70 to F-73 for details)

*¹ Not available for low measuring force models.

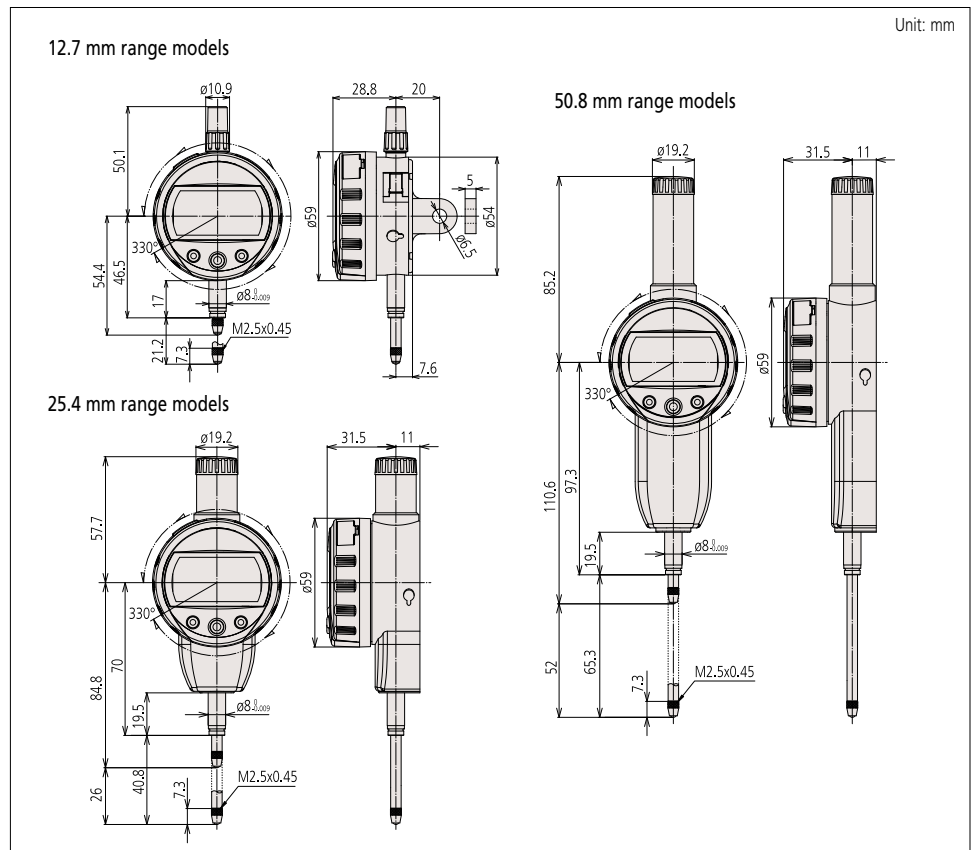
*² Required when orienting the indicator upside down.

Setting measuring force on low measuring force model

Plunger orientation	Spring	Weight (approx. 0.1 N)	Max. measuring force
Pointing vertically downward	Yes	Yes	0.7 N or less
	Yes	No	0.6 N or less
	No	Yes	0.4 N or less
Horizontal		No	Not guaranteed

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

DIMENSIONS



Three large buttons

The popular three-large-button design, which is used in products such as the ABSOLUTE Coolant Proof Digimatic Indicators ID-N/D-B, makes buttons easier to press and operations easier to perform.



- Parameter setting mode
Measuring direction switching, tolerance judgement setting, resolution switching, scale factor setting, and function lock setting
- inch/mm reading

- Power switch
- Data output (when connected to an external device)
- Data hold (when no external device is connected)

- Switches between the ABS (origin set) and INC (zero set) measurement modes

Large LCD

The large LCD incorporates 11 mm characters giving 1.5 times the character area of existing products (which display 8.5 mm characters) making measurement values much easier to read.



Actual size

330° rotary display

The display can be rotated 330°, allowing use at a position where you can easily read the measurement value.



Calculation: $f(x) = Ax$

Mounting the ID-C on a measuring jig and setting the multiplying factor 'A' (to any value) allows direct measurement without using a conversion table and improves measurement efficiency.



Application example

Function locking

Ensures reliability of measurement by locking the settings to prevent preset function settings from being changed by mistake.



Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Peak Value Hold Indicator ID-C

- The maximum, minimum, or runout value can be measured and displayed during measurement.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on. It also realizes high reliability by eliminating over-speed errors.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.
- User friendly, battery-operated type.

ABSOLUTE

IP42



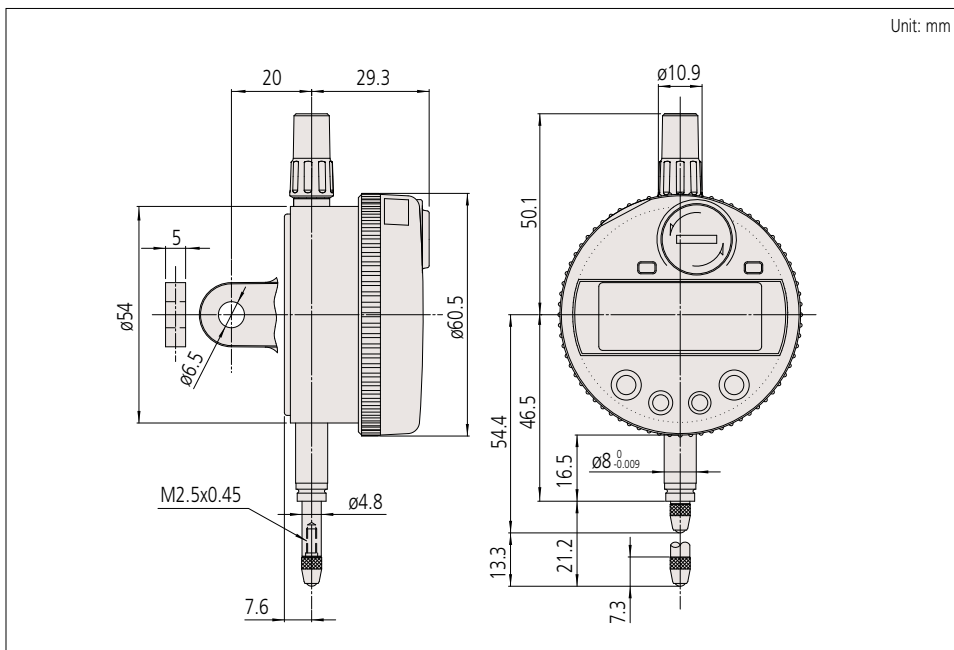
543-261B

SPECIFICATIONS

Inch/Metric					
Code No.	Range	Resolution	Accuracy*	Measuring force	Price
543-261B	.5" / 12.7 mm	.00005" / 0.001 mm	.00012" / 0.003 mm	1.5 N or less	£279.00

* Quantizing error of ± 1 count is excluded.

DIMENSIONS



Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Stem dia:	8 mm
Standard contact point:	901312
Battery:	SR44 (2 pcs.) 938882
Battery life:	6 months under normal use*2
Dust/water protection level:	IP42
*2 Operation time per day: 8 hours	

Functions

Preset, Zeroset, Max/Min value hold, Run out value hold, GO/ \pm NG judgement, Counting direction switching, Power ON/OFF, Data output, inch/mm reading
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

Optional Accessories

905338:	SPC data cable (1 m)	£32.90
905409:	SPC data cable (2 m)	£36.80
02AZD790F:	SPC data cable for U-WAVE-T (160 mm)	£52.20
02AZE140F:	SPC data cable for U-WAVE-T and footswitch (160/500 mm)	£107.00
902011:	Plunger lifting lever	£2.80
540774:	Plunger lifting cable	£20.50
264-504-5E:	Digimatic Mini-Processor DP-1VR	£342.00

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Interchangeable backs (refer to page F-41 for details)

Measuring stands (refer to pages F-70 to F-73 for details)

Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Stem dia:	8 mm
Standard contact point:	901312
Battery:	SR44 (2 pcs.) 938882
Battery life:	1 year under normal use*1
Dust/water protection level:	IP42

*1 Operation time per day: 8 hours

Functions

Origin-set/Presets, Zero-set, GO/±NG judgement, Power ON/OFF, Data output, inch/mm reading (inch/mm models), Max/Min value holding, Function lock, Data hold
 Alarm: Low voltage, Counting value composition error, Overflow error, Tolerance limit setting error

Optional Accessories

905338:	SPC data cable (1 m) £32.90
905409:	SPC data cable (2 m) £36.80
02AZD790F:	SPC data cable for U-WAVE-T (160 mm) £52.20
02AZE140F:	SPC data cable for U-WAVE-T and footswitch (160/500 mm) £107.00
902011:	Plunger lifting lever £2.80
540774:	Plunger lifting cable £20.50
264-504-5E:	Digimatic Mini-Processor DP-1VR £342.00

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Interchangeable backs (refer to page F-41 for details)

Measuring stands (refer to pages F-70 to F-73 for details)



Various fixtures suited for individual workpieces can be prepared. Measuring accuracy is subject to fixture accuracy.

SERIES 543 – ABSOLUTE Digimatic Calculating Indicator ID-C

- This indicator incorporates an internal calculation function that operates from plunger displacement. Using dedicated fixtures, measurements of outside and inside diameter and radius of curvature can easily be made without needing to use conversion tables or manual calculations, and requiring access to only one side of the component to be measured.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on.
- The chance of over-speed error has been avoided thanks to the ABSOLUTE sensor.
- Tolerance judgement is available by presetting upper and lower limit values.
- Large, easy-to-read LCD 7-digit readout with a character height of 8 mm. Can be rotated up to 330° to achieve the optimum reading position.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE

IP42



Calculation function: $f(x) = Ax + B + C/x$

x = plunger movement
 A, B and C are user definable over a wide range

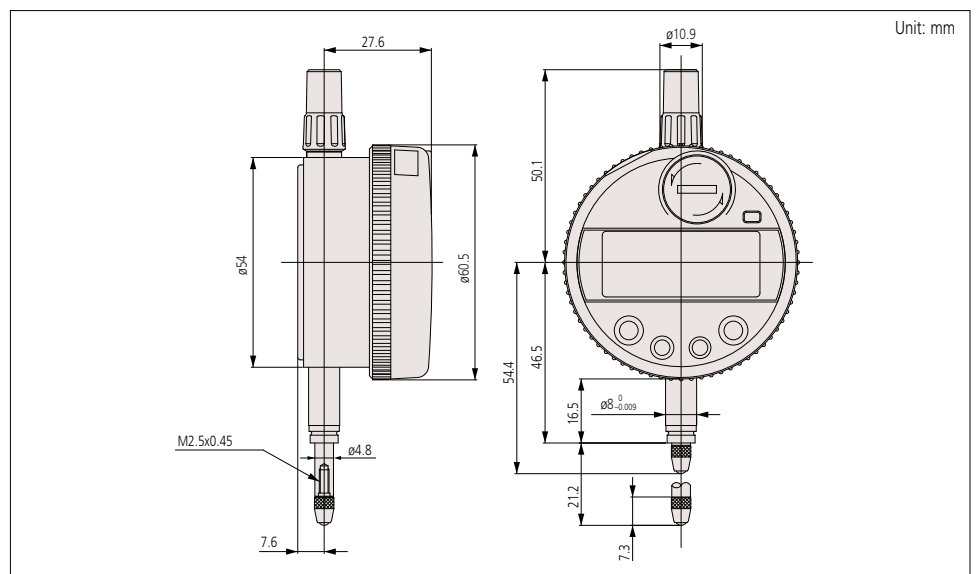
543-286B

SPECIFICATIONS

Inch/Metric					
Code No.	Range	Resolution (switchable)	Accuracy*	Measuring force	Price
543-286B	.5" / 12.7 mm	.00001" - .05" / 0.0002 - 1 mm	.00012" / 0.003 mm	1.5 N or less	£298.00

* Quantizing error of ±1 count is excluded.

DIMENSIONS



Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Signal Output Indicator ID-C

- With the MAX/MIN value holding function, this indicator can output the signal of a GO/±NG judgement result against the peak value set.
- Electronic processing provides high reliability and accuracy. The seven-core flying lead cable can be used by the customer to connect to external equipment as required. (See the I/O Specifications table for signal output and power supply details, and the Output/Input circuit diagrams for typical interface details.)
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on. It also realizes high reliability by eliminating over-speed errors.
- Provided with a 4 m cable.
- External power 12–24VDC required.



543-281B

ABSOLUTE

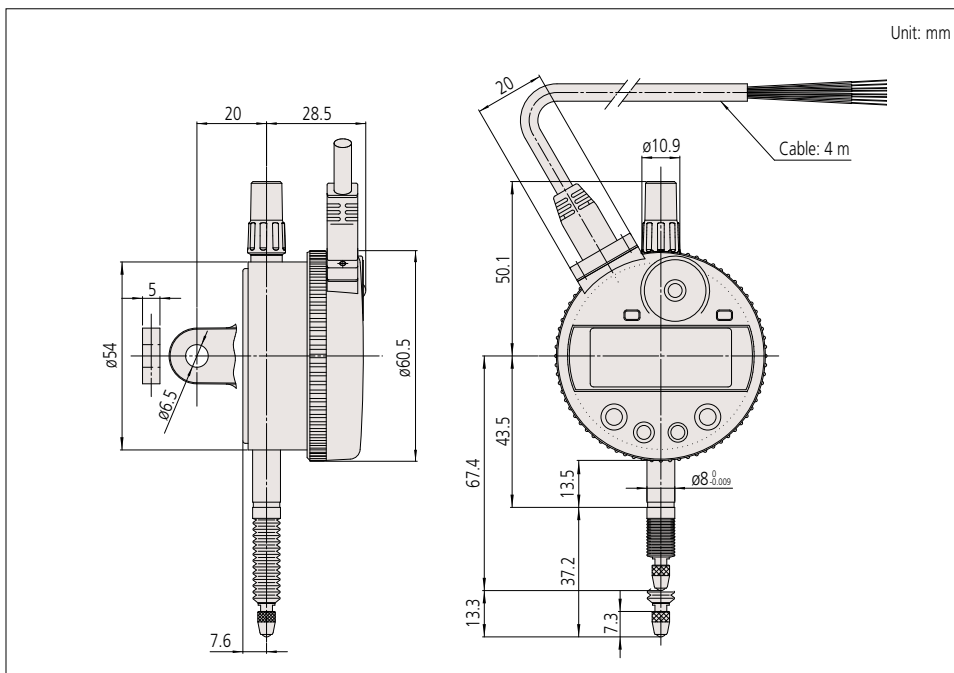
IP54

SPECIFICATIONS

Inch/Metric					
Code No.	Range	Resolution	Accuracy*	Measuring force	Price
543-281B	.5" / 12.7 mm	.00005" / 0.001 mm	.00012" / 0.003 mm	2.0 N or less	£420.00

* Quantizing error of ±1 count is excluded.

DIMENSIONS



Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Stem dia:	8 mm
Standard contact point:	901312
Dust/water protection level:	IP54

Functions

Signal output (–NG/OK/+NG, NPN open collector), Remote control (hold–reset, preset–recall, zero–set), Preset, Zeroset, GO/±NG judgement, Max/Min/Runout value holding, Counting direction switching, Power ON/OFF, inch/mm reading

Alarm: Counting value composition error, Overflow error, Tolerance limit setting error

Optional Accessories

902011:	Plunger lifting lever	£2.80
540774:	Plunger lifting cable	£20.50

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Interchangeable backs (refer to page F-41 for details)

Measuring stands (refer to pages F-70 to F-73 for details)

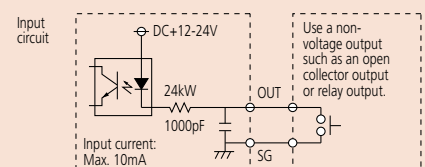
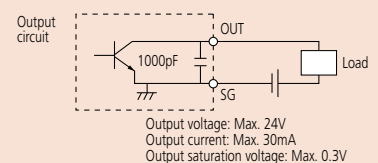
Output pattern

Wire	– NG	OK	+ NG	Composition error
Orange (– NG)	Low	High	High	High
Green (OK)	High	Low	High	High
Brown (+ NG)	High	High	Low	High
LED	Red	Green	Red	Red (blinking)
LCD	<	0	>	"x.xx"E" indication

I/O Specifications

Wire	Signal	I/O	Description
Black	– V (GND)	—	Connected to minus (–) terminal
Red	+ V	I	Power supply (12 – 24VDC)
Orange	– NG	O	Tolerance judgement result output:
Green	OK	O	Only the terminal corresponding to a judgement result is set to the low level.
Brown	+ NG	O	
Yellow	PRESET_RECALL ZERO	I	External input terminal: If the relevant terminal is set to the low level, its signal becomes true.
Blue	HOLD_RESET	I	
Shield	FG	—	Connected to GND

Note: Measurement data cannot be output.



Technical Data

Display:	6-digit LCD and sign
Scale type:	ABSOLUTE electrostatic linear encoder
Stem dia:	8 mm
Standard contact point:	901312
Battery:	SR44 (2 pcs.) 938882
Battery life:	9 months under normal use*2
Dust/water protection level:	IP42
*2 Operation time per day: 8 hours	

Functions

Presetting, Power on/off, inch/mm conversion (inch/mm type only), 3 set of master value and tolerance value memory, GO/±NG tolerance judgement, Min value holding, Data hold

Optional Accessories

905338:	SPC data cable (1 m) £32.90
905409:	SPC data cable (2 m) £36.80
02AZD790F:	SPC data cable for U-WAVE-T (160 mm) £52.20
02AZE140F:	SPC data cable for U-WAVE-T and footswitch (160/500 mm) £107.00
264-504-5E:	Digimatic Mini-Processor DP-1VR £342.00

The ABSOLUTE Digimatic Bore Gauge

ABSOLUTE Digimatic Bore Gauges, which integrate the display with a bore gauge measuring unit, are also available.



Example of bore gauge (optional) equipped with an ID-C Digimatic Indicator

SERIES 543 – ABSOLUTE Digimatic Bore Gauge Indicator ID-C

- Exclusively designed for Bore Gauges: this ID-C series indicator has the minimum value holding and GO/±NG judgement functions.
- Employing an ABSOLUTE Linear Encoder, the Bore Gauge ID-C always displays the absolute position of the plunger from the origin at power-on. Also, the reliability has been increased due to elimination of over-speed errors.
- An analog bar indication is integrated to provide the advantages of analog display for minimum value measurements.
- Up to three sets of reference diameter and upper/lower tolerance values can be stored to simplify the start-up key operation in repetitive hole inspection of mixed-diameter holes.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE

IP42



543-265B

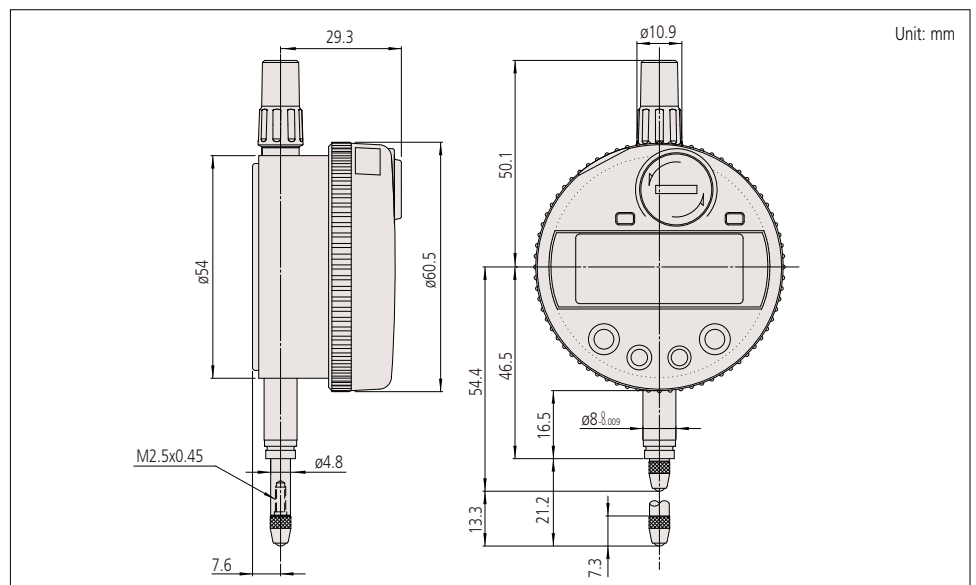
SPECIFICATIONS

Inch/Metric

Code No.	Range	Resolution	Accuracy*	Measuring force	Price
543-265B	.5" / 12.7 mm	.00005" / 0.001 mm	.00012" / 0.003 mm	1.5 N or less	£351.00

* Quantizing error of ±1 count is excluded.

DIMENSIONS



Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Multi-Function Indicator ID-F

- GO/±NG judgement function: If a judgement result shows an out of tolerance condition, the display backlighting changes from green to red.
- An analogue bar indicator has been integrated to make upper/lower limit and turnover point reading more comfortable.

Green indication for GO judgement Red indication for ±NG judgement



- With the ABSOLUTE Linear Encoder technology, once the measurement reference point has been set it will not be lost when the power is turned off. Also, reliability has been increased due to the elimination of over-speed errors.
- Easy-to-read large back-lit LCD readout with a character height of 8.5 mm.
- External power supply type: battery change is not necessary. Power is supplied via the AC adapter supplied as a standard accessory.
- The resolution can be switched between 0.001/0.01 mm (or .001"/.0005"/.0001"/.0005").
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE

IP30

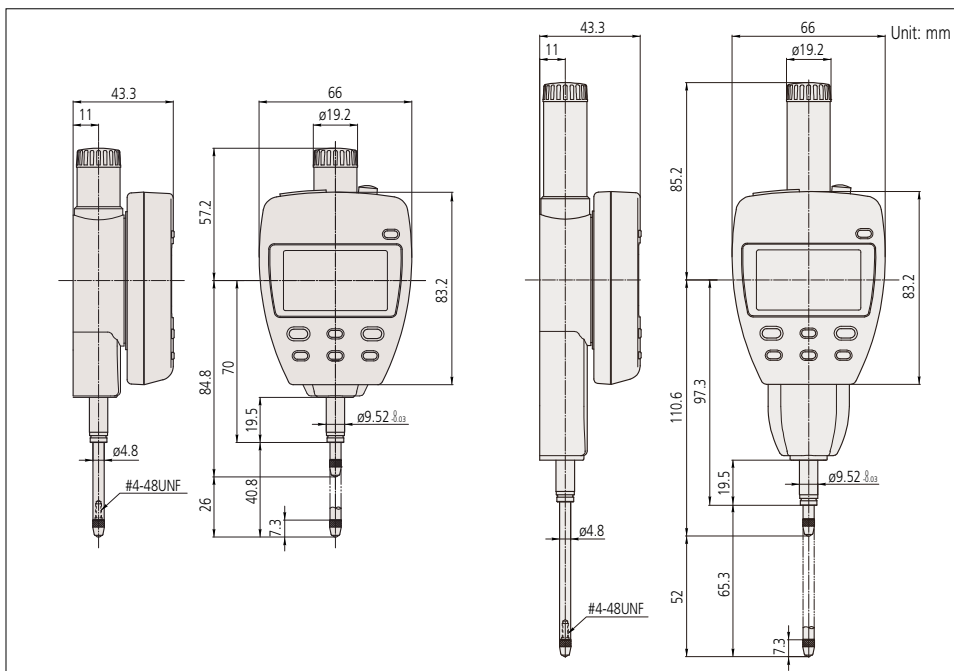


SPECIFICATIONS

Inch/Metric					
Code No.	Range	Resolution	Accuracy*	Measuring force	Price
543-552E	1" / 25 mm	.00002", .00005", .0001", .0005"	.00012" / 0.003 mm	1.8N or less	£421.00
543-554E	2" / 50 mm	.001" / 0.001 mm, 0.01 mm	.00024" / 0.006 mm	2.3N or less	£447.00

* Quantizing error of ±1 count is excluded.

DIMENSIONS



Technical Data

Display:	Back-lit LCD, 8.5 mm character height
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited
Stem dia:	3/8"
Standard contact point:	21BZB005
Power supply:	9V DC (via AC adapter)
Lifting lever:	137693

Functions

Preset, Zerose, GO/±NG judgement, Max/Min value hold, Runout measurement, Resolution switching, Counting direction switching, Power ON/OFF, Data output, inch/mm reading
 Alarm: Counting value composition error, Overflow error, Tolerance limit setting error

Optional Accessories

936937:	SPC data cable (1 m)	£32.90
965014:	SPC data cable (2 m)	£39.10
02AZD790D:	SPC data cable for U-WAVE-T (160 mm)	£52.20
02AZE140D:	SPC data cable for U-WAVE-T and footswitch (160/500 mm)	£107.00
540774:	Plunger lifting cable (stroke: 25.4 mm)	£20.50
21EZA197:	Lifting knob for 25 mm/1" model	£39.50
21EZA200:	Lifting knob for 50 mm/2" model	£38.00
101306:	Centre-lug back	£2.80
02ACA571:	Auxiliary plunger spring for 25 mm/1" model	£5.10
02ACA773:	Auxiliary plunger spring for 50 mm/2" model	£5.40

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

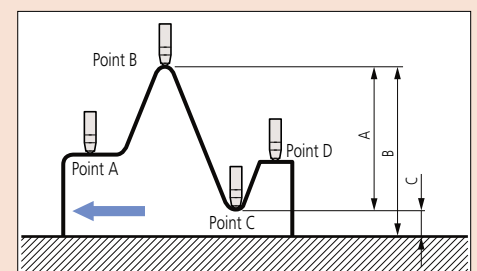
Interchangeable backs (refer to page F-41 for details)

Measuring stands (refer to pages F-70 to F-73 for details)

Application

Difference/Runout measurement

Example: Indicator travel from points A to D
 Difference (or Total Runout) is displayed as A. Dimensions B (maximum value) and C (minimum value) can be recalled from memory with a simple key sequence.



Technical Data

Display:	LCD, 8.5 mm character height
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited (measurement by scanning can not be performed)
Stem dia:	8 mm
Standard contact point:	901312
Battery:	SR44 (1 pc.) 938882
Battery life:	Approx. 20,000 hours under normal use
Dust/water protection level:	IP42

Functions

Origin-set (Zeraset), Counting direction switching, Power ON/OFF, Data output, inch/mm reading
 Alarm: Low voltage, Counting value composition error

Optional Accessories

905338:	SPC data cable (1 m) £32.90
905409:	SPC data cable (2 m) £36.80
02AZD790F:	SPC data cable for U-WAVE-T (160 mm) £52.20
02AZE140F:	SPC data cable for U-WAVE-T and footswitch (160/500 mm) £107.00
264-504-5E:	Digimatic Mini-Processor DP-1VR £342.00
903424:	Plunger lifting lever £3.40
540774:	Plunger lifting cable (stroke: 25.4 mm) £20.50
02ACB610:	Post-type back £14.10
02ACB630:	Adjustable back £14.10
02ACB640:	Offset-lug back £14.10
02ACB650:	Magnetic back £26.30
02ACB670:	Screw-mount back £14.10
02ACB680:	Adjustable-bracket back £41.60

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Measuring stands (refer to pages F-70 to F-73 for details)

SERIES 543 – ABSOLUTE Digimatic Economical Indicator ID-S

- Cost-effective and user-friendly type which is equipped with the basic functions necessary.
- Dust/water protection level: IP42
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on. It also realizes high reliability by eliminating over-speed errors.
- Battery life of 20,000 hours in continuous use has been achieved.
- Easy-to-read large LCD readout with a character height of 8.5 mm.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE

IP42



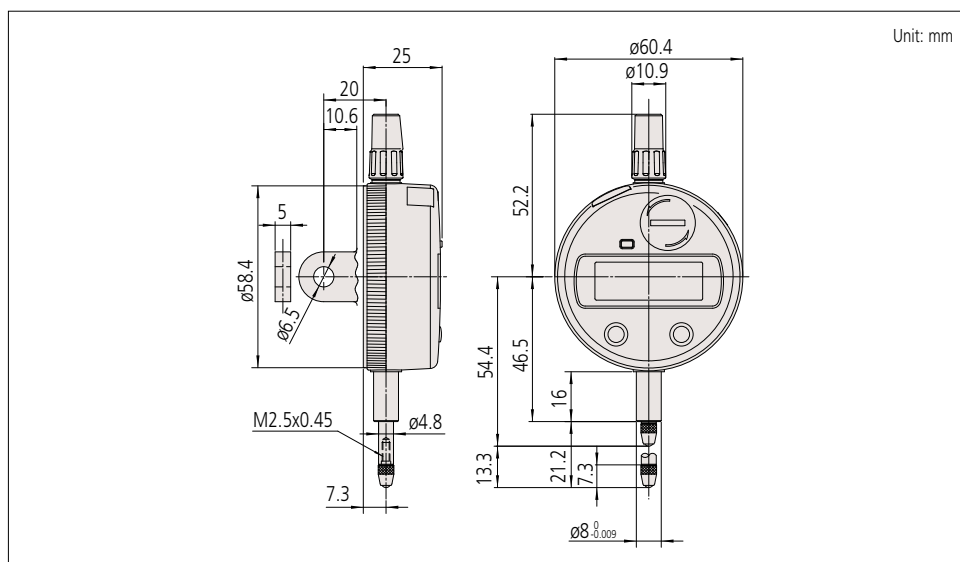
543-782

SPECIFICATIONS

Inch/Metric					
Code No.	Range	Resolution	Accuracy	Measuring force	Price
543-782	.5" / 12.7 mm	.00005" / 0.001 mm	.0008" / 0.02 mm	2.0N or less	£102.00

* Quantizing error of ± 1 count is excluded.

DIMENSIONS



Digimatic Indicators

SERIES 543 – ABSOLUTE Digimatic Slim Body Economical Indicator ID-U

- General purpose indicator with the measuring range of 25.4 mm / 1".
- Cost-effective and user-friendly type which is equipped with the basic functions necessary.
- The ABSOLUTE sensor restores the last origin position automatically when the indicator is turned on, and realizes high reliability by eliminating over-speed errors.
- Battery life of 20,000 hours in continuous use has been achieved.
- Easy-to-read large LCD readout with a character height of 8 mm.
- Equipped with a data output port that enables incorporation into measurement networking and statistical process control systems.

ABSOLUTE

IP42



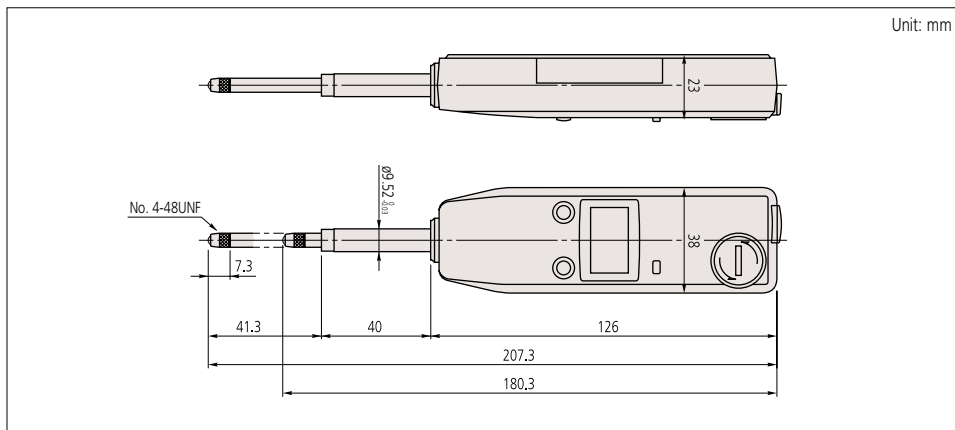
575-123

SPECIFICATIONS

Inch/Metric					
Code No.	Range	Resolution	Accuracy*	Measuring force	Price
575-123	1" / 25.4 mm	.0005" / 0.01 mm	.0008" / 0.02 mm	1.8N or less	£137.00

* Quantizing error of ±1 count is excluded.

DIMENSIONS



Technical Data

Display:	LCD, 8.5 mm character height
Scale type:	ABSOLUTE electrostatic linear encoder
Max. response speed:	Unlimited (measurement by scanning can not be performed)
Stem dia:	3/8"
Standard contact point:	21BZB005
Battery:	SR44 (1 pc.) 938882
Battery life:	Approx. 20,000 hours under normal use
Lifting lever:	137693
Dust/water protection level:	IP42

Functions

Origin-set (Zeroset), Counting direction switching, Power ON/OFF, Data output, inch/mm reading
Alarm: Low voltage, Counting value composition error

Optional Accessories

- 905338:** SPC data cable (1 m) **£32.90**
- 905409:** SPC data cable (2 m) **£36.80**
- 02AZD790F:** SPC data cable for U-WAVE-T (160 mm) **£52.20**
- 02AZE140F:** SPC data cable for U-WAVE-T and footswitch (160/500 mm) **£107.00**
- 264-504-5E:** Digimatic Mini-Processor DP-1VR **£342.00**
- 540774:** Plunger lifting cable (stroke: 10 mm) **£20.50**

Contact points for Mitutoyo's dial indicators (refer to pages F-37 to F-40 for details)

Measuring stands (refer to pages F-70 to F-73 for details)



Application example

SERIES 542 – EC Counter, Low-Cost Modular Display Unit

Technical Data

Functions: Preset, GO/±NG judgement
 Output (selectable) Tolerance judgement: -NG, OK, +NG (open collector)
 Data: Digimatic code
 External control signal input: Preset, data hold
 Power supply: Via AC adapter

Optional Accessories

936937: SPC data cable (1 m)
£32.90
 965014: SPC data cable (2 m)
£39.10
 214938: DC plug PJ-2
£3.80
 C162-155: I/O cable
£39.10

- 3 steps of limit setting value can be displayed.
- Can be set to produce either tolerance judgement output or Digimatic output.
- Small size (96 x 48 mm) which conforms to DIN standards.



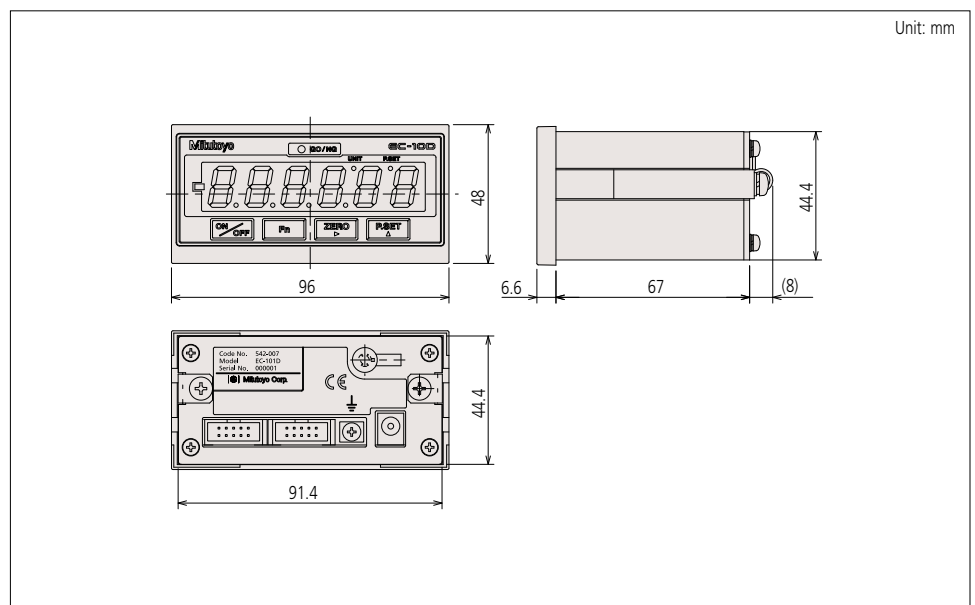
542-007E



SPECIFICATIONS

Code No.	542-007E
Applicable input	Digimatic code (SPC)
Number of gauge inputs	1
Resolution	0.01, 0.001 mm (automatically set depending on the gauge)
Display	6-digit and a negative [-] sign LED (amber, green, red)
Price	£216.00

DIMENSIONS



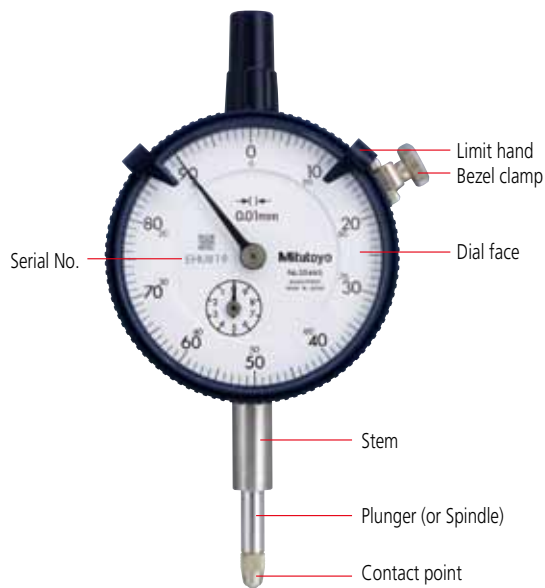
Dial Indicators

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 dial faces, measuring ranges, graduation styles and environmental resistance ratings. The stems, which ensure the fixture reliability, and the plungers, 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 resolution dial indicators employ a sector gear made of a special alloy in order to further increase the resistance to wear.

F- and S-type dial indicators employ an O-ring to ensure air tightness between the outer frame and the crystal case in order to prevent water or oil penetration.

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

Parts of a dial indicator



Feature icons

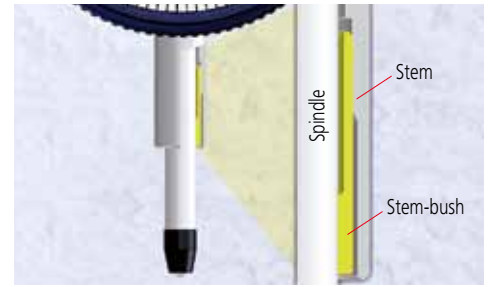
Icon	Feature description
	Reverse reading type. Suitable for depth and step measurement.
	One revolution type for easy and error-free reading.
	Double scale spacing type, easy-on-the-eyes.
	Shockproof type.
	Waterproof type (IP63).
	Waterproof type (IP64).
	With damper at lowest rest point.
	Jewelled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

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

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 outer frame. Easier reading is due to the improved shape of the crystal face.



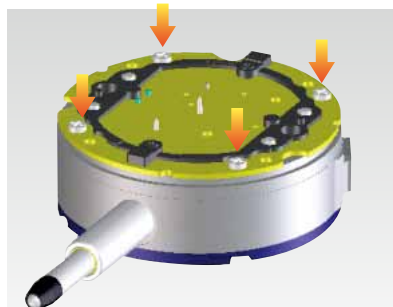
- Revolutionary stem-bush design for trouble-free stem clamping (longer clamping range; maximum tightening torque at the clamping point with M5 screw: 150N-cm).



- The plunger 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 markers (1) can be moved without interfering with the clamp (2).

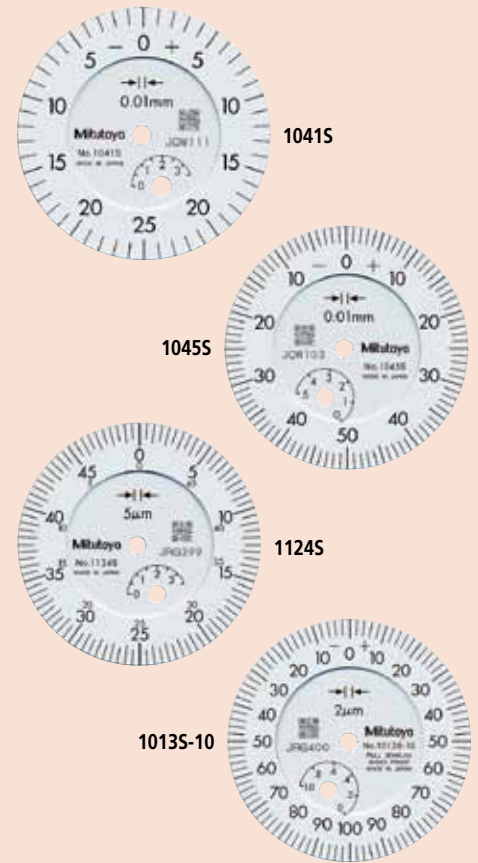


- Greater rigidity in the bearing plate for reduced retrace error (20%) and 4-screw mounting for increased impact resistance.

Dial Indicators

SERIES 1 – Compact Dial Indicators

- Compact dial indicators with outer bezel diameters of 31, 36 and 40 mm for restricted-space applications in gauging fixtures.



SPECIFICATIONS

Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
1013S-10	0.002 mm	1 mm (0.2 mm)	6 µm	2.5 µm	2.5 µm	5 µm	1 µm	0-100-0	1.5 N or less	£90.00
1040S	0.01 mm	3.5 mm (0.5 mm)	13 µm	4 µm	8 µm	11 µm	3 µm	±0-50	1.4 N or less	£60.00
1041S	0.01 mm							0-25-0		£60.00
1044S	0.01 mm	5 mm (1 mm)	13 µm	4 µm	8 µm	11 µm	3 µm	±0-100	0.4 N or less*	£42.00
1044S-15	0.01 mm							±0-100		£58.00
1044S-60	0.01 mm							±0-100		£70.00
1045S	0.01 mm							0-50-0		£46.00
1124S	0.005 mm	3.5 mm (0.5 mm)	12 µm	3.5 µm	6 µm	10 µm	1 µm	±0-50	1.4 N or less	£70.00

* Use in a vertical position only (contact point downward).

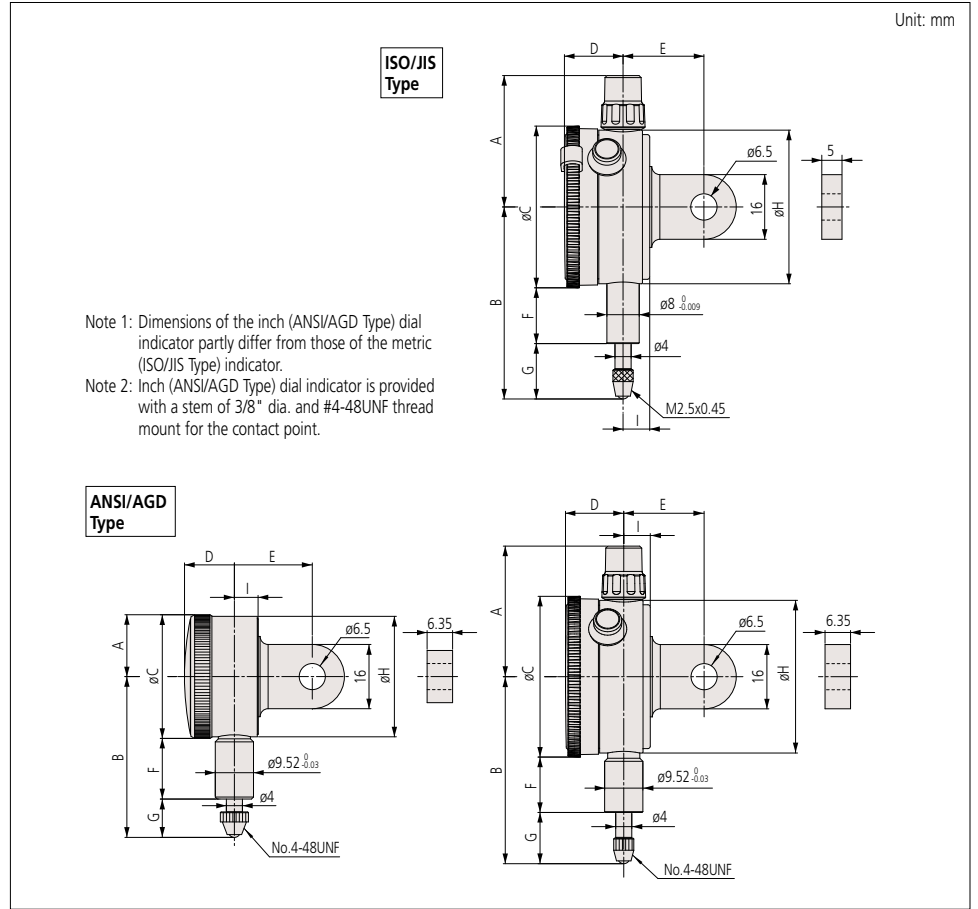
Inch										
Code No.	Graduation	Range (range/rev)	Accuracy		Repeat-ability	Scale	Measuring force	Price		
			First 1 rev / 2.5 rev / 10 rev	Retrace						
1923B* ²	.0005"	.05" (.02")	±.0005" / ±.005" / —	.0016"	±.0001"	0-10-0	1.8 N or less	£77.80		
1925-10	.0001"	.025" (.01")	±.0002" / ±.0002" / —	.0001"	±.00003"	0-5-0		£88.90		
1410S	.001"	.25" (.1")	±.001" / ±.001" / —	.0002"	±.0002"	0-100	1.4 N or less	£61.50		
1411S						0-50-0		£61.50		
1410S-10						0-100		£75.00		
1780S						0-50		£61.50		
1781S	.0005"	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-25-0	1.4 N or less	£61.50		
1506S						0-50		£63.40		
1507S						0-25-0		£63.40		
1670S	.0001"	.1" (.04")	±.0001" / ±.0001" / —	.0001"	±.00003"	0-40	1.5 N or less	£61.50		
1671S						0-20-0		£61.50		
1802S-10	.0001"	.025" (.01")	±.0001" / ±.0001" / —	.0001"	±.00003"	0-10	1.5 N or less	£86.60		
1803S-10						0-5-0		£86.60		

*² Flat-back type.

FEATURES

Metric				
Code No.				
1013S-10	—	✓	—	—
1040S	✓	—	—	—
1041S	✓	—	—	—
1044S	—	—	—	—
1044S-15	—	✓	—	—
1044S-60	—	—	✓	—
1045S	—	—	—	—
1124S	—	—	—	—
Inch				
Code No.				
1923B	—	—	—	—
1925-10	—	✓	—	—
1410S	—	—	—	—
1411S	—	—	—	—
1410S-10	—	✓	—	—
1780S	—	—	—	—
1781S	—	—	—	—
1506S	—	—	—	—
1507S	—	—	—	—
1670S	—	—	—	—
1671S	—	—	—	—
1802S-10	—	✓	—	✓
1803S-10	—	✓	—	✓

DIMENSIONS



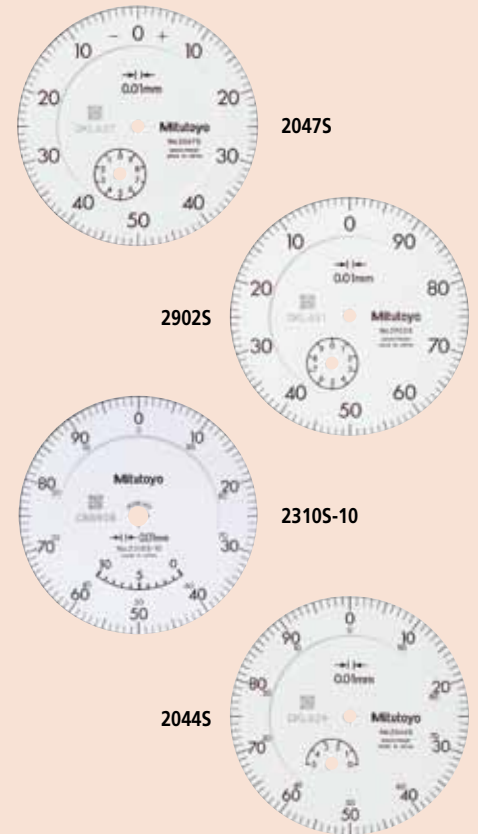
Code No.	A	B	C	D	E	F	G	H	I
ISO/JIS type									
1013S-10	32.5	49	40	14.5	20	13.8	15.2	38	6.6
1040S	32.5	46	40	14.5	20	13.8	12.2	38	6.6
1041S	32.5	46	40	14.5	20	13.8	12.2	38	6.6
1044S	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1044S-15*	32.5	47.5	40	14.5	20	13.8	13.7	38	6.6
1044S-60	32.5	57	40	14.5	20	12.2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

Code No.	A	B	C	D	E	F	G	H	I
ANSI/AGD type									
1923	15.5	38.3	31	12.5	19	15	7.8	30	7
1925-10	15.5	37.5	31	12.5	19	15	7	30	7
1410S	32.5	47.6	40	14.5	19	12.8	14.8	38	6.6
1411S	32.5	47.6	40	14.5	19	12.8	14.8	38	6.6
1410S-10	32.5	47.6	40	14.5	19	12.8	14.8	38	6.6
1780S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1781S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1506S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1507S	32.5	44.1	40	14.5	19	12.8	11.3	38	6.6
1670S	32.5	43.4	40	14.5	19	12.8	10.6	38	6.6
1671S	32.5	43.4	40	14.5	19	12.8	10.6	38	6.6
1802S-10	32.5	41.3	40	14.5	19	12.5	8.5	38	6.6
1803S-10	32.5	41.3	40	14.5	19	12.5	8.5	38	6.6

Dial Indicators

SERIES 2 – 0.01 mm Graduation Dial Indicators

- Standard 0.01 mm graduation dial gauges 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.
- Secure adhesion between the bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The stem and plunger 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 it highly resistant to scratching and chemical attack.



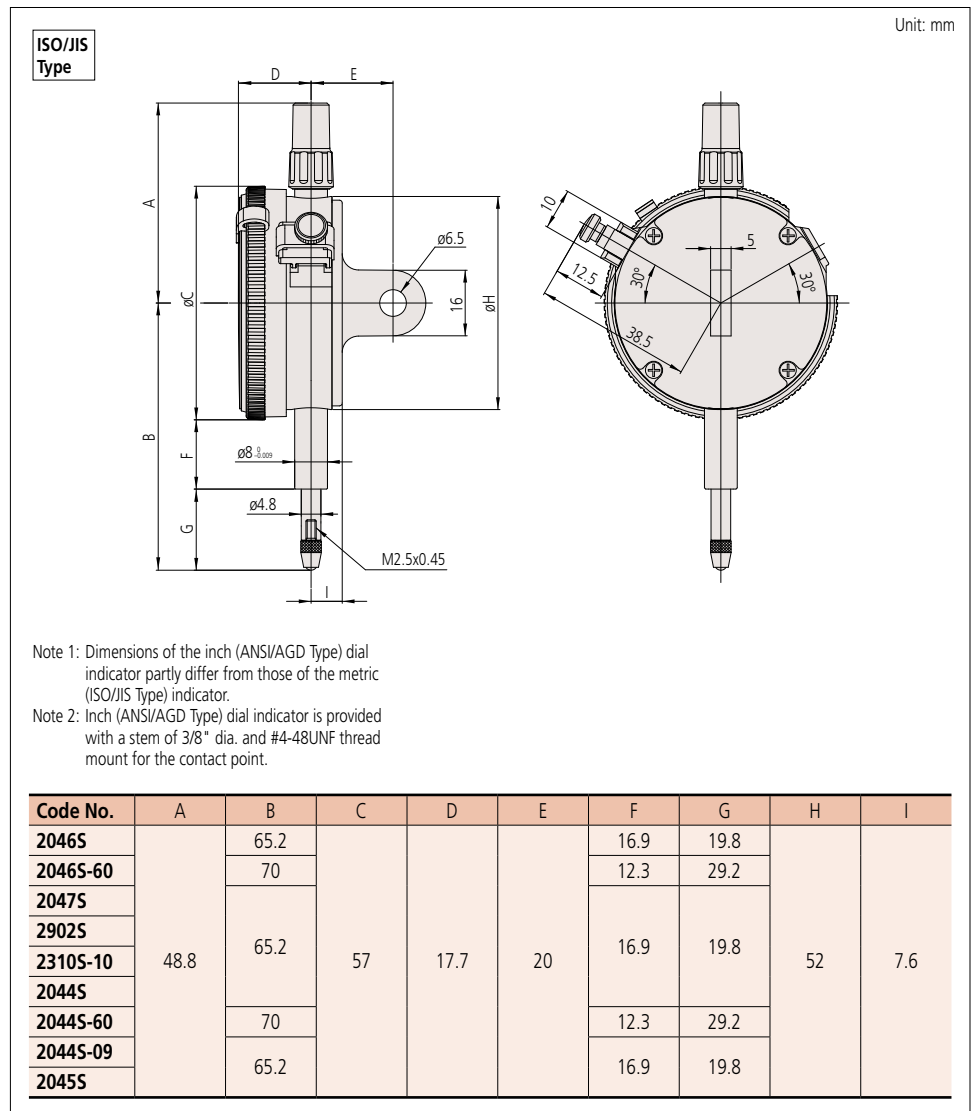
SPECIFICATIONS

Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
2046S	0.01 mm	10 mm (1 mm)	13 µm	3 µm	5 µm	10 µm	3 µm	±0-100	1.4 N or less	£31.60
2046S-60								2.5 N or less	£78.00	
2047S								0-50-0	£46.00	
2902S			100-0					£48.00		
2310S-10			1.4 N or less					£49.00		
2044S			£44.00							
2044S-60		5 mm (1 mm)	12 µm	3 µm	5 µm	10 µm	3 µm	±0-100	2.5 N or less	£70.00
2044S-09								1.4 N or less	£45.50	
2045S								13 µm	£45.50	
								12 µm	£45.00	

FEATURES

Metric					
Code No.					
2046S	—	—	—	—	—
2046S-60	—	✓	—	—	—
2047S	—	—	—	—	—
2902S	—	—	—	—	✓
2310S-10	—	—	✓	✓	—
2044S	—	—	—	—	—
2044S-60	—	✓	—	—	—
2044S-09	✓	—	—	—	—
2045S	—	—	—	—	—

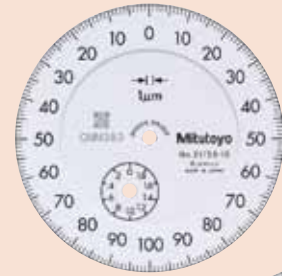
DIMENSIONS



Dial Indicators

SERIES 2 – 0.001 mm and 0.005 mm Graduation Dial Indicators

- 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 outer 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.
- Secure adhesion between the bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- The plunger is made of high-strength quench hardened stainless steel which resists arduous use.
- A carbide contact point is used.
- A special alloy is used for the sector gears to provide improved wear resistance.
- The indicator uses jewelled bearings, providing excellent indication sensitivity and durability.
- Application of a hard coating on the surface of the crystal makes it highly resistant to scratching and chemical attack.



2113S-10



2124S-10



2110S-10



2109S-10



2119S-10

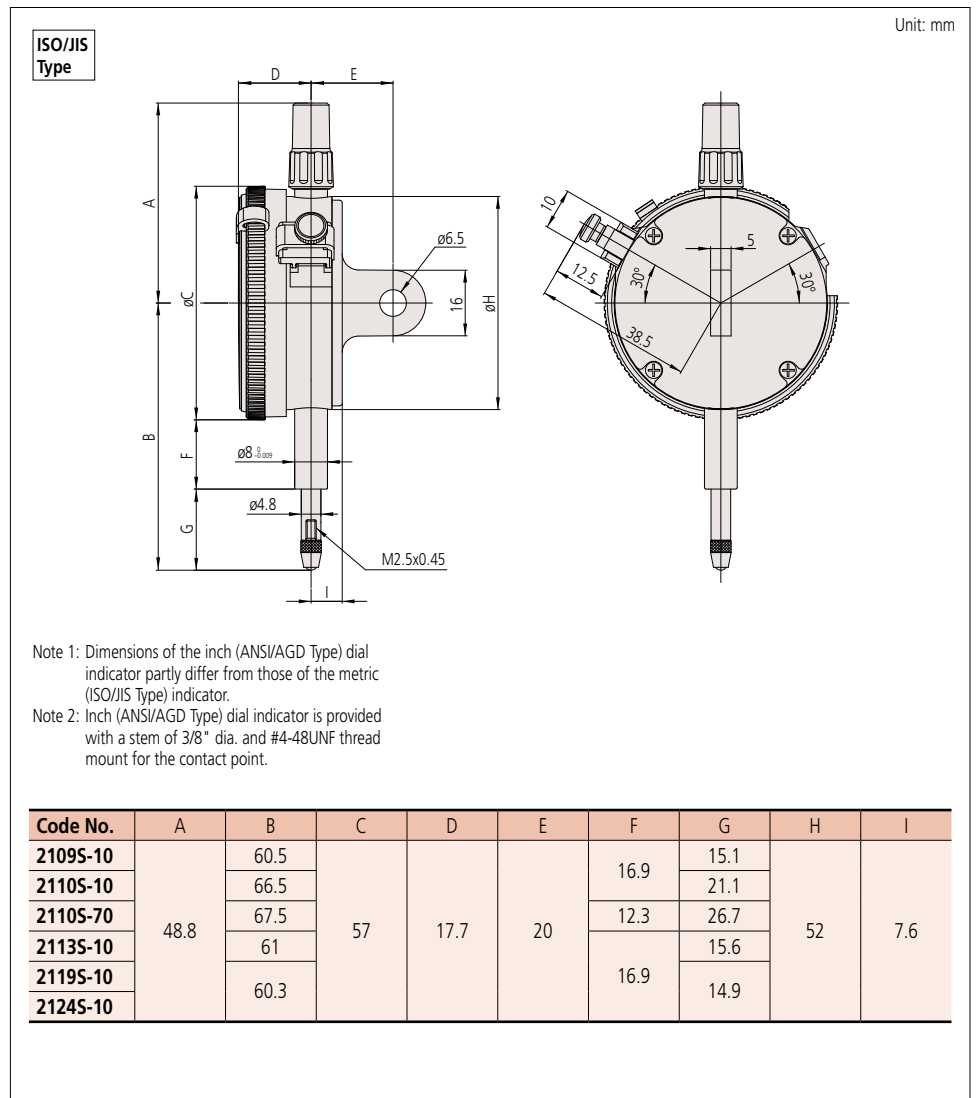
SPECIFICATIONS

Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
2109S-10	0.001 mm	1 mm (0.2 mm)	5 μ m	2 μ m	2 μ m	4 μ m	0.5 μ m	0-100-0	1.5 N or less	£67.50
2110S-10		1 mm (0.1 mm)						±0-100		£82.80
2110S-70		2 mm (0.2 mm)	7 μ m	5 μ m	0-100-0	2.0 N or less	£106.00			
2113S-10		2 mm (0.2 mm)	7 μ m	5 μ m	0-100-0	1.5 N or less	£74.80			
2119S-10		5 mm (0.2 mm)	10 μ m	3 μ m	3.5 μ m	6 μ m	1 μ m	1.5 N or less	£92.90	
2124S-10	0.005 mm	5 mm (0.5 mm)	12 μ m	3 μ m	5 μ m	9 μ m	3 μ m	±0-50	1.5 N or less	£64.00

FEATURES

Metric				
Code No.				
2109S-10	✓	—	✓	—
2110S-10	✓	—	✓	✓
2110S-70	✓	✓	✓	✓
2113S-10	✓	—	✓	—
2119S-10	—	—	✓	—
2124S-10	—	—	✓	—

DIMENSIONS



Dial Indicators

SERIES 2 – Inch Reading Dial Indicators

- Standard .0001" to 0.001" graduation dial indicators having a bezel with an outside diameter of 57 mm.
- The outer 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.
- Secure adhesion between the bezel and crystal as well as the use of an O-ring prevents water or oil penetration.
- A carbide contact point is used.
- The stem and plunger are made of high-strength quench-hardened stainless steel which resists arduous use.
- A special alloy is used for the sector gears to provide improved wear resistance.
- The indicator uses jewelled bearings, providing excellent indication sensitivity and durability.
- Application of a hard coating on the surface of the crystal makes it highly resistant to scratching and chemical attack.



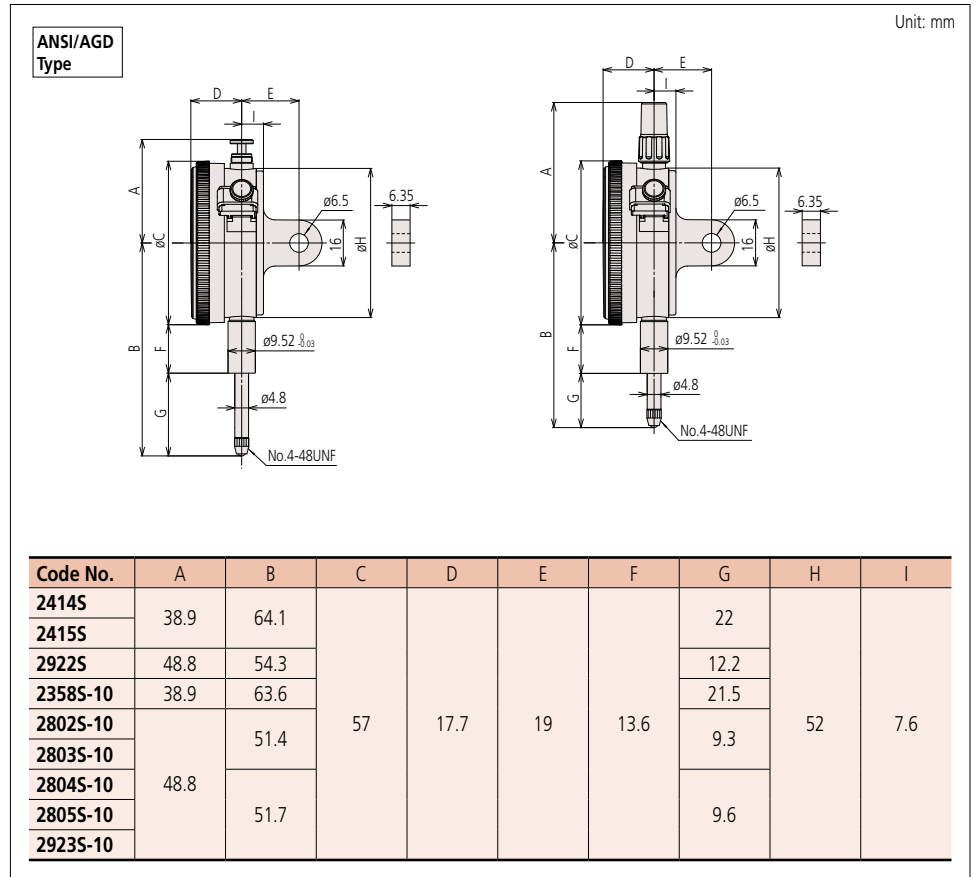
FEATURES

Inch		
Code No.		
2414S	—	—
2415S	—	—
2922S	—	—
2358S-10	—	✓
2802S-10	✓	✓
2803S-10	✓	✓
2804S-10	✓	✓
2805S-10	✓	✓
2932S-10	✓	✓

SPECIFICATIONS

Inch								
Code No.	Graduation	Range (range/rev)	Accuracy		Repeat-ability	Scale	Measuring force	Price
			First 1 rev / 2.5 rev / 10 rev	Retrace				
2414S	.001"	.5" (.1")	±.001" / ±.001" / ±.001"	.0002"	±.0002"	±0-100	1.8 N or less	£59.30
2415S						0-50-0		£59.30
2922S	.0005"	.125" (.05")	±.0005" / ±.0005" / —	.00016"	±.0001"	0-25-0		£57.00
2358S-10	.0001"	.5" (.01")	±.0002" / .0002" / ±.0003" ±.0004" (first 20 rev) / ±.0008" (over 20 rev)	.00015"	±.00003"	0-10	2.0 N or less	£112.00
2802S-10								£92.50
2803S-10		.025" (.01")	±.0001" / ±.0001" / —		0-5-0	£92.50		
2804S-10		.05" (.01")	±.0001" / ±.0001" / ±.0002"	.0001"	0-10	£98.70		
2805S-10					0-5-0	£98.70		
2923S-10						£89.90		

DIMENSIONS



Dial Indicators

SERIES 1 and 2 – One Revolution Dial Indicators

- Mitutoyo's unique shock-proof mechanism is incorporated, providing improved resistance to shock due to sudden plunger 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 gauges are also available. (Refer to page F-36 for details.)

2970 Series:

- Excellent water- and drip-proof characteristics (IP43).
- Smooth movement thanks to the improved design of bush and stem.
- Application of a hard coating on the surface of the crystal makes it highly resistant to scratching and chemical attack.
- Lightweight (75 g).



2972



2901S-10



2929S

SPECIFICATIONS

Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
Series 1										
1929S	0.01 mm	1 mm (1.4 mm)	11 μm	4 μm	7 μm	—	3 μm	50-0-50	1.4 N or less	£65.00
Series 2										
2929S	0.01 mm	0.8 mm (1 mm)	8 μm	3 μm	5 μm	—	3 μm	40-0-40	1.4 N or less	£65.00
2929S-62									2.0 N or less	£92.00
2900S-10	0.001 mm	0.08 mm (0.1 mm)	3 μm	2 μm	2 μm	—	0.5 μm	80-0-80	1.4 N or less	£93.00
2900S-72									2.0 N or less	£99.10
2901S-10									0.16 mm (0.2 mm)	4 μm
2971	0.01 mm	0.5 mm (0.7 mm)	8 μm	3 μm	5 μm	—	3 μm	25-0-25	1.4 N or less	£36.80
2972									1 mm (1.4 mm)	8 μm

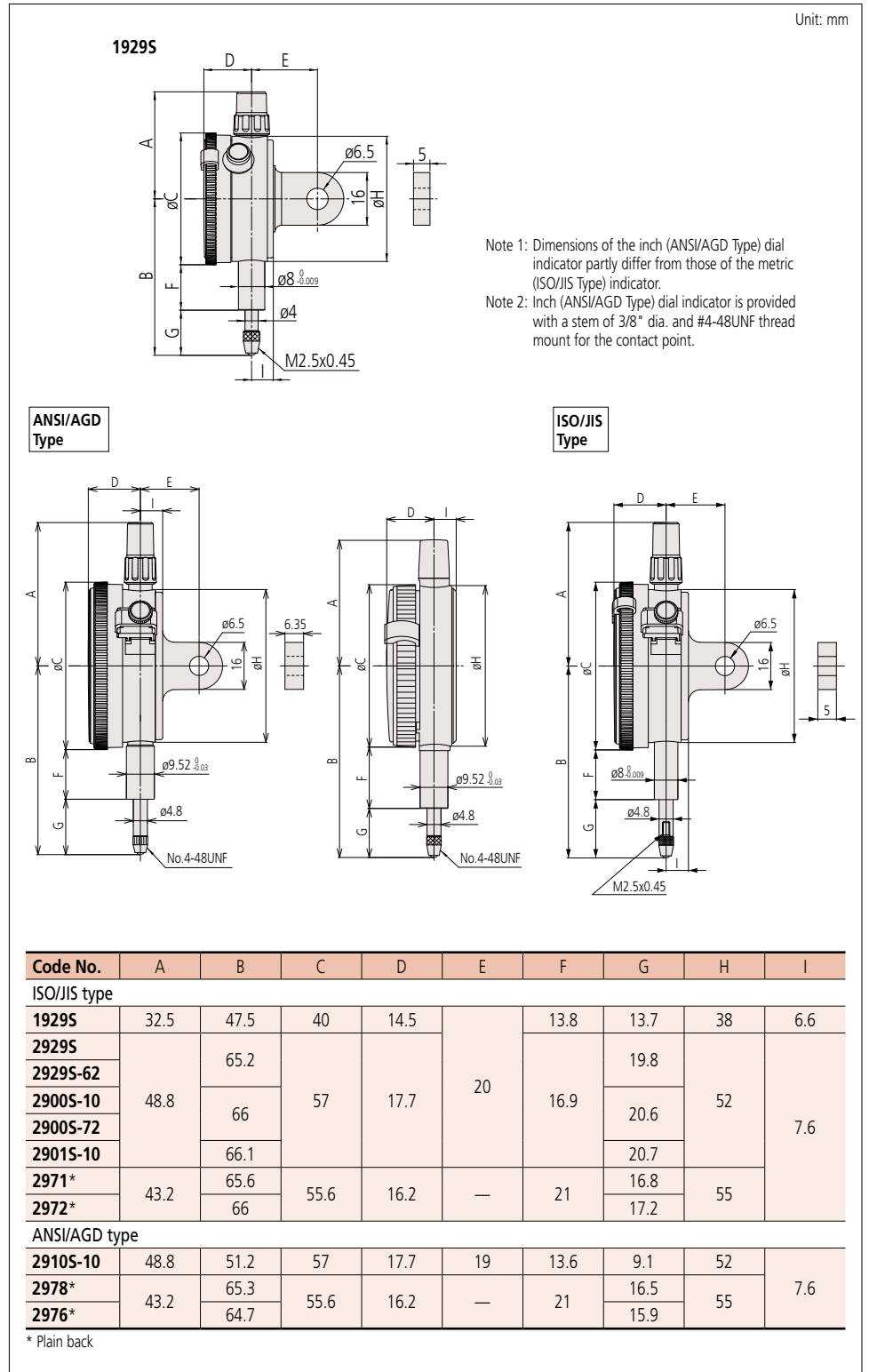
Inch										
Code No.	Graduation	Range (range/rev)	Accuracy			Repeat-ability	Scale	Measuring force	Price	
			First 1 rev / 2.5 rev / 10 rev	Retrace						
Series 2										
2910S-10	.0001"	.008" (.01")	±.0001" / — / —			.0001"	±.00003"	4-0-4	1.8 N or less	£83.30
2978	.001"	.06" (.079")	±.001" / — / —			.0002"	±.0002"	30-0-30	1.4 N or less	£34.70
2976	.0005"	.02" (.028")	±.0005" / — / —			.00016"	±.0001"	10-0-10	1.4 N or less	£36.80

FEATURES

Metric			
Code No.			
1929S	✓	—	—
2929S	✓	—	—
2929S-62	✓	✓	—
2900S-10	✓	—	✓
2900S-72	✓	✓	✓
2901S-10	✓	—	✓
2971	✓	✓	—
2972	✓	✓	—

Inch			
Code No.			
2910S-10	✓	—	✓
2978	✓	✓	—
2976	✓	✓	—

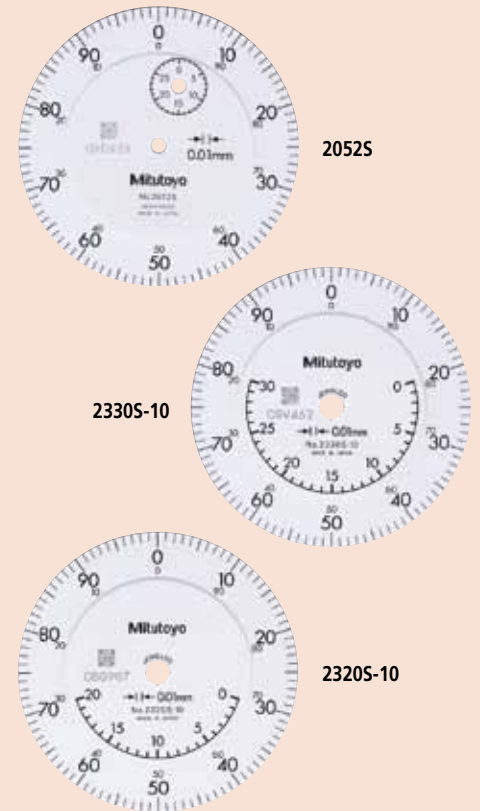
DIMENSIONS



Dial Indicators

SERIES 2 – Long Stroke Dial Indicators

- Long stroke dial indicators with a $\varnothing 57$ mm outer frame. All models are equipped with limit markers and a bezel clamp as standard.
- An O-ring is employed to ensure air-tightness between the outer frame and the crystal case to prevent water or oil penetration.
- Both the stem and the plunger are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- A carbide-tipped 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 it highly resistant to scratching and chemical attack.
- 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.



SPECIFICATIONS

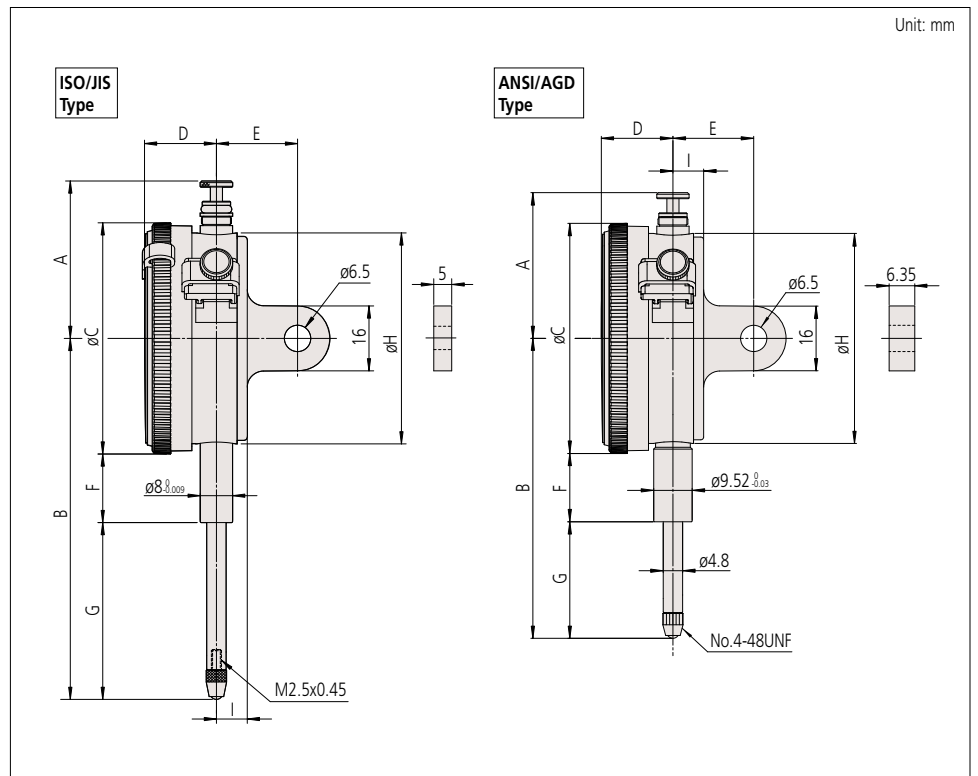
Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
2050S	0.01 mm	20 mm (1 mm)	20 μ m	5 μ m	8 μ m	15 μ m	4 μ m	$\pm 0-100$	2.0 N or less	£61.00
2320S-10										£61.00
2052S		30 mm (1 mm)	25 μ m	7 μ m	10 μ m	15 μ m	5 μ m	$\pm 0-100$	2.5 N or less	£74.60
2330S-10										£80.00
Inch										
Code No.	Graduation	Range (range/rev)	Accuracy		Repeat-ability	Scale	Measuring force	Price		
			First 1 rev / 2.5 rev / 10 rev	Retrace						
2416S	.001"	1" (.1")	$\pm .001$ " / $\pm .001$ " / $\pm .002$ "	.0002"	$\pm .0002$ "	$\pm 0-100$	1.8 N or less	£59.30		
2416S-10								£70.30		
2417S								0-50-0	£59.30	
2424S-19	.0005"	2" (.1")	$\pm .001$ " / $\pm .001$ " / $\pm .002$ " / $\pm .003$ " (first 20 rev)	.00033"	$\pm 0-100$	2.5 N or less	£110.00			
2776S							£68.00			
2904S							£61.50			

FEATURES

Metric					
Code No.					
2050S	—	✓	—	—	—
2320S-10	—	✓	✓	✓	—
2052S	—	✓	—	—	—
2330S-10	—	✓	✓	✓	—

Inch					
Code No.					
2416S	—	—	—	—	—
2416S-10	—	—	✓	—	—
2417S	—	—	—	—	—
2424S-19	✓	—	✓	✓	—
2776S	—	—	—	—	—
2904S	—	—	—	—	✓

DIMENSIONS



Code No.	A	B	C	D	E	F	G	H	I
ISO/JIS type									
2050S	38.8	75.2	57	17.7	20	16.9	29.8	52	7.6
2320S-10									
2052S		88.7							
2330S-10									
ANSI/AGD type									
2416S	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6
2416S-10									
2417S					20.9	54.3	59.7		9.5
2424S-19									
2776S	38.9	76.8	57	17.7	19	13.6	34.7	52	7.6
2904S									

Dial Indicators

SERIES 3 and 4 – Long Stroke Large Dial Indicators

- Dial indicators with a large-diameter dial face for easy reading.
- Models with longer measuring ranges are also available.
- Both the stem and the plunger are made of high-strength quench-hardened stainless steel suitable for heavy-duty use.
- All types are supplied with limit markers and a bezel clamp as standard.
- The bezel clamp and lifting lever (optional)*1 can be attached to either the right or left side. These parts can be easily installed and removed without tools.

*1: Can be attached only to Code No. 3046S, 3047S, 3050S, 3109S-10 and 4046S.



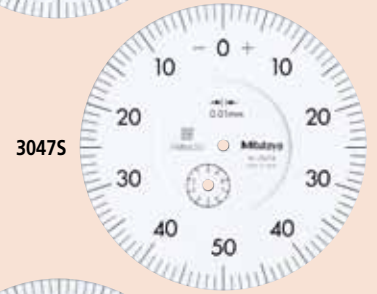
3109S-10



4046S



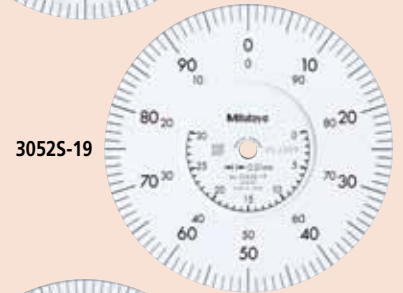
3046S



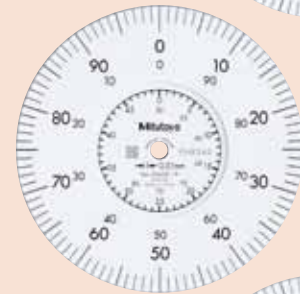
3047S



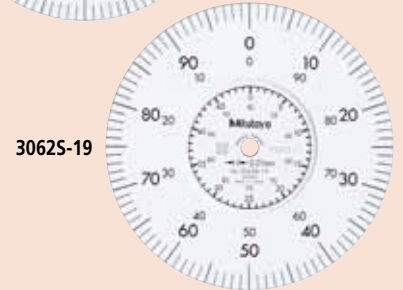
3050S



3052S-19



3060S-19



3062S-19

SPECIFICATIONS

Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
3046S	0.01 mm	10 mm (1 mm)	15 µm	3 µm	5 µm	10 µm	3 µm	±0-100	1.4 N or less	£85.00
3047S							0-50-0	£85.00		
3050S		20 mm (1 mm)	20 µm	5 µm	8 µm	10 µm	4 µm	±0-100	2.0 N or less	£105.00
3052S-19		30 mm (1 mm)	25 µm	7 µm	15 µm		5 µm			2.5 N or less
3058S-19		50 mm (1 mm)	30 µm	8 µm	20 µm	5 µm	±0-100	3.0 N or less	£126.00	
3060S-19*		80 mm (1 mm)	45 µm	9 µm						12 µm
3062S-19*		100 mm (1 mm)	50 µm						£267.00	
3109S-10	0.001 mm	1 mm (0.2 mm)	5 µm	2 µm	2 µm	4 µm	0.5 µm	0-100-0	1.5 N or less	£116.00
4046S	0.01 mm	10 mm (1 mm)	15 µm	3 µm	5 µm	10 µm	3 µm	±0-100	1.4 N or less	£117.00

Inch										
Code No.	Graduation	Range (range/rev)	Accuracy			Repeat-ability	Scale	Measuring force	Price	
			First 1 rev / 2.5 rev / 10 rev	Retrace						
3414S	.001"	.5" (.1")	±.001" / ±.001" / ±.001"		.0002"	±.0002"	±0-100	1.8 N or less	£68.50	
3415S			±.001" / ±.001" / ±.001"						0-50-0	£68.50
3416S			±.001" / ±.001" / ±.002"						±0-100	£84.70
3417S		1" (.1")	±.001" / ±.001" / ±.002"		.00033"	±0-100	3.0 N or less	£84.70		
3424S-19		2" (.1")	±.001" / ±.001" / ±.002" / ±.003" (20 rev)					£95.90		
3426S-19*		3" (.1")	±.001" / ±.001" / ±.002" / ±.003" (20 rev) / ±.005" (over 20 rev)					£158.00		
3428S-19*		4" (.1")	±.001" / ±.001" / ±.002" / ±.003" (20 rev) / ±.005" (over 20 rev)			3.2 N or less	£198.00			
3802S-10	.0001"	.025" (.01")	±.0001" / ±.0001" / —		.0001"	±.00003"	0-10	2.0 N or less	£99.60	
3803S-10			±.0001" / ±.0001" / ±.002" / ±.003" (20 rev) / ±.005" (over 20 rev)					0-5-0	£94.90	
4887S-19*	.001"	3" (.1")	±.001" / ±.001" / ±.002" / ±.003" (20 rev) / ±.005" (over 20 rev)		.00033"	±.0002"	±0-100	3.0 N or less	£158.00	

* Use in a vertical position only.

FEATURES

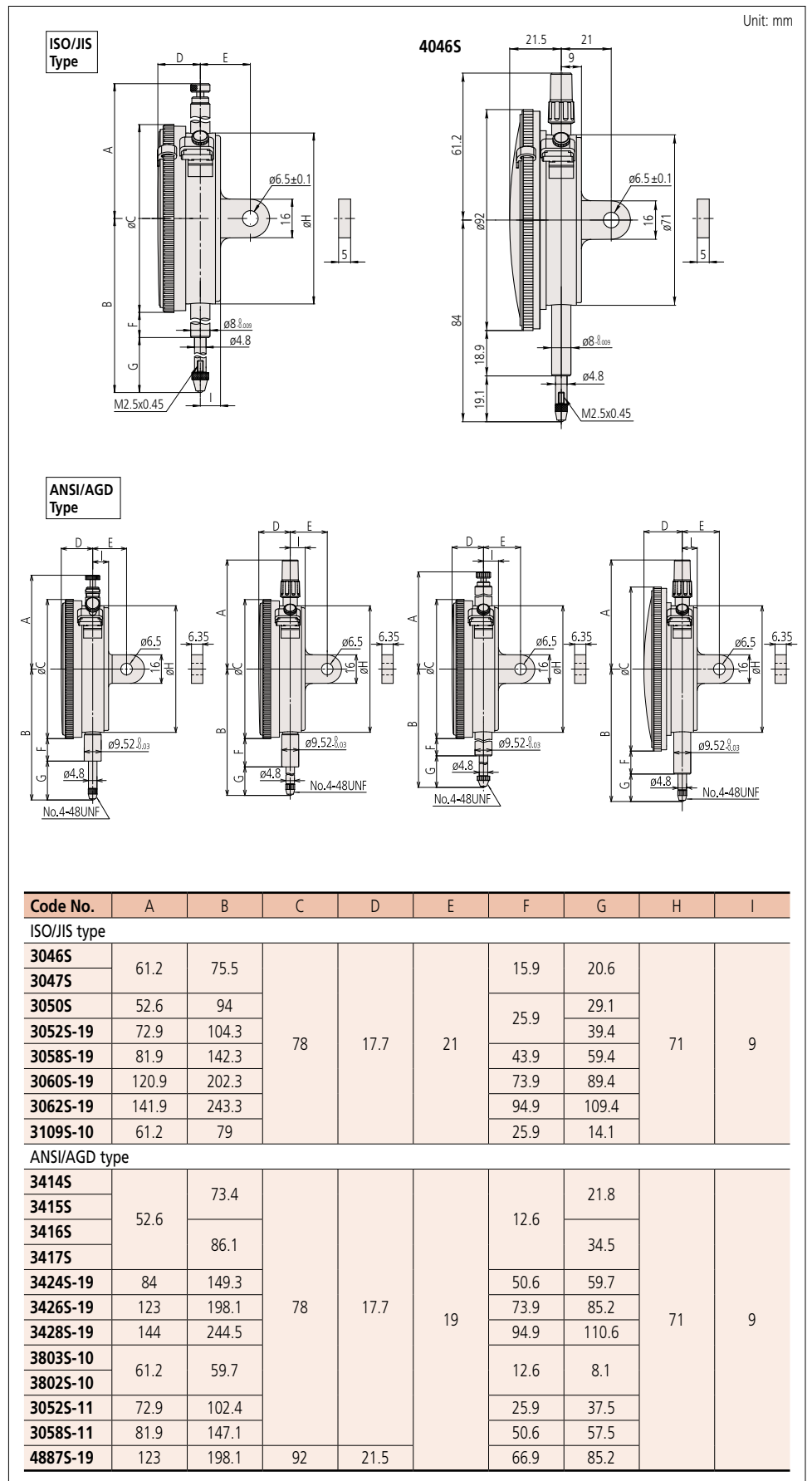
Metric				
Code No.				
3046S	—	—	—	—
3047S	—	—	—	—
3050S	—	✓	—	—
3052S-19	✓	—	✓	✓
3058S-19	✓	—	✓	✓
3060S-19	✓	—	✓	✓
3062S-19	✓	—	✓	✓
3109S-10	✓	—	✓	—
4046S	—	—	—	—

Inch				
Code No.				
3414S	—	—	—	—
3415S	—	—	—	—
3416S	—	—	—	—
3417S	—	—	—	—
3424S-19	✓	—	✓	✓
3426S-19	✓	—	✓	✓
3428S-19	✓	—	✓	✓
3802S-10	✓	—	✓	—
3803S-10	✓	—	✓	—
4887S-19	✓	—	✓	✓



3058S-19

DIMENSIONS



Dial Indicators

SERIES 2 – Special Purpose Dial Indicators



20485-10



20465-80

Adjustable-hand dial gauge

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

Peak-hold dial gauge

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

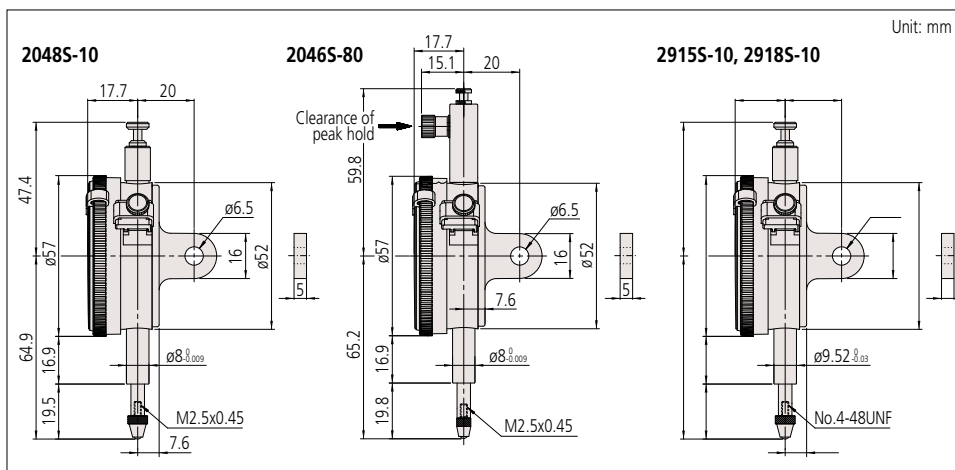
* Clearance of peak hold: push the nut in the direction of the arrow indicated in the dimensions of 20465-80.

SPECIFICATIONS

Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
20485-10	0.01 mm	10 mm (1 mm)	15 μm	3 μm	5 μm	10 μm	3 μm	0-100	1.4 N or less	£56.40
20465-80									5.0 N or less	£80.00

Inch										
Code No.	Graduation	Range (range/rev)	Accuracy		Repeat-ability	Scale	Measuring force	Price		
			First 1 rev / 2.5 rev / 10 rev	Retrace						
29155-10	.001"	.5" (.1")	±.001" / ±.001" / ±.001"		.0002"	±.0002"	0-100	1.8 N or less	£74.40	
29185-10							0-50-0		£74.40	

DIMENSIONS



FEATURES

Metric			
Code No.			
20485-10	✓	—	✓
20465-80	—	✓	—

Inch			
Code No.			
29155-10	✓	—	✓
29185-10	✓	—	✓

SERIES 1 and 2 – Back Plunger Dial Indicators

• Back plunger type dial gauges are suitable for mounting onto levelling machine tool tables or inspection jigs, and for use in situations where standard dial gauges are difficult to read.

• Models 1960 and 2960F, which use Mitutoyo's proprietary shock-proofing mechanism, have excellent durability and shock resistance.



FEATURES

Metric			
Code No.			
1960	✓	✓	✓
1160	✓	—	—
2960F	✓	✓	✓

SPECIFICATIONS

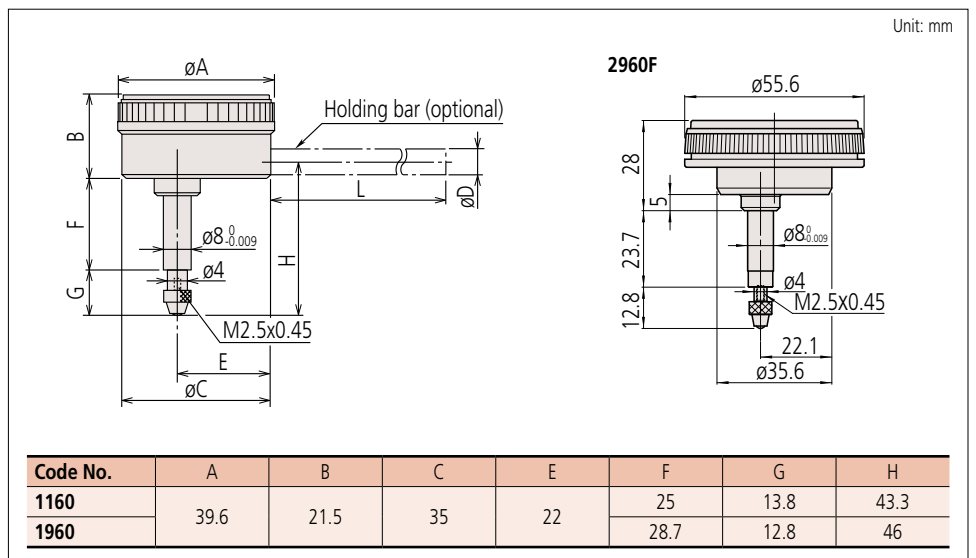
Metric										
Code No.	Graduation	Range (range/rev)	Accuracy				Repeat-ability	Scale	Measuring force	Price
			Overall	Retrace	1/10 rev	1 rev				
1960	0.01 mm	1 mm (1.27 mm)	14 μm	4 μm	8 μm	14 μm	3 μm	50-0-50	1.4 N or less	£90.00
1160		5 mm (1 mm)	16 μm					0-100		£82.00
2960F		1 mm (1.27 mm)	14 μm					50-0-50		£110.00

Holding Bar (optional)

Code No.	øD	L	Price
21AAA166	6 mm	42 mm	£2.16
136567	6 mm	81 mm	£2.20
124625	6.35 mm	81 mm	£2.20
21AAA167	6.35 mm	42 mm	£2.16
21AAA168	8 mm	42 mm	£2.16
136568	8 mm	81 mm	£2.20

Note: øD and L are as in diagram on right.

DIMENSIONS

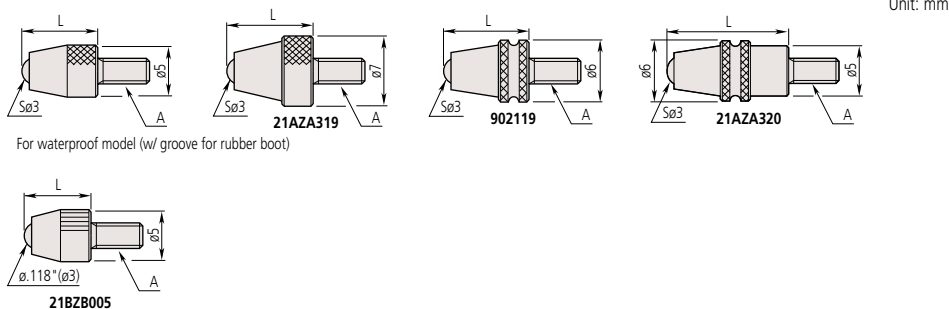


Optional Accessories

Contact Points for Digimatic and Dial Indicators and Linear Gauges

Ball Point

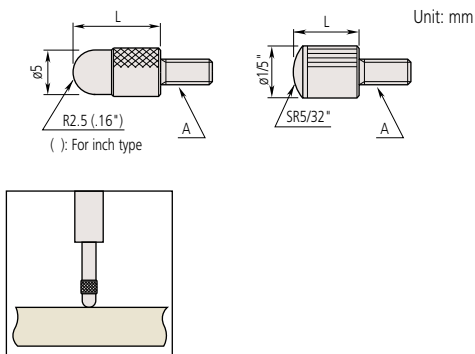
Standard contact point.



Code No.	Material	L	Price
A: M2.5x0.45			
901312	Carbide without groove	7.3	£5.30
120047	Ruby without groove		£10.20
901994	Plastic without groove		£8.70
21AZA319	Carbide without groove	8.3	£2.70
902119	Carbide with groove (waterproof type)		£11.70
21AZA320	Carbide with groove (waterproof type)	12.1	£6.80
21JAA225	Carbide without groove	14	£3.10
120049		15	£16.50
120051		15	£13.40
21JAA224	Carbide without groove	17	£2.70
120053		25	£16.50
120055		25	£13.40
A: 4-48UNF			
21BZB005	Carbide	1/4"	£5.90

Shell Type Point

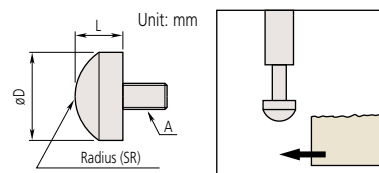
Contact point with a large radius. Optimal for use on flat surfaces.



Code No.	L	Price
A: M2.5x0.45		
101386	5	£4.20
101118	10	£4.20
137393	15	£4.20
101387	20	£4.20
101388	25	£4.20
A: 4-48UNF		
101184	5/32"	£4.20
21AAA031	1/4"	£3.50
101185	1/2"	£4.20
101186	3/4"	£4.20
21AAA034	7/8"	£3.10
101187	1"	£4.20

Spherical Point

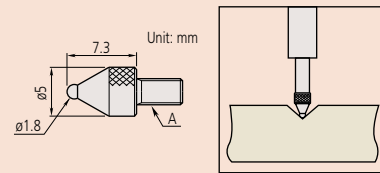
A large radius makes this contact point optimal for use where the workpiece needs to slide from the side.



Code No.	D	L	SR	Price
A: M2.5x0.45				
111460	5.5	3	5	£4.90
125258	7.9	5	5	£4.90
101119	10	5	7	£4.20
A: 4-48UNF				
101205	1/2"	1/8"	.35"	£4.20
101204	3/8"	3/32"	.28"	£4.20

Ball Point

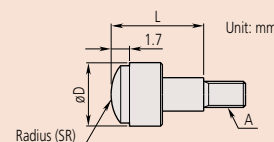
Optimal for workpieces with deep indentations.



Code No.	SøD	Price
A: M2.5x0.45		
21AAA349	1 mm, carbide	£40.30
21AAA350	1.5 mm, carbide	£33.90
101122	1.8 mm, steel	£4.20
21AAA351	2.5 mm, carbide	£33.90
21AAA352	4 mm, carbide	£40.60

Spherical Point (Carbide)

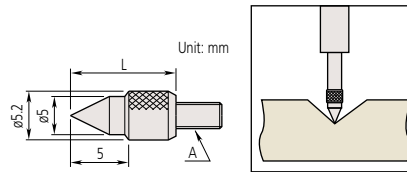
A large radius makes this contact point optimal for use where the workpiece needs to slide from the side.



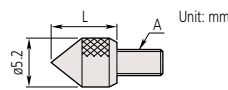
Code No.	D	L	SR	Price
A: M2.5x0.45				
120058	5.2	5	5	£41.00
120059	7.5	10	7	£47.00
120060	10.5	10	10	£56.20

Conical Point

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



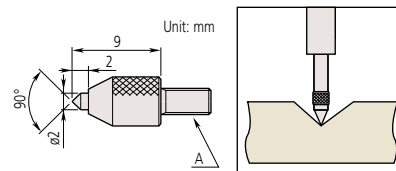
Code No.	Tip angle	L	Price
A: M2.5x0.45			
101120	60°	10	£4.20
A: 4-48UNF			
101190	60°	1/2"	£4.20



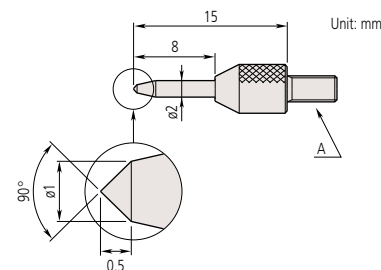
Code No.	Tip angle	L	Price
A: M2.5x0.45			
101385	90°	5	£4.20
A: 4-48UNF			
101191	90°	1/4"	£4.20

Conical Point (Carbide)

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



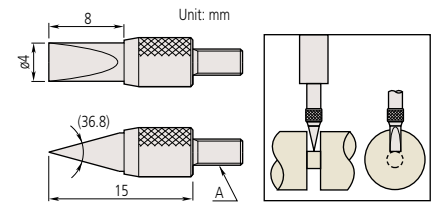
Code No.	Price
A: M2.5x0.45	
120057	£30.10



Code No.	Price
A: M2.5x0.45	
120068	£54.90

Knife Edge Point (Carbide)

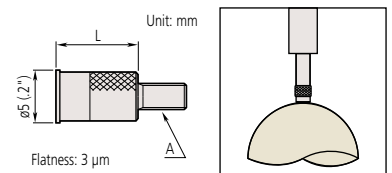
Suitable for measuring narrow groove diameter, etc.



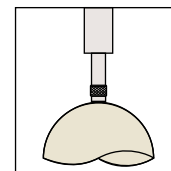
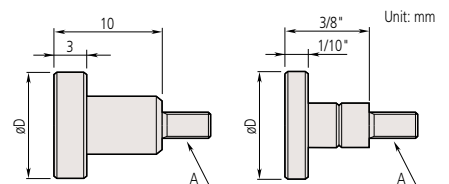
Code No.	Price
A: M2.5x0.45	
120067	£56.20

Flat Point

Optimal for use on convex surfaces.



Code No.	L	Price
A: M2.5x0.45		
131365	8	£6.00
21AAA340	10	£33.10
A: 4-48UNF		
133017	5/16"	£6.00
21AAA043	1/2"	£5.45
21AAA044	3/4"	£6.60
21AAA045	1"	£6.50



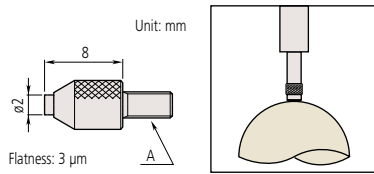
Code No.	D	Price
A: M2.5x0.45		
101117	10	£7.20
21AAA341	15	£33.10
21AAA342	20	£46.70
21AAA343	25	£60.00
21AAA344	30	£66.80
A: 4-48UNF		
101188	1/2"	£7.20
101189	3/8"	£7.20

Optional Accessories

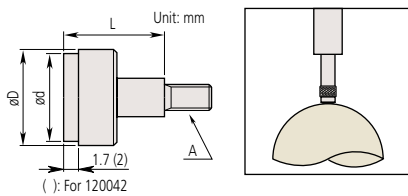
Contact Points for Digimatic and Dial Indicators and Linear Gauges

Flat Point

Optimal for use on convex surfaces.

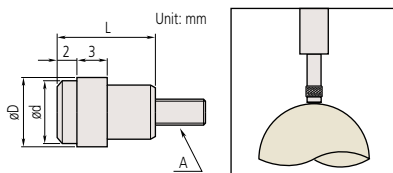


Code No.	Price
A: M2.5x0.45	
120056	£12.40



Code No.	D	d	L	Price
A: M2.5x0.45				
120041	5.2	4.3*	5	£34.10
120042	7	6.5*	10	£37.90
120043	10.5	9.5*	10	£45.70
21AAA345	17	15**	10	£80.00
21AAA346	22	20**	10	£91.50

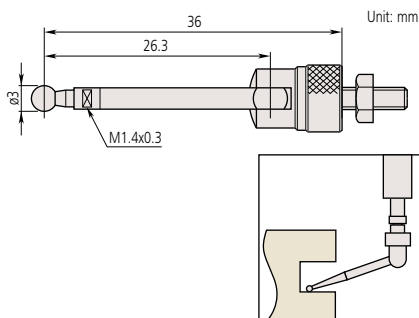
Flatness: *3 µm, **5 µm



Code No.	D	d	L	Price
A: M2.5x0.45				
137255	7	6.4	10	£56.40
137399	9	8	10	£60.10

Lever Point

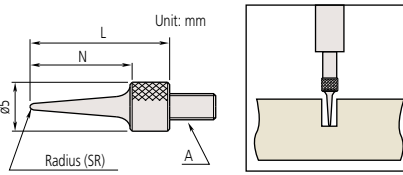
Suitable for use on perpendicular faces, such as those within mould cavities. Lever can be adjusted to the required angle.



Code No.	Price
A: M2.5x0.45	
900391	£11.10
A: 4-48UNF	
900393	£16.50

Needle Point

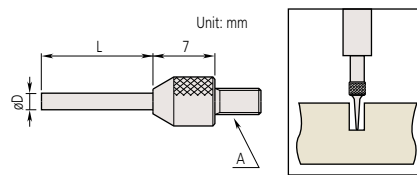
Suitable for probing the bottom of a groove or hole.



Code No.	N	L	SR	Price
A: M2.5x0.45				
101121	11	15	0.4	£4.20
137413	13	17	0.2	£4.20
21AAA255	21	25	0.4	£4.90
21AAA256	31	35	0.4	£6.25
A: 4-48UNF				
21AAA030	.27"	.6"	.016"	£4.40
21AAA046	.52"	1"	.016"	£4.90

Needle Point (Carbide)

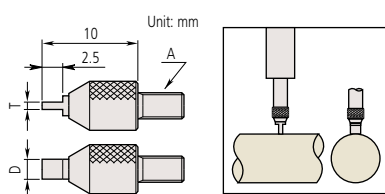
Suitable for probing the bottom of a groove or hole.



Code No.	D	L	Price
A: M2.5x0.45			
120066	0.45	3	£26.40
21AAA329	0.45	5	£105.00
120065	1	3	£19.30
21AAA330	1	5	£74.20
21AAA331	1	8	£77.70
21AAA332	1	10	£84.50
21AAA335	1.5	5	£70.90
21AAA336	1.5	10	£105.00
120064	1.5	13	£20.80
21AAA337	1.5	20	£80.30
21AAA338	1.5	40	£94.50
137257	2	8	£30.60
21AAA257	2	18	£48.20
21AAA258	2	28	£42.00
21AAA339	2	40	£102.00

Blade Point (Carbide)

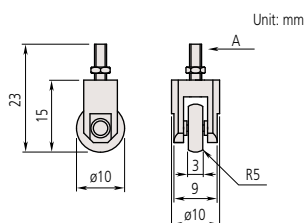
Suitable for use on convex surfaces, especially those with shallow grooves.



Code No.	T	W	Price
A: M2.5x0.45			
120061	0.4	2	£36.90
120062	0.6	2	£36.90
120063	1	4	£43.00

Roller Point

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



Code No.	Price
A: M2.5x0.45	
901954	£30.60
A: 4-48UNF	
901991	£30.60

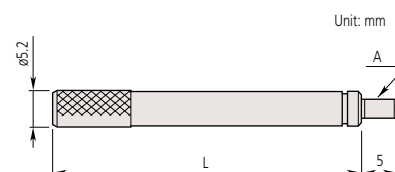
Interchangeable Contact Point Set

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

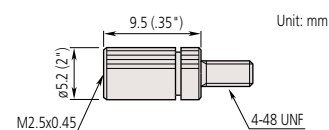


Code No.	Contact points included	Price
A: M2.5x0.45		
7822	Flat point (131365, 05 mm)	£25.70
	Flat point (101117, 010 mm)	
	Needle point (101121)	
	Spherical point (101119)	
	Shell type point (101118)	
	Shell type point (101387)	

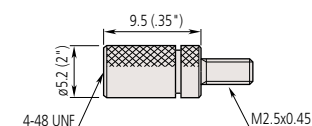
Extension Rod



Code No.	L	Price
A: M2.5x0.45		
303611	10	£0.90
21AAA259A	15	£2.10
303612	20	£2.20
21AAA259B	25	£2.20
303613	30	£2.80
21AAA259C	35	£2.40
21AAA259F	50	£5.60
304146	60	£6.00
21AAA259J	70	£5.10
21AAA259L	75	£6.10
21AAA259M	80	£6.50
304147	90	£9.00
303614	100	£9.40
A: 4-48UNF		
139167	1/2"	£5.60
301655	1"	£2.50
301657	2"	£4.80
301659	4"	£9.40



Code No.	Price
21AAA011	£6.90

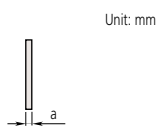


Code No.	Price
21AAA012	£7.70

Optional Accessories

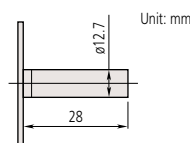
Interchangeable Backs for Digimatic and Dial Indicators

Flat Back



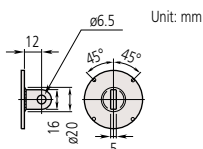
Code No.	Series	Remarks	Price
101211	1 (ø41 mm)	a = 2.2	£1.20
101039	1 (ø41 mm)	a = 2.5	£1.20
192910	2 (ø57 mm)	(F type waterproof model)	£3.10
100836	3, 4 (ø78, 91 mm)	a = 3.0	£1.80

Back with Post



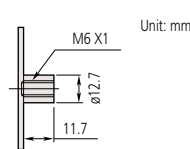
Code No.	Series	Remarks	Price
193172	1 (ø41 mm)	—	£20.30
101169	2 (ø57 mm)	—	£7.20
100839	3, 4 (ø78, 91 mm)	—	£36.60

Lug-On-Centre Back



Code No.	Series	Remarks	Price
101210	1 (ø41 mm)	metric type	£3.60
101040	2 (ø57 mm)	metric type	£3.60
101306	2 (ø57 mm)	inch type	£2.80
100691	3, 4	metric type	£4.80
100797	(ø78, 91 mm)	inch type	£4.80

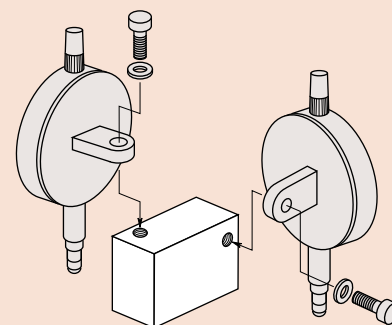
Back with Screw Mount



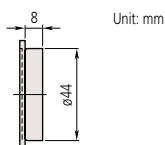
Code No.	Series	Remarks	Price
193173	1 (ø41 mm)	M6x1	£19.90
136023	2 (ø57 mm)	M6x1	£7.20
101170	2 (ø57 mm)	1/4-28UNF	£7.20
136024	3, 4	M6x1	£36.60
100840	(ø78, 91 mm)	1/4-28UNF	£36.60

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 are available for Mitutoyo Digimatic and dial indicators.

Application

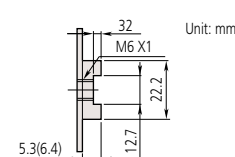


Magnetic Back



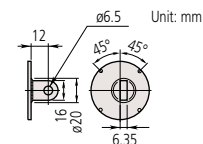
Code No.	Series	Remarks	Price
900928	2 (ø57 mm)	—	£22.80
900929	3, 4 (ø78, 91 mm)	—	£36.60

Flat Back Adjustable Back



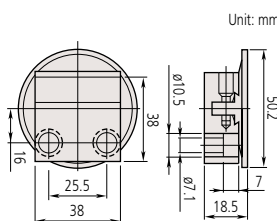
Code No.	Series	Remarks	Price
136025	1 (ø41 mm)	M6x1	£13.30
136026	2 (ø57 mm)	M6x1	£7.20
101168	2 (ø57 mm)	1/4-20UNF	£7.20
136027	3, 4	M6x1	£36.60
100838	(ø78, 91 mm)	1/4-20UNF	£36.60

Back with Offset Lug



Code No.	Series	Remarks	Price
101167	2 (ø57 mm)	—	£7.20
100837	3, 4 (ø78, 91 mm)	—	£36.60

Back with Adjustable Bracket



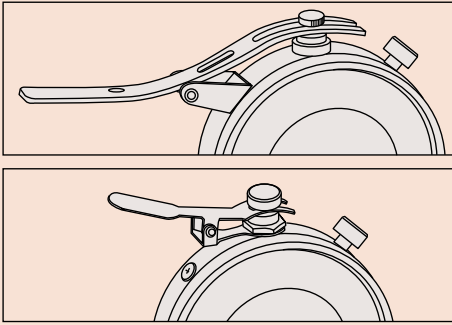
Code No.	Series	Remarks	Price
901963	2 (ø57 mm)	—	£43.00

Plunger Lifting Aids for Digimatic and Dial Indicators

Plunger Lifting Lever

The Plunger Lifting Lever is attached to the top end of the plunger for improved inspection efficiency when using a dial indicator mounted on a stand.

Application



902100



21BZA205
(900527: Lever, 101171: Screw)



21AZB149



902011



21AZB150



903424
(903307: Lever, 192686: Screw)

Code No.	Remarks	Price
902100	Use for S type Series 1 and F type Series 2 (up to 10 mm/.4" range) dial indicators.	£5.70
21AZB149	Use for S type Series 2, 3, and 4 dial indicators (up to 10 mm/.4").	£2.60
21AZB150	Use for S type Series 2 and 3 dial indicators (from 10 mm/.4" up to 20 mm/.8").	£2.90
21BZA205	Use for F type Series 1 dial indicators.	£4.60
902011	Use for F type Series 2 dial indicators (up to 10 mm/.4" range).	£2.80
903424	Use for F type Series 2 dial indicators (up to 20 mm/.8" range) and Series 3 and 4 dial indicators (up to 10 mm/.4" range).	£3.40

Plunger Lifting Cable

With auto-stop function.



Code No.	Remarks	Price
901975	For Series 2 only	£12.70

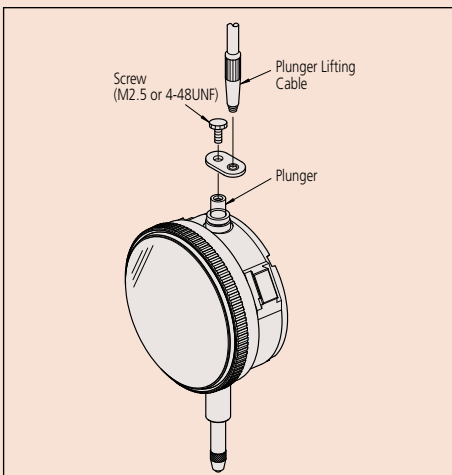
Plunger Lifting Knob

Suitable for 4.8 mm plunger diameter.



Code No.	Price
137693	£0.80

Application



Optional Accessories

Limit Stickers

- These are stuck onto the dial face or crystal of a Series 2 dial indicator (55.6 mm or 57 mm bezel diameter) to indicate tolerance limits.
- 10 pieces per set.



Code No.	Remarks	Price
136420	Red (10 sheets)	£5.70
136421	Green (10 sheets)	£5.70
136422	Yellow (10 sheets)	£5.70

Plunger Caps

- Plunger caps are available for dial indicators with a range of 10 mm or less.



Code No.	Remarks	Price
193051	Standard	£0.80
193595	Waterproof	£0.80

Note: This accessory is not applicable to 1003, 1911, 1913-10, and 2971 to 2973.

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

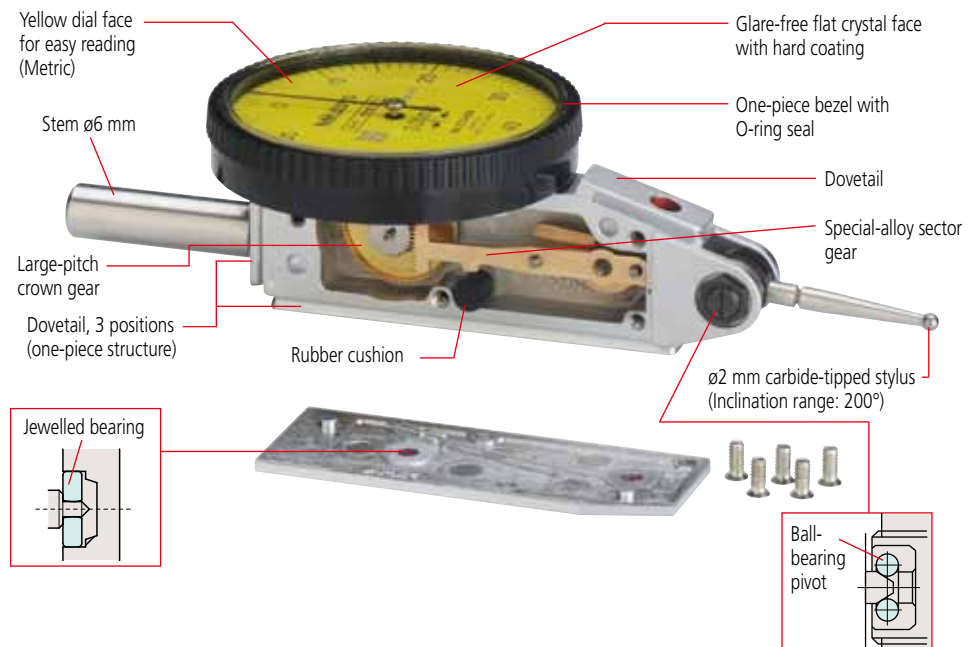
Dial Test Indicators

SERIES 513 – Lever Dial Test Indicators

Feature Icons

Icon	Feature description
	With revolution counter type.
	Long stylus type.
	Jewelled bearing type.
	Double scale spacing type, easy-on-the-eyes.
	Dustproof type.
	Anti-magnetic type.

- Designed to probe surfaces that cannot be reached with a normal dial gauge. Useful both for alignment and for measurement purposes.
- Mitutoyo's proprietary new design permits smooth pointer operation.
- Strong frame provides excellent rigidity and durability.
- Non-magnetic pointer and contact point permit reliable operation even in magnetic environments.
- Clear and concise wide dial face allows excellent visibility.
- Flat crystal makes graduations easy to read. Moreover, the O-ring sealing method used for the bezel prevents water or oil penetration. (Note that this model is NOT waterproof.)
- The surface of the crystal is hard-coated for excellent scratch resistance.
- Five types are available: horizontal, vertical, parallel, universal, and pocket, allowing users to select the model most suited to their needs.
 - Horizontal: The standard configuration.
 - Vertical: Best suited for centering a hole under the spindle of a machine tool.
 - Parallel: The scale can be read from the front, with the stylus pivoting in a plane parallel to that of the dial face.
 - Universal: The direction of the stylus movement can be freely changed.
 - Pocket: Compact type.



Features of dial test indicators with a ruby contact point

- Dial test indicators with a ruby contact point are available in the horizontal (standard) type.
- Benefits of ruby contact points:
 - Several times more resistant to wear than carbide.
 - Can be used on electrical discharge machines without special precautions.
 - Will not pick up ferrous swarf.



Dial Test Indicators

SERIES 513 – Horizontal Dial Test Indicator

- Provides easy access to shrouded surfaces that cannot be reached with conventional dial indicators.
- No-clutch structure for automatic reversal of measuring direction.
- Resistant to water and dust thanks to the one piece bezel and O-ring seal for the crystal.
- The glare-free flat crystal face has a scratch resistant coating.

- High sensitivity and quick response due to low-friction jewelled bearings.

513-474E:

- Ruby contact point model.
- Higher resistance to wear.
- Non-magnetic, non-conductive tip allows use in EDM processes.



513-474E



513-415E



513-424E



513-404E



513-414E



513-405E



513-425E



513-401E

FEATURES

Metric					
Code No.					
513-424E	✓	✓	—	✓	—
513-414E	✓	✓	✓	✓	—
513-404E	✓	—	—	✓	—
513-474E	✓	—	—	✓	—
513-415E	✓	—	✓	✓	—
513-426E	✓	✓	—	✓	✓
513-405E	✓	—	—	✓	—
513-425E	✓	—	—	✓	✓
513-401E	✓	—	—	✓	—

Inch					
Code No.					
513-402	✓	—	—	✓	—
513-412	✓	—	✓	✓	—
513-403	✓	—	—	✓	—

Metric/inch					
Code No.					
513-409T	✓	—	—	✓	—

Inch/metric					
Code No.					
513-406T	✓	—	—	✓	—

Special Sets:

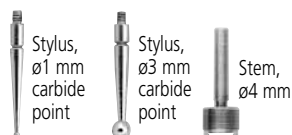
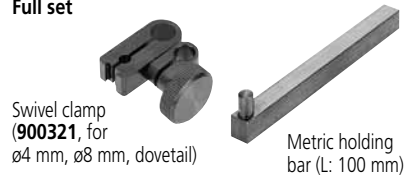
513-908: Metric set, consisting of:
513-404E Dial test indicator
7014 Mini magnetic stand
£126.00

513-907: Inch set, consisting of:
513-402 Dial test indicator
7014 Mini magnetic stand
£126.00

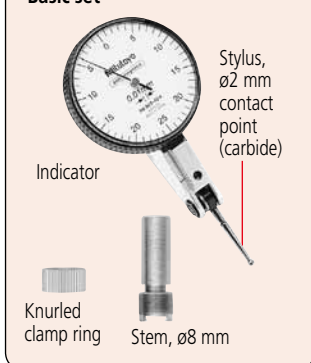


Set Configuration: Metric and Metric/Inch

Full set

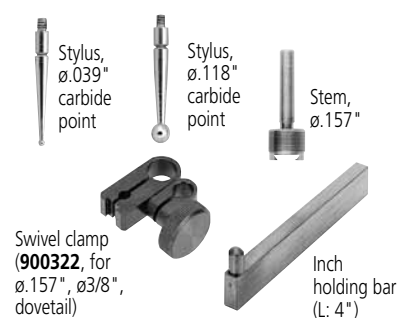


Basic set

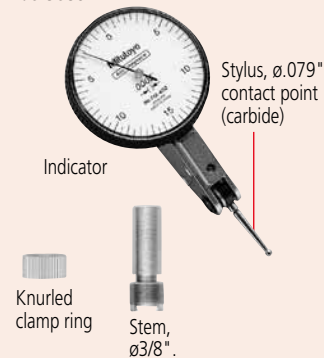


Set Configuration: Inch and Inch/Metric

Full set



Basic set



SPECIFICATIONS

Metric						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Basic Set						
513-424E	0.01 mm	0.5 mm	5 µm	0-25-0	0.3 N or less	£80.90
513-414E	0.01 mm	0.5 mm	10 µm	0-25-0	0.2 N or less	£82.10
513-404E	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£72.30
513-474E*	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£83.80
513-415E	0.01 mm	1 mm	10 µm	0-50-0	0.2 N or less	£89.20
513-426E	0.01 mm	1.5 mm	8 µm	0-25-0	0.4 N or less	£83.30
513-405E	0.002 mm	0.2 mm	3 µm	0-100-0	0.3 N or less	£87.80
513-425E	0.002 mm	0.6 mm	6 µm	0-100-0	0.4 N or less	£102.00
513-401E	0.001 mm	0.14 mm	3 µm	0-70-0	0.3 N or less	£87.80
Full Set						
513-424T	0.01 mm	0.5 mm	5 µm	0-25-0	0.3 N or less	£99.70
513-414T	0.01 mm	0.5 mm	10 µm	0-25-0	0.2 N or less	£116.00
513-404T	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£87.50
513-415T	0.01 mm	1 mm	10 µm	0-50-0	0.2 N or less	£108.00
513-405T	0.002 mm	0.2 mm	3 µm	0-100-0	0.3 N or less	£106.00

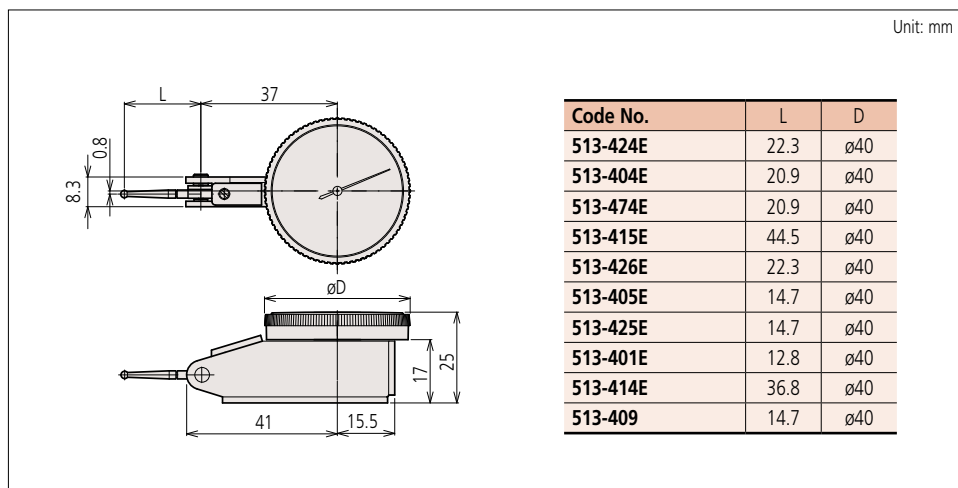
Inch						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Basic Set						
513-402	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	£72.00
513-412	.0005"	.03"	±.0005"	0-15-0	0.2 N or less	£104.00
513-403	.0001"	.008"	±.0001"	0-4-0	0.3 N or less	£94.00
Full Set						
513-402T	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	£102.00
513-412T	.0005"	.03"	±.0005"	0-15-0	0.2 N or less	£125.00
513-403T	.0001"	.008"	±.0001"	0-4-0	0.3 N or less	£125.00

Metric/inch						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Full Set						
513-409T	0.002 mm/.0001"	0.2 mm/.0075"	3 µm	0-10-0/0-3.8-0	0.3 N or less	£115.00

Inch/metric						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Full Set						
513-406T	.0005"/0.01 mm	.03"/0.7 mm	±.0005"	0-15-0/0-35-0	0.3 N or less	£108.00

* Provided with a ø2 mm ruby contact point as a substitute for ø2 mm carbide contact point.

DIMENSIONS



Dial Test Indicators

SERIES 513 – Vertical and Parallel Face Dial Test Indicators

- The vertical face indicator is useful for centering holes under a machine tool spindle using the universal holder mounted in the spindle chuck.
- The parallel face indicator is convenient to use when the application calls for stylus movement in a plane parallel to that of the dial face.



513-454E



513-455E



513-452



513-284GE



513-282GT

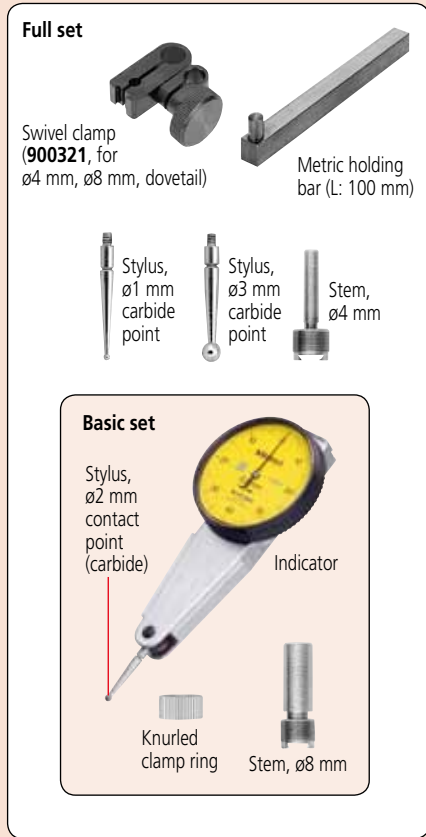
FEATURES

Metric		
Code No.		
513-454E	✓	✓
513-455E	✓	✓
513-284GE	—	✓
Inch		
Code No.		
513-452	✓	✓
513-453	✓	✓
513-282GT	—	✓

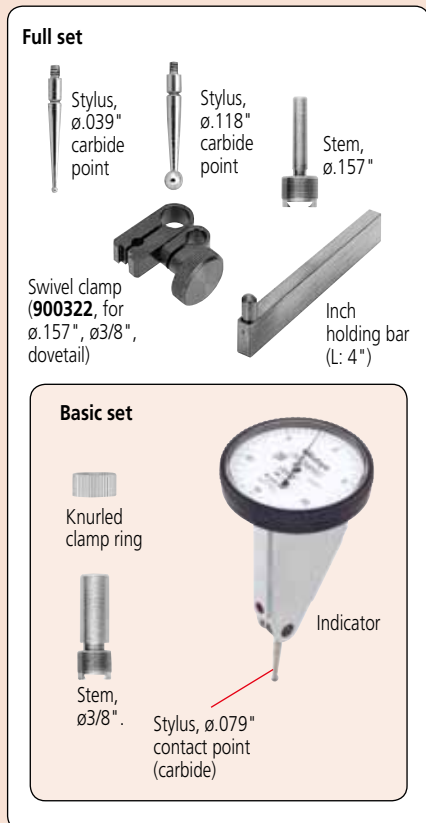
Optional Accessories

Swivel clamps, holding bars, stems and styli (refer to pages F-52 to F-54 for details)

Set Configuration: Metric



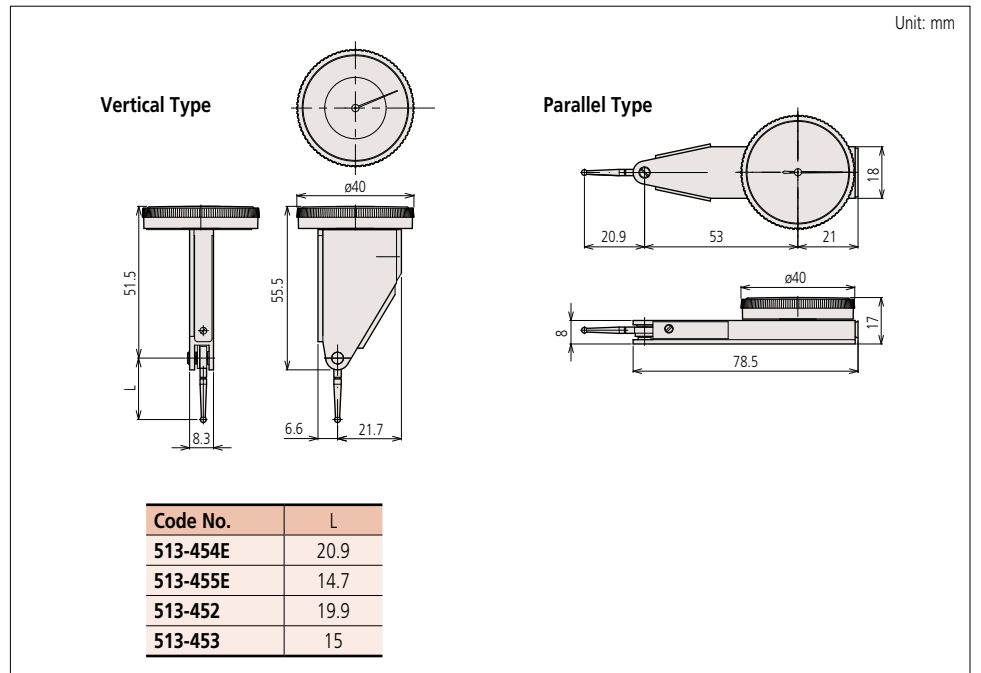
Set Configuration: Inch



SPECIFICATIONS

Metric						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Vertical type, basic set						
513-454E	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£74.80
513-455E	0.002 mm	0.2 mm	3 µm	0-100-0	0.3 N or less	£117.00
Vertical type, full set						
513-454T	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£116.00
513-455T	0.002 mm	0.2 mm	3 µm	0-100-0	0.3 N or less	£126.00
Parallel type, basic set						
513-284GE	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£80.60
Parallel type, full set						
513-284GT	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£92.50
Inch						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
Vertical type, basic set						
513-452	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	£86.40
513-453	.0001"	.008"	±.0001"	0-4-0	0.3 N or less	£102.00
Vertical type, full set						
513-452T	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	£92.50
513-453T	.0001"	.008"	±.0001"	0-4-0	0.3 N or less	£126.00
Parallel type, full set						
513-282GT	.0005"	.03"	±.0005"	0-15-0	0.3 N or less	£92.50

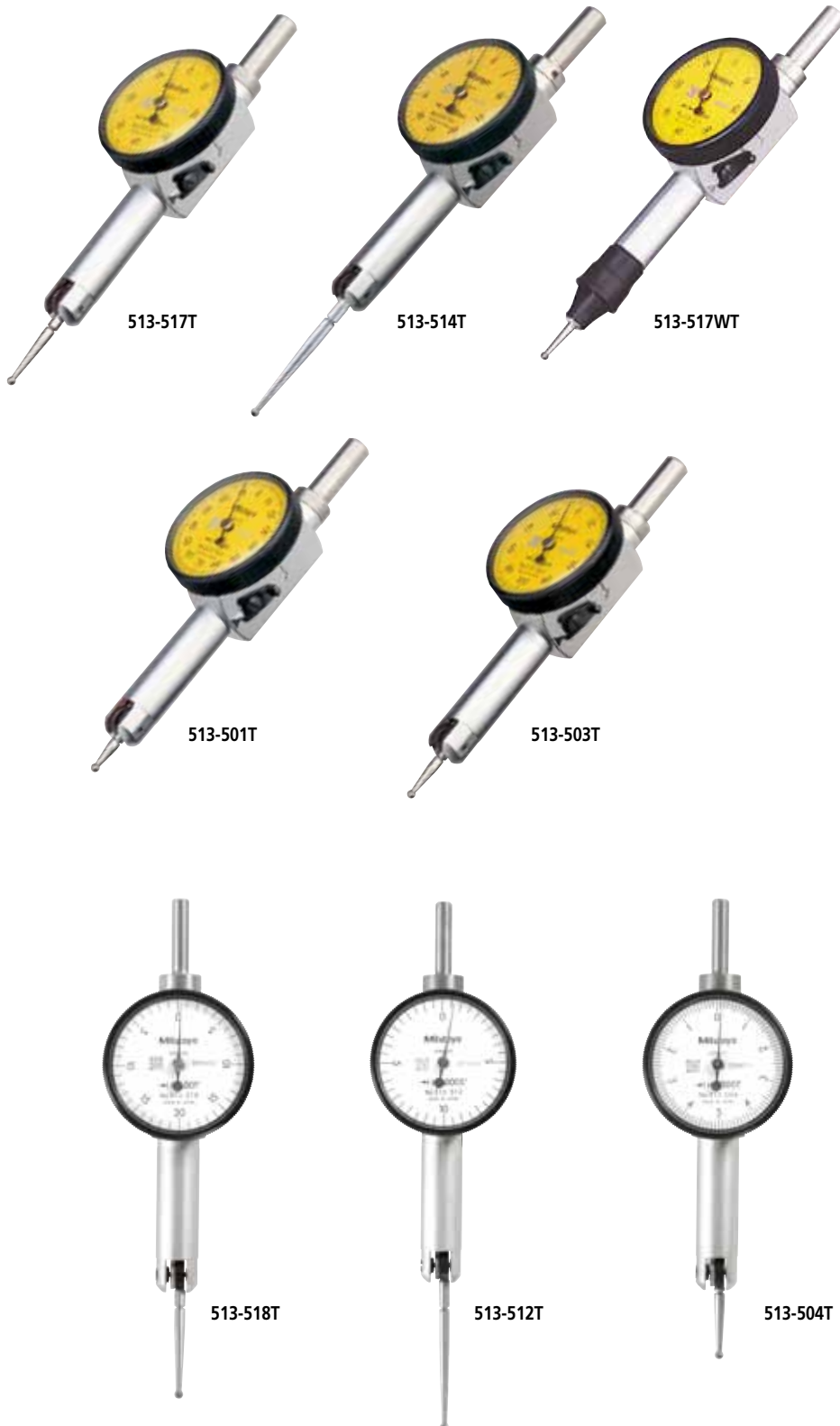
DIMENSIONS



Dial Test Indicators

SERIES 513 – Pocket Dial Test Indicator

- Jewelled bearings assure higher sensitivity and accuracy. Indicator can be mounted by clamping the stem or the body (except for 513-517WE and 513-517WT).
- Reversible measuring direction.
- Two holding bars are supplied. (Full sets only.)
- Fully adjustable bezel/dial face.
- Stylus is adjustable within 220°.
- Bezel is sealed with an O-ring to keep out water / oil.



FEATURES

Metric			
Code No.	!	◆	□
513-514T	✓	✓	—
513-517T	—	✓	—
513-517WT	—	✓	✓
513-503T	—	✓	—
513-501T	—	—	—

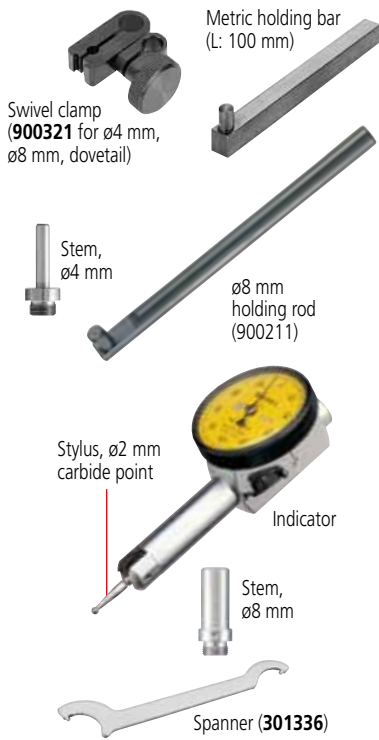
Inch			
Code No.	!	◆	□
513-518T	—	✓	—
513-512T	✓	✓	—
513-504T	—	✓	—

Optional Accessories

Swivel clamps, holding bars, stems and styli (refer to pages F-52 to F-54 for details)

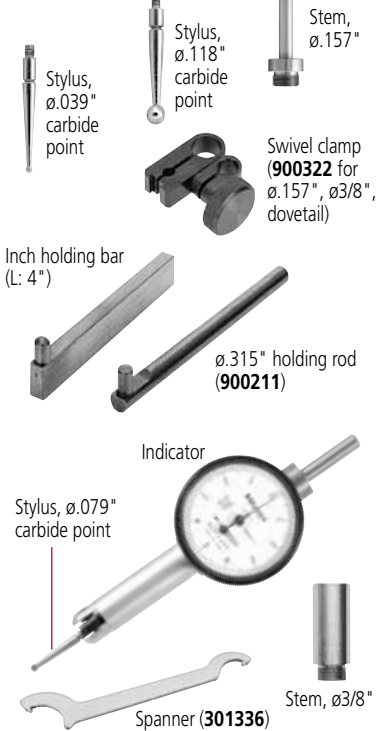
Set Configuration: Metric

Full set



Set Configuration: Inch

Full set

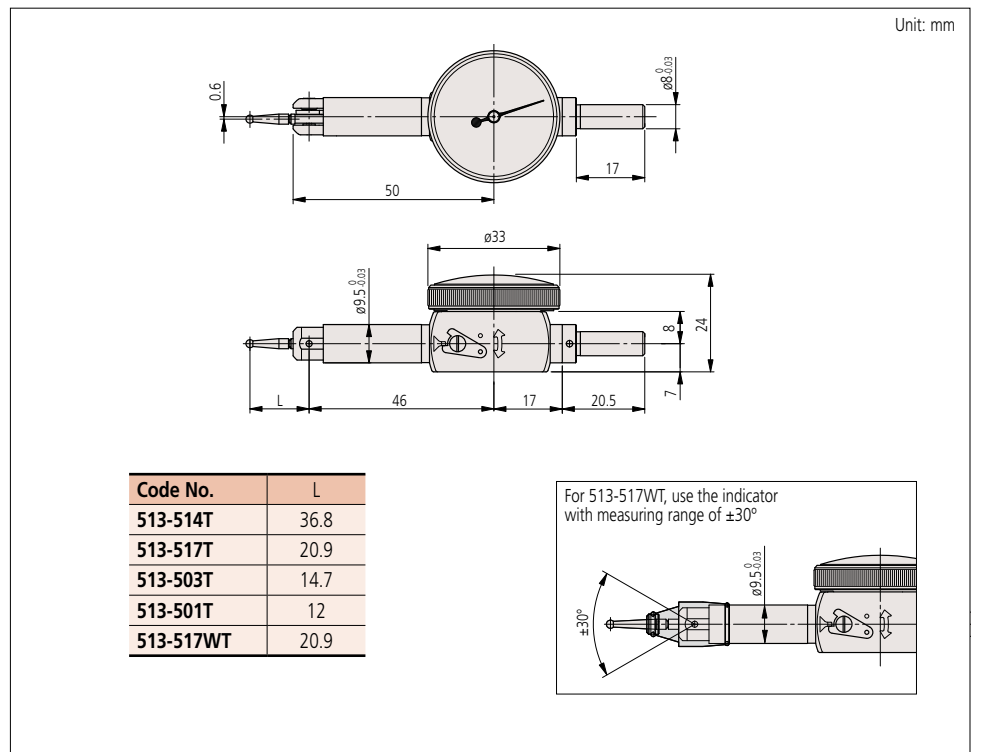


SPECIFICATIONS

Metric						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
513-514T	0.01 mm	0.5 mm	10 µm	0-25-0	0.3 N or less	£97.30
513-517T	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£87.80
513-517WT	0.01 mm	0.8 mm	8 µm	0-40-0	0.3 N or less	£107.00
513-503T	0.002 mm	0.2 mm	3 µm	0-100-0	0.3 N or less	£107.00
513-501T	0.001 mm	0.14 mm	3 µm	0-70-0	0.4 N or less	£131.00

Inch						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
513-518T	.001"	.04"	±.001"	0-20-0	0.3 N or less	£86.50
513-512T	.0005"	.02"	±.0005"	0-10-0	0.3 N or less	£97.30
513-504T	.0001"	.01"	±.0002"	0-5-0	0.3 N or less	£101.00

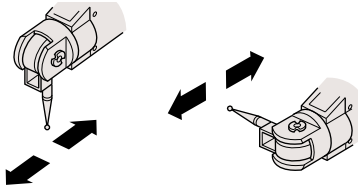
DIMENSIONS



Dial Test Indicators

SERIES 513 – Universal Dial Test Indicator

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



513-304GT

SPECIFICATIONS

Metric						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
513-304GT	0.01 mm	0.8 mm	8 μm	0-40-0	0.3N or less	£301.00

Inch						
Code No.	Graduation	Range	Accuracy	Scale	Measuring force	Price
513-302GT	.0005"	.03"	±.0005"	0-15-0	0.3N or less	£301.00

FEATURES

Metric	
Code No.	
513-304GT	✓

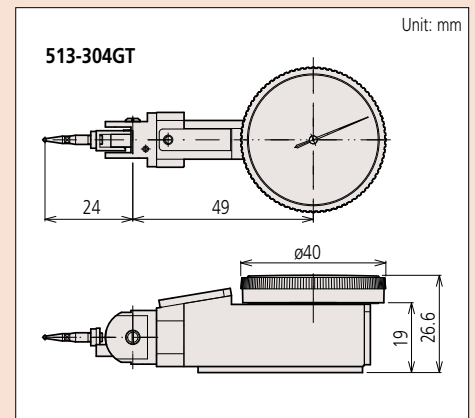
Inch	
Code No.	
513-302GT	✓

Optional Accessories

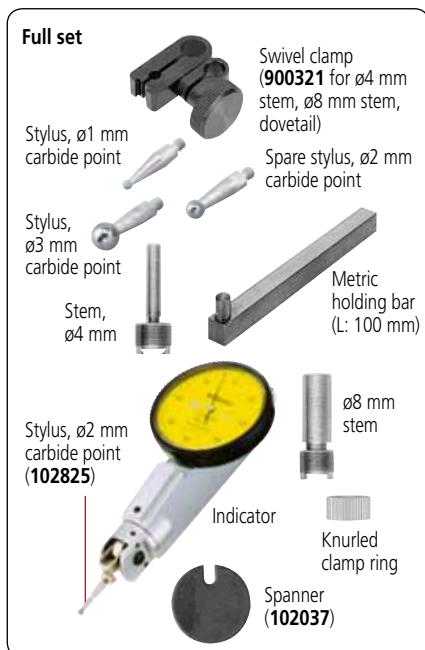
- 102824: Stylus, ø1 mm ball contact (carbide) £4.20
- 102825: Stylus, ø2 mm ball contact (carbide) £7.20
- 102826: Stylus, ø3 mm ball contact (carbide) £4.20

Swivel clamps, holding bars, stems and styli (refer to pages F-52 to F-54 for details)

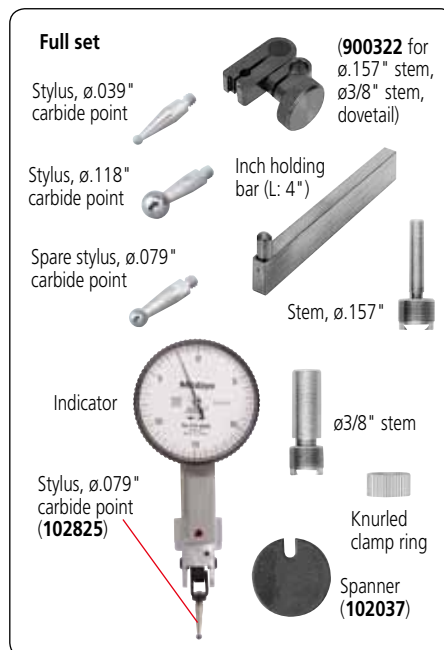
DIMENSIONS



Set Configuration: Metric



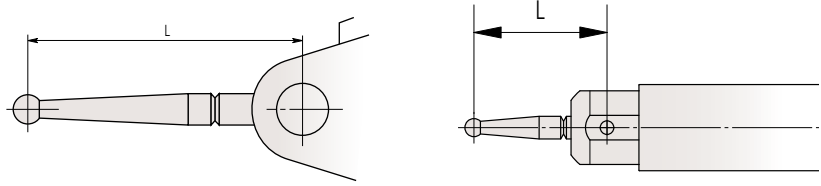
Set Configuration: Inch



Optional Accessories

Styli for Metric Dial Test Indicators

- Stylus length affects the scale factor of an indicator. The styli provided as standard give a scale factor of unity.



ø0.5 mm ball-point



ø0.7 mm ball-point



ø1 mm ball-point (Carbide)



ø2 mm ball-point (Carbide)



ø2 mm ball-point (Ruby)



ø3 mm ball-point (Carbide)



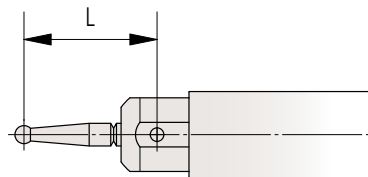
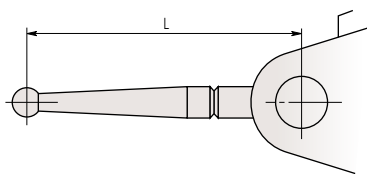
SPECIFICATIONS

Metric			
Code No.	L	To fit models	Price
ø0.5 mm ball-point			
190547	14.7 mm	513-405E, 513-425E, 513-409, 513-455E, 513-503T	£13.30
190549	20.9 mm	513-404E, 513-474E, 513-454E, 513-517T, 513-284GE	£13.30
190654	22.3 mm	513-424E, 513-426E	£8.90
190656	44.5 mm	513-415E	£9.00
ø0.7 mm ball-point			
190548	14.7 mm	513-405E, 513-425E, 513-409, 513-455E, 513-503T	£11.50
190550	20.9 mm	513-404E, 513-474E, 513-454E, 513-517T, 513-284GE	£11.50
190653	22.3 mm	513-424E, 513-426E	£9.00
190655	44.5 mm	513-415E	£8.50
ø1 mm ball-point (Carbide)			
136756	12.1 mm	513-501T	£2.70
21CZA044	12.8 mm	513-401E	£5.80
103017	14.7 mm	513-405E, 513-425E, 513-409, 513-455E, 513-503T	£4.20
103013	20.9 mm	513-404E, 513-474E, 513-454E, 513-517T, 513-284GE	£4.20
137558	22.3 mm	513-424E, 513-426E	£4.20
137746	36.8 mm	513-414E, 513-514T	£4.20
136235	44.5 mm	513-415E	£2.80
ø2 mm ball-point (Carbide)			
136104	12.1 mm	513-501T	£4.80
21CZA036	12.8 mm	513-401E	£5.10
103010	14.7 mm	513-405E, 513-425E, 513-409, 513-455E, 513-503T	£7.20
103006	20.9 mm	513-404E, 513-474E, 513-454E, 513-517T, 513-284GE	£7.20
137557	22.3 mm	513-424E, 513-426E	£7.20
129949	36.8 mm	513-414E, 513-514T	£7.90
136013	44.5 mm	513-415E	£7.90
ø2 mm ball-point (Ruby)			
21CZA212	12.8 mm	513-401E	£10.50
21CZA209	14.7 mm	513-405E, 513-425E, 513-409, 513-455E, 513-503T	£10.50
21CZA201	20.9 mm	513-404E, 513-474E, 513-454E, 513-517T, 513-284GE	£15.90
21CZA210	22.3 mm	513-424E, 513-426E	£10.50
21CZA211	44.5 mm	513-415E	£10.50
ø3 mm ball-point (Carbide)			
136758	12.8 mm	513-401E	£2.70
103018	14.7 mm	513-405E, 513-425E, 513-409, 513-455E, 513-503T	£4.20
103014	20.9 mm	513-404E, 513-474E, 513-454E, 513-517T, 513-284GE	£4.20
137559	22.3 mm	513-424E, 513-426E	£4.20
137747	36.8 mm	513-414E, 513-514T	£4.20
136236	44.5 mm	513-415E	£2.80

Optional Accessories

Styli for Imperial Dial Test Indicators

- Stylus length affects the scale factor of an indicator. The styli provided as standard give a scale factor of unity.



ø.04" ball-point



ø.08" ball-point (Carbide)



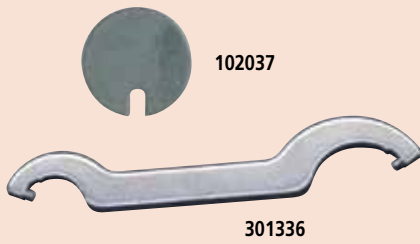
ø.12" ball-point



SPECIFICATIONS

Inch			
Code No.	L	To fit models	Price
ø.04" ball-point			
136076	.59"	513-403, 513-453	£2.70
131314	.74"	513-504T	£4.80
133196	.78"	513-402, 513-452, 513-282GT	£4.20
102824	.9"	513-302GT	£4.20
103008	1.04"	513-518T	£4.20
136291	1.33"	513-412	£2.80
131316	1.47"	513-512T	£4.20
ø.08" ball-point (Carbide)			
136075	.59"	513-403, 513-453	£4.80
103011	.74"	513-504T	£7.20
133195	.78"	513-402, 513-452, 513-282GT	£7.20
102825	.9"	513-302GT	£7.20
103007	1.04"	513-518T	£4.20
136290	1.33"	513-412	£4.80
131324	1.47"	513-512T	£4.20
ø.12" ball-point			
136077	.59"	513-403, 513-453	£2.70
131315	.74"	513-504T	£4.80
133197	.78"	513-402, 513-452, 513-282GT	£4.20
102826	.9"	513-302GT	£4.20
103009	1.04"	513-518T	£4.20
136292	1.33"	513-412	£2.80
131317	1.47"	513-512T	£4.20

Spanner

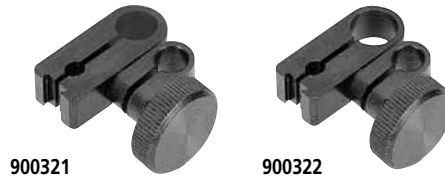


- 102037:** Spanner for Dial Test Indicators
£0.80
- 301336:** Spanner for Pocket Dial Test Indicators
£1.20

For Dial Test Indicators

Swivel Clamps

- Can be used with Holding Bars.



Code No.	Remarks	Price
900321	For $\varnothing 4$ mm stem, $\varnothing 8$ mm stem, and dovetail	£12.80
900322	For $\varnothing .157$ " stem, $\varnothing 3/8$ " stem, and dovetail	£12.80

Holding Bars



953638 (9 x 9 mm)
900209 (9 x 9 mm)



900211 ($\varnothing 8$ mm, $\varnothing .315$ ")



953639 (.25" x .5")
900306 (.25" x .5")

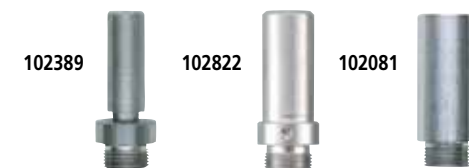
Code No.	Stem	Length	Price
953638	$\varnothing 6$ mm	50 mm	£9.40
900209		100 mm	£8.30
900211		115 mm	£8.30
953639	$\varnothing .236$ "	2"	£9.60
900306		4"	£8.30

Stems with Knurled Clamp Ring



Code No.	Diameter	Price
902802	4 mm / .157"	£7.90
902804	8 mm	£6.50
902805	3/8"	£7.90

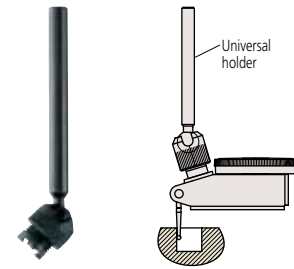
Stems for Pocket Types



Code No.	Diameter	Price
102389	4 mm / .157"	£2.80
102822	8 mm	£2.80
102081	3/8"	£2.80

Universal Holder

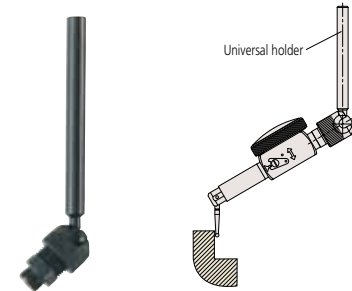
- Allows the indicator to be set at the desired attitude to the workpiece.



Code No.	Stem	Price
901916	$\varnothing 8$ mm	£32.30
901459	$\varnothing .25$ "	£23.60
901461	$\varnothing 6$ mm	£23.60

Universal Holder for Pocket Types

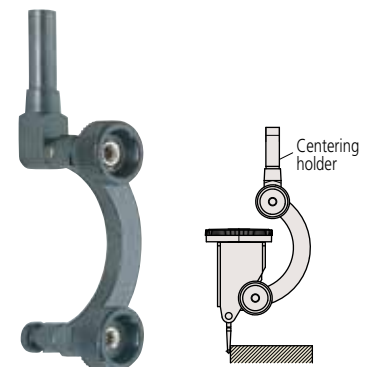
- Allows the indicator to be set at the desired attitude to the workpiece.



Code No.	Stem	Price
901917	$\varnothing 8$ mm	£32.30
901546	$\varnothing .25$ "	£23.60
901547	$\varnothing 6$ mm	£23.60

Centering Holder

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



Code No.	Stem	Price
901959	$\varnothing 8$ mm	£74.20
901997	$\varnothing .25$ "	£73.70

Instruments

SERIES 170 – i-Checker

- The i-Checker is specially designed to calibrate all types of indicators and electronic gauges with a stroke of up to 100 mm (4").
- $\pm(0.2+L/100)$ μm indication accuracy, where L = indicator stroke (mm).
- Directly inspects an indicator with a stroke of up to 100 mm (4"). Dial test indicators, bore gauges and lever-type inductive heads can be inspected with optional accessories, such as the test indicator attachment set (02ASK000).
- Adjustment of the measurement position is very easily accomplished because of 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.



Code No.	Remarks	Price
170-321E	With $\varnothing 8$ mm bush	£7700.00
170-312E	With $\varnothing 3/8$ " bush	£7700.00

Technical Data

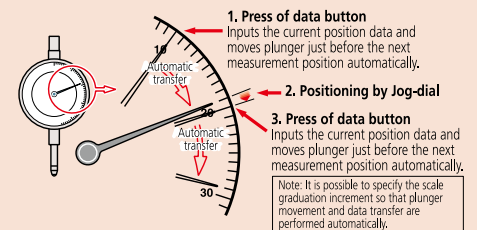
Measuring range:	100 mm/4"
Resolution:	0.02 μm / 0.8 μin
Accuracy:	$\pm(0.2+L/100)$ μm in vertical position (at 20°C) $\pm(0.3+2L/100)$ μm in lateral position L = arbitrary length (mm)
Drive method:	Electric motor
Measuring unit:	Reflective-type glass linear encoder
Thermal expansion coefficient:	$(8\pm 1) \times 10^{-6}/\text{K}$
Measurement method*:	Automatic/semi-automatic
Dimensions:	184 x 225 x 532 mm (W x D x H)
Operating temperature range:	20°C ± 3 °C
Power supply:	100VAC to 240VAC $\pm 10\%$, 50/60 Hz
Mass:	20 kg

* Consult your local Mitutoyo Sales Office for advice on your particular application.

Functions

Inspect your analogue indicator semi-automatically:

The pointer of the analogue 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 plunger 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:

It is possible to create, edit and print out your own inspection certificate. Furthermore, that data can be saved as a CSV file.

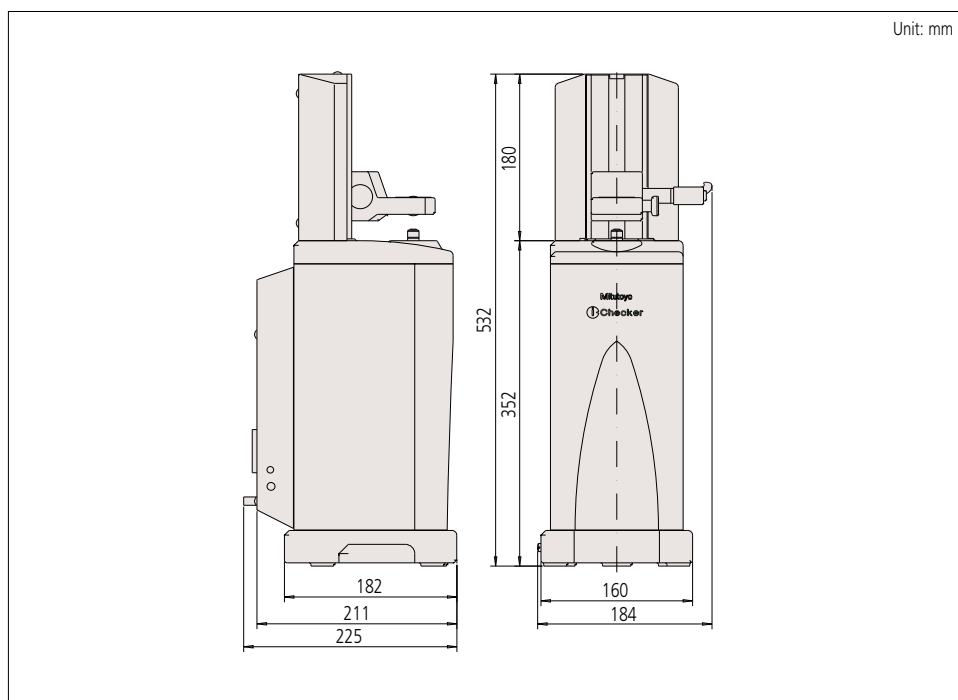
Optional Accessories

- 02ASK000:** Test indicator attachment set (ø6 mm stem)
£940.00
- 02ASK180:** Test indicator attachment set (ø8 mm stem)
£940.00
- 02ASK370:** Test indicator holder (ø6 mm stem)
£206.00
- 02ASK380:** Test indicator holder (ø8 mm stem)
£206.00
- 902803:** ø6 mm dovetail grooved stem
£6.50
- 902804:** ø8 mm dovetail grooved stem
£6.50
- 02ASK040:** Stem bush ø6 mm
£122.00
- 02ASJ856:** Stem bush ø8 mm
£122.00
- 02ASK150:** Stem bush ø8 mm, short
£122.00
- 02ASL150:** Stem bush ø10 mm, short
£120.00
- 02ASK050:** Bush ø9.5 (requires 02ASK070)
£73.00
- 02ASK060:** Stem bush ø12 mm
£122.00
- 02ASK070:** Stem bush ø15 mm
£122.00
- 02ASK080:** Stem bush ø20 mm
£122.00
- 02ASK710:** Stem bush ø28 mm
£120.00
- 02ASK090:** Stem bush 3/8"
£122.00
- 02ASK130:** Stem bush case
£122.00
- 02ASK730:** Reflector
£91.10
- 937179T:** Footswitch
£45.30



Using test indicator attachment set (**02ASK000**)

DIMENSIONS



Instruments that can be tested with the i-Checker



- Dial indicator
- Hicator
- Digimatic indicator*³
- Dial Test indicator*¹
- Bore gauge*²
- Linear gauge

*¹ Requires optional test indicator attachment set. Contact the nearest Mitutoyo sales office for testable indicators.

*² Requires optional bore gauge accessory.

*³ Requires optional SPC data cable for fully automatic measurement.

Instruments

SERIES 170 – UDT-2 Dial Indicator Tester

- UDT-2 is an accuracy tester for 0.01 mm resolution dial indicators, dial test indicators and bore gauges.
- Accepts $\varnothing 6$ mm and $\varnothing 8$ mm stems.



170-102-12

SPECIFICATIONS

Metric				
Code No.	Range	Graduation	Accuracy	Price
170-102-12	0 - 25 mm	0.001 mm	$\pm 2 \mu\text{m}$	£1090.00
Inch				
Code No.	Range	Graduation	Accuracy	Price
170-101-10	0 - 1"	.0001"	$\pm .0001$ "	£1090.00



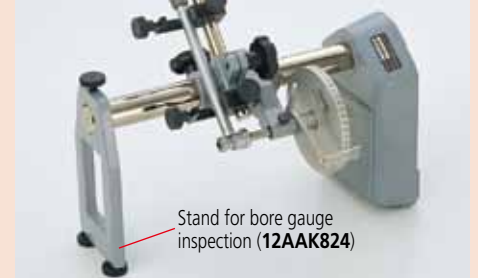
Calibrating a bore gauge.



Calibrating a lever indicator.

Optional Accessory

- 12AAK824:** Stand for bore gauge inspection
 Can be used for the inspection of bore gauges 511 series standard type and micrometer heads up to 400 mm.
£155.00



Application example.

SERIES 521 – Calibration Tester

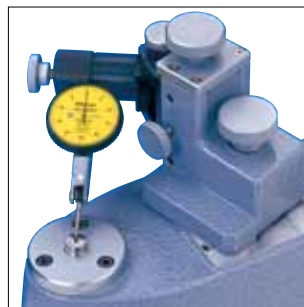
- The Calibration Tester is specially designed to calibrate short range dial indicators, dial test indicators, and electronic gauge heads.
- Clamping capacity: $\varnothing 4$ mm to $\varnothing 10$ mm.
- Universal bracket accepts any dial indicator, dial test indicator or electronic gauge without any additional accessory.



521-105

SPECIFICATIONS

Metric				
Code No.	Range	Graduation	Accuracy	Price
521-103	0 - 1 mm	0.0002 mm	$\pm 0.2 \mu\text{m}$	£3270.00
521-105	0 - 5 mm		$\pm 0.8 \mu\text{m}$	£3470.00
Inch				
Code No.	Range	Graduation	Accuracy	Price
521-104	0 - .05"	.00001"	$\pm .00001$ "	£3270.00
521-106	0 - .2"		$\pm .00003$ "	£3470.00



Calibrating a lever indicator.



Calibrating a probe head.



Calibrating a lever probe head.

Instruments

SERIES 547 – ABSOLUTE Digimatic Thickness Gauges

- Digimatic thickness gauges can quickly measure the thickness of thin products such as paper and felt.
- Contact points and anvils of **547-300S** and **547-320S** are carbide or ceramic.
- Integrated moulding of the bezel and crystal ensures protection against water and oil penetration via the front face.

Tube thickness measurement type

- Pipe wall thickness and the thickness of curved boards can be measured.

Lens thickness measurement type

- Thickness of concave-convex lenses and surfaces can be measured.
- Anvils and contact points are interchangeable to enable concave surfaces to be measured.
- Provided with a ball point.

Groove depth measurement type

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

ABSOLUTE



547-300S



547-320S



547-361S



547-400S



547-312S



547-316S

Optional Accessories

905338: SPC data cable (1 m)
£32.90

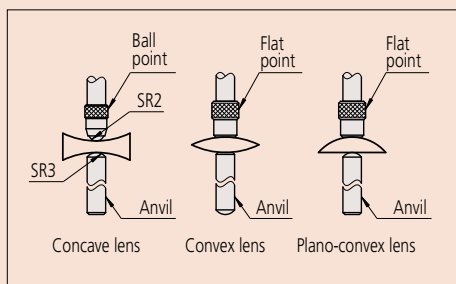
905409: SPC data cable (2 m)
£36.80

02AZD790F: SPC data cable for U-WAVE-T (160 mm)
£52.20

264-504-5E: Digimatic Mini-Processor DP-1VR
£342.00

Input Tool: Convenient Interface Input Tools which enable the conversion of measurement data to keyboard signals and directly input them to cells in off-the-shelf spreadsheet software such as Excel.

Lens Thickness Measurement Application Examples

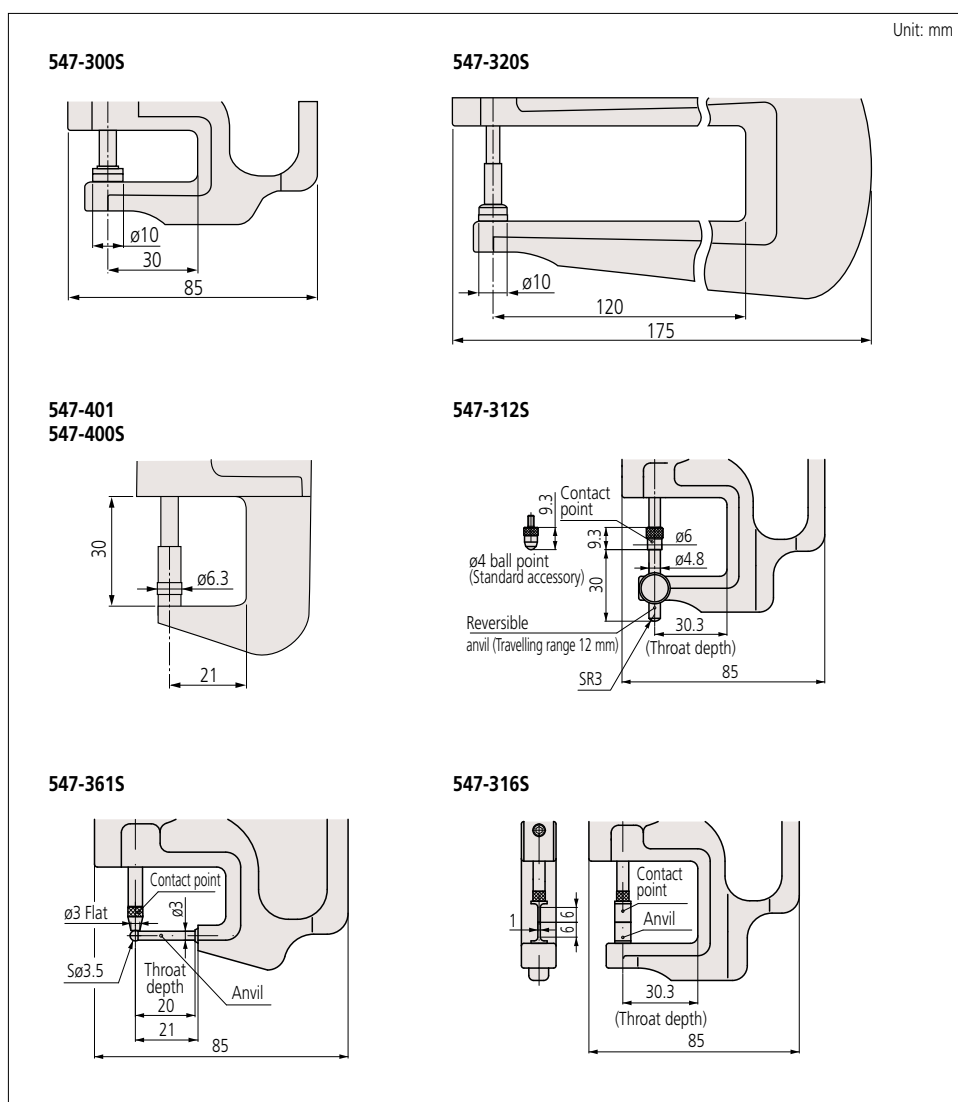


Note: Parallelism between the flat point and anvil is 10 µm

SPECIFICATIONS

Metric					
Code No.	Range	Resolution	Accuracy	Measuring force	Price
High accuracy, carbide plunger/anvil					
547-401	0 - 12 mm	0.001 mm	±3 µm	3.5 N or less	£500.00
Inch/Metric					
Code No.	Range	Resolution	Accuracy	Measuring force	Price
High accuracy, carbide plunger/anvil					
547-400S	0 - 12 mm / 0 - .47"	.00005" / 0.001 mm	±.0001" / ±3 µm	3.5 N or less	£500.00
Standard, ceramic plunger/anvil					
547-300S	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	£310.00
Deep throat, ceramic plunger/anvil					
547-320S	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	£269.00
Lens thickness					
547-312S	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	£310.00
Groove depth					
547-316S	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	£320.00
Tube thickness					
547-361S	0 - 10 mm / 0 - .4"	.0005" / 0.01 mm	±.001" / ±20 µm	1.5 N or less	£290.00

DIMENSIONS



Instruments

SERIES 7 – Dial Thickness Gauges

- Dial thickness gauges can quickly measure the thickness of thin products such as paper and felt.
- Contact points and anvils of **547-300S** and **547-320S** are carbide or ceramic.
- Integrated moulding of the bezel and crystal ensures protection against water and oil penetration via the front face.

Tube thickness measurement type

- Pipe wall thickness and the thickness of curved boards can be measured.

Lens thickness measurement type

- Thickness of concave-convex lenses and surfaces can be measured.
- Anvils and contact points are interchangeable to enable concave surfaces to be measured.
- Provided with a ball point.

Groove depth measurement type

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



7301



7321



7360



7326S

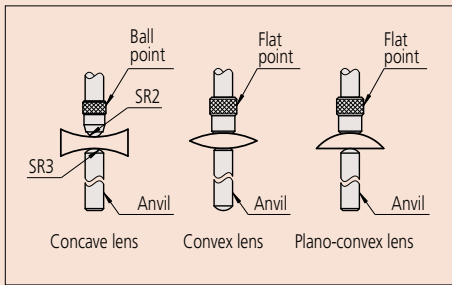


7313



7315

Lens Thickness Measurement Application Examples

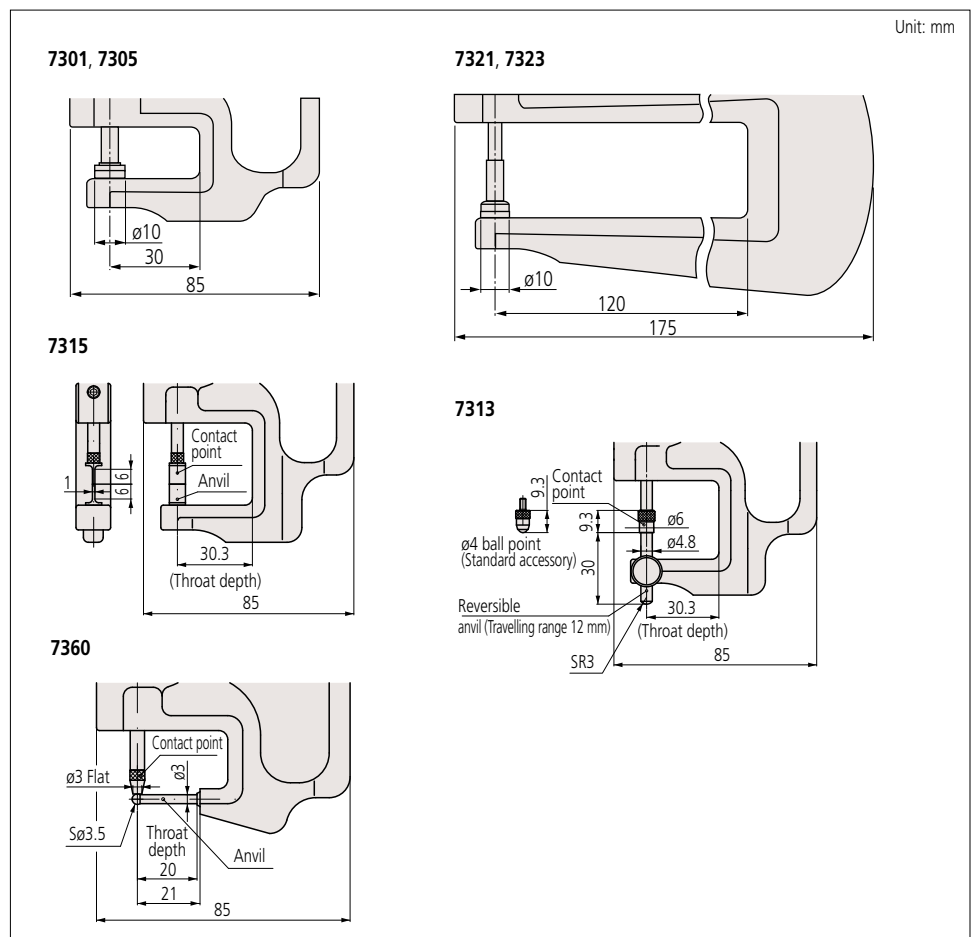


Note: Parallelism between the flat point and anvil is 5 µm

SPECIFICATIONS

Metric					
Code No.	Range	Graduation	Accuracy	Measuring force	Price
Standard, ceramic plunger/anvil					
7301	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	£72.30
7305	0 - 20 mm		±20 µm	2.0 N or less	£88.30
Deep throat, ceramic plunger/anvil					
7321	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	£87.00
7323	0 - 20 mm		±22 µm	2.0 N or less	£101.00
Lens thickness					
7313	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	£79.20
Groove depth					
7315	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	£98.00
Tube thickness					
7360	0 - 10 mm	0.01 mm	±15 µm	1.4 N or less	£70.80
Inch					
Code No.	Range	Graduation	Accuracy	Measuring force	Price
Fine dial reading, ceramic plunger/anvil					
7326S	0 - .05"	.0001"	±.0002"	1.4 N or less	£117.00
Standard, ceramic plunger/anvil					
7300S	0 - .5"	.001"	±.001"	1.4 N or less	£76.00
7304S	0 - 1"		±.002"	2.0 N or less	£88.30
Deep throat, ceramic plunger/anvil					
7322S	0 - 1"	.001"	±.002"	2.0 N or less	£101.00
Groove depth					
7316S	0 - .5"	.001"	±.001"	1.4 N or less	£98.00
Tube thickness					
7361S	0 - .5"	.001"	±.001"	1.4 N or less	£98.00

DIMENSIONS



Instruments

SERIES 546 – Contact Force Gauge

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



Measuring contact force on a relay.



546-114

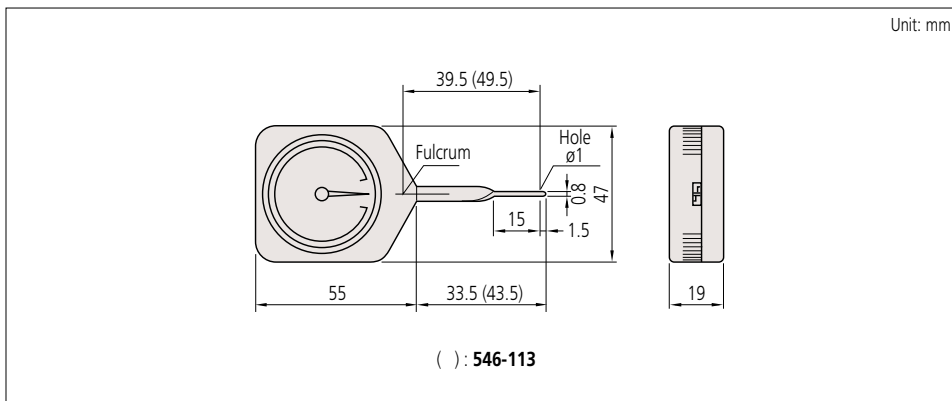


546-138

SPECIFICATIONS

Code No.	Graduation	Range	Accuracy	Price
Standard type				
546-113	5 mN	10 mN - 100 mN	±0.5 (division)	£102.00
546-114	10 mN	30 mN - 300 mN		£97.70
546-118	0.1 N	0.3 N - 3 N		£90.00
Peak hold type				
546-138	0.1 N	0.3 N - 3 N	±0.5 (division)	£150.00

DIMENSIONS



SERIES 209 – Digimatic Coolant Proof Outside Caliper Gauge

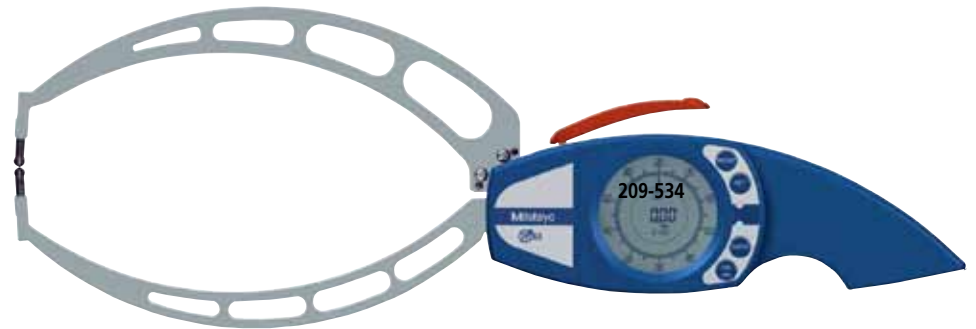
- Versatile gauge with a choice of arm configurations suitable for measuring grooves and other hard-to-measure features.

IP67



209-572

IP63



209-534

SPECIFICATIONS

Inch/Metric										
Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price	
Measuring contacts: Carbide ball ϕ 1.5 mm										
209-572	0 - 20 mm	1.1/1.6 N	0.01 mm	0.03 mm	24.7	24.6	85	Fig. 1	£671.00	
Measuring contacts: Carbide ball ϕ 5 mm										
209-534	0 - 60 mm	0.9/1.2 N	0.02 mm	0.06 mm	25	25	190	Fig. 1	£834.00	

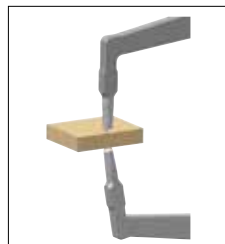


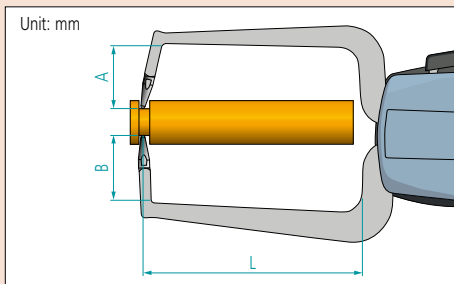
Figure 1

Functions

Mode key, SET key, DATA key, ON/OFF/0-Preset, Max. reading, Min. reading, ABS/INC switchable, Display hold, Data output, Direction switching, Tolerance LED (green/red), Tolerance judgement

Optional Accessories

- 937387:** SPC data cable (1 m) **£32.90**
- 965013:** SPC data cable (2 m) **£39.10**
- 02AZD790E:** SPC data cable for U-WAVE-T (160 mm) **£52.20**
- 06ADV380E:** USB Input tool direct cable (2 m) **£90.80**



- Unit: mm
- L : Maximum reach of contact arms over workpiece
- A : Maximum penetration depth of upper contact
- B : Maximum penetration depth of lower contact

Instruments

SERIES 209 – Coolant Proof Outside Dial Caliper Gauge

- Versatile gauge with a choice of arm configurations suitable for measuring grooves and other hard-to-measure features.



209-402



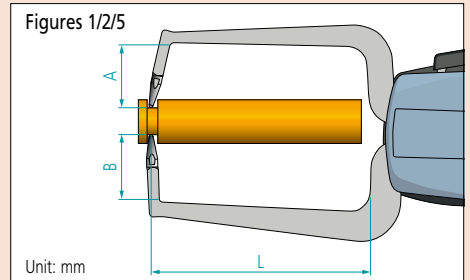
209-406



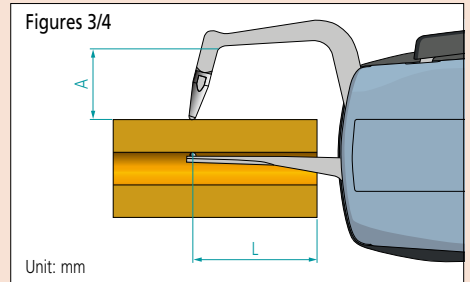
209-405

SPECIFICATIONS

Metric										
Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Contact radii	Type	Price
Measuring contacts: Carbide bevel										
209-405	0-20 mm	1.1/1.6 N	0.01 mm	0.03 mm	24.7	24.6	81	0.4/0.4 mm	Fig. 1	£433.00
Measuring contacts: Carbide ball ø1.5/2 mm										
209-402	0-10 mm	0.8/1.2 N	0.005 mm	0.015 mm	19.1	18.6	35	0.75/0.75 mm	Fig. 2	£470.00
209-404	0-20 mm	1.1/1.6 N	0.01 mm	0.03 mm	24.7	24.6	85			£470.00
209-911	0-50 mm	0.8/1.7 N	0.05 mm	0.05 mm	30	30	167	3/3 mm		£618.00
209-407	0-20 mm	1.1/1.6 N	0.01 mm	0.03 mm	24.7	—	85	0.75/0.75 mm	Fig. 4	£433.00
Measuring contacts: Carbide ball/bevel										
209-406	0-20 mm	1.1/1.6 N	0.01 mm	0.03 mm	24.7	—	80	0.4/0.75 mm	Fig. 3	£433.00
Measuring contacts: Carbide ball ø2 mm										
209-843	0-10 mm	0.3/1.3 N	0.1 mm	0.1 mm	5	5	35	2/2 mm	Fig. 5	£123.00
Inch										
Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Contact radii	Type	Price
Measuring contacts: Carbide bevel										
209-454	0-.8"	1.1/1.6 N	.0005"	.0015"	24.7	24.6	81	.02/.02"	Fig. 1	£561.00
Measuring contacts: Carbide ball ø.059"										
209-456	0-.8"	1.1/1.6 N	.0005"	.0015"	24.7	—	84	.06/.06"	Fig. 3	£514.00
209-450	0-.4"	1.2/1.6 N	.0002"	.0008"	8.9	19	35		Fig. 2	£530.00
209-455	0-.8"	1.1/1.6 N	.0005"	.0015"	24.7	24.6	81		Fig. 2	£514.00
Measuring contacts: Carbide ball ø.118"										
209-916	0-2"	0.8/1.7 N	.001"	.002"	30	30	167	.118/.118"	Fig. 2	£618.00
209-917						—	169		Fig. 4	£618.00



Unit: mm



Unit: mm

L : Maximum reach of contact arms over workpiece
 A : Maximum penetration depth of upper contact
 B : Maximum penetration depth of lower contact

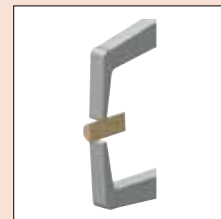


Figure 1

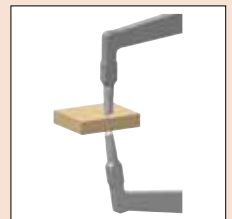


Figure 2

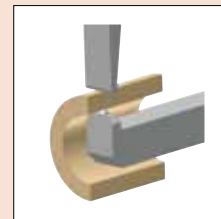


Figure 3

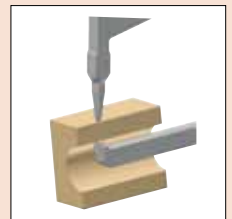


Figure 4

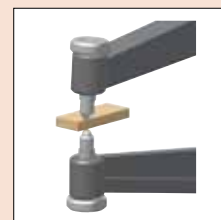


Figure 5

SERIES 209 – Digimatic Coolant Proof Inside Caliper Gauge

- Versatile gauge for measuring internal groove diameter.

Functions

Mode key, SET key, DATA key, ON/OFF/0-Preset, Max. reading, Min. reading, ABS/INC switchable, Display hold, Data output, Direction switching, Tolerance LED (green/red), Tolerance judgement

Optional Accessories

- 937387:** SPC data cable (1 m)
£32.90
- 965013:** SPC data cable (2 m)
£39.10
- 02AZD790E:** SPC data cable for U-WAVE-T (160 mm)
£52.20
- 06ADV380E:** USB Input tool direct cable (2 m)
£90.80

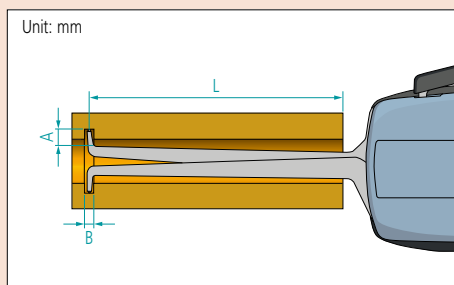
IP67



209-551



209-558



Unit: mm
L : Maximum reach of contact arms over workpiece
A : Maximum groove depth
B : Maximum groove width

SPECIFICATIONS

Inch/Metric										
Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price	
Measuring contacts: Carbide ball $\phi 0.6$ mm										
209-551	5 - 15 mm	0.8/1.2 N	0.005 mm	0.015 mm	2.3	0.8	35	Fig. 3	£620.00	
Measuring contacts: Carbide ball $\phi 1$ mm										
209-552	10 - 30 mm	1.1/1.6 N	0.01 mm	0.03 mm	5.2	1.2	85	Fig. 3	£545.00	
209-904	13 - 43 mm	1.2/1.7 N	0.02 mm	0.04 mm	5.9	5.9	127	Fig. 1	£561.00	
209-556	50 - 70 mm	1.1/1.6 N	0.01 mm	0.03 mm	8.3	1.2	85	Fig. 2	£545.00	
209-558	70 - 90 mm								£545.00	

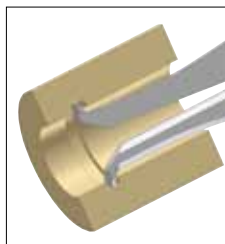


Figure 1

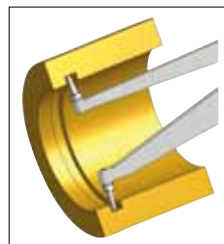


Figure 2

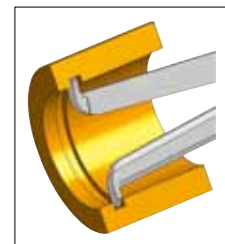


Figure 3

Instruments

SERIES 209 – Coolant Proof Inside Dial Caliper Gauge

- Versatile gauge for measuring internal groove diameter.

IP65



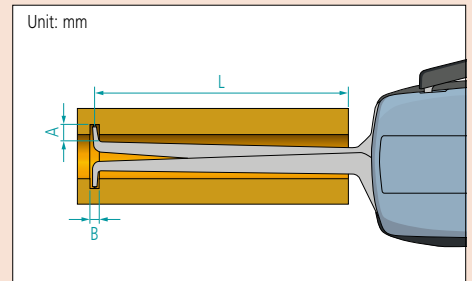
209-300



209-305

SPECIFICATIONS

Metric									
Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price
Measuring contacts: Carbide bevel									
209-300	2.5 - 12.5 mm	0.8/1.2 N	0.005 mm	0.015 mm	0.7	0.4	12	Fig. 1	£470.00
Measuring contacts: Carbide ball $\phi 0.6$ mm									
209-301	5 - 15 mm	0.8/1.2 N	0.005 mm	0.015 mm	2.3	0.8	35	Fig. 4	£403.00
Measuring contacts: Carbide ball $\phi 1$ mm									
209-302	10 - 30 mm	1.1/1.6 N	0.01 mm	0.03 mm	5.2	1.2	85	Fig. 4	£530.00
209-303	20 - 40 mm				7			Fig. 2	£530.00
209-304	30 - 50 mm				Fig. 3			£530.00	
209-305	40 - 60 mm				Fig. 3			£460.00	
209-306	50 - 70 mm				Fig. 3			£460.00	
209-307	60 - 80 mm				Fig. 3			£531.00	
209-308	70 - 90 mm				Fig. 3			£531.00	
209-309	80 - 100 mm				Fig. 3			£563.00	
Inch									
Code No.	Range	Measuring force	Graduation	Accuracy	A	B	L	Type	Price
Measuring contacts: Carbide bevel									
209-350	.1 - .5"	0.8/1.2 N	.0002"	.0008"	0.9	0.5	35	Fig. 1	£514.00
209-351	.2 - .6"				4.6	0.8			£514.00
Measuring contacts: Carbide ball $\phi 0.394$ "									
209-352	.4 - 1.2"	1.1/1.6 N	.0005"	.0015"	5.3	1.8	84	Fig. 1	£514.00
209-354	.8 - 1.6"				7.4	3.3		Fig. 2	£433.00
209-356	1.6 - 2.4"				12.2	1.8		Fig. 3	£514.00



L : Maximum reach of contact arms over workpiece
 A : Maximum groove depth
 B : Maximum groove width

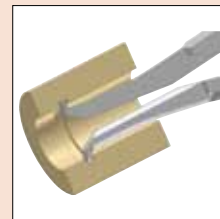


Figure 1

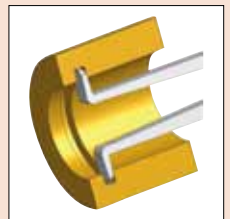


Figure 2

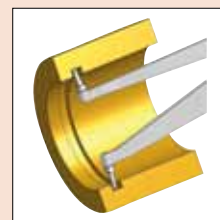


Figure 3

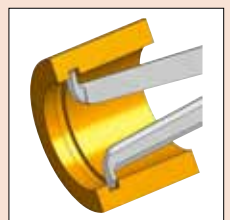
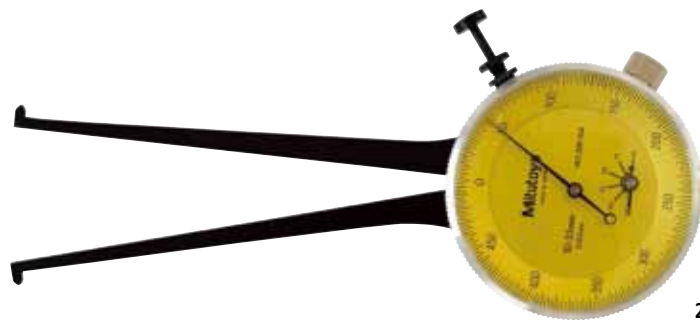


Figure 4

SERIES 209 – Inside Dial Caliper Gauge

- Dial caliper gauges are inside diameter measurement tools, which have a broader range of applications including the measurement of hole diameter and internal measurement of special shapes (grooves).



209-106

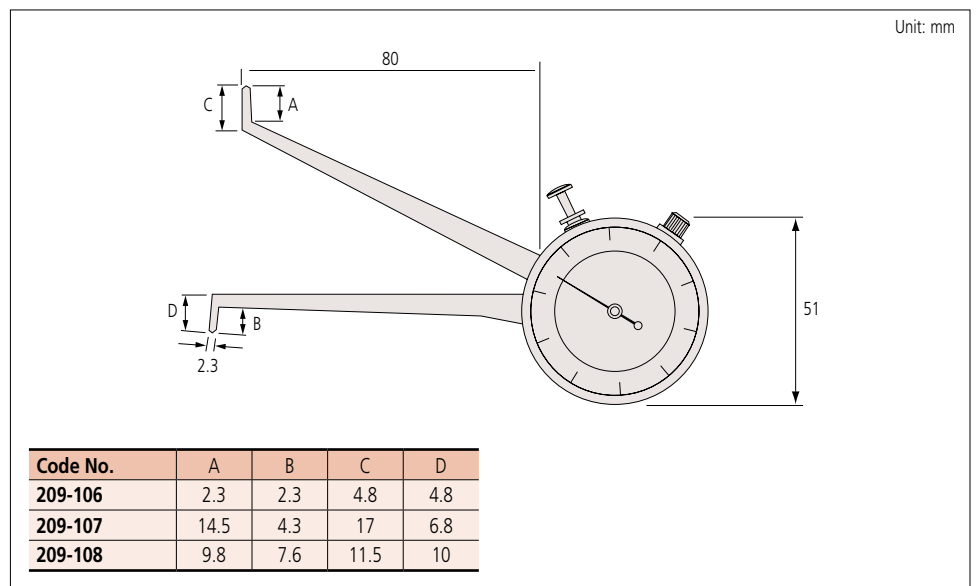


209-117

SPECIFICATIONS

Metric				
Code No.	Range	Graduation	Accuracy	Price
209-106	10 - 35 mm	0.025 mm	±0.04 mm	£150.00
209-107	30 - 55 mm			£182.00
209-108	50 - 75 mm			£217.00
Inch				
Code No.	Range	Graduation	Accuracy	Price
209-116	.4 - 1.4"	.001"	±.02"	£150.00
209-117	1.2 - 2.2"			£182.00
209-118	2 - 3"			£217.00

DIMENSIONS



Instruments

SERIES 201 – Dial Snap Gauges

- Designed for quick GO/NG judgement of diameters of cylinders and shafts in machining processes.
- Wide (13.5 x 12 mm/1.53 x 47"), flat carbide anvils.
- Anvil retracting stroke: 2 mm/.080"
Anvil positioning range: 25 mm/1"
- Adjustment nut: adjusts the measuring range.
- Clamp: adjustment nut.
- Flatness of measuring face: 1 µm.
- Stability of indication: 2 µm or less (stability of indicators is not included).
- The dial indicator and protection cover are optional. Also, some dial indicators and protection covers cannot be used with the dial snap gauge. Consult Mitutoyo before using dial indicators which are not recommended.



201-101

Note: The dial indicator and protection cover are optional.

SPECIFICATIONS

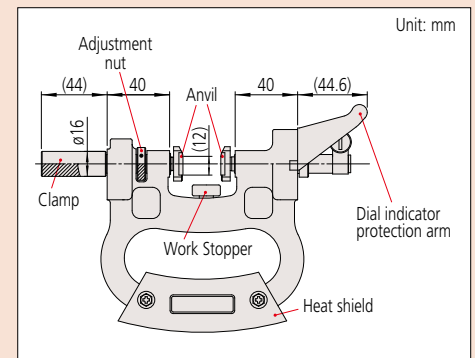
Metric					
Code No.	Range	Parallelism	Measuring force	Recommended dial indicator (optional)	Price
201-101	0 - 25 mm	5 µm	15N±3N	2046SB (0.01 mm reading), 2109SB-10 (0.001 mm reading)	£286.00
201-102	25 - 50 mm				£295.00
201-103	50 - 75 mm				£309.00
201-104	75 - 100 mm				£318.00
201-105	100 - 125 mm				£332.00
201-106	125 - 150 mm				£346.00
201-107	150 - 175 mm				£364.00
201-108	175 - 200 mm				£378.00
201-109	200 - 225 mm				£398.00
201-110	225 - 250 mm				£417.00
201-111	250 - 275 mm				£427.00
201-112	275 - 300 mm				£445.00

Inch					
Code No.	Range	Parallelism	Measuring force	Recommended dial indicator (optional)	Price
201-151	0 - 1"	.0002"	15N±3N	2803SB-10 (.0001" reading)	£286.00
201-152	1 - 2"				£295.00
201-153	2 - 3"				£309.00
201-154	3 - 4"				£318.00
201-155	4 - 5"				£332.00
201-156	5 - 6"				£346.00
201-157	6 - 7"				£364.00
201-158	7 - 8"				£378.00
201-159	8 - 9"				£398.00
201-160	9 - 10"				£417.00
201-161	10 - 11"				£427.00
201-162	11 - 12"				£445.00

Optional Accessories

- 21DZA000:** Dial protection cover
£7.20
- 2046SB:** Dial indicator (graduation: 0.01 mm)
£26.40
- 2109SB-10:** Dial indicator (graduation: 0.001 mm)
£67.50
- 2803SB-10:** Dial indicator (graduation: .0001")
£92.50

DIMENSIONS



Stands

SERIES 7 – Dial Gauge Stands

- Dial Gauge Stands are designed for comparison measurements of size using a dial indicator or Digimatic Indicator.
- Vertical fine adjustment is available with one-touch control thanks to the parallel spring suspension.



7001-10

7002-10

7007-10

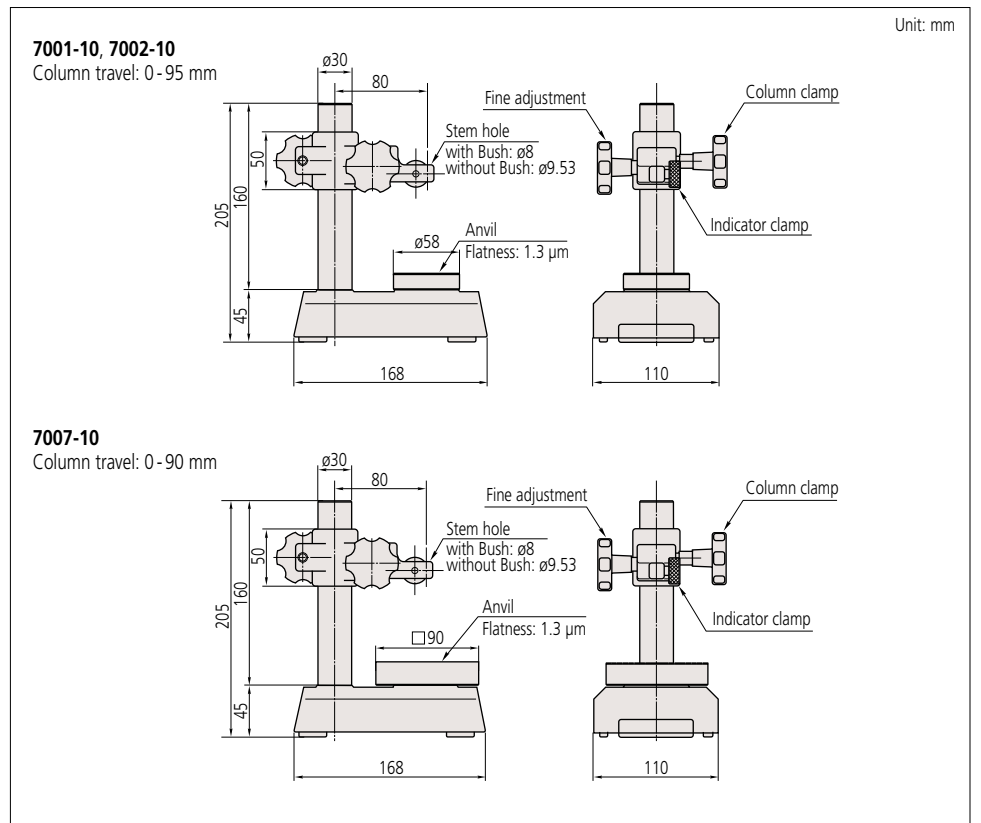
SPECIFICATIONS

Metric			
Code No.	Acceptable stem sizes	Remarks	Price
7001-10	ø8 mm, ø9.53 mm	With ø58 mm serrated anvil	£389.00
7002-10		With ø58 mm flat anvil	£364.00
7007-10		With 90 mm square anvil	£399.00

Note: Perpendicularity of the mounting hole to the anvil: less than 0.4 mm/100 mm.

Consult us when mounting Mitutoyo's Linear Gauge on this stand. We will check the operation of the stand and Linear gauge before shipment (made-to-order).

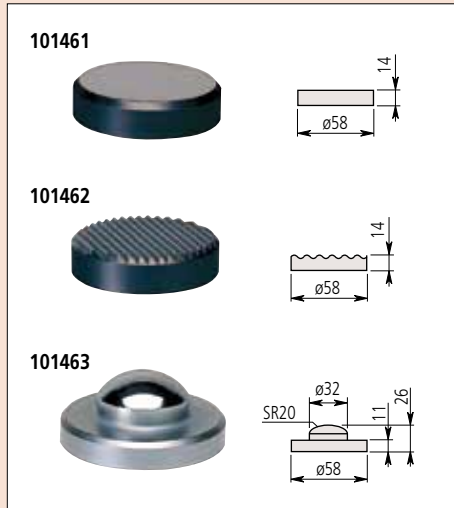
DIMENSIONS



Optional Accessories

- 101461: Hardened steel flat anvil
£36.90
- 101462: Hardened steel serrated anvil
£40.30
- 101463: Hardened steel domed anvil*
£51.70

* Not available for 7007-10.



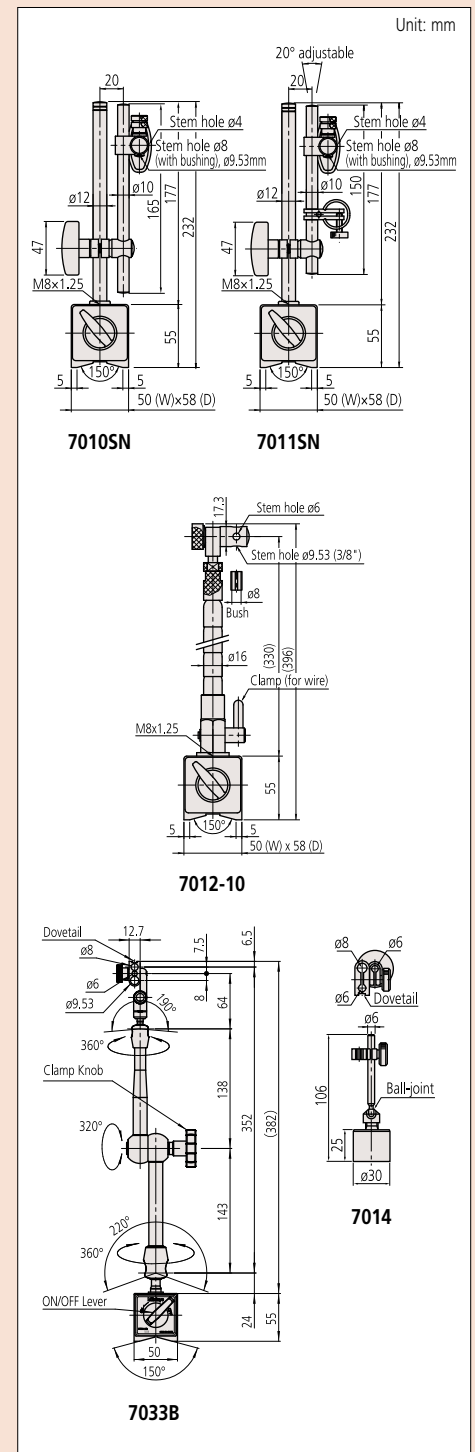
Stands

SERIES 7 – Magnetic Stands

- Mitutoyo's Magnetic Stands accept all dial indicators and dial test indicators (with stem $\varnothing 6$ mm or $\varnothing 8$ mm) and clamp to iron or steel surfaces with a strong magnetic force.



DIMENSIONS



SPECIFICATIONS

Code No.	Description	Acceptable stem sizes	Dovetail groove	Remarks	Price
7010SN	Magnetic stand	$\varnothing 4$ mm, $\varnothing 8$ mm, $\varnothing 9.53$ mm ($\varnothing 3/8$ ")	—	—	£58.50
7011SN				With fine adjustment	£61.30
7012-10	Flexible column stand	$\varnothing 4.5$ mm, $\varnothing 8$ mm ($\varnothing 3/8$ ")	Provided	—	£125.00
7014	Mini magnetic stand	$\varnothing 6$ mm, $\varnothing 8$ mm	Provided	Without magnet ON/OFF	£53.50
7033B	Universal magnetic stand	$\varnothing 6$ mm, $\varnothing 8$ mm, $\varnothing 9.53$ mm ($\varnothing 3/8$ ")	Provided	With mechanical locking system	£143.00

SERIES 215 – Comparator Stands

Optional Accessories

- 21JAA329:** ø8 mm bush*
£20.20
- 21JAA330:** ø9.53 mm (3/8") bush*
£20.20
- 21JAA331:** ø15 mm bush*
£10.90

* Only available for 215-505-10.



Application example using Digimatic Indicator ID-H.

- Comparator Stands have a very stable, cast iron base which enables precise measurement.
- The partially serrated anvil prevents very flat workpieces from wringing to it and the 2.3 µm flatness (or better) promotes accurate measurement.

- The **215-505-10** model has a threaded column which enables easy and precise coarse adjustment.
- Serrated anvils 110 x 110 mm are supplied with **215-405-10**, and 150 x 150 mm with **215-505-10** models.



215-405-10



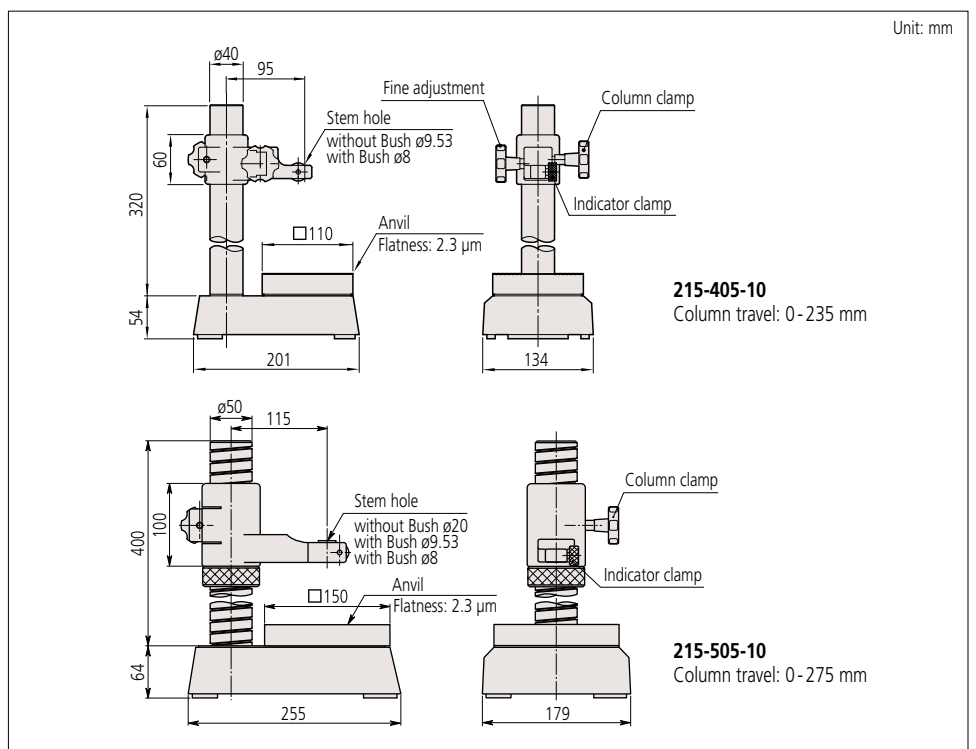
215-505-10

SPECIFICATIONS

Code No.	Square anvil size (W x D)	Column travel	Acceptable stem sizes	Remarks	Price
215-405-10	110 x 110 mm	235 mm	ø8 mm, ø9.53 mm	With fine adjustment of 1 mm range	£500.00
215-505-10	150 x 150 mm	275 mm	ø8 mm, ø9.53 mm, ø20 mm	With fine adjustment over the entire travel	£656.00

Note: Perpendicularity of the mounting hole to the anvil: less than 0.4 mm / 100 mm

DIMENSIONS



Stands

SERIES 519 – Transfer Stand

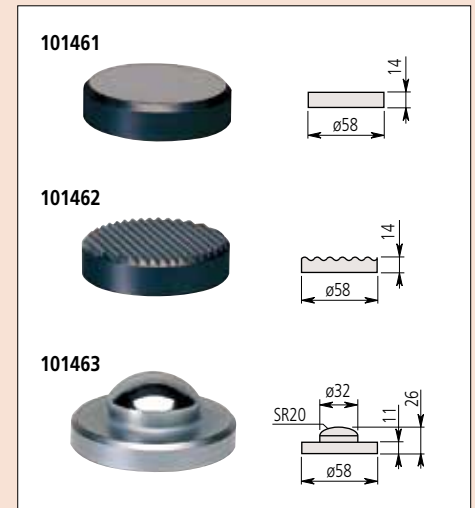
- Transfer Stands are designed for comparison measurements of size using a dial indicator or Digimatic Indicator.



519-109-10
(with a serrated anvil)

Optional Accessories

- 101461:** Hardened steel flat anvil
£36.90
- 101462:** Hardened steel serrated anvil
£40.30
- 101463:** Hardened steel domed anvil
£51.70

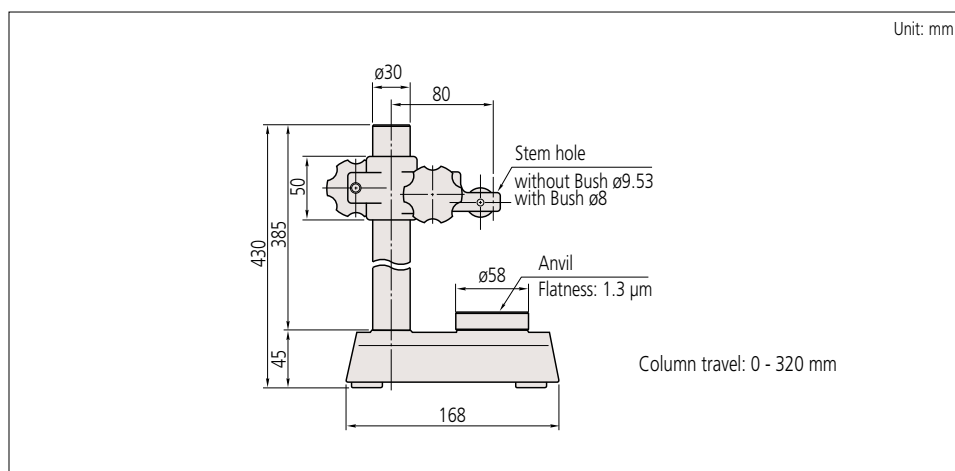


SPECIFICATIONS

Metric			
Code No.	Acceptable stem sizes	Remarks	Price
519-109-10	ø8 mm, ø9.53 mm	With serrated anvil	£512.00

Note: Perpendicularity of the mounting hole to the anvil: less than 0.4 mm / 100 mm.

DIMENSIONS



SERIES 181 – V-Block Set

- Two V-blocks per set.

Accuracy

	Mitutoyo	Reference JIS B 7540 Grade 1, 100 mm or less	
Bottom-surface flatness	2 μm or less	10 μm or less	
V-surface flatness			
Parallelism between the bottom-surface and the cylinder on the V-surface	7.5 μm or less		
Inclination of the V-anvil against the bottom-surface	10 μm or less		
Parallelism between the side surface and the cylinder on the V-surface	7.5 μm or less		20 μm or less
Difference in the height of a pair of V-blocks	9 μm or less		10 μm or less

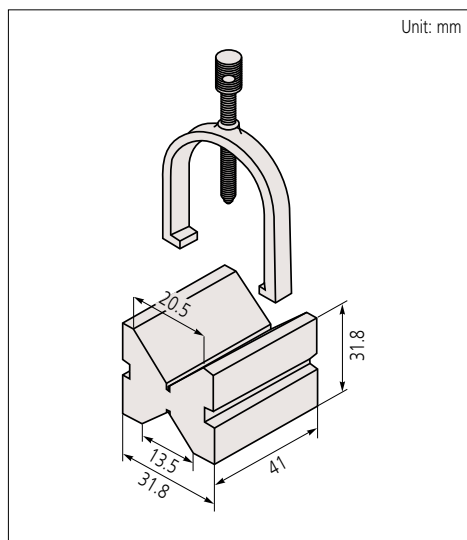


181-902-10

SPECIFICATIONS

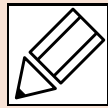
Metric			
Code No.	Max. workpiece dia.	Remarks	Price
181-902-10	25 mm	With clamp	£124.00
Inch			
Code No.	Max. workpiece dia.	Remarks	Price
181-901-10	1"	With clamp	£124.00

DIMENSIONS



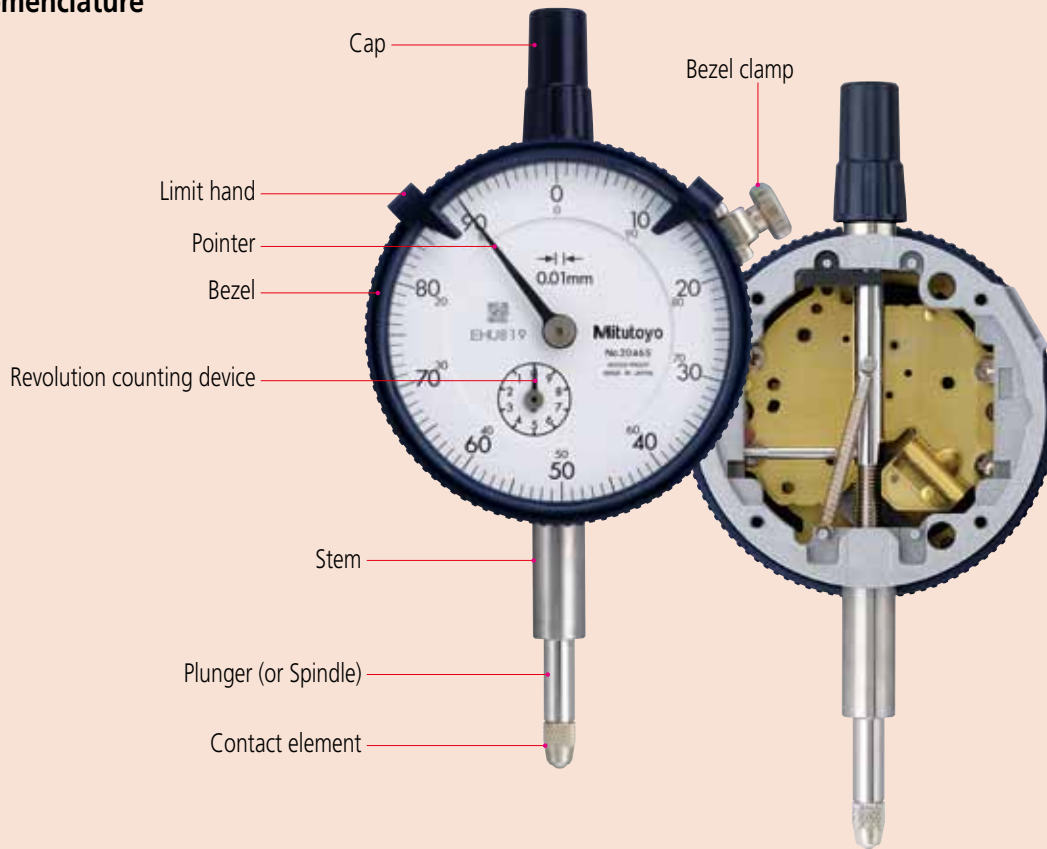
Application example.

Quick Guide to Precision Measuring Instruments



Dial Gauges and Digital Indicators

Nomenclature



Dial Faces

0.01 mm



Continuous dial
(Bi-directional graduation)



Balanced dial (Multi-revolution)



Continuous dial (Reverse reading)



Balanced dial (One revolution)

0.001 mm



Continuous dial
(Standard scale spacing)



Balanced dial (Multi-revolution)



Continuous dial (Double scale spacing)



Balanced dial (One revolution)

- Continuous dial: For direct reading
- Balanced dial: For reading the difference from a reference surface
- Reverse reading dial: For depth or bore gauge measurement
- One revolution dial: For error-free reading of small differences

Mitutoyo's Response to Dial Indicator Standard B7503: 2011

- We guarantee the accuracy of completed products by inspecting them in the vertical posture. Standard-attached inspection certificate includes inspection data.
- We issue paid-for inspection certificates for horizontal or opposite posture if required.
- The old JIS Standard indicates that "the uncertainty of calibration" is evaluated inclusively. On the other hand, the new JIS Standard indicates that conformity or nonconformity to specification is verified based on JIS B 0641-1 and that it is preferred that the uncertainty is evaluated based on ISO/TS 14253-2 and ISO/IEC Guide 98. Therefore, we perform shipping inspection of dial indicators inclusive of the uncertainty of calibration as usual.

Dial Indicator Standard B7503 : 2011 (Extract from JIS/Japanese Industrial Standards)

Item	Calibration method	Diagram of calibration setup in vertical posture (example)	Tools for calibration (example)
Indication error	Hold the dial indicator with its plunger set vertically downward, retract the plunger (retraction direction) to set the dial hand at the zero point, and determine the indication error at the below-mentioned measurement points with reference to the dial graduations. - Every 1/10 revolution for the first two revolutions - Every half revolution for the next five revolutions - Every revolution for the next 25 revolutions - Every 5 revolutions for after the 25th revolution For one revolution type dial indicators and indicators whose graduations are not factors of 10, determine the indication errors at the closest measurement points mentioned above.		For 0.01 mm graduation dial indicators: A micrometer head or other measuring unit with 0.5 μm graduation or less and instrumental error of ±1 μm and a supporting stand. For dial indicators other than the above: A micrometer head or other measuring unit with 1 μm graduation or less and ±1 μm instrumental error and a supporting stand.
Retrace error	Next, retract the plunger more than three graduations over the entire measuring range, reverse the plunger displacement (extension direction), and determine the indication errors at the same points measured during plunger retraction. Then determine the indication errors and the retrace errors with reference to the bidirectional indication errors thus obtained. When automatically reading errors by automatic inspection machine, determine the gap between the dial hand and the graduation mark with reference to the displacement of the measuring instrument.		
Repeatability	Apply the contact point of the dial indicator perpendicularly to the upper face of a measuring stage, retract and extend the plunger quickly and slowly five times at a desired position within the measuring range and determine the maximum difference between the five indications obtained.		Measuring stage Supporting stand
Measuring Force	Holding a dial indicator, retract and extend the plunger continuously and gradually, and measure the measuring force at the zero, middle and end points in the measuring range. The largest value: maximum measurement force The smallest value: minimum measurement force The maximum difference in contact force measured when the plunger is retracting and extending at the same measuring position: difference in the measurement force		Supporting stand Top pan type spring scale (graduation: 0.02 N or less) or force gauge (sensitivity: 0.02 N or less)

Maximum Permissible Error

Graduation (mm)	Maximum permissible error (MPE) by measurement characteristics -- dial indicators with the bezel dia. 50 mm or more												Maximum permissible error (MPE) by measurement characteristics --dial indicators with the bezel dia. 50 mm or less and back plunger type dial indicators							
	0.01								0.005	0.001			0.01			0.005	0.002	0.001		
Measuring range (mm)	1 or less	Over 1 and up to 3	Over 3 and up to 5	Over 5 and up to 10	Over 10 and up to 20	Over 20 and up to 30	Over 30 and up to 50	Over 50 and up to 100	5 or less	1 or less	Over 1 and up to 2	Over 2 and up to 5	1 or less	Over 1 and up to 3	Over 3 and up to 5	Over 5 and up to 10	5 or less	1 or less	1 or less	
Retrace error	3	3	3	3	5	7	8	9	3	2	2	3	4	4	4	5	3.5	2.5	2	
Repeatability	3	3	3	3	4	5	5	5	3	0.5	0.5	1	3	3	3	3	3	1	1	
Indication error	Arbitrary 1/10 revolution	5	5	5	5	8	10	10	12	5	2	2	3.5	8	8	8	9	6	2.5	2.5
	Arbitrary 1/2 revolution	8	8	9	9	10	12	12	17	9	3.5	4	5	11	11	12	12	9	4.5	4
	Arbitrary One revolution	8	9	10	10	15	15	15	20	10	4	5	6	12	12	14	14	10	5	4.5
	Entire measuring range	8	10	12	15	25	30	40	50	12	5	7	10	15	16	18	20	12	6	5

MPE for one revolution type dial indicators does not define the indication error of arbitrary 1/2 and 1 revolution.

Notes: (1) Values in the table above apply at 20°C, which JIS B0680 defines as the standard temperature.

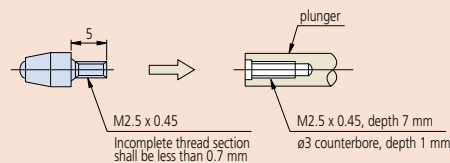
(2) The measurement characteristics of a dial indicator have to meet both maximum permissible error (MPE) and measurement force permissible limits (MPL) at any position within the measuring range in any posture when the measurement characteristics are not specified by the manufacturer.

■ Mounting a Dial Gauge

Stem mounting	Method	<p>Clamping the stem directly with a screw</p>	<p>Clamping the stem by split-clamp fastening</p>
	Note	<ul style="list-style-type: none"> • Mounting hole tolerance: $\phi 8G7(+0.005 \text{ to } 0.02)$ • Clamping screw: M4 to M6 • Clamping position: 8 mm or more from the lower edge of the stem • Maximum clamping torque: 150 N·cm when clamping with a single M5 screw • Note that excessive clamping torque may adversely affect plunger movement. 	<ul style="list-style-type: none"> • Mounting hole tolerance: $\phi 8G7(+0.005 \text{ to } 0.02)$
Lug mounting	Method		
	Note	<ul style="list-style-type: none"> • Lugs can be changed 90 degrees in orientation according to the application. (The lug is set horizontally when shipped.) • Lugs of some Series 1 models (No. 1911, 1913-10 & 1003), however, cannot be altered to horizontal. • To avoid cosine-effect error, ensure that any type of gauge or indicator is mounted with its plunger in line with the intended measurement direction. 	

■ Contact Element

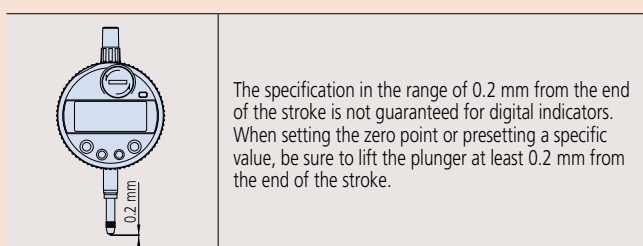
- Screw thread is standardized on M2.5x0.45 (Length: 5 mm).
- Incomplete thread section at the root of the screw shall be less than 0.7 mm when fabricating a contact point.



■ Effect of Orientation on Measuring Force

Position	Remarks
Contact element down (normal position)	—
Plunger horizontal (lateral position)	If measurement is performed with the plunger horizontal or contact element up, the measuring force is less than when the contact element is down. In this case be sure to check the operation and repeatability of the indicator or digital display. For guaranteed-operation specifications according to positions of digital indicators and dial gauges, refer to the product descriptions in a general catalogue.
Contact element up (upside-down position)	

■ Setting the Origin of a Digital Indicator



■ Care of the Plunger

- Do not lubricate the plunger. Doing so might cause dust to accumulate, resulting in a malfunction.
- If the plunger movement is poor, wipe the upper and lower plunger surfaces with a dry or alcohol-soaked cloth. If the movement is not improved by cleaning, contact Mitutoyo for repair.
- Before making a measurement or calibration, confirm if the plunger moves upward and downward smoothly, and test the repeatability of the zero point.

Dial Test Indicator Standard B7533-1990 (Extract from JIS/Japanese Industrial Standards)

No.	Item	Calibration method	Diagram of calibration setup	Tools for calibration
1	Wide-range accuracy	(1) For an indicator of 0.01 mm graduation: Displace the contact point so as to move the pointer clockwise in increments of 0.1 mm with reference to the graduations from the zero point to the end point of the measuring range while taking readings of the calibration tool at each point and determine this accuracy from the error curve drawn by plotting the differences of each "indicator reading - calibration tool reading".		Micrometer head or measuring unit (graduation: 1 μm or less, instrumental error: within ±1 μm), supporting stand
2	Adjacent error	(2) For an indicator of 0.002 mm graduation: Displace the contact point so as to move the pointer clockwise in increment of 0.02 mm with reference to the graduations from the zero point to the end point of the measuring range while taking readings of the calibration tool at each point and determine this accuracy from the error curve drawn by plotting the differences of each "indicator reading - calibration tool reading". The instrumental error of the calibration tool shall be compensated prior to this measurement.		
3	Retrace error	After the completion of the wide-range accuracy measurement, reverse the contact point from the last point of measurement while taking readings at the same scale graduations as for the wide-range accuracy measurement and determine the retrace error from the error curve plotted.		
4	Repeatability	a		Measuring stage, Supporting stand, and Gauge block of grade 1 as stipulated by JIS B7506 (Gauge block)
		b	Holding the stylus parallel to a gauge block placed on the measuring stage, move the gauge block to and fro and left to right under the contact point within the measuring range and determine the maximum difference in indication.	
5	Measuring force	Holding an indicator by the case or stem, displace the contact point gradually and continuously in the forward and backward directions respectively and take a reading of measuring force at the zero, middle and end points of the measuring range in each direction. <ul style="list-style-type: none"> • Performance The maximum measuring force in the forward direction shall not exceed 0.5 N. The difference between the maximum and minimum measuring forces in one direction shall not exceed 0.2 N (20 gf). Note that the smallest possible measuring force is desirable for indicators.		Top pan type spring scale (graduation: 2 gf or less) or force gage (sensitivity: 0.02 N or less)

Notes: There are no JIS standards applicable to models with a graduation of 0.001 mm. Therefore, referring to JIS B 7533-1990 for inspecting the wide-range accuracy and adjacent error, the accuracy is measured by moving the contact point 0.01 mm clockwise from the start point of the measuring range to the end point with reference to the graduations.

Accuracy of indication

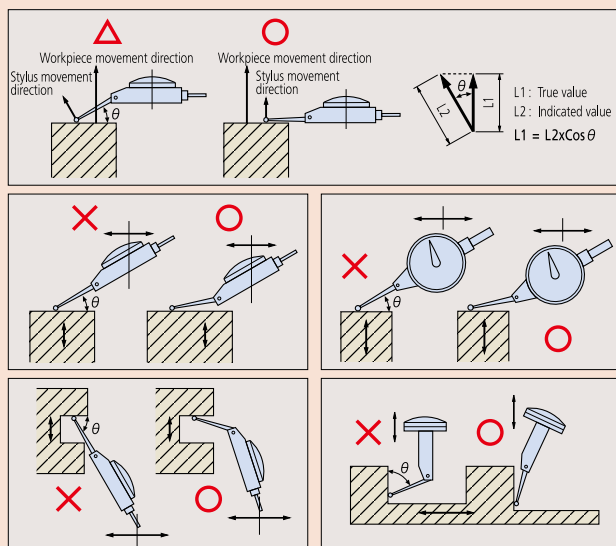
Permissible indication errors of dial test indicators are as per the table below.

Graduation (mm)	Measuring range (mm)	Wide range accuracy	Adjacent error	Repeatability	Retrace error
0.01	0.5	5	5	3	3
	0.8	8			4* ¹
	1.0	10			
0.002	0.2	3	2	1	2
	0.28				

*1: Applies to indicators with a stylus over 35 mm long.
Remarks: Values in the table above apply at 20°C.

Dial Test Indicators and the Cosine Effect

Always minimize the angle between movement directions during use.



The reading of any indicator will not represent an accurate measurement if its measuring direction is misaligned with the intended direction of measurement (cosine effect). Because the measuring direction of a dial test indicator is at right angles to a line drawn through the contact point and the stylus pivot, this effect can be minimized by setting the stylus to minimize angle θ (as shown in the figures). If necessary, the dial reading can be compensated for the actual θ value by using the table below to give the true value of a measurement.
True value = indicated value x compensation factor

Compensating for a non-zero angle

Angle	Compensation factor
10°	0.98
20°	0.94
30°	0.86
40°	0.76
50°	0.64
60°	0.50

Examples

If a 0.200 mm measurement is indicated on the dial at various values of θ , the true values are:

For $\theta = 10^\circ$, 0.200 mm x .98 = 0.196 mm

For $\theta = 20^\circ$, 0.200 mm x .94 = 0.188 mm

For $\theta = 30^\circ$, 0.200 mm x .86 = 0.172 mm

Note: A special contact point of involute form can be used to apply compensation automatically and allow measurement to be performed without manual compensation for any angle θ from 0 to 30°. (This type of contact point is custom-made.)