

Calipers

An industry standard measuring tool

ABSOLUTE Coolant Proof Caliper SERIES 500 — with Dust/Water Protection Conforming to IP67 Level

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- ABS Coolant Proof Caliper with Dust/Water Protection conforming to IP67 Level. Can be used in workshop conditions exposed to coolant, water, dust or oil. 100 % air-leak test ensures every caliper conforms to IP67.
- Large characters on the display provide better visibility, and high-contrast LCD reduces eyestrain.
- Easy to use — advanced ergonomic design uses only 1 button.
- The automatic power-on/off function shuts down the LCD display after 20 minutes inactivity, but the ABS scale origin is unaffected. Power is restored to the display when the slider is moved.

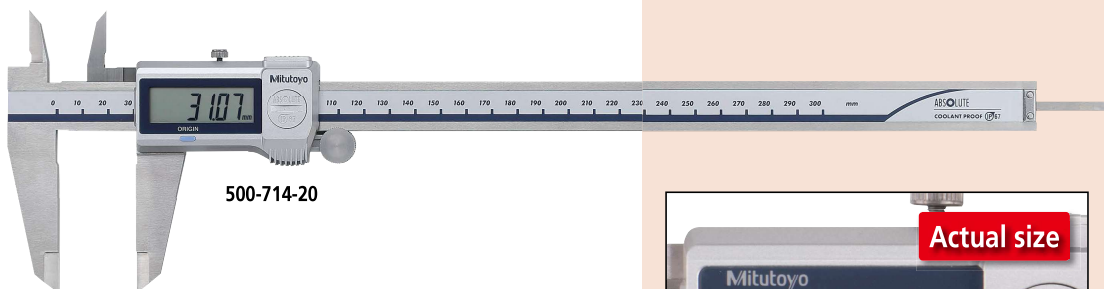
- Incorporates Mitutoyo's ABSOLUTE measurement system. No need to reset the origin.
- Allows step measurement.
- Battery cap does not require a screw driver for battery replacement (except for 0 to 300 mm/0 to 12 inch models).
- Extended battery life of Approx. 5 years due to low current integrated circuit (except for 0 to 300 mm/0 to 12 inch models).
- Can be integrated into statistical process control and measurement systems. (Refer to page A-3.)
- An inspection certificate is supplied as standard. (However, this cannot be used as a calibration certificate as it is undated.)



500-712-20

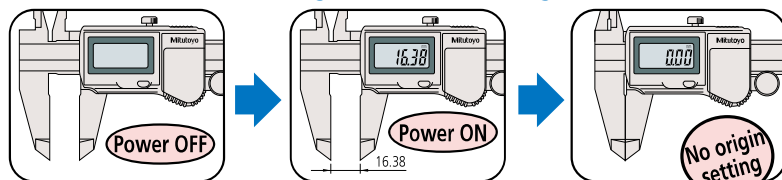


500-713-20



500-714-20

No need to reset the origin after switching on



Optional accessories



Connecting cables for IT/DP/MUX*

05CZA624: SPC cable with data button (1 m)
05CZA625: SPC cable with data button (2 m)

* Cannot be used for other than water resistant type Digital calipers with external output function.



USB Input Tool Direct

06AFM380A: SPC cable for USB-ITN-A (2 m)

U-WAVE-T: 02AZD730G (IP67 type)
02AZD880G (Buzzer type)

Wireless data output U-WAVE/fit

U-WAVE-TC: 264-620 (IP67 type)
264-621 (Buzzer type)

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

ABSOLUTE[™]

IP67



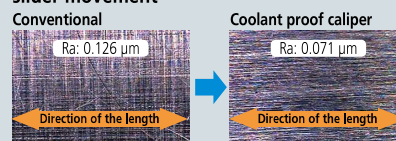
www.tuv.com
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An inspection certificate is supplied as standard. Refer to page U-11 for details.

Smooth slider movement makes for comfortable operation.

High quality guide surface finish for smooth slider movement



Technical Data

- Resolution: 0.01 mm or 0.0005 in/0.01 mm
 - Repeatability: 0.01 mm or 0.0005 in/0.01 mm
 - Quantizing error: Excluding ± 1 count
 - Dust/Water protection level: IP67 (IEC60529)*
 - Scale type: ABSOLUTE electromagnetic induction linear encoder
 - Max. response speed: Unlimited
 - Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
 - Battery life: Approx. 5 years under normal use
- * Although these models are IP67 rated, care should be taken to dry tool after use.



Remarkably easy to read display

U-WAVE-TCB Transmitter (Mitutoyo Bluetooth[®] U-WAVE)

264-624 (IP type)

264-625 (Buzzer type)

Refer to page A-15 for details.

Connecting unit for U-WAVE-TC/TCB

02AZF310 (IP67 type)

02AZF300 (Buzzer type*)

* IP67 model is water/dust-proofed suitable for the factory floor.

Buzzer type is not water/dust-proofed. Refer to pages A-16 and A-18 for details.

Functions

Origin-set: Absolute origin position can be changed.

Data output*: Measurement data output connector allows integration into statistical process control and measurement systems.

* Excludes **500-702-20** and **500-703-20**.

Automatic power on/off: LCD display will turn off after 20 minutes inactivity, but the ABS scale unit origin is stored. Power is restored when the slider is moved.

Alarm: Error message is displayed if error in calculation is found and measurement is stopped. Measurement will not be continued while error is displayed. Also, if the battery voltage becomes low, "B" appears to alert the user before measurement is no longer possible.



IP67 protection level

IP67

First characteristic number	Protection from solid objects (people or things)		Second characteristic number	Protection from liquids (water, etc.)	
	Brief description	Description		Brief description	Description
6	Dust-proof	No ingress of dust allowed.	7	Protected against water penetration.	Ingress of water in quantities causing harmful effects shall not be possible when the enclosure is temporarily immersed in water under standardized conditions of pressure and time.

Note: For details of the test conditions used in evaluating each degree of protection, please refer to the original standard.

SPECIFICATIONS

Metric						
Order No.	Range (mm)	Accuracy (mm)*	Measurement data output port	Mass (g)	Thumb roller	Remarks
500-702-20	0 - 150	±0.02	—	168	✓	—
500-703-20	0 - 200			198		
500-706-20	0 - 150			168		
500-707-20	0 - 200			198		
500-716-20	0 - 150		—	168	—	
500-717-20	0 - 200			198		
500-712-20	0 - 150			168		
500-713-20	0 - 200			198		
500-719-20	0 - 150		✓	168	✓	Depth bar ø1.9 mm
500-721-20	0 - 150			168		Carbide-tipped jaws for outside measurement
500-722-20	0 - 200			198		Carbide-tipped jaws for outside and inside measurement
500-723-20	0 - 150			168		
500-724-20	0 - 200			198		
500-714-20	0 - 300	±0.03	✓	350	✓	—
500-718-20				345	—	
500-704-20			—	350	✓	
500-708-20				345	—	

* Excluding quantizing error of ±1 count in LSD

Inch / Metric						
Order No.	Range (in)	Accuracy*	Measurement data output port	Mass (g)	Thumb roller	Remarks
500-731-20	0 - 6	±.001 in/ ±0.02 mm	—	168	✓	Carbide-tipped jaws for outside measurement
500-732-20	0 - 8			198		Carbide-tipped jaws for outside and inside measurement
500-733-20	0 - 6			168		
500-734-20	0 - 8			198		
500-735-20	0 - 6		✓	168		Carbide-tipped jaws for outside measurement
500-736-20	0 - 8			198		Carbide-tipped jaws for outside and inside measurement
500-737-20	0 - 6			168		
500-738-20	0 - 8			198		
500-752-20	0 - 6		—	168		—
500-753-20	0 - 8			198		
500-762-20	0 - 6		✓	168		—
500-763-20	0 - 8			198		
500-768-20	0 - 6		—	168		Depth bar ø1.9 mm
500-769-20	0 - 6		✓	168		Depth bar ø1.9 mm
500-764-20	0 - 12	±0.0015 in/ ±0.03 mm	✓	350	✓	—
500-754-20			—	350		

* Excluding quantizing error of ±1 count in LSD

DIMENSIONS

Unit: mm						
Range (mm)	A	B	C	D	H	L
0 - 150	16.5	21	14.6	40	16	233
0 - 200	20	24.5	18.1	50		290
0 - 300	22	27.5	19.8	64	20	404
Outside jaw thickness = 3.5 mm for 0 to 150 mm/0 to 200 mm models 3.8 mm for 0 to 300 mm model						

Calipers

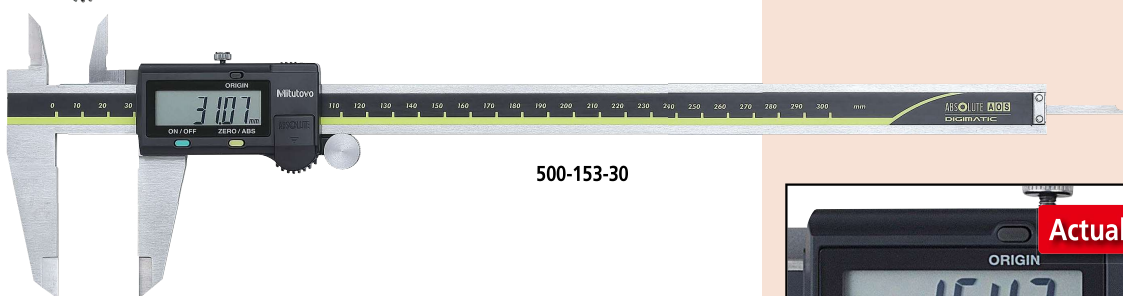
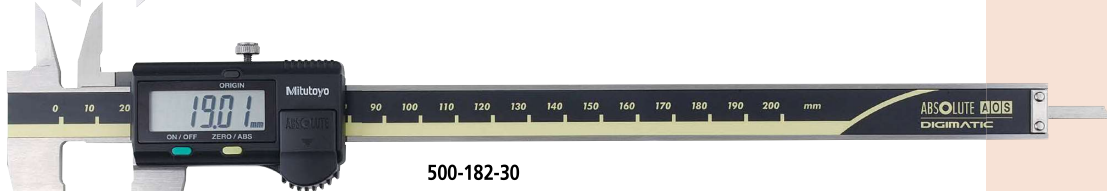
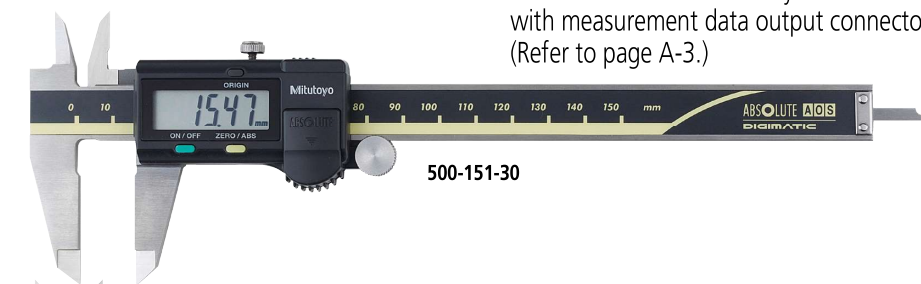
An industry standard measuring tool

ABSOLUTE Digimatic Caliper SERIES 500 — with exclusive ABSOLUTE Encoder Technology

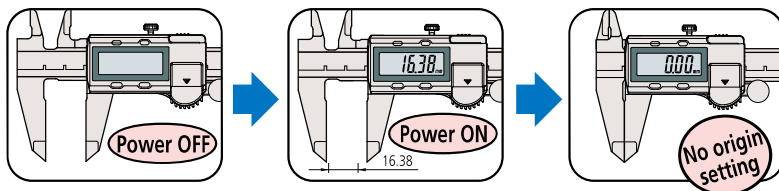
MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- An ABSOLUTE electromagnetic induction linear encoder system is incorporated.
- New ergonomic design with finger rest.
- The ZERO/ABS button allows the display to be Zero-Set at any slider position along the scale for comparison measurements. Scale overspeed-error has been eliminated for maximum reliability.
- Large and clear LCD readout.
- Smooth slider movement makes for comfortable operation.
- Extended battery life of Approx. 5 years due to low current integrated circuit (except for 0 to 300 mm/0 to 12 inch models).
- Allows step measurement.
- Carbide-tipped jaw calipers are optimal for rough finished parts, castings, grinding stones, etc.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector.

(Refer to page A-3.)



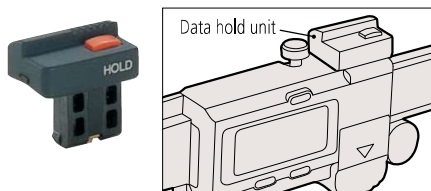
No need to reset the origin after switching on



Optional accessories

Dedicated for the models equipped with a digimatic output function. For details, refer to page A-27.

959143: Data hold unit



Connecting cables for IT/DP/MUX

959149: SPC cable with data button (1 m)

959150: SPC cable with data button (2 m)

USB Input Tool Direct

06AFM380C: SPC cable for USB-ITN-C (2 m)

Connecting cables for U-WAVE-T

02AZD790C: SPC cable with data button (160 mm)

02AZE140C: SPC cable for foot switch

Wireless data output **U-WAVE[®]**
U-WAVE-TC: 264-621 (Buzzer type)

• U-WAVE-TCB Transmitter
(Mitutoyo Bluetooth[®] U-WAVE)
264-625 (Buzzer type)

Refer to page A-15 for details.

Connecting unit for U-WAVE-TC/TCB 02AZF300 (Buzzer type)



MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

ABSOLUTE[™]



Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

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

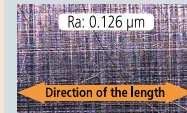
Technical Data

- Accuracy: ± 0.02 mm (≤ 200 mm), ± 0.03 mm (≤ 300 mm) (excluding quantizing error)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Repeatability: 0.01 mm
- Scale type: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 5 years under normal use

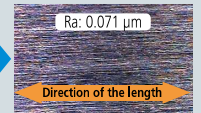
Smooth slider movement makes for comfortable operation.

High quality guide surface finish for smooth slider movement

Conventional
ex. 500-151



ABSOLUTE Digimatic Caliper
ex. 500-151-30



Remarkably easy to read display

Functions

Absolute measurement: After power is turned ON, measurement can be started without zero-setting if origin-setting was previously performed. The Absolute origin position can be changed by the ORIGIN button.

Incremental measurement: Display can be set to zero at any arbitrary position for comparative measurements.

Low-voltage alert: If the battery voltage becomes low, a "B" appears in the display to alert the user before measurement is no longer possible. A battery change advisory alert precedes this alert.

Data output: By using the connecting cable (optional), measurement data can be output.

Data hold: By using the data hold unit (optional), the displayed value can be held. This cannot be used with the data output function.

SPECIFICATIONS

Metric						
Order No.	Range (mm)	Accuracy (mm)*2	Mass (g)	Depth bar	Fine adjustment	Remarks
500-150-30	0 - 100		143	ø1.9 mm rod	with thumb roller	—
500-180-30*1					—	
500-151-30					—	
500-154-30	0 - 150	±0.02	168	Blade	with thumb roller	Carbide-tipped jaws for outside measurement
500-155-30				ø1.9 mm rod	—	Carbide-tipped jaws for outside and inside measurement
500-158-30					—	—
500-181-30*1	0 - 200		198	Blade	with thumb roller	Carbide-tipped jaws for outside measurement
500-152-30					—	Carbide-tipped jaws for outside and inside measurement
500-156-30					—	—
500-157-30					—	—
500-182-30*1	0 - 300	±0.03	350		with thumb roller	—
500-153-30					—	—

*1 Without SPC data output

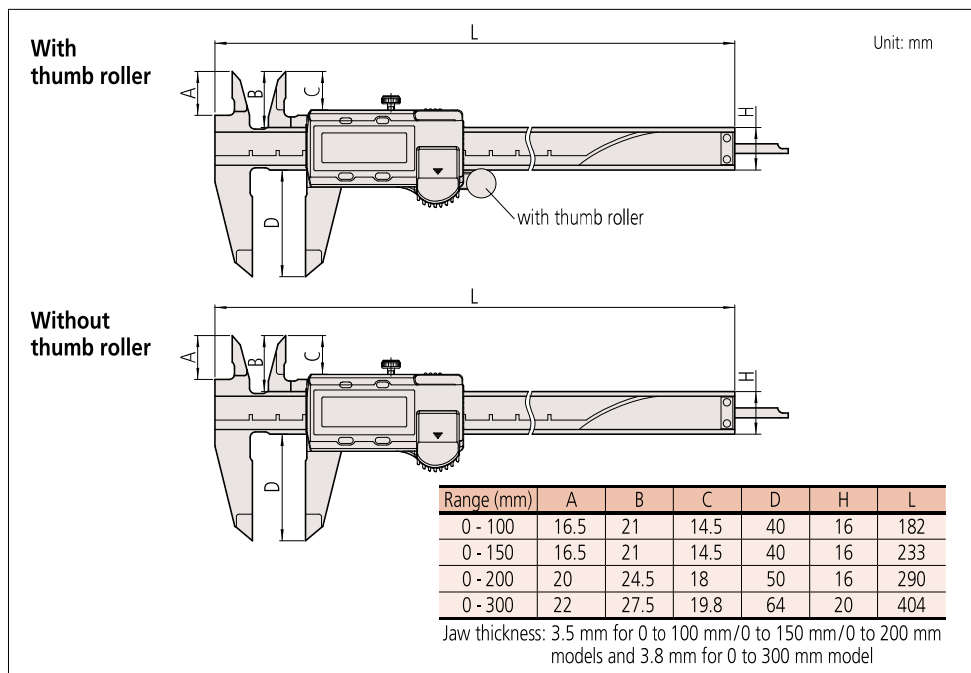
*2 Excluding quantizing error of ±1 count in LSD

Inch / Metric						
Order No.	Range (in)	Accuracy*2	Mass (g)	Depth bar	Fine adjustment	Remarks
500-170-30	0 - 4	±0.001 in/ ±0.02 mm	137	0.075 inch rod	with thumb roller	—
500-195-30*1						
500-171-30						
500-174-30	Blade		Carbide-tipped jaws for outside measurement			
500-175-30			Carbide-tipped jaws for outside and inside measurement			
500-178-30						
500-196-30*1	0.075 inch rod		—			
500-159-30*1			Carbide-tipped jaws for outside measurement			
500-160-30*1			Carbide-tipped jaws for outside and inside measurement			
500-172-30	0 - 8		192	Blade		—
500-176-30		Carbide-tipped jaws for outside measurement				
500-177-30		Carbide-tipped jaws for outside and inside measurement				
500-197-30*1		—				
500-163-30*1		Carbide-tipped jaws for outside measurement				
500-164-30*1		Carbide-tipped jaws for outside and inside measurement				
500-173-30		—				
500-167-30	0 - 12	±0.0015 in/ ±0.03 mm			350	Carbide-tipped jaws for outside measurement
500-168-30						Carbide-tipped jaws for outside and inside measurement
500-193-30*1						—
500-165-30*1			Carbide-tipped jaws for outside measurement			
500-166-30*1			Carbide-tipped jaws for outside and inside measurement			

*1 Without SPC data output

*2 Excluding quantizing error of ±1 count in LSD

DIMENSIONS



Calipers

An industry standard measuring tool

Long ABSOLUTE Digimatic Caliper SERIES 500 — with Exclusive ABSOLUTE Encoder Technology

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

ABSOLUTE[™]

- Long Digital caliper incorporating an ABSOLUTE scale and available with a measuring range from 450 mm to 1000 mm.
- Allows step measurement.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- For details of the Absolute scale and its function, refer to page D-6.



SPECIFICATIONS

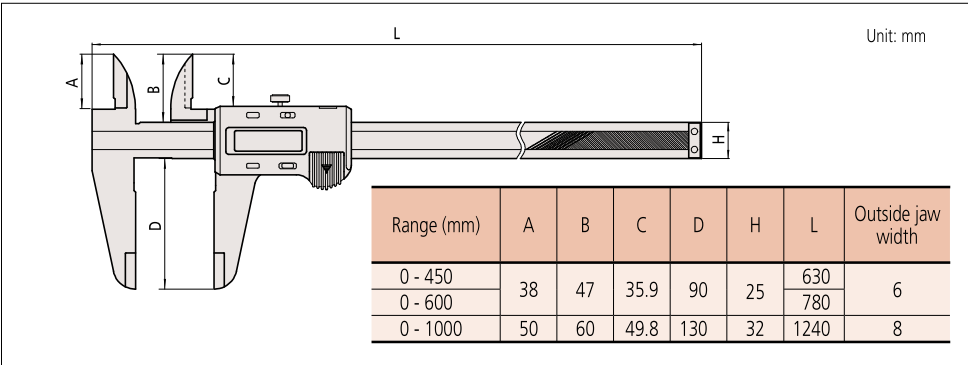
Metric					
Order No.	Range (mm)	Accuracy* (mm)	Resolution (mm)	Repeatability (mm)	Mass (g)
500-500-10	0 - 450	±0.05	0.01	0.01	1170
500-501-10	0 - 600				1350
500-502-10	0 - 1000	±0.07			3300

* Excluding quantizing error.
Note: Without SPC data output

Inch / Metric					
Order No.	Range (in)	Accuracy* (mm)	Resolution	Repeatability (mm)	Mass (g)
500-505-10	0 - 18	±0.05	0.0005 in/0.01 mm	0.01	1170
500-506-10	0 - 24				1350
500-507-10	0 - 40	±0.07			3300

* Excluding quantizing error.
Note: Without SPC data output

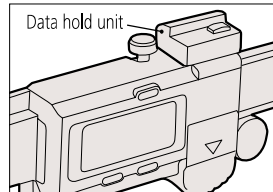
DIMENSIONS



Optional accessories

Dedicated for the models equipped with a digimatic output function. For details, refer to page A-27.

959143: Data hold unit



Connecting cables for IT/DP/MUX

959149: SPC cable with data button (1 m)

959150: SPC cable with data button (2 m)



USB Input Tool Direct

06AFM380C: SPC cable for USB-ITN-C (2 m)

Connecting cables for U-WAVE-T

02AZD790C: SPC cable with data button (160 mm)

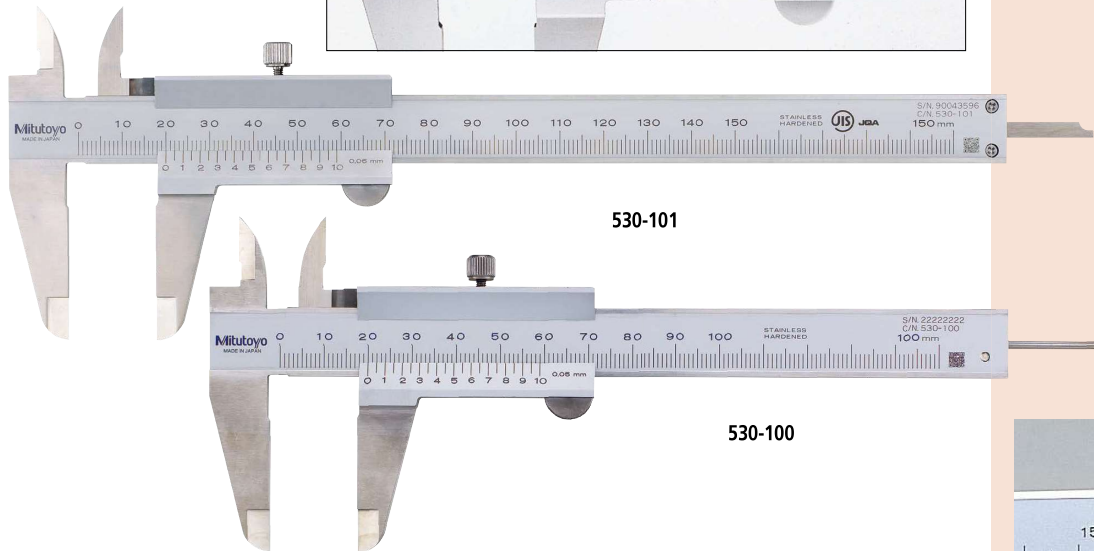
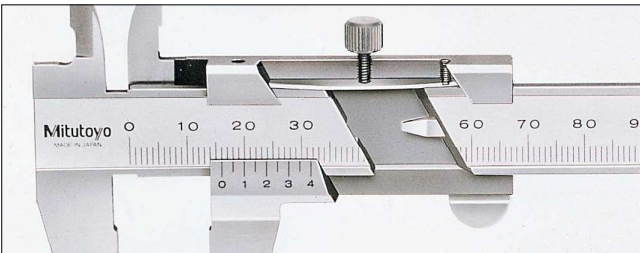
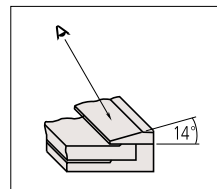
02AZE140C: SPC cable for foot switch

Calipers

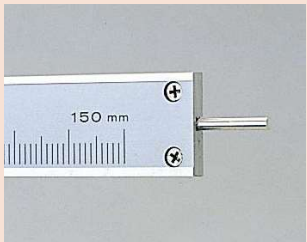
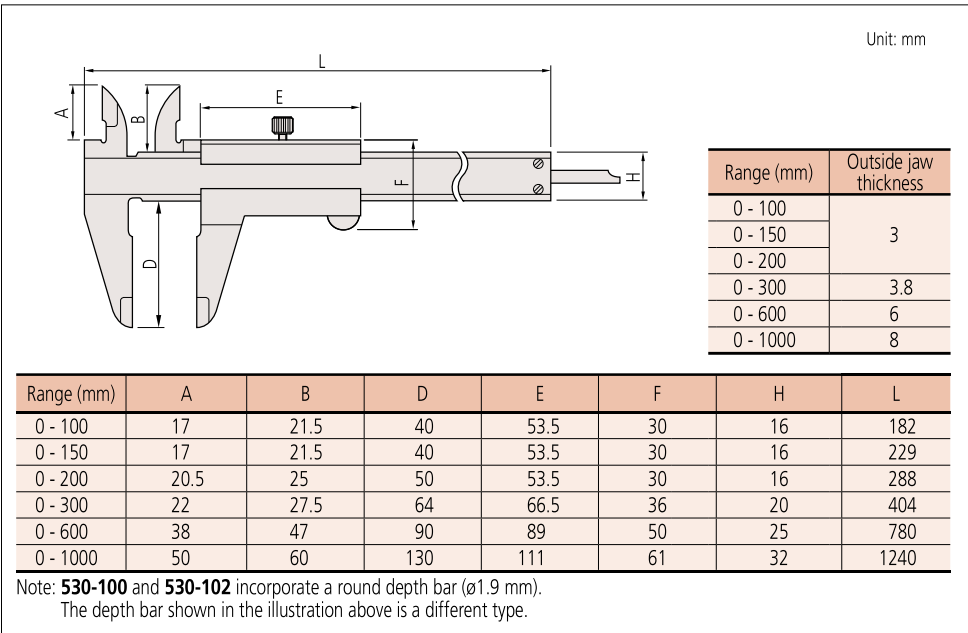
An industry standard measuring tool

Vernier Caliper SERIES 530 — Standard model

- Plain and basic design.
- Stepped graduation face prevents dust ingress between the main scale and slider.
- The small vernier face angle (14°) provides easy reading.
- Can measure steps, since the end faces of the beam and slider are the zero reference point (measuring face). Standard calipers allow four types of measurement, i.e. outside, inside, depth, and step.
- Carbide-tipped jaw calipers are optimal for rough finished parts, castings, grinding stones, etc.
- Decimal and fractional graduated scales (metric/inch and inch models only).



DIMENSIONS



530-102 (Round depth bar type)



530-320
(Carbide-tipped jaws for outside measurement)

SPECIFICATIONS

Metric

Order No.	Range (mm)	Maximum Permissible Error* (mm) • $EMPE$ (outside measurement) • $SMPE$ (inside measurement)	Depth bar	Graduation (mm)	Remarks
530-101	0 - 150	± 0.05	Blade	0.05	—
530-122		± 0.03		0.02	High accuracy model
530-108		± 0.05		0.05	—
530-123	0 - 200	± 0.03		0.02	High accuracy model
530-109		± 0.08		0.05	—
530-124	0 - 300	± 0.04		0.02	High accuracy model

Order No.	Range (mm)	Accuracy (mm)	Depth bar	Graduation (mm)	Remarks
530-100	0 - 100	±0.05	ø1.9 mm rod	0.05	—
530-102	0 - 150	±0.05			—
530-320		±0.05	Blade		Carbide-tipped jaws for outside measurement
530-335		±0.05			Carbide-tipped jaws for outside and inside measurement
530-321	0 - 200	±0.05			Carbide-tipped jaws for outside measurement
530-322	0 - 300	±0.08			Carbide-tipped jaws for outside measurement
530-501	0 - 600	±0.10	—		—
530-502	0 - 1000	±0.15			

* Partial Measuring Face Contact Error $EMPE$ /Scale Shift Error $SMPE$ are terms (notations) used in JIS B 7507: 2016, revised based on ISO 13385-1: 2011. The measurement method is the same as before. Refer to page D-40 for details.

Metric/Inch with metric/inch double scale

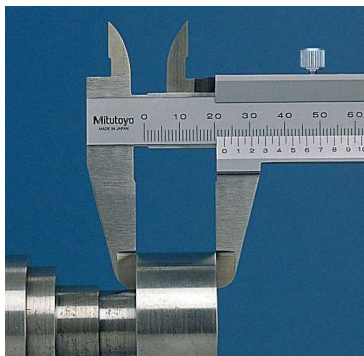
Order No.	Range (mm)	Accuracy (mm)	Depth bar	Graduation	Remarks
530-104	0 - 150	±0.05	Blade	0.05 mm (1/128 in)	—
530-316		±0.03			Clamping screw below the slider
530-312				0.02 mm (0.001 in)	High accuracy model: ±0.03 mm
530-114	0 - 200	±0.05		0.05 mm (1/128 in)	—
530-118		±0.03		0.02 mm (0.001 in)	High accuracy model: ±0.03 mm
530-115	0 - 300	±0.08		0.05 mm (1/128 in)	—
530-119		±0.04		0.02 mm (0.001 in)	High accuracy model: ±0.04 mm

Inch with inch/inch double scale

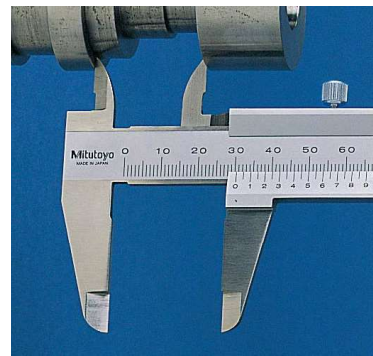
Order No.	Range (in)	Accuracy (in)	Depth bar	Graduation (in)	Remarks
530-105	0 - 6	$\pm 0.5/128$	Blade	0.001	—
530-116	0 - 8	$\pm 0.5/128$			

Measurement Applications

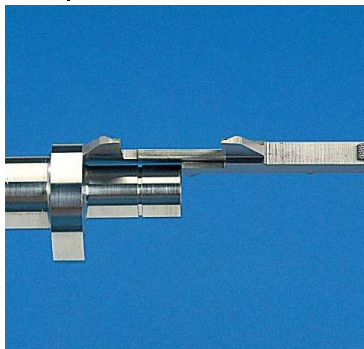
1. Outside measurement



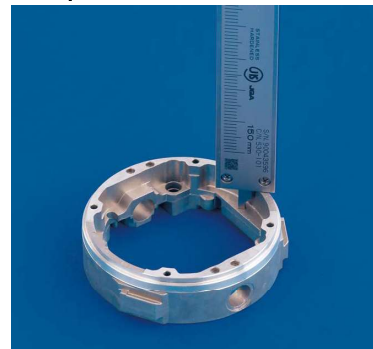
2. Inside measurement



3. Step measurement



4. Depth measurement

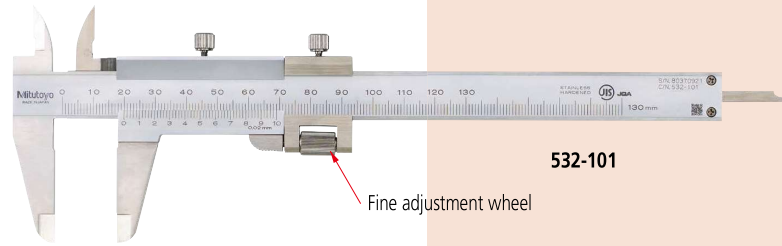


Calipers

An industry standard measuring tool

Vernier Caliper SERIES 532 — with fine adjustment

- Fine-adjustment aids slider positioning.
- Allows step measurement.



SPECIFICATIONS

Metric				
Order No.	Range (mm)	Maximum Permissible Error* ¹ (mm)	Depth bar	Remarks
		• EMPE (outside measurement) • SMPE (inside measurement)		
532-101* ²	0 - 130	±0.03	Blade	with fine adjustment
532-102* ²	0 - 180	±0.03		
532-103* ²	0 - 280	±0.04		

*1 Partial Measuring Face Contact Error EMPE/Scale Shift Error SMPE are terms (notations) used in JIS B 7507: 2016, revised based on ISO 13385-1: 2011. The measurement method is the same as before. Refer to page D-40 for details.

*2 Graduation: 0.02 mm

Metric/Inch with metric/inch double scale

Order No.	Range (mm)	Accuracy (mm)	Depth bar	Graduation	Remarks
532-119	0 - 130	±0.03	Blade	0.02 mm (0.001 in)	with fine adjustment
532-120	0 - 180	±0.03			
532-121	0 - 280	±0.04			

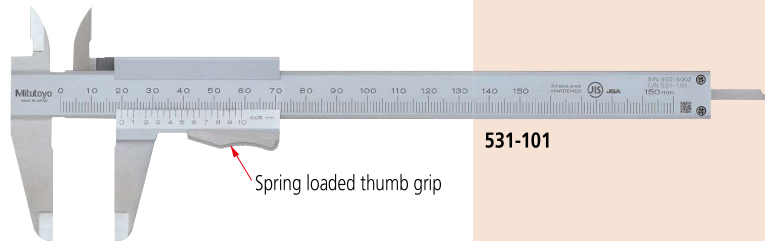
DIMENSIONS

		Unit: mm					
Range	A	B	D	E	F	H	L
0 - 130 mm/0 - 5 in	17	21.5	40	53.5	31.2	16	229
0 - 180 mm/0 - 7 in	20.5	25	50	53.5	31.2	16	288
0 - 280 mm/0 - 11 in	22	27.5	64	66.5	38	20	404

Jaw thickness: 3 mm for 0 to 130 mm/0 to 5 inch and 0 to 180 mm/0 to 7 inch models
3.8 mm for 0 to 280 mm/0 to 11 inch model

Vernier Caliper 531 Series — with thumb grip

- The slider moves only when the spring-loaded thumb grip is depressed.
- Allows step measurement.



SPECIFICATIONS

Metric				
Order No.	Range (mm)	Maximum Permissible Error* ¹ (mm)	Depth bar	Remarks
		• EMPE (outside measurement) • SMPE (inside measurement)		
531-101* ²	0 - 150	±0.05	Blade	—
531-102* ²	0 - 200			
531-103* ²	0 - 300	±0.08		

*1 Partial Measuring Face Contact Error EMPE/Scale Shift Error SMPE are terms (notations) used in JIS B 7507: 2016, revised based on ISO 13385-1: 2011. The measurement method is the same as before. Refer to page D-40 for details.

*2 Graduation: 0.05 mm

Metric/Inch with metric/inch double scale

Order No.	Range (mm)	Accuracy (mm)	Depth bar	Graduation	Remarks
531-122	0 - 150	±0.05	Blade	0.05 mm (1/128 in)	with inch/mm conversion label
531-128		±0.03		0.02 mm (0.001 in)	High accuracy model
531-108	0 - 200	±0.05		0.05 mm (1/128 in)	—
531-129		±0.03		0.02 mm (0.001 in)	High accuracy model
531-109	0 - 300	±0.08		0.05 mm (1/128 in)	—
531-112		±0.04		0.02 mm (0.001 in)	High accuracy model

DIMENSIONS

		Unit: mm					
Range	A	B	D	H	L		
0 - 150 mm/0 - 6 in	17	21.5	40	16	229		
0 - 200 mm/0 - 8 in	20.5	25	50	16	288		
0 - 300 mm/0 - 12 in	22	27.5	64	20	404		

Jaw thickness: 3 mm for 0 to 150 mm/0 to 6 inch and 0 to 200 mm/0 to 8 inch models
3.8 mm for 0 to 300 mm/0 to 12 inch model

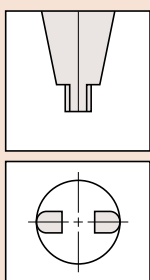
* (): Dimension in 0 to 300 mm/0 to 12 inch model

ABSOLUTE[™]

IP67



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ID 0000045042



Radiused jaws for accurate ID measurement

Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Display: LCD
- Scale type: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed: Unlimited
- Battery: SR44 (1 pc, 938882, for initial operational checks (standard accessory))

Optional Accessories

For details, refer to page A-27.

- 959143: Data hold unit
- Connecting cables for IT/DP/MUX
 - 05CZA624: SPC cable with data button (1 m)*
 - 05CZA625: SPC cable with data button (2 m)*
 - 959149: SPC cable with data button (1 m)
 - 959150: SPC cable with data button (2 m)
- USB Input Tool Direct
 - 06AFM380A: SPC cable for USB-ITN-A (2 m)*
 - 06AFM380C: SPC cable for USB-ITN-C (2 m)
- Connecting cables for U-WAVE-T
 - 02AZD790A: SPC cable with data button (160 mm)
 - 02AZE140A: SPC cable for foot switch

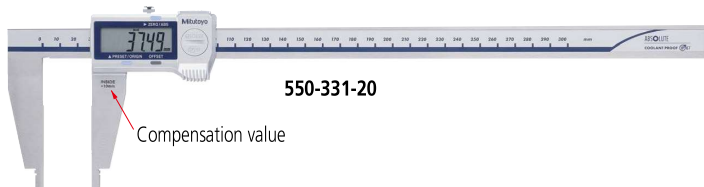
Wireless Data Output U-WAVE[™]

- U-WAVE-TC: 264-620 (IP67 type)
264-621 (Buzzer type)
- U-WAVE-TCB Transmitter (Mitutoyo Bluetooth[®] U-WAVE)
264-624 (IP type)
264-625 (Buzzer type)
Refer to page A-15 for details.
- Connecting unit for U-WAVE-TC/TCB
02AZF310 (IP67 type)
Note: IP67 model is water/dust-proofed suitable for the factory floor.
Buzzer type is not water/dust-proofed.
Refer to pages A-16 and A-18 for details.
* For IP67 models (up to 300 mm)

ABSOLUTE Digimatic Caliper SERIES 550 — with Nib Style Jaws

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Offers a resolution of 0.01 mm with corresponding accuracy.
- Incorporates an Absolute measurement system. No need to reset the origin after switching on. (Refer to page D-4 and D-6 for details on the Absolute function.)
- Order No. 550-301-20, 550-331-20, 550-311-20 and 550-341-20: IP67 (Rustproofing shall be applied after use if caliper was in contact with coolant.)
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- ID measurement value: displayed value + (a compensation value displayed on the main unit). OFFSET switch allows to input a compensation value so that the measurement value can be read directly (Order No. 550-301-20, 550-331-20, 550-311-20 and 550-341-20). Preset function allows to set a desired starting point (550-331-20 and 550-341-20).



SPECIFICATIONS

Metric			
Order No.	Range (mm)*	Accuracy (mm)	Remarks
550-301-20	0 - 200 (10.1 - 210)	±0.03	IP67, with offset
550-331-20	0 - 300 (10.1 - 310)	±0.04	IP67, with offset/preset function for easy inside measurement
550-203-10	0 - 450 (20.1 - 470)	±0.05	—
550-205-10	0 - 600 (20.1 - 620)	±0.05	—
550-207-10	0 - 1000 (20.1 - 1020)	±0.07	—

* (): Inside measurement

Note: Series 550 is not equipped with a depth bar.

Inch / Metric			
Order No.	Range (in)*	Accuracy (in)	Remarks
550-311-20	0 - 8 (0.404 - 8.4)	±0.0015	IP67, with offset
550-341-20	0 - 12 (0.404 - 12.4)	±0.002	IP67, with offset/preset function for easy inside measurement
550-223-10	0 - 18 (0.504 - 18.5)		—
550-225-10	0 - 24 (0.504 - 24.5)		—
550-227-10	0 - 40 (1.004 - 41)		—

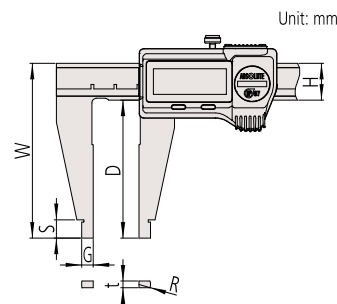
* (): Inside measurement

Note: Series 550 is not equipped with a depth bar.

DIMENSIONS

Range (mm)	D	G	S	W	H	t	R
0 - 200 (0 - 8 in)*	60	5 (5.08)*	8	76	16	3	5 (5.08)*
0 - 300 (0 - 12 in)*	75		12	95	20	3.8	
0 - 450 (0 - 18 in)*	100	10 (6.35)*	18	125	25	6	10 (6.35)*
0 - 600 (0 - 24 in)*			24	172	32	8	10 (12.7)*
0 - 1000 (0 - 40 in)*	140	10 (12.7)*	24	172	32	8	10 (12.7)*

* Inch model

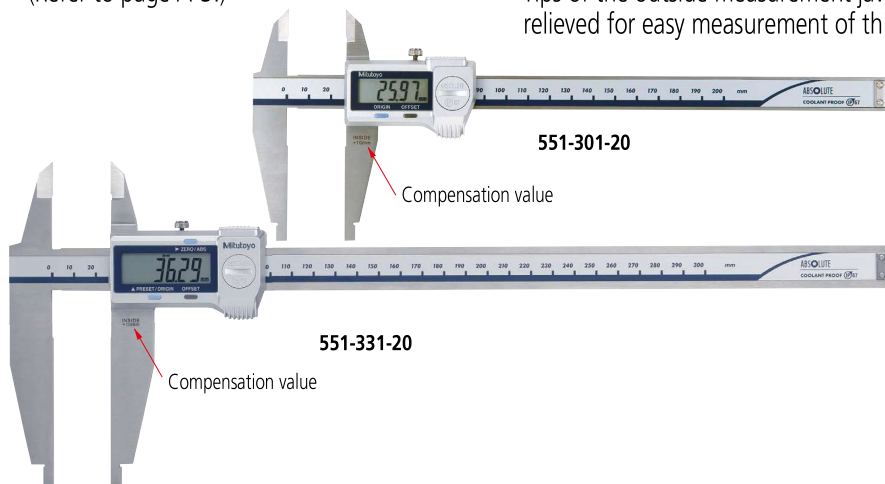


Calipers

An industry standard measuring tool

ABSOLUTE Digimatic Caliper SERIES 551 - with Nib Style and Standard Jaws

- Offers a resolution of 0.01 mm with corresponding accuracy.
- Incorporates an Absolute measurement system. No need to reset the origin after switching on. (Refer to page D-4 and D-6 for details on the Absolute function.)
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- ID measurement value: displayed value + (a compensation value displayed on the main unit). OFFSET switch allows to input a compensation value so that the measurement value can be read directly (**Order No. 551-301-20, 551-331-20, 551-311-20 and 551-341-20**). Preset function allows to set a desired starting point (**Order No. 551-331-20 and 551-341-20**).
- Tips of the outside measurement jaw are relieved for easy measurement of thin parts.



SPECIFICATIONS

Metric			
Order No.	Range (mm)*	Accuracy (mm)	Remarks
551-301-20	0 - 200 (10.1 - 210)	±0.03	IP67, with offset
551-331-20	0 - 300 (10.1 - 310)	±0.04	
551-204-10	0 - 500 (20.1 - 520)	±0.06	—
551-206-10	0 - 750 (20.1 - 770)	±0.06	
551-207-10	0 - 1000 (20.1 - 1020)	±0.07	

* () : inside measurement

Note: **Series 551** is not equipped with a depth bar.

Inch / Metric			
Order No.	Range (in)*	Accuracy (in)	Remarks
551-311-20	0 - 8 (0.404 - 8.4)	±0.0015	IP67, with offset
551-341-20	0 - 12 (0.404 - 12.4)	±0.002	
551-224-10	0 - 20 (0.504 - 20.5)	±0.0025	—
551-226-10	0 - 30 (0.504 - 30.5)	±0.0025	
551-227-10	0 - 40 (1.004 - 41)	±0.003	

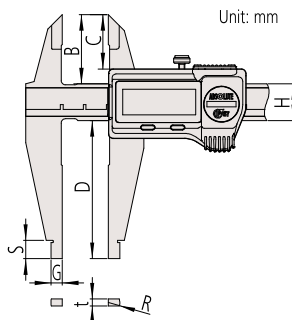
* () : inside measurement

Note: **Series 551** is not equipped with a depth bar.

DIMENSIONS

Range (mm)	B	C	D	G	S	H	t	R
0 - 200 (0 - 8 in)*	30	23.6	60	5 (5.08)*	8	16	3	5 (5.08)*
0 - 300 (0 - 12 in)*	40	32.2	90		10	20	3.8	
0 - 500 (0 - 20 in)*	56	44.9	150	10 (6.35)*	18	25	6	10 (6.35)*
0 - 750 (0 - 30 in)*	56			10 (12.7)*	20	32	8	10 (12.7)*
0 - 1000 (0 - 40 in)*	56	43.8						

* Inch model



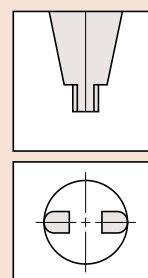
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IP67



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ID 000045042



Radiused jaws for accurate
ID measurement

Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Display: LCD
- Scale type: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Dust/Water protection level: IP67* (models up to 300 mm)

* Rustproofing shall be applied after use if caliper was in contact with coolant.

Optional Accessories

For details, refer to page A-27.

- **959143**: Data hold unit
- Connecting cables for **IT / DP / MUX**
 - **05CZA624**: SPC cable with data button (1 m)*
 - **05CZA625**: SPC cable with data button (2 m)*
 - **959149**: SPC cable with data button (1 m)
 - **959150**: SPC cable with data button (2 m)
- USB Input Tool Direct
 - **06AFM380A**: SPC cable for **USB-ITN-A** (2 m)*
 - **06AFM380C**: SPC cable for **USB-ITN-C** (2 m)
- Connecting cables for **U-WAVE-T**
 - **02AZD790A**: SPC cable with data button (160 mm)
 - **02AZE140A**: SPC cable for foot switch

Wireless Data Output U-WAVE[®]

- **U-WAVE-TC: 264-620** (IP67 type)
- **264-621** (Buzzer type)
- **U-WAVE-TCB Transmitter (Mitutoyo Bluetooth[®] U-WAVE)**
 - **264-624** (IP type)
 - **264-625** (Buzzer type)

Refer to page A-15 for details.

- Connecting unit for **U-WAVE-TC/TCB**
 - **02AZF310** (IP67 type)

Note: IP67 model is water/dust-proofed suitable for the factory floor.

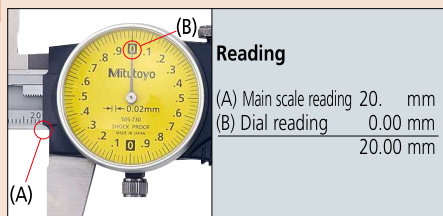
Buzzer type is not water/dust-proofed.

Refer to pages A-16 and A-18 for details.

* For IP67 models (up to 300 mm)



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



Dial Caliper SERIES 505

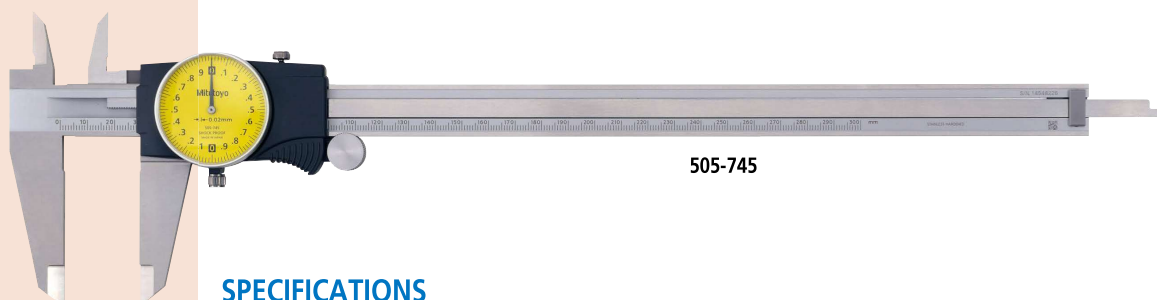
- Newly designed dial movement for ultra-smooth sliding.
- Easy-to-read yellow dial.
- Large finger-rest aids ease-of-use.
- Jaw tips are relieved for easy measurement of thin parts.
- Allows step measurement.



505-730

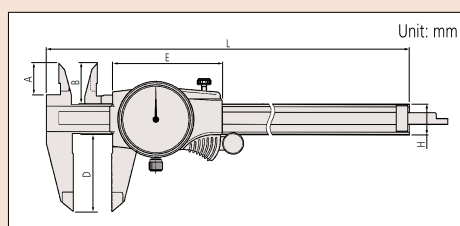


505-731



505-745

DIMENSIONS



Range (mm)	A	B	D	E	H	L
0 - 150	16.5	21	40	57.2	16	231
0 - 200	20	24.5	50			288
0 - 300	22	27.5	64	70.2	20	404

SPECIFICATIONS

Metric				
Order No.	Range (mm)	Graduation (mm)	Accuracy (mm)	Remarks
505-730	0 - 150	0.02, 2/rev	±0.03	Carbide-tipped jaws for outside measurement
505-734				
505-735		0.01, 1/rev	±0.02	Carbide-tipped jaws for outside and inside measurement
505-732*				
505-731	0 - 200	0.02, 2/rev	±0.03	—
505-733*		0.01, 1/rev		
505-745	0 - 300	0.02, 2/rev	±0.04	

* Silver cover type

Inch				
Order No.	Range (in)	Graduation (in)	Accuracy (in)	Remarks
505-740J	0 - 6	0.001, 0.2/rev	±0.001	
505-742J*			±0.001	
505-742-56J		0.001, 0.1/rev	±0.001	
505-742-51J			±0.001	
505-736*	0 - 8	0.001, 0.2/rev	±0.001	Carbide-tipped jaws for outside measurement
505-738*			±0.001	
505-744		0.001, 0.1/rev	±0.001	Carbide-tipped jaws for outside and inside measurement
505-741J			±0.002	
505-743J*	0 - 12	0.001, 0.2/rev	±0.002	—
505-737*			±0.002	
505-739*		0.001, 0.1/rev	±0.002	Carbide-tipped jaws for outside measurement
505-749			±0.002	
505-746*	0 - 12	0.001, 0.2/rev	±0.002	—
505-750			±0.002	
505-747*		0.001, 0.1/rev	±0.002	Carbide-tipped jaws for outside and inside measurement
505-748*			±0.002	

* Silver cover type

Calipers

An industry standard measuring tool

ABSOLUTE Coolant Proof Carbon Fiber Caliper SERIES 552 — with Standard jaws

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- IP66 Absolute Digital Caliper (Refer to page D-6 for details on the Absolute function.)
- Lightweight Digimatic Calipers that employ CFRP (Carbon Fiber Reinforced Plastics) in the beam.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



552-303-10

SPECIFICATIONS

Metric			Inch / Metric		
Order No.	Range (mm)*	Accuracy (mm)	Order No.	Range (in)*	Accuracy (in)
552-302-10	0 - 450 (20.1 - 470)	±0.04	552-312-10	0 - 18 (0.504 - 18.5)	±0.002
552-303-10	0 - 600 (20.1 - 620)	±0.04	552-313-10	0 - 24 (0.504 - 24.5)	±0.002
552-304-10	0 - 1000 (20.1 - 1020)	±0.05	552-314-10	0 - 40 (1.004 - 40.5)	±0.002
552-305-10	0 - 1500 (20.1 - 1520)	±0.09	552-315-10	0 - 60 (1.004 - 60.5)	±0.004
552-306-10	0 - 2000 (20.1 - 2020)	±0.12	552-316-10	0 - 80 (1.004 - 80.5)	±0.005

* (): Dimension in inside measurement

Note: A constant-force mechanism is used in the finger rest; however, this is only an auxiliary mechanism to avoid measurement error caused by excessive measuring force. To measure with good accuracy, use the minimum necessary measuring force for the caliper measuring faces to make sufficient contact with the workpiece. Refer to page D-40 for details.

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

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Technical Data

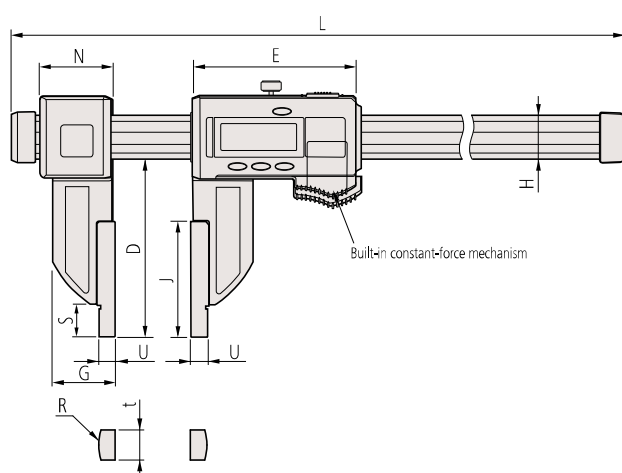
- Repeatability: 0.01 mm
- Accuracy: Refer to the list of specifications. (excluding quantizing error)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Material of jaws: Stainless Steel Hardened
- Display: LCD
- Scale type: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 5,000 hours in continuous use
- Dust/Water protection level: IP66 (IEC60529)*
- Standard accessory: Jaw clamps (2 pcs.), 05GZA033
- * Rustproofing shall be applied after use if caliper was in contact with coolant.

Functions

- Zero-setting
- Data hold
- Offsetting
- Presetting
- Data output
- Low-power and low-voltage alert
- Counting value composition error
- Automatic power on/off, inch/mm reading (inch/mm models)

Note: LCD display turns off after 20 minutes inactivity but the ABS scale unit origin is stored. Moving the slider restores the display.

DIMENSIONS



Unit: mm

Range	D	E	G	H	J	L	N	R	S	t	U
0 - 450 mm (0 - 18 in)	100	91.8	35	25	65	640	41.2	R10	18	8	10 (0.25 in)
0 - 600 mm (0 - 24 in)	100	91.8	35	25	65	790	41.2	R10	18	8	10 (0.25 in)
0 - 1000 mm (0 - 40 in)	150	113.8	45	32	100	1230	62.8	R10	24	8	10 (0.5 in)
0 - 1500 mm (0 - 60 in)	150	113.8	45	32	100	1740	62.8	R10	24	8	10 (0.5 in)
0 - 2000 mm (0 - 80 in)	150	113.8	45	32	100	2250	62.8	R10	24	8	10 (0.5 in)

Optional Accessories

For details, refer to page A-27.

• Connecting cables for IT/DP/MUX

05CZA624: SPC cable with data button (1 m)

05CZA625: SPC cable with data button (2 m)



• USB Input Tool Direct

06AFM380A: SPC cable for USB-ITN-A (2 m)

• Connecting cables for U-WAVE-T

02AZD790A: SPC cable with data button (160 mm)

02AZE140A: SPC cable for foot switch

Optional accessories

Metric	552-302-10, 552-155-10, 552-303-10 and 552-156-10	552-304-10, 552-305-10 and 552-306-10
Clamp box (1 pair)	914053	914054
Distance measurement jaw (1 pair)	914055	
Point ID measurement jaw (1 pair)	914057	

Inch/Metric	552-312-10, 552-165-10, 552-313-10 and 552-166-10	552-314-10, 552-315-10 and 552-316-10
Clamp box (1 pair)	914053	914054
Distance measurement jaw (1 pair)	914056	
Point ID measurement jaw (1 pair)	914058	

<p>Distance measurement jaw</p>	<p>Clamp box</p>
<p>Point ID measurement jaw</p>	<p>Distance measurement jaw Accuracy: ± 0.03 mm*</p> <p>Point ID measurement jaw Accuracy: ± 0.02 mm*</p>

* Accuracies shown in the diagrams are of each accessory and accuracy resulting in mounting them on the main body is not guaranteed.

Calipers

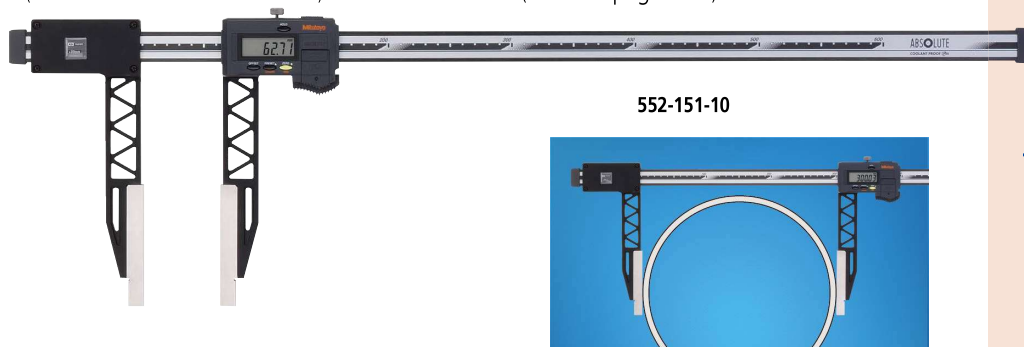
An industry standard measuring tool

ABSOLUTE Coolant Proof Carbon Fiber Caliper SERIES 552 - with Long Jaws

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- IP66 Absolute Digital Caliper (Refer to page D-6 for details on the Absolute function.)
- Lightweight Digimatic Calipers that employ CFRP (Carbon Fiber Reinforced Plastics) in the beam.

- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



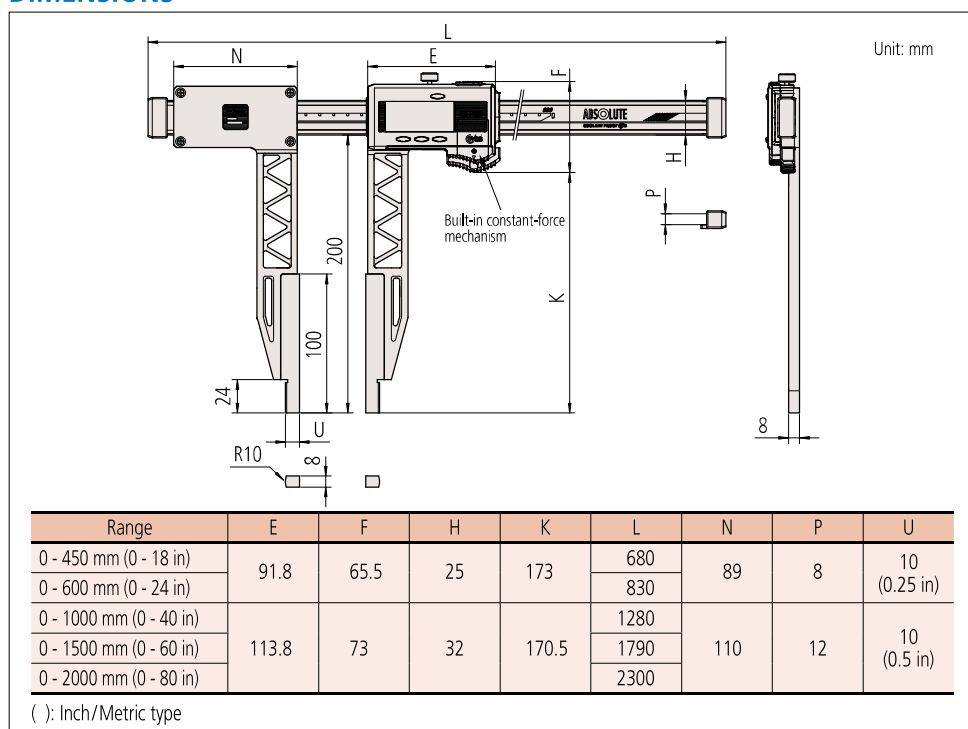
SPECIFICATIONS

Metric			Inch / Metric		
Order No.	Range (mm)*	Accuracy (mm)	Order No.	Range (in)*	Accuracy (in)
552-150-10	0 - 450 (20.1 - 470)	±0.06	552-160-10	0 - 18 (0.504 - 18.5)	±0.0025
552-151-10	0 - 600 (20.1 - 620)		552-161-10	0 - 24 (0.504 - 24.5)	
552-152-10	0 - 1000 (20.1 - 1020)	±0.07	552-162-10	0 - 40 (1.004 - 40.5)	±0.003
552-153-10	0 - 1500 (20.1 - 1520)	±0.11	552-163-10	0 - 60 (1.004 - 60.5)	±0.0045
552-154-10	0 - 2000 (20.1 - 2020)	±0.14	552-164-10	0 - 80 (1.004 - 80.5)	±0.0055

* () : Dimension in inside measurement

Note: A constant-force mechanism is used in the finger rest; however, this is only an auxiliary mechanism to avoid measurement error caused by excessive measuring force. To measure with good accuracy, use the minimum necessary measuring force for the caliper measuring faces to make sufficient contact with the workpiece. Refer to page D-40 for details.

DIMENSIONS



MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

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Technical Data

- Repeatability: 0.01 mm
- Accuracy: Refer to the list of specifications. (excluding quantizing error)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Material of jaws: Stainless Steel Hardened
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 5,000 hours in continuous use
- Dust/Water protection level: IP66 (IEC 60529)*
- Standard accessory: Jaw clamps (2 pcs.), 05GZA033
- * Rustproofing shall be applied after use if caliper was in contact with coolant.

Functions

- Zero-setting
- Data hold
- Offsetting
- Presetting
- Data output
- Low-power and low-voltage alert
- Counting value composition error
- Automatic power on/off, inch/mm reading (inch/mm models)

Optional Accessories

For details, refer to page A-27.

- Connecting cables for **IT / DP / MUX**
05CZA624: SPC cable with data button (1 m)
05CZA625: SPC cable with data button (2 m)



- USB Input Tool Direct
06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
02AZD790A: SPC cable with data button (160 mm)
02AZE140A: SPC cable for foot switch

ABSOLUTE[™]

IP66


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Technical Data

- Repeatability: 0.01 mm
- Accuracy: Refer to the list of specifications. (excluding quantizing error)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Material of jaws: Ceramic
- Display: LCD
- Scale type: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 5,000 hours in continuous use
- Dust/Water protection level: IP66 (IEC 60529)*
- Standard accessory: Jaw clamps (2 pcs.), 05GZA033
- * Rustproofing shall be applied after use if caliper was in contact with coolant.

Functions

- Zero-setting
- Data hold
- Offsetting
- Presetting
- Data output
- Low-power and low-voltage alert
- Counting value composition error
- Automatic power on/off, inch/mm reading (inch/mm models)

Optional Accessories

For details, refer to page A-27.

- Connecting cables for **IT/DP/MUX**
- 05CZA624**: SPC cable with data button (1 m)
- 05CZA625**: SPC cable with data button (2 m)



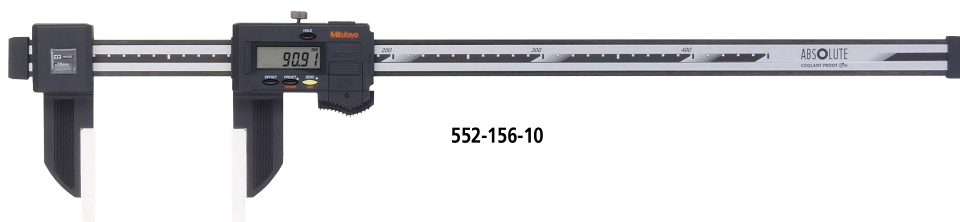
- USB Input Tool Direct
- 06AFM380A**: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
- 02AZD790A**: SPC cable with data button (160 mm)
- 02AZE140A**: SPC cable for foot switch

ABSOLUTE Coolant Proof Carbon Fiber Caliper SERIES 552 - with Ceramic Jaws

MeasurLink[®] ENABLED

Data Management Software by Mitutoyo

- IP66 Absolute Digital Caliper (Refer to page D-6 for details on the Absolute function.)
- Lightweight Digimatic Calipers that employ CFRP (Carbon Fiber Reinforced Plastics) in the beam.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- The zirconia-ceramic jaws make this caliper suitable for measuring moderately magnetic workpieces. However, since steel is used in the main unit, it may not be suitable for measuring strongly magnetic workpieces.



552-156-10

SPECIFICATIONS

Metric		
Order No.	Range (mm)*	Accuracy (mm)
552-155-10	0 - 450 (20.1 - 47.0)	±0.04
552-156-10	0 - 600 (20.1 - 62.0)	

* (): Dimension in inside measurement

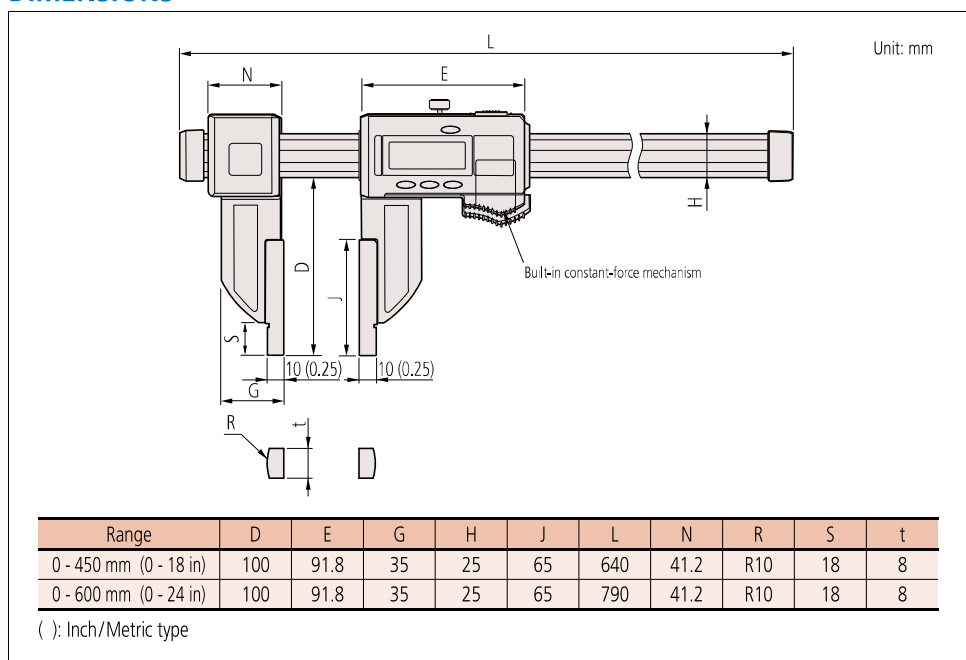
Note: A constant-force mechanism is used in the finger rest; however, this is only an auxiliary mechanism to avoid measurement error caused by excessive measuring force. To measure with good accuracy, use the minimum necessary measuring force for the caliper measuring faces to make sufficient contact with the workpiece. Refer to page D-40 for details.

Inch/Metric		
Order No.	Range (in)*	Accuracy (in)
552-165-10	0 - 18 (0.504 - 18.5)	±0.002
552-166-10	0 - 24 (0.504 - 24.5)	

* (): Dimension in inside measurement

Note: A constant-force mechanism is used in the finger rest; however, this is only an auxiliary mechanism to avoid measurement error caused by excessive measuring force. To measure with good accuracy, use the minimum necessary measuring force for the caliper measuring faces to make sufficient contact with the workpiece. Refer to page D-40 for details.

DIMENSIONS



Calipers

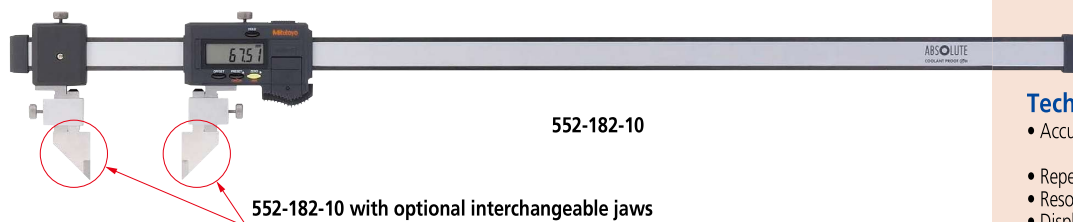
An industry standard measuring tool

ABSOLUTE Coolant Proof Carbon Fiber Caliper SERIES 552 - with Interchangeable Jaws

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- IP66 Absolute Digital Caliper (Refer to page D-6 for a description of Absolute measurement.)
- The range of applications can be expanded by using interchangeable jaws (optional).

- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- The PRESET function enables quick and easy scale resetting to match the jaws when they are changed.



SPECIFICATIONS

Metric			Inch / Metric		
Order No.	Range (mm)	Accuracy (mm)	Order No.	Range (in)	Accuracy (in)
552-181-10	0 - 450	±0.04	552-191-10	0 - 18	±0.002
552-182-10	0 - 600		552-192-10	0 - 24	
552-183-10	0 - 1000	±0.05	552-193-10	0 - 40	±0.004
552-184-10	0 - 1500	±0.09	552-194-10	0 - 60	
552-185-10	0 - 2000	±0.12	552-195-10	0 - 80	±0.005

Note: A constant-force mechanism is used in the finger rest; however, this is only an auxiliary mechanism to avoid measurement error caused by excessive measuring force. To measure with good accuracy, use the minimum necessary measuring force for the caliper measuring faces to make sufficient contact with the workpiece. Refer to page D-40 for details.

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

ABSOLUTE[™]

IP 66



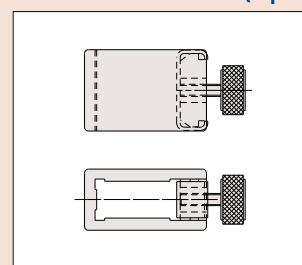
Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error)
 - Repeatability: 0.01 mm
 - Resolution: 0.01 mm or 0.0005 in/0.01 mm
 - Display: LCD
 - Scale type: ABSOLUTE electromagnetic induction linear encoder
 - Max. response speed: Unlimited
 - Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
 - Battery life: Approx. 5,000 hours in continuous use
 - Dust/Water protection level: IP66 (IEC 60529)*
 - Standard accessory: Jaw clamps (2 pcs.), 05GZA033
- * Rustproofing shall be applied after use if caliper was in contact with coolant.

Functions

- Zero-setting
- Data hold
- Offsetting
- Presetting
- Data output
- Low-power and low-voltage alert
- Counting value composition error
- Automatic power on/off, inch/mm reading (inch/mm models)

Standard Accessories (2 pcs.)



Jaw clamps: 05GZA033

Optional Accessories

For details, refer to page A-27.

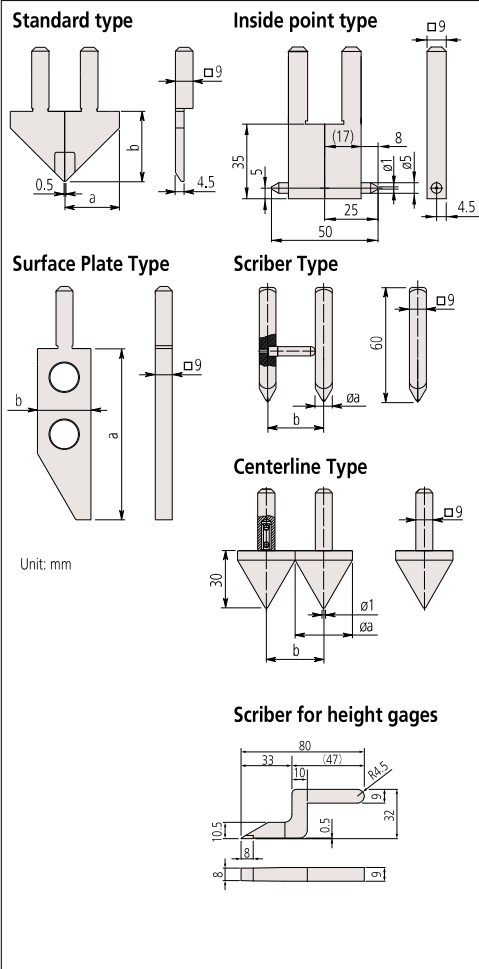
- Connecting cables for **IT/DP/MUX**
05CZA624: SPC cable with data button (1 m)
05CZA625: SPC cable with data button (2 m)



- USB Input Tool Direct
06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
02AZD790A: SPC cable with data button (160 mm)
02AZE140A: SPC cable for foot switch

Interchangeable jaws

SPECIFICATIONS



Standard Type

Order No.	Components	a	b
07CZA056	Right (07CAA044), Left (07CAA045)	28 mm (1.1 in)	36 mm (1.2 in)

Note: 1 set

Inside Point Type

Order No.	Components	a	b
07CZA058	07CZA041x2 pcs.	25 mm	50 mm
07CZA059	07CZA048x2 pcs.	1 in	2 in

Scriber Type

Order No.	Components	a	b
07CZA055	Right (07CZA042), Left (07CZA043)	8 mm	30 mm
07CZA061	Right (07CZA042), Left (07CZA049)	0.31 in	1.2 in

Surface Plate Type

Order No.	a	b
07CZA044	90 mm (3.5 in)	28 mm (1.1 in)

Centerline Type

Order No.	Components	a	b
07CZA057	07CZA039x2 pcs.	30 mm	30 mm
07CZA060	07CZA047x2 pcs.	1.2 in	1.2 in

Note: Entering the appropriate offset value enables the display to indicate the correct measurement value inscribed on the jaws, which should be installed so that this inscription is visible from the display side of the caliper.

Scriber for height gages

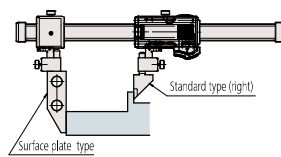
Order No.
07GZA000

Type	Applicable calipers	Range	Accuracy when attached to the caliper
Standard type	552-181-10 (552-191-10)	0 - 450 mm (0 - 18 in)	±0.06 mm (±0.0025 in)
	552-182-10 (552-192-10)	0 - 600 mm (0 - 24 in)	
	552-183-10 (552-193-10)	0 - 1000 mm (0 - 40 in)	±0.07 mm (±0.0030 in)
	552-184-10 (552-194-10)	0 - 1500 mm (0 - 60 in)	±0.11 mm (±0.0045 in)
	552-185-10 (552-195-10)	0 - 2000 mm (0 - 80 in)	±0.14 mm (±0.0055 in)
Inside point type	552-181-10 (552-191-10)	Inside: 50.1 - 500 mm (2.004 - 20 in) Outside: 0 - 450 mm (0 - 18 in)	±0.09 mm (±.0035 in)
	552-182-10 (552-192-10)	Inside: 50.1 - 650 mm (2.004 - 26 in) Outside: 0 - 600 mm (0 - 24 in)	
	552-183-10 (552-193-10)	Inside: 50.1 - 1050 mm (2.004 - 42 in) Outside: 0 - 1000 mm (0 - 40 in)	±0.10 mm (±0.0040 in)
	552-184-10 (552-194-10)	Inside: 50.1 - 1550 mm (2.004 - 62 in) Outside: 0 - 1500 mm (0 - 60 in)	±0.14 mm (±0.0055 in)
	552-185-10 (552-195-10)	Inside: 50.1 - 2050 mm (2.004 - 82 in) Outside: 0 - 2000 mm (0 - 80 in)	±0.17 mm (±0.0070 in)
Centerline type	552-181-10 (552-191-10)	30.1 - 480 mm (1.204 - 19.2 in)	±0.08 mm (±0.0030 in)
	552-182-10 (552-192-10)	30.1 - 630 mm (1.204 - 25.2 in)	±0.09 mm (±0.0035 in)
	552-183-10 (552-193-10)	30.1 - 1030 mm (1.204 - 41.2 in)	
	552-184-10 (552-194-10)	30.1 - 1530 mm (1.204 - 61.2 in)	±0.13 mm (±0.0055 in)
	552-185-10 (552-195-10)	30.1 - 2030 mm (1.204 - 81.2 in)	±0.16 mm (±0.0065 in)
Scriber type	552-181-10 (552-191-10)	30.1 - 480 mm (1.204 - 19.2 in)	±0.10 mm (±0.0040 in)
	552-182-10 (552-192-10)	30.1 - 630 mm (1.204 - 25.2 in)	
	552-183-10 (552-193-10)	30.1 - 1030 mm (1.204 - 41.2 in)	±0.11 mm (±0.0045 in)
	552-184-10 (552-194-10)	30.1 - 1530 mm (1.204 - 61.2 in)	±0.15 mm (±0.0060 in)
	552-185-10 (552-195-10)	30.1 - 2030 mm (1.204 - 81.2 in)	±0.18 mm (±0.0070 in)
Surface plate type + Scriber type for height gages	552-181-10 (552-191-10)	0 - 450 mm (0 - 17.7 in)	±0.10 mm (±0.0040 in)
	552-182-10 (552-192-10)	0 - 600 mm (0 - 23.7 in)	
	552-183-10 (552-193-10)	0 - 1000 mm (0 - 39.4 in)	±0.11 mm (±0.0045 in)
	552-184-10 (552-194-10)	0 - 1500 mm (0 - 59.4 in)	±0.15 mm (±0.0060 in)
	552-185-10 (552-195-10)	0 - 2000 mm (0 - 79.6 in)	±0.18 mm (±0.0070 in)
Surface plate type + Inside point type	552-181-10 (552-191-10)	Inside: 60 - 450 mm (1.004 - 19 in) Outside: 0 - 450 mm (1 - 18 in)	±0.12 mm (±0.0050 in)
	552-182-10 (552-192-10)	Inside: 60 - 600 mm (1.004 - 25 in) Outside: 0 - 600 mm (1 - 24 in)	
	552-183-10 (552-193-10)	Inside: 60 - 1000 mm (1.004 - 41 in) Outside: 0 - 1000 mm (1 - 40 in)	±0.13 mm (±0.0055 in)
	552-184-10 (552-194-10)	Inside: 60 - 1500 mm (1.004 - 62 in) Outside: 0 - 1500 mm (1 - 60 in)	±0.17 mm (±0.0070 in)
	552-185-10 (552-195-10)	Inside: 60 - 2000 mm (1.004 - 81 in) Outside: 0 - 2000 mm (1 - 80 in)	
			±0.20 mm (±0.0080 in)
Surface plate type + Centerline type	552-181-10 (552-191-10)	15.1 - 465 mm (0.6 - 18.6 in)	±0.11 mm (±0.0045 in)
	552-182-10 (552-192-10)	15.1 - 615 mm (0.6 - 24.6 in)	
	552-183-10 (552-193-10)	15.1 - 1015 mm (0.6 - 40.6 in)	±0.12 mm (±0.0050 in)
	552-184-10 (552-194-10)	15.1 - 1515 mm (0.6 - 60.6 in)	±0.16 mm (±0.0065 in)
	552-185-10 (552-195-10)	15.1 - 2015 mm (0.6 - 80.6 in)	±0.19 mm (±0.0075 in)

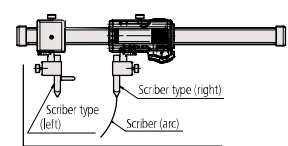
(): Inch/Metric models

Typical applications

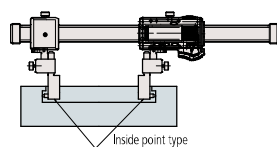
Surface plate type + Standard type



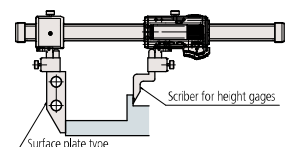
Scriber type



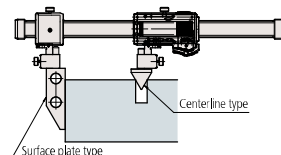
Inside point type



Surface plate type + Scriber for height gages



Surface plate type + Centerline type



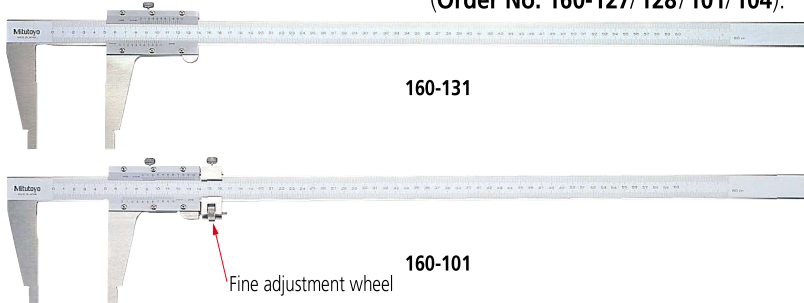
The above combinations are examples only.
Contact us for advice on accuracy when using a contact
point in a combination other than as shown above.

Calipers

An industry standard measuring tool

Vernier Caliper SERIES 160 — with Nib Style Jaws and Fine Adjustment

- Inside and outside measurements can be read directly from the upper and lower vernier scales.
- The jaws have radiused measuring faces for accurate inside diameter (ID) measurement.
- With fine adjustment
(Order No. 160-127/128/101/104).



SPECIFICATIONS

Metric _____ with inside measurement vernier scale				
Order No.	Range (mm)*	Minimum reading (mm)	Accuracy (mm)	Remarks
160-130	0 (20.1) - 450	0.05	±0.10	without fine adjustment
160-131	0 (20.1) - 600		±0.10	
160-132	0 (20.1) - 1000		±0.15	

* (): Minimum dimension in ID measurement

Metric _____ with inside measurement vernier scale				
Order No.	Range (mm)*	Minimum reading (mm)	Accuracy (mm)	Remarks
160-127	0 (10.1) - 300	0.02	±0.04	with fine adjustment
160-128	0 (20.1) - 450		±0.05	
160-101	0 (20.1) - 600		±0.05	
160-104	0 (20.1) - 1000		±0.07	

* (): Minimum dimension in ID measurement

Metric/Inch _____ with metric/inch double scale				
Order No.	Range (mm)*	Minimum reading	Accuracy (mm)	Remarks
160-150	0 (10.1) - 300	0.02 mm/0.001 in	±0.04	+10 mm/0.394 in to reading in inside measurement
160-151	0 (20.1) - 450		±0.05	+20 mm/0.787 in to reading in inside measurement
160-153	0 (20.1) - 600		±0.05	
160-155	0 (20.1) - 1000		±0.07	

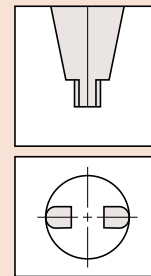
* (): Minimum dimension in ID measurement

Inch _____ with inside measurement vernier scale				
Order No.	Range (in)*	Minimum reading (in)	Accuracy (in)	Remarks
160-124	0 (0.304) - 12	0.001	±0.0015	—
160-116	0 (0.504) - 18		±0.002	
160-102	0 (0.504) - 24		±0.002	
160-105	0 (1.004) - 40		±0.003	

* (): Minimum dimension in ID measurement

Inch/Metric _____ with inch/metric double scale				
Order No.	Range (in)*	Minimum reading	Accuracy (in)	Remarks
160-125	0 (0.304) - 12	0.001 in/0.02 mm	±0.0015	+0.3 in/7.62 mm to reading in inside measurement
160-119	0 (0.504) - 18		±0.002	+0.5 in/12.7 mm to reading in inside measurement
160-103	0 (0.504) - 24		±0.002	
160-106	0 (1.004) - 40		±0.003	

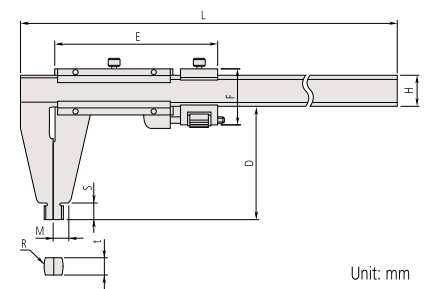
* (): Minimum dimension in ID measurement



Radiused jaws for accurate ID measurement



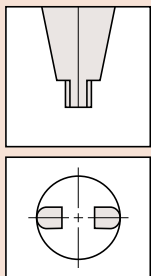
DIMENSIONS



Unit: mm

Range	D	E	F	H	L	M	R	S	t
0 - 300 mm/0 - 12 in	75	103	38	20	445	10	R5	12	3.8
0 - 450 mm*	89	—	—	—	—	—	R10	18	6
0 - 450 mm/0 - 18 in	100	112	51	25	630	14.8	R10	18	6
0 - 600 mm*	100	89	—	—	—	—	R10	18	6
0 - 600 mm/0 - 24 in	112	51	—	—	—	—	R10	18	6
0 - 1000 mm*	111	—	—	—	—	—	R10	24	8
0 - 1000 mm/0 - 40 in	140	150	62.5	32	1240	17	R10	24	8

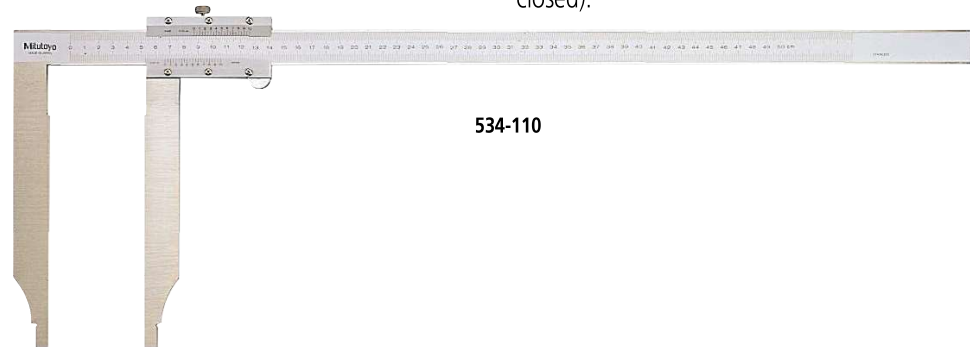
* Without fine adjustment



Round jaws for accurate ID measurement


Long Jaw Vernier Caliper **SERIES 534**

- Long jaws for measuring hard-to-reach workpiece features.
- Inside and outside measurements can be read directly from the upper and lower vernier scales.
- Inside measurement is possible upwards from the minimum inside measuring length (jaws closed).




534-110

SPECIFICATIONS

Metric  with inside measurement vernier scale				
Order No.	Range (mm)*	Graduation (mm)	Accuracy (mm)	Remarks
534-109	0 (10.1) - 300	0.05	±0.07	without fine adjustment
534-110	0 (20.1) - 500		±0.13	

* (): Minimum dimension in inside measurement

Metric/Inch  with metric/inch double scale				
Order No.	Range (mm)*	Graduation	Accuracy (mm)	Remarks
534-101	0 (10.1) - 300	0.05 mm/1/128 in	±0.07	+10 mm/0.394 in to reading in inside measurement without fine adjustment
534-105		0.02 mm/0.001 in	±0.04	
534-102	0 (20.1) - 500	0.05 mm/1/128 in	±0.13	+20 mm/0.787 in to reading in inside measurement without fine adjustment
534-106		0.02 mm/0.001 in	±0.06	
534-103	0 (20.1) - 750	0.05 mm/1/128 in	±0.16	
534-107		0.02 mm/0.001 in	±0.08	
534-104	0 (20.1) - 1000	0.05 mm/1/128 in	±0.20	
534-108		0.02 mm/0.001 in	±0.10	

* (): Minimum dimension in inside measurement

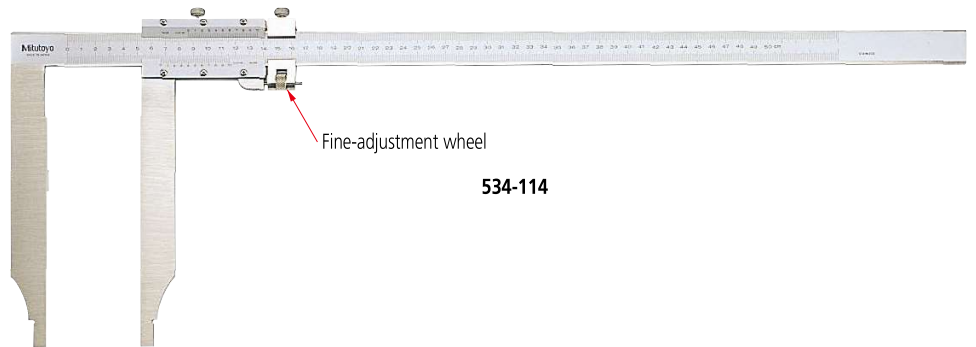
Note: For external dimensions, refer to the series **534** on page D-23.

Calipers

An industry standard measuring tool

Long Jaw Vernier Caliper SERIES 534

- Long jaws for measuring hard-to-reach workpiece features.
- Inside and outside measurements can be read directly from the upper and lower vernier scales.
- The fine-adjustment wheel enables precise feed and adjustment.
- Inside measurement is possible upwards from the minimum inside measuring length (jaws closed).



534-114

SPECIFICATIONS

Metric with inside measurement vernier scale				
Order No.	Range (mm)*	Graduation (mm)	Accuracy (mm)	Remarks
534-113	0 (10.1) - 300	0.02	±0.04	with fine adjustment
534-114	0 (20.1) - 500		±0.06	
534-115	0 (20.1) - 750		±0.08	
534-116	0 (20.1) - 1000		±0.10	

* (): Minimum dimension in inside measurement

Inch with inside measurement vernier scale				
Order No.	Range (in)*	Graduation (in)	Accuracy (in)	Remarks
534-117	0 (0.304) - 12	0.001	±0.002	with fine adjustment
534-118	0 (0.804) - 20		±0.003	
534-119	0 (0.804) - 30		±0.004	
534-120	0 (0.804) - 40		±0.004	

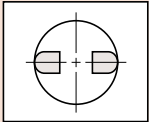
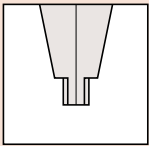
* (): Minimum dimension in inside measurement

DIMENSIONS

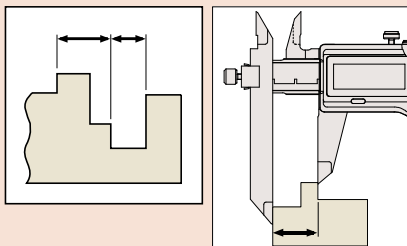
Unit: mm

Range	D	E	F	H	L	M	R	S	t
0 - 300 mm*	90	76.5	—	20	445	7	R5	12	3.8
0 - 300 mm/0 - 12 in		103	38				R5		3.8
0 - 500 mm*	200	89	—	25	682	12	R10	18.5	6
0 - 500 mm/0 - 20 in		112	51				R10		6
0 - 750 mm*		150	—	32	995	12	R10		8
0 - 750 mm/0 - 30 in			62.5				R10		8
0 - 1000 mm*	250	150	—	40	1230	12	R10	18.5	8
0 - 1000 mm/0 - 40 in			62.5				R10		8

* Without fine adjustment



Radiused jaws for accurate ID measurement



Technical Data

- Accuracy: Refer to the list of specifications.
(excluding quantizing error for Digimatic models)
- Resolution*¹: 0.01 mm or 0.0005 in/0.01 mm
- Graduation*²: 0.05 mm
- Display*¹: LCD
- Scale type*¹: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed*¹: Unlimited
- Battery: SR44 (1 pc), **938882**,
for initial operational checks (standard accessory)
- Battery life*¹: Approx. 5 years under normal use
- Dust/Water protection level*¹: IP67 (IEC 60529)*³
- *¹ Digimatic models
- *² Analog models
- *³ Rustproofing shall be applied after use if caliper was in contact with coolant.

Optional Accessories for Digimatic Models

For details, refer to page A-27.

- 959143**: Data hold unit
- Connecting cables for **IT/DP/MUX**
- 05CZA624**: SPC cable with data button (1 m)
- 05CZA625**: SPC cable with data button (2 m)
- USB Input Tool Direct
- 06AFM380A**: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
- 02AZD790A**: SPC cable with data button (160 mm)
- 02AZE140A**: SPC cable for foot switch

Wireless Data Output U-WAVE[®] fir

- U-WAVE-TC**: **264-620** (IP67 type)
264-621 (Buzzer type)
- U-WAVE-TCB Transmitter**
(Mitutoyo Bluetooth[®] U-WAVE)
264-624 (IP type)
264-625 (Buzzer type)

Refer to page A-15 for details.

- Connecting unit for **U-WAVE-TC/TCB**

02AZF310 (IP67 type)
Note: IP67 model is water/dust-proofed suitable for the factory floor.

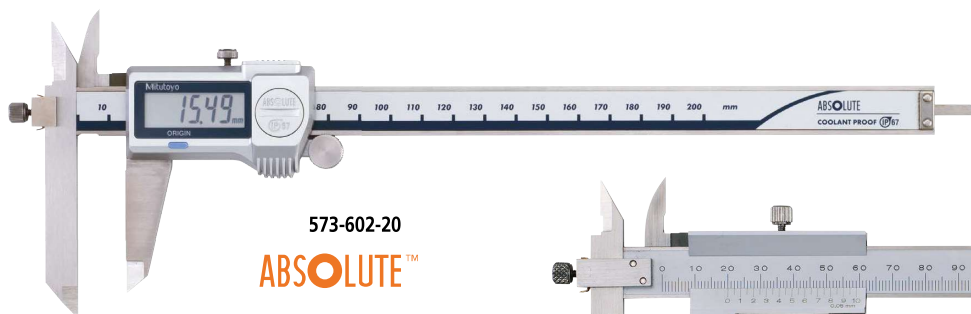
Buzzer type is not water/dust-proofed.

Refer to pages A-16 and A-18 for details.

Note: Cannot be used with **573-611-20**, **573-612-20** and **573-614**

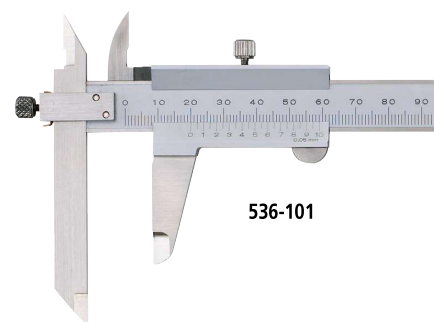
Offset Caliper SERIES 573, 536 — ABSOLUTE Digimatic and vernier types

- The beam-mounted jaw can be adjusted to facilitate measurement of stepped sections and hard-to-get-at workpiece features.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



573-602-20

ABSOLUTE[™]



536-101

SPECIFICATIONS

Metric	Digimatic model	
Order No.	Range (mm)	Accuracy (mm)
573-601-20	0 - 150	±0.02
573-611-20*	0 - 150	±0.02
573-602-20	0 - 200	±0.02
573-612-20*	0 - 200	±0.02
573-604-20	0 - 300	±0.03
573-614-20*	0 - 300	±0.03

* Without thumb roller

Metric	Analog model	
Order No.	Range (mm)	Accuracy (mm)
536-101	0 - 150	±0.05
536-102	0 - 200	±0.05
536-103	0 - 300	±0.08

Inch/Metric	Digimatic model	
Order No.	Range (in)	Accuracy (in)
573-701-20	0 - 6	±0.001
573-702-20	0 - 8	±0.001
573-704-20	0 - 12	±0.0015

DIMENSIONS

Unit: mm											
Analog model						Digimatic model					
Order No.	Model	Range (mm)	A	B	C	D	G	H	N	W	t
573-601-20	Digimatic model	0 - 150	16.5	21	14.6	40	10	16	(18) (4)	95	3.5
573-602-20		0 - 200	20	24.5	18.1	50					
573-604-20		0 - 300	22	27.5	19.8	64					
536-101	Analog model	0 - 150	17	21.5	17	40	10	16	(18) (4)	95	3
536-102		0 - 200	20.5	25	20.5	50					
536-103		0 - 300	22	27.5	22	64					

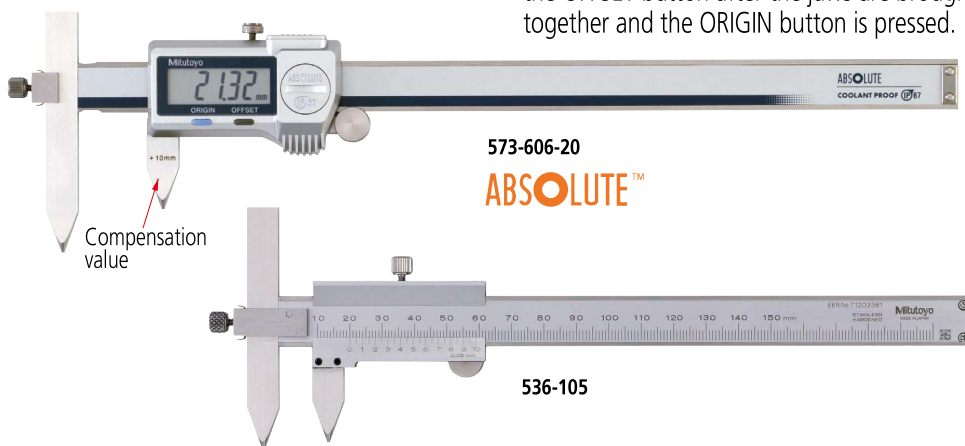
Calipers

An industry standard measuring tool

Offset Centerline Caliper SERIES 573, 536 — ABSOLUTE Digimatic and vernier types

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Specially designed for hole Center-to-Center measurements on the same, or offset, planes.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Direct reading of pitch measurements is available due to the offset-value setting function.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- Dedicated calibration and inspection tool can be made to order.
- Digimatic models need the compensation value (engraved on the moving jaw) added to the displayed value for correct measurement. However, the featured Offset function enables this to be done easily just by pressing the OFFSET button after the jaws are brought together and the ORIGIN button is pressed.



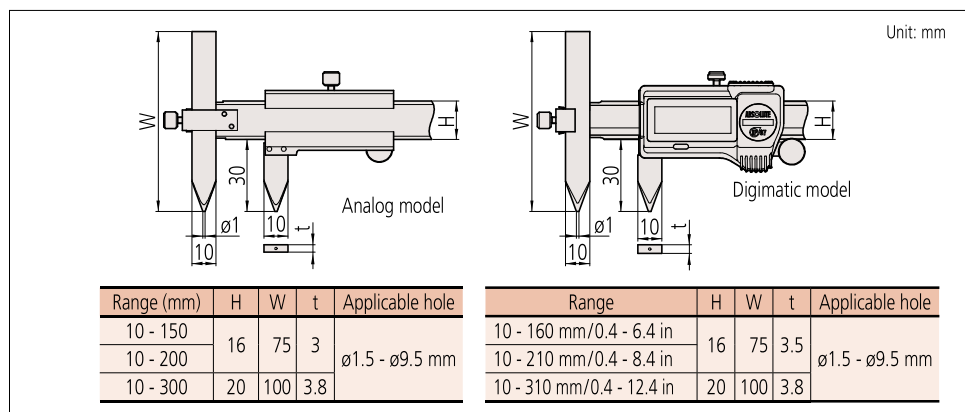
SPECIFICATIONS

Metric Digimatic model		
Order No.	Range (mm)	Accuracy (mm)
573-605-20	10.1 - 160	±0.03
573-615-20*	10.1 - 160	±0.03
573-606-20	10.1 - 210	±0.03
573-616-20*	10.1 - 210	±0.03
573-608-20	10.1 - 310	±0.04
573-618-20*	10.1 - 310	±0.04

* Without thumb roller

Metric Analog model		
Order No.	Range (mm)	Accuracy (mm)
536-105	10.1 - 150	±0.05
536-106	10.1 - 200	±0.05
536-107	10.1 - 300	±0.08

DIMENSIONS

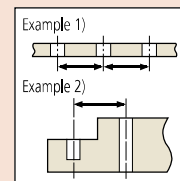


MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

IP67



Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
- Resolution*1: 0.01 mm or 0.0005 in / 0.01 mm
- Graduation*2: 0.05 mm
- Display*1: LCD
- Scale type*1: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed*1: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life*1: Approx. 5 years under normal use
- Dust/Water protection level*1: IP67 (IEC 60529)*3
- *1 Digimatic models
- *2 Analog models
- *3 Rustproofing shall be applied after use if caliper was in contact with coolant.

Optional Accessories for Digimatic Models

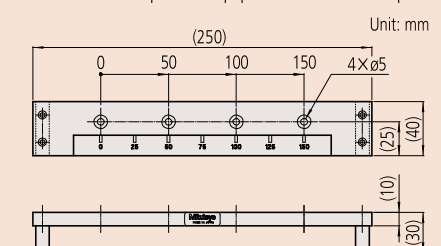
For details, refer to page A-27.

- **959143**: Data hold unit
- Connecting cables for **IT / DP / MUX**
- **05CZA624**: SPC cable with data button (1 m)
- **05CZA625**: SPC cable with data button (2 m)
- USB Input Tool Direct
- **06AFM380A**: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
- **02AZD790A**: SPC cable with data button (160 mm)
- **02AZE140A**: SPC cable for foot switch

Wireless Data Output U-WAVE[®]

- **U-WAVE-TC**: **264-620** (IP67 type)
264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter**
(Mitutoyo Bluetooth[®] U-WAVE)
264-624 (IP type)
264-625 (Buzzer type)
Refer to page A-15 for details.
- Connecting unit for **U-WAVE-TC / TCB**
02AZF310 (IP67 type)
Note: IP67 model is water/dust-proofed suitable for the factory floor.
Buzzer type is not water/dust-proofed.
Refer to pages A-16 and A-18 for details.
Note: Cannot be used with **573-708-20**

- **05FAJ735**: Inspection Equipment For Offset Caliper



ABSOLUTE[™]

IP67



www.mitutoyo.com
ID 0000045042

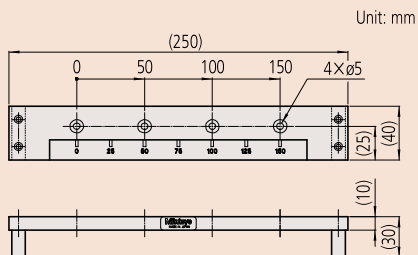
Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Scale type: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 5 years under normal use

Optional Accessories

For details, refer to page A-27.

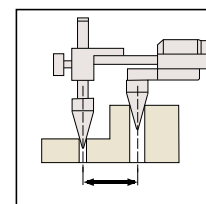
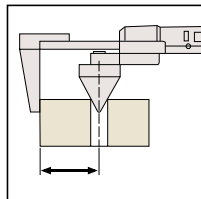
- **959143**: Data hold unit
- Connecting cables for **IT/DP/MUX**
 - 05CZA624**: SPC cable with data button (1 m)
 - 05CZA625**: SPC cable with data button (2 m)
- USB Input Tool Direct
 - 06AFM380A**: SPC cable for **USB-ITN-C** (2 m)
- Connecting cables for **U-WAVE-T**
 - 02AZD790A**: SPC cable with data button (160 mm)
 - 02AZE140A**: SPC cable for foot switch
- **05FAJ735**: Inspection Equipment For Offset Caliper



ABSOLUTE Back-Jaw Centerline Caliper SERIES 573 - Center-to-Center & Edge-to-Center Types

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Specially designed to measure hole Center-to-Center and Edge-to-Center distances. Provided with jaws on the back of the slider, measurements can be read easily from above.
- Direct reading of pitch measurements is available due to the offset value setting function.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- Dedicated calibration inspection tools are available.



SPECIFICATIONS

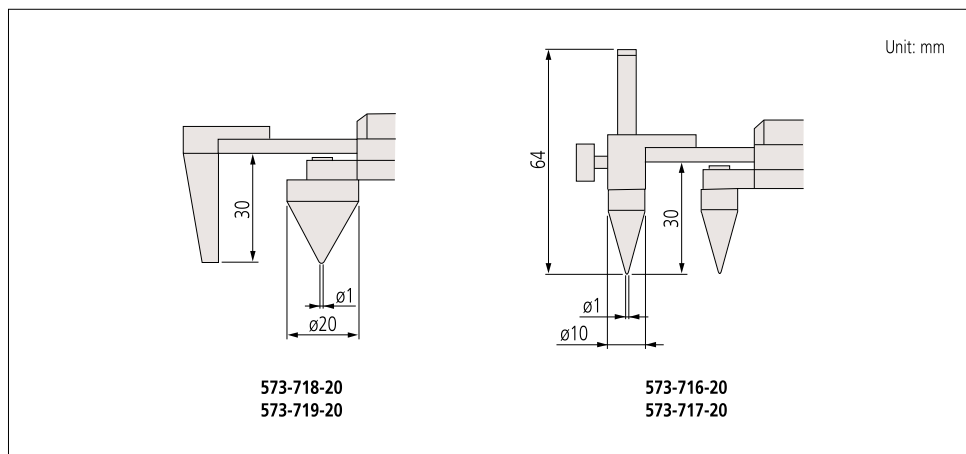
Metric	Edge-to-center distance type	
Order No.	Range (mm)	Accuracy (mm)
573-718-20 *1	10.1 - 200	±0.10
573-719-20 *1	10.1 - 300	±0.15

*1 Applicable hole diameter: ø1.5 - ø19.5 mm

Metric	Center-to-center distance type	
Order No.	Range (mm)	Accuracy (mm)
573-716-20 *2	10.1 - 200	±0.10
573-717-20 *2	10.1 - 300	±0.15

*2 Applicable hole diameter: ø1.5 - ø9.5 mm

DIMENSIONS



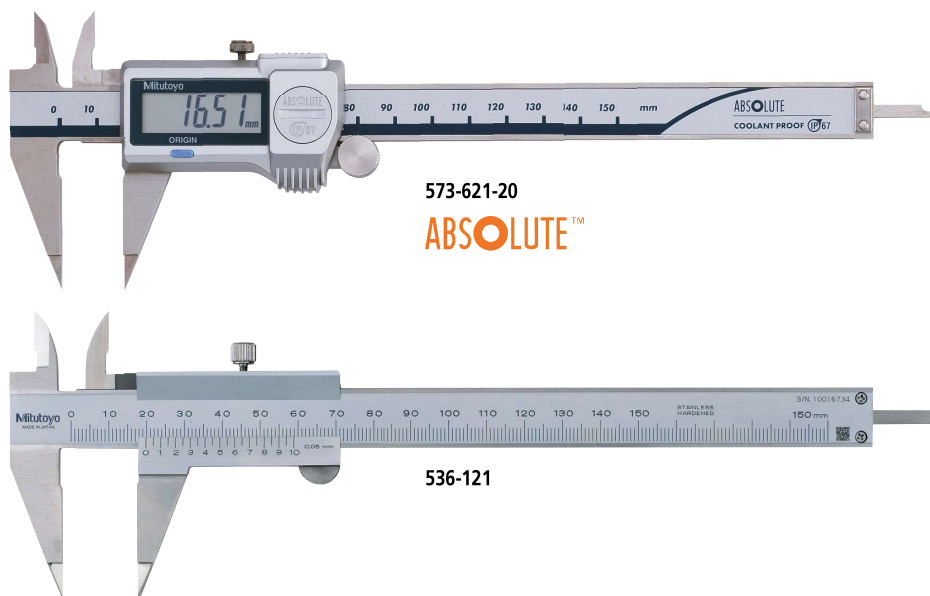
Calipers

An industry standard measuring tool

Point Caliper SERIES 573, 536 — ABSOLUTE Digimatic and vernier types

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Narrow-tip jaws fit into very small grooves and tracks, making many previously difficult outside measurements far easier to obtain.
- Allows step measurement.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- SPC output models allow integration into statistical process control and measurement systems. (Refer to page A-3.)



573-621-20

ABSOLUTE[™]

536-121

SPECIFICATIONS

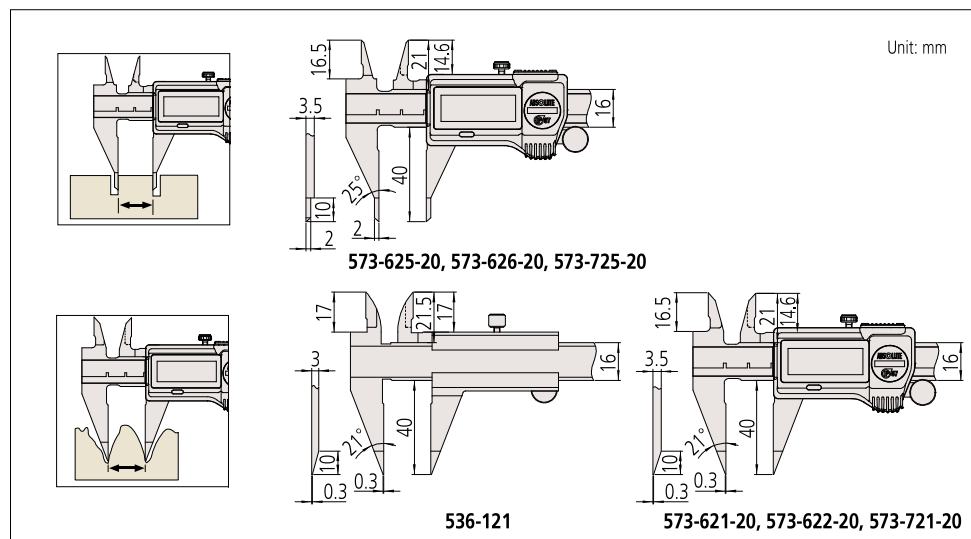
Metric	Digimatic model	
Order No.	Range (mm)	Accuracy (mm)
573-621-20	0 - 150	±0.02
573-625-20	0 - 150	±0.02
573-622-20*	0 - 150	±0.02
573-626-20*	0 - 150	±0.02

* Without thumb roller

Metric	Analog model	
Order No.	Range (mm)	Accuracy (mm)
536-121	0 - 150	±0.05

Inch / Metric	Digimatic model	
Order No.	Range (in)	Accuracy (in)
573-721-20	0 - 6	±0.001
573-725-20	0 - 6	±0.001

DIMENSIONS



573-625-20, 573-626-20, 573-725-20

536-121

573-621-20, 573-622-20, 573-721-20

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

IP67



Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
- Resolution*1: 0.01 mm or 0.0005 in/0.01 mm
- Graduation*2: 0.05 mm
- Display*1: LCD
- Scale type*1: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed*1: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life*1: Approx. 5 years under normal use
- Dust/Water protection level*1: IP67 (IEC 60529)*3
- *1 Digimatic models
- *2 Analog models
- *3 Rustproofing shall be applied after use if caliper was in contact with coolant.

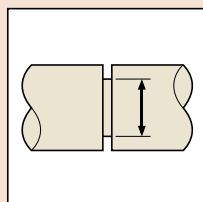
Optional Accessories for Digimatic Models

For details, refer to page A-27.

- Connecting cables for **IT / DP / MUX**
05CZA624: SPC cable with data button (1 m)
05CZA625: SPC cable with data button (2 m)
- USB Input Tool Direct
06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
02AZD790A: SPC cable with data button (160 mm)
02AZE140A: SPC cable for foot switch

Wireless Data Output **U-WAVE^{fit}**

- **U-WAVE-TC: 264-620** (IP67 type)
264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter** (Mitutoyo **Bluetooth[®]** U-WAVE)
264-624 (IP type)
264-625 (Buzzer type)
Refer to page A-15 for details.
- Connecting unit for **U-WAVE-TC / TCB**
02AZF310 (IP67 type)
Note: IP67 model is water/dust-proofed suitable for the factory floor.
Buzzer type is not water/dust-proofed.
Refer to pages A-16 and A-18 for details.



Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
- Resolution*¹: 0.01 mm or 0.0005 in/0.01 mm
- Graduation*²: 0.05 mm
- Display*¹: LCD
- Scale type*¹: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed*¹: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life*¹: Approx. 5 years under normal use
- Dust/Water protection level*¹: IP67 (IEC 60529)*³
- *¹ Digimatic models
- *² Analog models
- *³ Rustproofing shall be applied after use if caliper was in contact with coolant.

Optional Accessories for Digimatic Models

For details, refer to page A-27.

- Connecting cables for **IT/DP/MUX**
05CZA624: SPC cable with data button (1 m)
05CZA625: SPC cable with data button (2 m)
- USB Input Tool Direct
06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
02AZD790A: SPC cable with data button (160 mm)
02AZE140A: SPC cable for foot switch

Wireless Data Output U-WAVE[®]

- U-WAVE-TC**: **264-620** (IP67 type)
264-621 (Buzzer type)
- U-WAVE-TCB Transmitter (Mitutoyo Bluetooth[®] U-WAVE)**
264-624 (IP type)
264-625 (Buzzer type)

Refer to page A-15 for details.

- Connecting unit for **U-WAVE-TC/TCB**
02AZF310 (IP67 type)

Note: IP67 model is water/dust-proofed suitable for the factory floor.

Buzzer type is not water/dust-proofed.

Refer to pages A-16 and A-18 for details.

Blade Type Caliper SERIES 573, 536 — ABSOLUTE Digimatic and vernier types

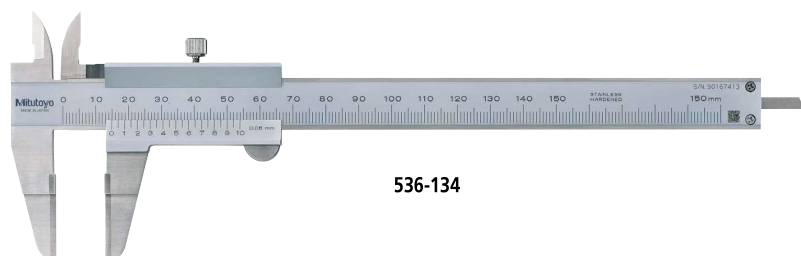
MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- The thin blade-type jaws fit into very small grooves and make previously difficult outside measurements far easier to obtain.
- The outside measuring faces are carbide tipped.
- Allows step measurement.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



573-634-20

ABSOLUTE[™]



536-134

SPECIFICATIONS

Metric	Digimatic model	
Order No.	Range (mm)	Accuracy (mm)
573-634-20	0 - 150	±0.02
573-635-20*	0 - 150	±0.02

* Without thumb roller

Metric	Analog model	
Order No.	Range (mm)	Accuracy (mm)
536-134	0 - 150	±0.05
536-135	0 - 200	±0.05
536-136	0 - 300	±0.08

Inch/Metric	Digimatic model	
Order No.	Range (in)	Accuracy (in)
573-734-20	0 - 6	±0.001

DIMENSIONS

		Unit: mm							
Range (mm)	Diagram	A	B	C	D	d	e	H	t
		17	21.5	17	40	20	0.75	16	3
		20.5	25	20.5	50	25			
		22	27.5	22	64	30	1	20	3.8

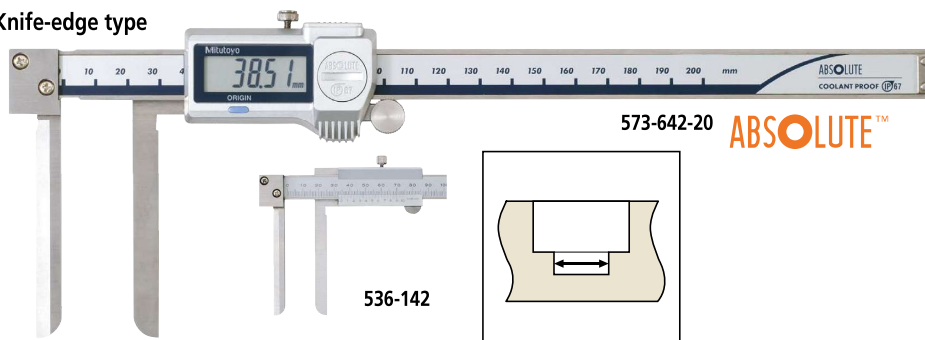
Calipers

An industry standard measuring tool

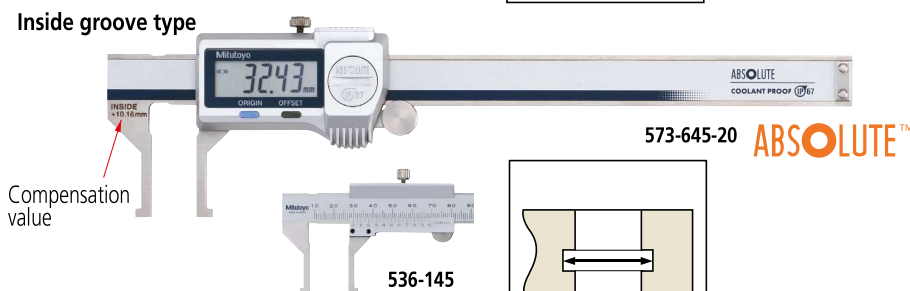
ABSOLUTE Inside Caliper SERIES 573, 536 — Knife-edge/Inside Groove/Point Jaw Type

- Dedicated caliper for inside measurement.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)
- Digimatic models **573-645-20** and **573-646-20** need the compensation value (engraved on the fixed jaw) added to the displayed value for correct measurement. However, the featured Offset function enables this to be done easily just by pressing the OFFSET button after the jaws are brought together and the ORIGIN button is pressed.

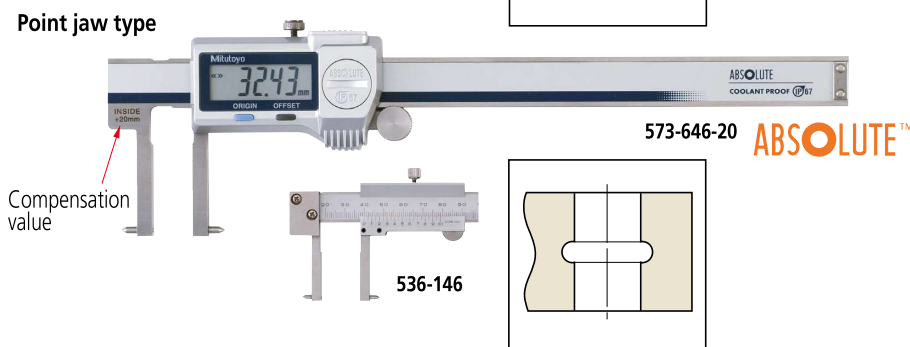
Knife-edge type



Inside groove type



Point jaw type



SPECIFICATIONS

Metric	Digimatic model		
Order No.	Range (mm)	Accuracy (mm)	Remarks
573-642-20	10 - 200	±0.05	Knife-edge type, Measurable min.
573-643-20 *1	10 - 200	±0.05	Knife-edge type, Measurable min.
573-645-20 *2	10.1 - 160	±0.05	Inside groove type, Measurable min.
573-647-20 *1	10.1 - 160	±0.05	Inside groove type, Measurable min.
573-646-20 *2	20.1 - 170	±0.05	Point jaw type, Measurable min.
573-648-20 *1	20.1 - 170	±0.05	Point jaw type, Measurable min.

*1 Without thumb roller

*2 Includes the offsetting function, which indicates the actual measurement value.

Metric	Analog model		
Order No.	Range (mm)	Accuracy (mm)	Remarks
536-142	10 - 200	±0.12	Knife-edge type, Measurable min.
536-145	10.1 - 150	±0.05	Inside groove type, Measurable min.
536-146	20.1 - 150	±0.05	Point jaw type, Measurable min.
536-147	30.1 - 300	±0.08	Point jaw type, Measurable min.
536-148	70.1 - 450	±0.10	Point jaw type, Measurable min.
536-149	70.1 - 600	±0.12	Point jaw type, Measurable min.

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Data Management Software by Mitutoyo

MeasurLink ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

IP67



Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
- Resolution*1: 0.01 mm or 0.0005 in/0.01 mm
- Graduation*2: 0.05 mm
- Display*1: LCD
- Scale type*1: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed*1: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life*1: Approx. 5 years under normal use
- Dust/Water protection level*1: IP67 (IEC 60529)*3
- *1 Digimatic models
- *2 Analog models
- *3 Rustproofing shall be applied after use if caliper was in contact with coolant.

Optional Accessories for Digimatic Models

For details, refer to page A-27.

- Connecting cables for **IT/DP/MUX**
05CZA624: SPC cable with data button (1 m)
05CZA625: SPC cable with data button (2 m)
- USB Input Tool Direct
06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
02AZD790A: SPC cable with data button (160 mm)
02AZE140A: SPC cable for foot switch

Wireless Data Output **U-WAVE**

- **U-WAVE-TC: 264-620** (IP67 type)
264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter (Mitutoyo Bluetooth® U-WAVE)**
264-624 (IP type)
264-625 (Buzzer type)
Refer to page A-15 for details.
- Connecting unit for **U-WAVE-TC/TCB**
02AZF310 (IP67 type)
Note: IP67 model is water/dust-proofed suitable for the factory floor.
Buzzer type is not water/dust-proofed.
Refer to pages A-16 and A-18 for details.
Note: Cannot be used with **573-642-20**, **573-643-20** and **573-742-20**

Inch/Metric Digimatic model

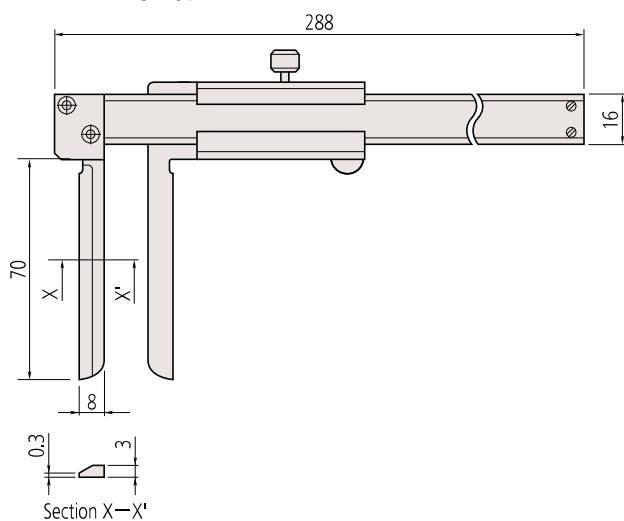
Order No.	Range (in)	Accuracy (in)	Remarks
573-742-20	0.4 - 8	±0.002	Knife-edge type, Measurable min.
573-745-20 *	0.404 - 6.4	±0.002	Inside groove type, Measurable min.
573-746-20 *	0.804 - 6.8	±0.002	Point jaw type, Measurable min.

* Includes the offsetting function, which indicates the actual measurement value.

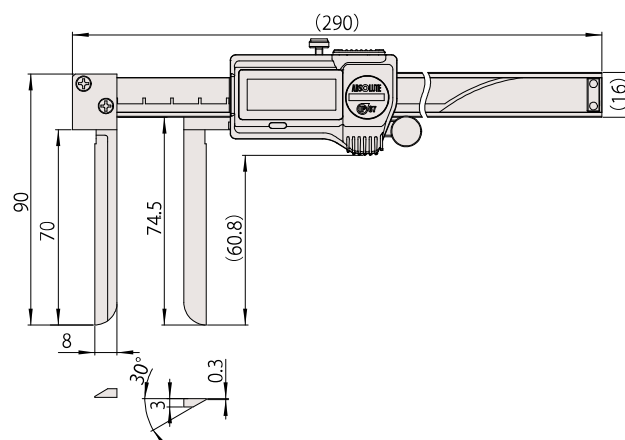
DIMENSIONS

Unit: mm

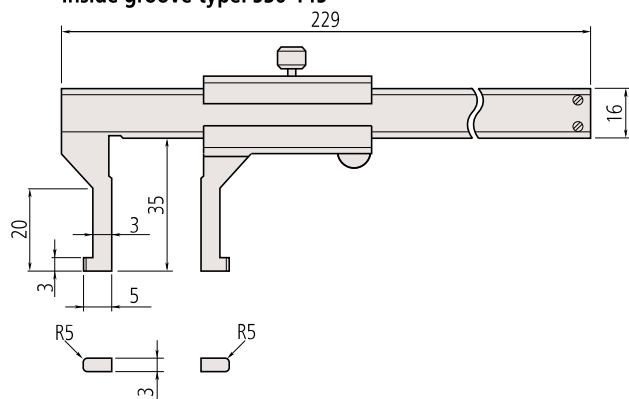
Knife-edge type: 536-142



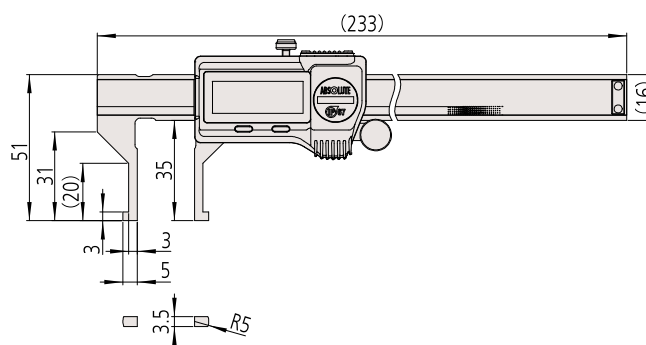
Knife-edge type: 573-642-20, 573-643-20, 573-742-20



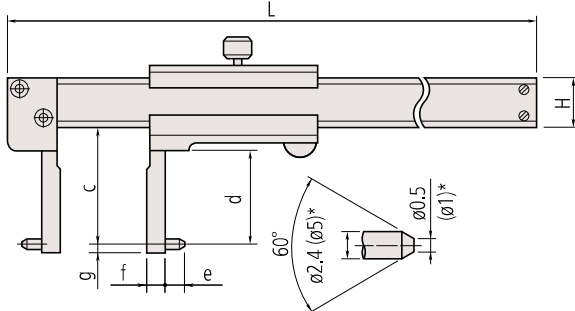
Inside groove type: 536-145



Inside groove type: 573-645-20, 573-647-20, 573-745-20

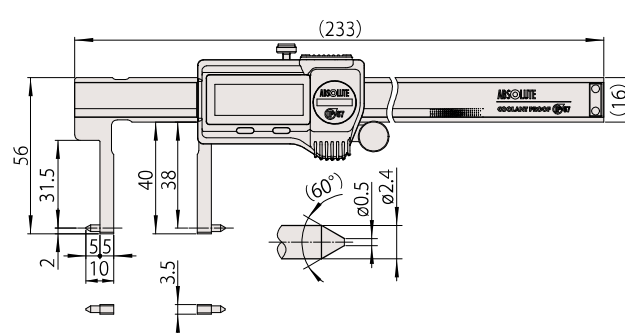


Point jaw type: 536-146, 147, 148, 149



*Applies to 536-148 or 149

Point jaw type: 573-646-20, 573-648-20, 573-746-20



Range (mm)	c	d	e	f	g	H	L
150	38	31	5	5	2	16	229
300	98	89	5	10	2	20	403
450	145	136	10	25	5	25	610
600	145	136	10	25	5	25	750

Note: Models with a measuring range of more than 300 mm have slightly different appearance.
For details, contact our Customer Support Center.

Calipers

An industry standard measuring tool

Neck Caliper SERIES 573, 536 — ABSOLUTE Digimatic and vernier types

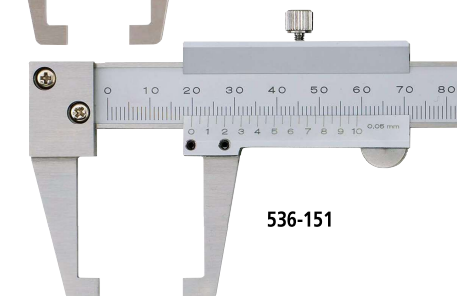
MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- Can measure wall thickness inside bores and recesses.
- Digimatic models are an IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



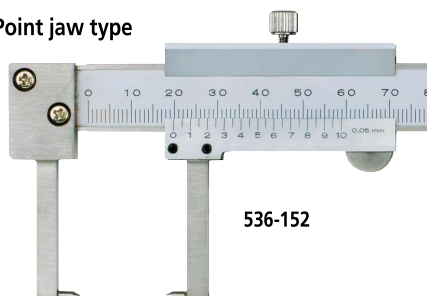
573-651-20

ABSOLUTE[™]



536-151

Point jaw type



536-152

SPECIFICATIONS

Metric	Digimatic model
Order No.	Range (mm)
573-651-20	0 - 150
573-652-20* ¹	0 - 150
573-653-20* ²	0 - 150
573-654-20* ^{1*2}	0 - 150

*1 Point jaw type

*2 Without thumb roller

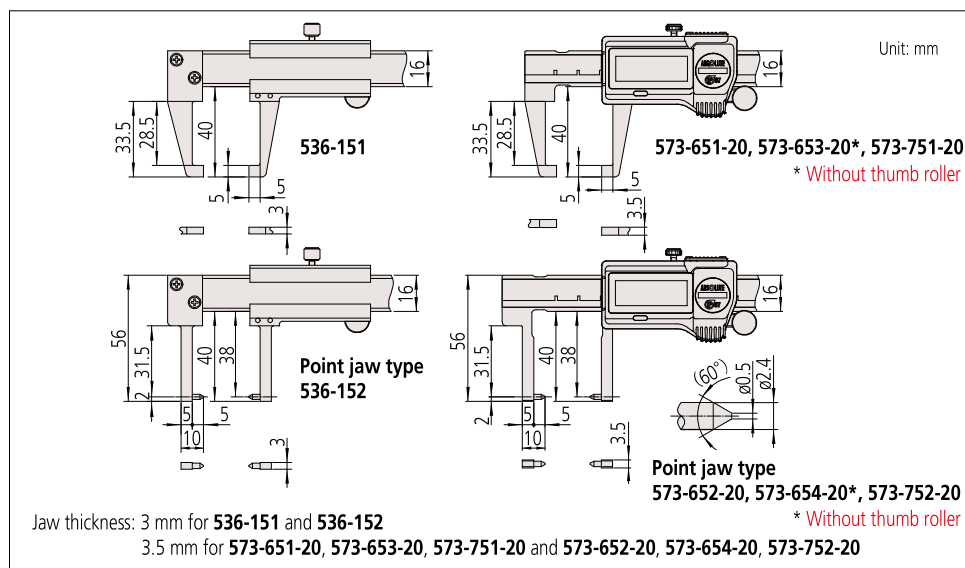
Metric	Analog model
Order No.	Range (mm)
536-151	0 - 150
536-152*	0 - 150

* Point jaw type

Inch / Metric	Digimatic model
Order No.	Range (in)
573-751-20	0 - 6
573-752-20*	0 - 6

* Point jaw type

DIMENSIONS

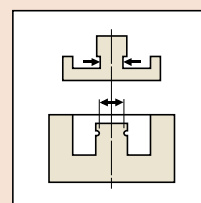


Jaw thickness: 3 mm for 536-151 and 536-152

3.5 mm for 573-651-20, 573-653-20, 573-751-20 and 573-652-20, 573-654-20, 573-752-20

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
- Resolution*¹: 0.01 mm or 0.0005 in/0.01 mm
- Graduation*²: 0.05 mm
- Display*¹: LCD
- Scale type*¹: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed*¹: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life*¹: Approx. 5 years under normal use
- Dust/Water protection level*¹: IP67 (IEC 60529)*³
- *1 Digimatic models
- *2 Analog models
- *3 Rustproofing shall be applied after use if caliper was in contact with coolant.

Optional Accessories for Digimatic Models

For details, refer to page A-27.

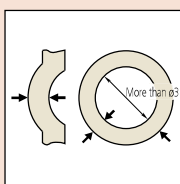
- Connecting cables for **IT / DP / MUX**
 - 05CZA624**: SPC cable with data button (1 m)
 - 05CZA625**: SPC cable with data button (2 m)
- USB Input Tool Direct
- **06AFM380A**: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
 - 02AZD790A**: SPC cable with data button (160 mm)
 - 02AZE140A**: SPC cable for foot switch

Wireless Data Output **U-WAVE[®]**

- **U-WAVE-TC**: **264-620** (IP67 type)
264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter (Mitutoyo Bluetooth[®] U-WAVE)**
264-624 (IP type)
264-625 (Buzzer type)
Refer to page A-15 for details.
- Connecting unit for **U-WAVE-TC / TCB**
02AZF310 (IP67 type)
Note: IP67 model is water/dust-proofed suitable for the factory floor.
Buzzer type is not water/dust-proofed.
Refer to pages A-16 and A-18 for details.



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Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error for Digimatic models)
 - Resolution*¹: 0.01 mm or 0.0005 in/0.01 mm
 - Graduation*²: 0.05 mm
 - Display*¹: LCD
 - Scale type*¹: ABSOLUTE electromagnetic induction linear encoder
 - Max. response speed*¹: Unlimited
 - Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
 - Battery life*¹: Approx. 5 years under normal use
 - Dust/Water protection level*¹: IP67 (IEC 60529)*³
- *¹ Digimatic models
*² Analog models
*³ Rustproofing shall be applied after use if caliper was in contact with coolant.

Optional Accessories for Digimatic Models

For details, refer to page A-27.

- Connecting cables for **IT/DP/MUX**
05CZA624: SPC cable with data button (1 m)
05CZA625: SPC cable with data button (2 m)
- USB Input Tool Direct
06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
02AZD790A: SPC cable with data button (160 mm)
02AZE140A: SPC cable for foot switch

Wireless Data Output **U-WAVE™**

- U-WAVE-TC**: **264-620** (IP67 type)
264-621 (Buzzer type)
- U-WAVE-TCB Transmitter** (Mitutoyo Bluetooth[®] U-WAVE)
264-624 (IP type)
264-625 (Buzzer type)
Refer to page A-15 for details.
- Connecting unit for **U-WAVE-TC/TCB**
02AZF310 (IP67 type)
Note: IP67 model is water/dust-proofed suitable for the factory floor.
Buzzer type is not water/dust-proofed.
Refer to pages A-16 and A-18 for details.

Tube Thickness Caliper SERIES 573, 536 — ABSOLUTE Digimatic and vernier types

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- The beam-mounted jaw is a round bar that facilitates measurements of tube wall thickness.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



573-661-20

ABSOLUTE™



536-161

SPECIFICATIONS

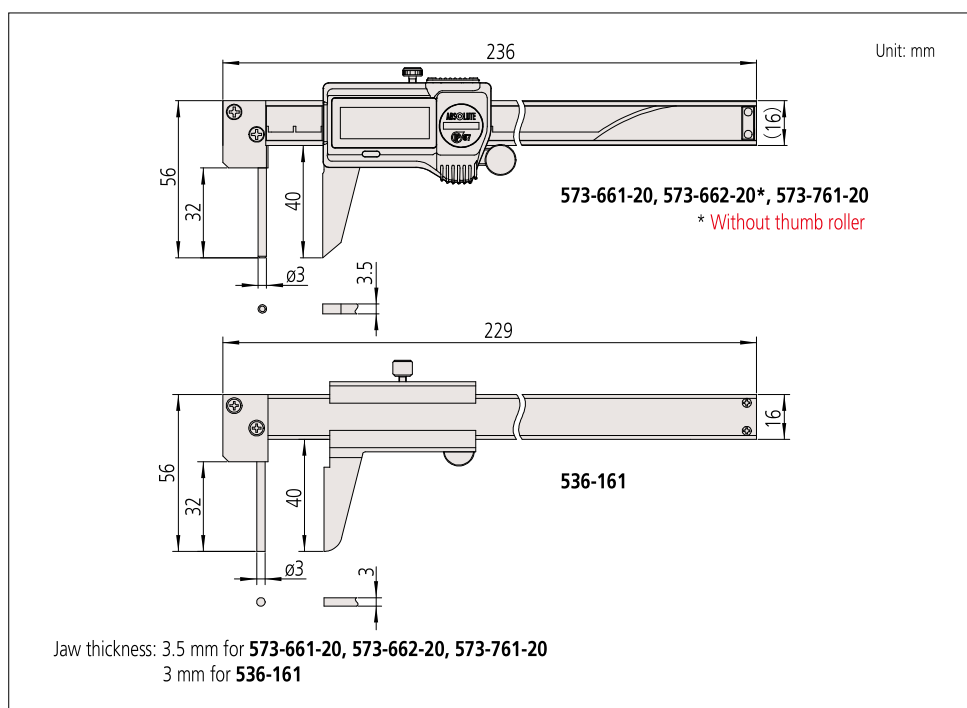
Metric	Digimatic model	
Order No.	Range (mm)	Accuracy (mm)
573-661-20	0 - 150	±0.05
573-662-20*	0 - 150	±0.05

* Without thumb roller

Metric	Analog model	
Order No.	Range (mm)	Accuracy (mm)
536-161	0 - 150	±0.05

Inch / Metric	Digimatic model	
Order No.	Range (in)	Accuracy (in)
573-761-20	0 - 6	±0.002

DIMENSIONS

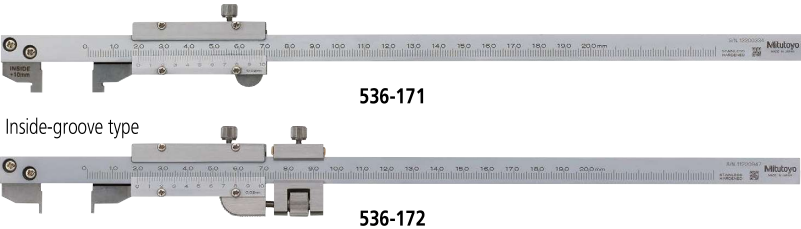


Calipers

An industry standard measuring tool

Hook Type Vernier Caliper SERIES 536

- Allows measurement of stepped inside diameter section of cylinders.
- **536-172** is equipped with a fine-adjustment wheel to enable precise feed and adjustment.

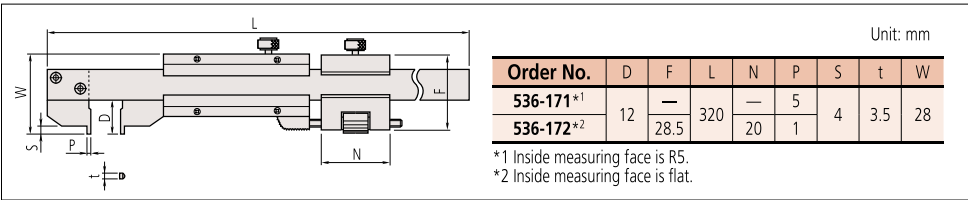


SPECIFICATIONS

Metric				
Order No.	Range (mm)*	Graduation (mm)	Accuracy (mm)	Remarks
536-171	0 - 200 (10.1 - 200)	0.02	±0.03	—
536-172	0 - 200 (2.1 - 200)		±0.03	with fine adjustment

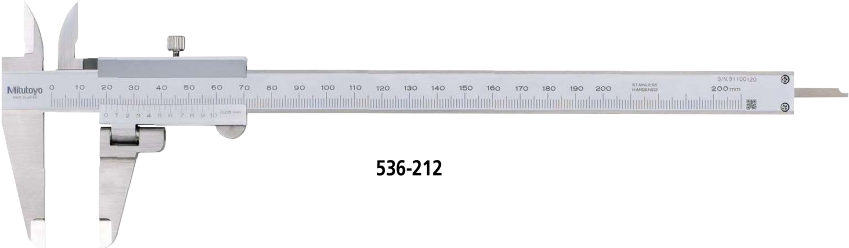
* () : Dimension in inside measurement

DIMENSIONS



Swivel Vernier Caliper SERIES 536 — Moving Jaw type

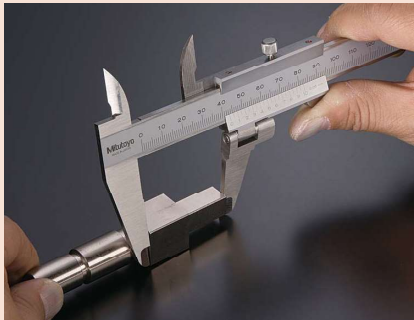
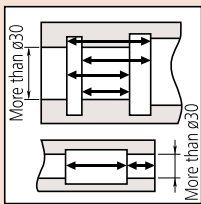
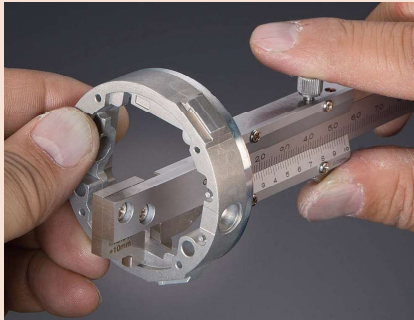
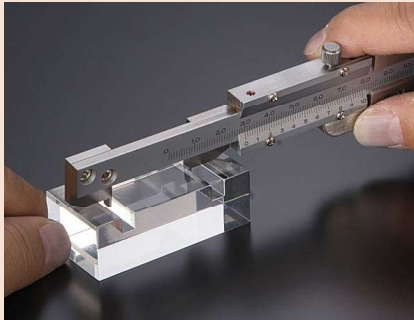
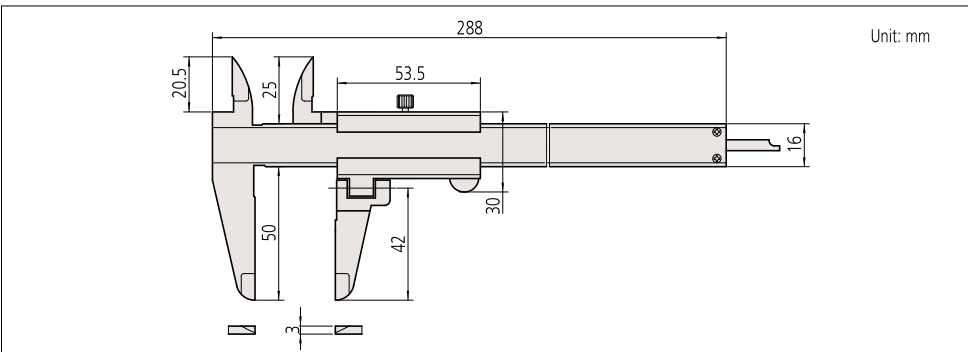
- The moving jaw can be rotated to measure sectioned shafts.
- Allows step measurement.



SPECIFICATIONS

Metric				
Order No.	Range (mm)	Graduation (mm)	Accuracy (mm)	Remarks
536-212	0 - 200	0.05	±0.05	with depth bar

DIMENSIONS





Technical Explanation

Measurement procedure



A consistently low measuring force can be guaranteed by only taking measurements when the pointer is between the two fiducial lines.

Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Display: LCD
- Scale type: ABSOLUTE electromagnetic inductive linear encoder
- Jaw retraction: 0.3 mm
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 3.5 years under normal use

Optional Accessories

For details, refer to page A-27.

- **959143**: Data hold unit
- Connecting cables for **IT/DP/MUX**
 - **959149**: SPC cable with data button (1 m)
 - **959150**: SPC cable with data button (2 m)
- USB Input Tool Direct
 - **06AFM380C**: SPC cable for **USB-ITN-C** (2 m)
- Connecting cables for **U-WAVE-T**
 - **02AZD790A**: SPC cable with data button (160 mm)
 - **02AZE140A**: SPC cable for foot switch

Wireless Data Output **U-WAVE[™]**

- **U-WAVE-TC**: **264-620** (IP67 type)
264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter**
(Mitutoyo **Bluetooth[®]** U-WAVE)
264-624 (IP type)
264-625 (Buzzer type)

Refer to page A-15 for details.

- Connecting unit for **U-WAVE-TC/TCB**
02AZF300 (Buzzer type)

Note: IP67 model is water/dust-proofed suitable for the factory floor.

Buzzer type is not water/dust-proofed.

Refer to pages A-16 and A-18 for details.

ABSOLUTE Low Force Caliper SERIES 573

- An ABSOLUTE electromagnetic induction linear encoder system is incorporated.
- Enables accurate measurement of plastic parts and other workpieces that are difficult to measure with conventional calipers due to deformation.
- Allows fine feeding easily by using thumb roller.
- Displacement of main scale jaw is 0.3 mm.
- Measuring force: 0.5 N to 1.0 N

- Absolute type. (Refer to page D-6 for a description of Absolute measurement.) Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



573-191-30

SPECIFICATIONS

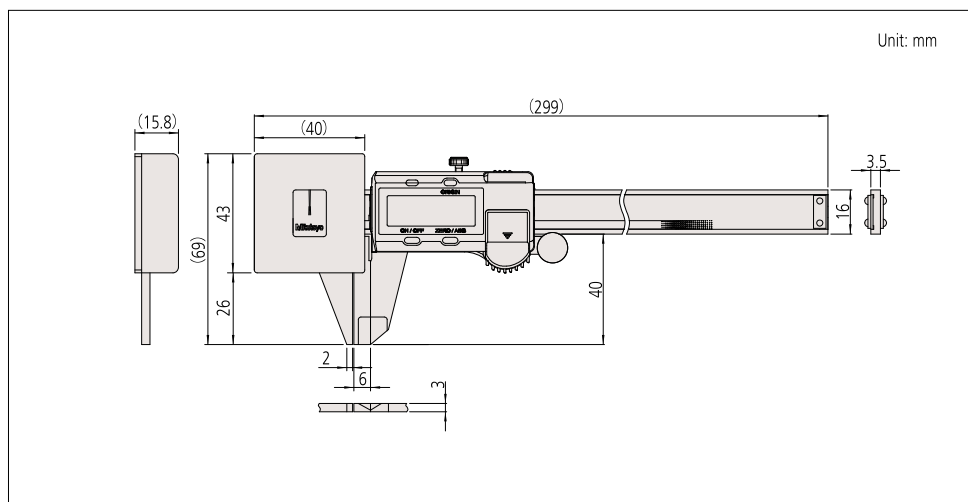
Metric		
Order No.	Range (mm)	Accuracy (mm)*
573-191-30	0 - 180	±0.05

Inch / Metric		
Order No.	Range (in)	Accuracy (in)*
573-291-30	0 - 7	±0.002

* Excluding quantizing error.

Note: Dedicated for outside measurement (depth bar is not fitted).

DIMENSIONS



Unit: mm

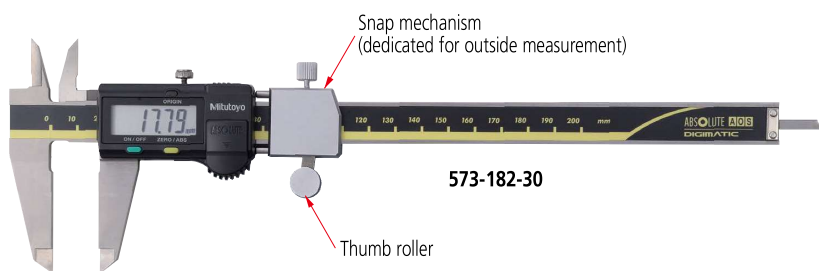
Calipers

An industry standard measuring tool

ABSOLUTE Snap Caliper SERIES 573

MeasurLink[®] ENABLED
Data Management Software by Mitutoyo

- An ABSOLUTE electromagnetic induction linear encoder system is incorporated.
- Snap mechanism allows continuous and easy measurement without moving the slider by using the lever.
- Allows efficient continuous measurement of workpieces during acceptance inspection or mass production.
- Allows step measurement
- Displacement of snap part is 2 mm.
- Measuring force: 7 N to 14 N
- Absolute type. (Refer to page D-6 for details on the Absolute function.)
- Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. (Refer to page A-3.)



SPECIFICATIONS

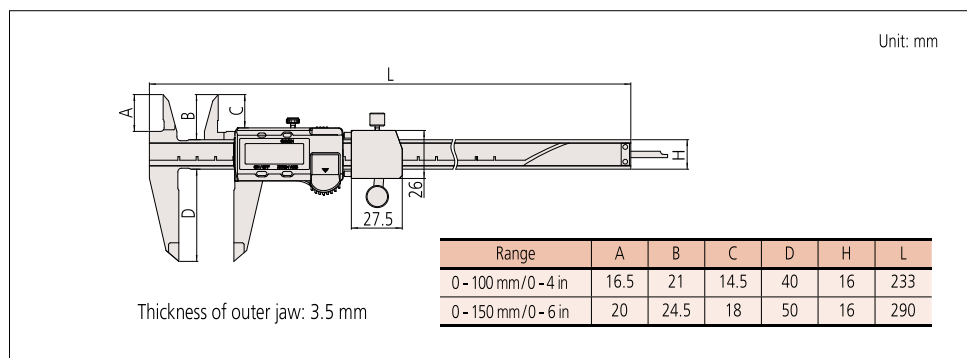
Metric		
Order No.	Range (mm)	Accuracy (mm)*
573-181-30	0 - 100	±0.02
573-182-30	0 - 150	±0.02

* Excluding quantizing error.

Note: Dedicated for outside measurement (depth bar is not fitted).

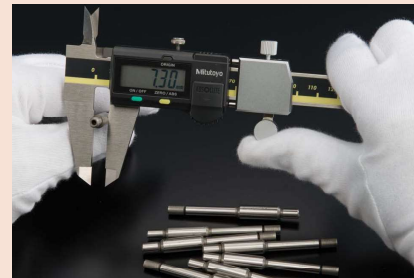
Inch / Metric		
Order No.	Range (in)	Accuracy (in)*
573-281-30	0 - 4	±0.001
573-282-30	0 - 6	±0.001

DIMENSIONS



Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).

ABSOLUTE[™]



Technical Data

- Accuracy: Refer to the list of specifications. (excluding quantizing error)
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Repeatability: 0.01 mm
- Display: LCD
- Scale type: ABSOLUTE electromagnetic inductive linear encoder
- Jaw retraction: 2 mm
- Max. response speed: Unlimited
- Battery: SR44 (1 pc), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 3.5 years under normal use

Optional Accessories

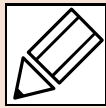
For details, refer to page A-27.

- **959143**: Data hold unit
- Connecting cables for **IT / DP / MUX**
- **959149**: SPC cable with data button (1 m)
- **959150**: SPC cable with data button (2 m)
- USB Input Tool Direct
- **06AFM380C**: SPC cable for **USB-ITN-C** (2 m)
- Connecting cables for **U-WAVE-T**
- **02AZD790C**: SPC cable with data button (160 mm)
- **02AZE140C**: SPC cable for foot switch

Wireless Data Output **U-WAVE[®]**

- **U-WAVE-TC: 264-620** (IP67 type)
- **264-621** (Buzzer type)
- **U-WAVE-TCB Transmitter (Mitutoyo Bluetooth[®] U-WAVE)**
- **264-624** (IP type)
- **264-625** (Buzzer type)
- Refer to page A-15 for details.
- Connecting unit for **U-WAVE-TC / TCB: 02AZF300** (Buzzer type)
- Note: IP67 model is water/dust-proofed suitable for the factory floor.
- Buzzer type is not water/dust-proofed.
- Refer to pages A-16 and A-18 for details.

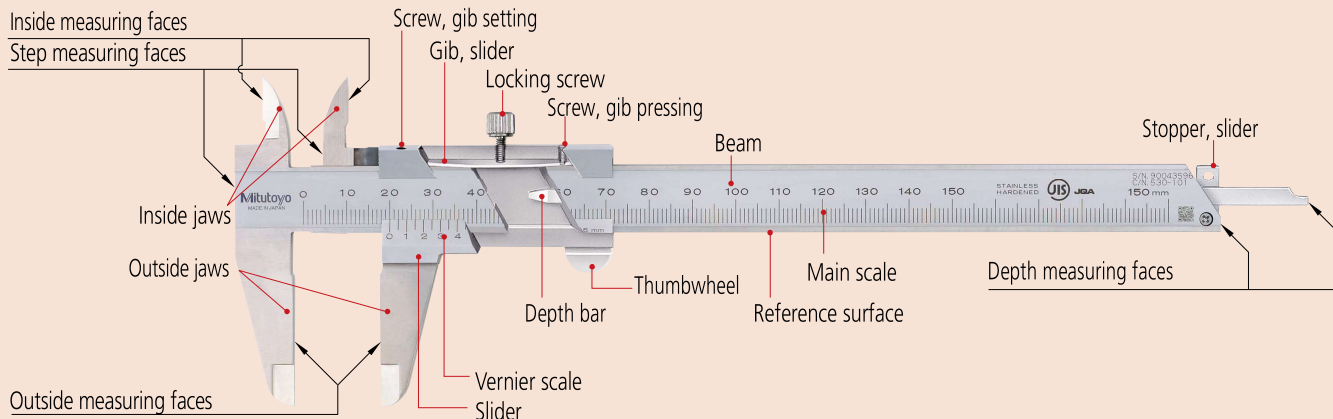
Quick Guide to Precision Measuring Instruments



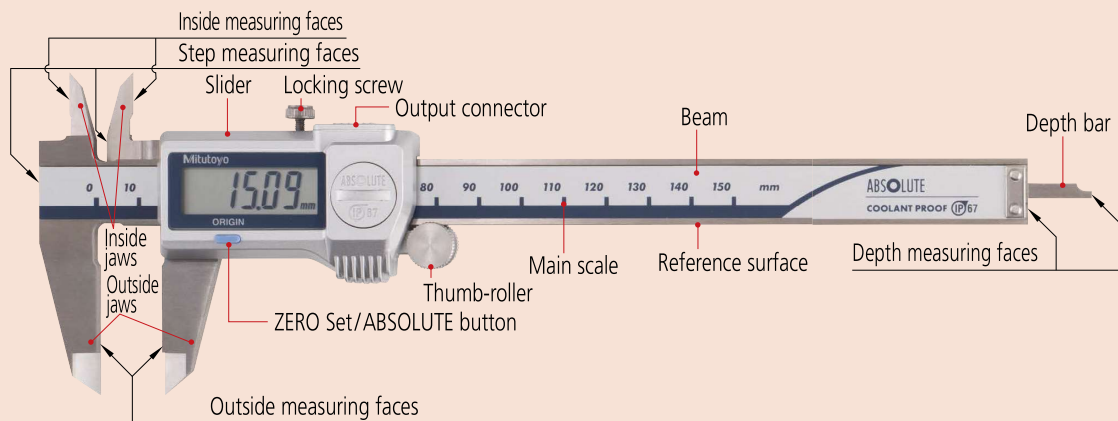
Calipers

Nomenclature

Vernier Caliper

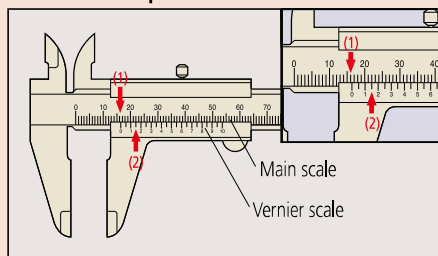


Absolute Digimatic Caliper



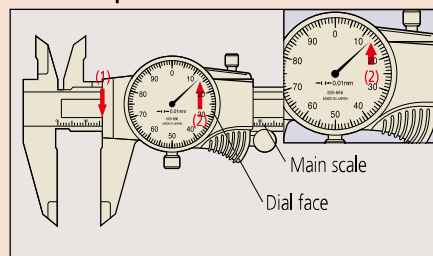
How to Read the Scale

• Vernier Calipers



Graduation	0.05 mm
(1) Main scale	16 mm
(2) Vernier	0.15 mm
Reading	16.15 mm

• Dial Calipers

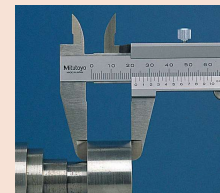


Graduation	0.01 mm
(1) Main scale	16 mm
(2) Dial face	0.13 mm
Reading	16.13 mm

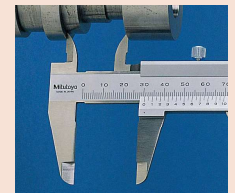
Note: Above left, 0.15 mm (2) is read at the position where a main scale graduation line corresponds with a vernier graduation line.

Measurement examples

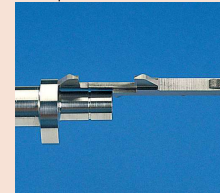
1. Outside measurement



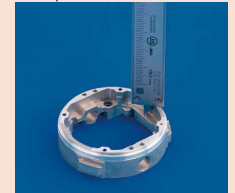
2. Inside measurement



3. Step measurement

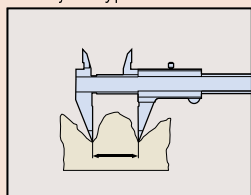


4. Depth measurement



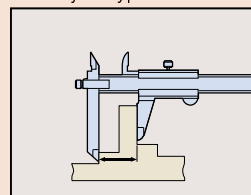
Special Purpose Caliper Applications

Point jaw type



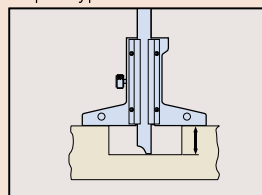
For uneven surface measurement

Offset jaw type



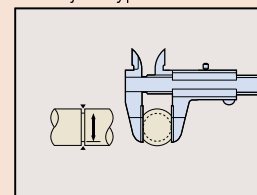
For stepped feature measurement

Depth type



For depth measurement

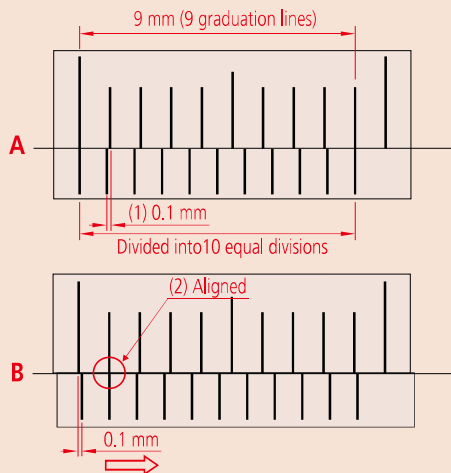
Blade jaw type



For diameter of narrow groove measurement

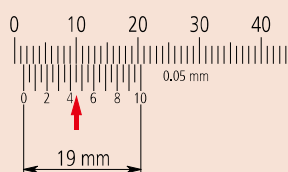
Vernier scale

This is a short auxiliary scale that enables accurate interpolation between the divisions of a longer scale without using mechanical magnification. The principle of operation is that each vernier scale division is slightly smaller than a main scale division, so that successive vernier graduations successively coincide with main scale graduations as one is moved relative to the other. Specifically, n divisions on a vernier scale are the same length as $n-1$ divisions on the main scale it works with, and n defines the division (or interpolation) ratio. Although n may be any number, in practice it is typically 10, 20, 25, etc., so that the division is a useful decimal fraction. The example below is for $n = 10$. The main scale is graduated in mm, and so the vernier scale is 9 mm (10 divisions) long, the same as 9 mm (9 divisions) on the main scale. This produces a difference in length of 0.1 mm (1) as shown in figure A (the 1st vernier graduation is aligned with the first main scale graduation). If the vernier scale is slid 0.1 mm to the right as shown in figure B, the 2nd graduation line on the vernier scale moves into alignment with the 2nd line on the main scale (2), and so enables easy reading of the 0.1 mm displacement.



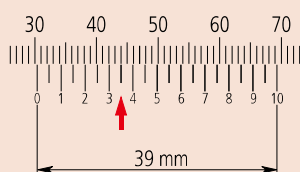
Some early calipers divided 19 divisions on the main scale by 20 vernier divisions to provide 0.05 mm resolution. However, the closely spaced lines proved difficult to read and so, since the 1970s, a long vernier scale that uses 39 main scale divisions to spread the lines is generally used instead, as shown below.

• 19 mm Vernier scale



Scale reading 1.45 mm

• 39 mm vernier scale (long vernier scale)



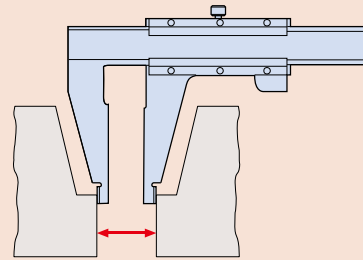
Scale reading 30.35 mm

Calipers were made that gave an even finer resolution of 0.02 mm. These required a 49-division vernier scale dividing 50 main scale divisions. However, they were difficult to read and are now hard to find since Digital calipers with an easily read display and resolution of 0.01 mm appeared.

About Long Calipers

Steel rules are commonly used to roughly measure large workpieces but if a little more accuracy is needed then a long caliper is suitable for the job. A long caliper is very convenient for its user friendliness but does require some care in use. In the first place it is important to realize there is no relationship between resolution and accuracy. For details, refer to the values in our catalog. Resolution is constant whereas the accuracy obtainable varies dramatically according to how the caliper is used.

The measuring method with this instrument is a concern since distortion of the main beam causes a large amount of the measurement error, so accuracy will vary greatly depending on the method used for supporting the caliper at the time. Also, be careful not to use too much measuring force when using the outside measuring faces as they are furthest away from the main beam so errors will be at a maximum here. This precaution is also necessary when using the tips of the outside measuring faces of a long-jaw caliper.



Small hole measurement with an M-type caliper

A structural error d occurs when you measure the internal diameter of a small hole.

$\varnothing D$: True internal diameter

$\varnothing d$: Measured diameter

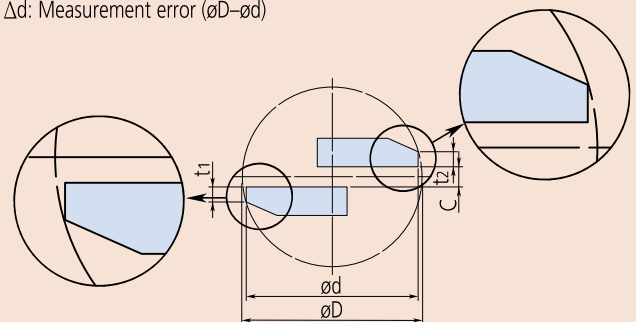
t_1, t_2 : Thickness of the inside jaw

C : Distance between the inside jaws

Δd : Measurement error ($\varnothing D - \varnothing d$)

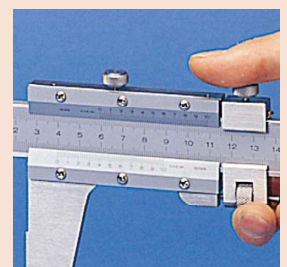
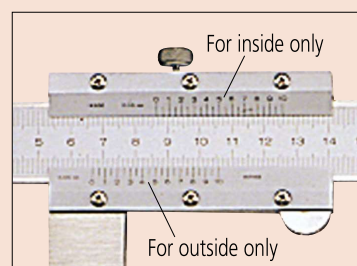
True internal diameter ($\varnothing D$: 5 mm) Unit: mm

$t_1 + t_2 + C$	0.3	0.5	0.7
Δd	0.009	0.026	0.047



Inside Measurement with a CM-type Caliper

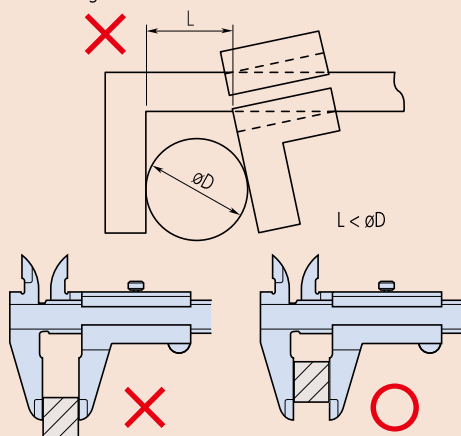
Because the inside measuring faces of a CM-type caliper are at the tips of the jaws the measuring face parallelism is heavily affected by measuring force, and this becomes a large factor in the measurement accuracy attainable. In contrast to an M-type caliper, a CM-type caliper cannot measure a very small hole diameter because it is limited to the size of the stepped jaws, although normally this is no inconvenience as it would be unusual to have to measure a very small hole with this type of caliper. Of course, the radius of curvature on the inside measuring faces is always small enough to allow correct hole diameter measurements right down to the lowest limit (jaw closure). Mitutoyo CM-type calipers are provided with an extra scale on the slider for inside measurements so they can be read directly without the need for calculation, just as for an outside measurement. This useful feature eliminates the possibility of error that occurs when having to add the inside-jaw-thickness correction on a single-scale caliper.



General notes on use of the caliper

1. Potential causes of error

A variety of factors can cause errors when measuring with a caliper. Major factors include parallax effects, excessive measuring force due to the fact that a caliper does not conform to Abbe's Principle, differential thermal expansion due to a temperature difference between the caliper and workpiece, and the effect of the thickness of the knife-edge jaws and the clearance between these jaws during measurement of the diameter of a small hole. Although there are also other error factors such as graduation accuracy, reference edge straightness, main scale flatness on the main blade, and squareness of the jaws, these factors are included within the $EMPE$ error tolerances. Therefore, these factors do not cause problems as long as the caliper satisfies the $EMPE$ error tolerances. Handling notes have been added to the JIS so that consumers can appreciate the error factors caused by the structure of the caliper before use. These notes relate to the measuring force and stipulate that "as the caliper does not have a constant-force device, you must measure a workpiece with an appropriate even measuring force. Take extra care when you measure it with the root or tip of the jaw because a large error could occur in such cases."



2. Inside measurement

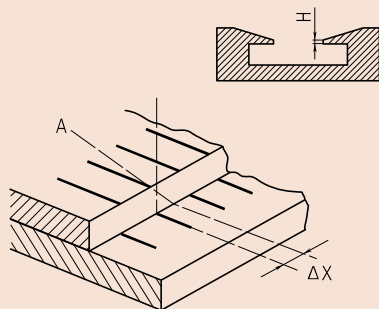
Insert the inside jaw as deeply as possible before measurement.
Read the maximum indicated value during inside measurement.
Read the minimum indicated value during groove width measurement.

3. Depth measurement

Read the minimum indicated value during depth measurement.

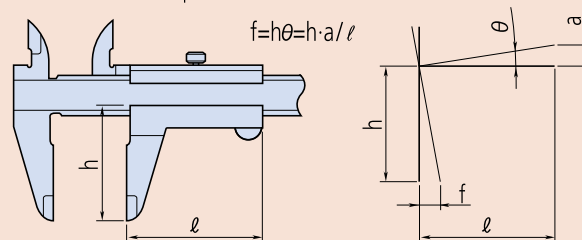
4. Parallax error when reading the scales

Look straight at the vernier graduation line when checking the alignment of vernier graduation lines to the main scale graduation lines.
If you look at a vernier graduation line from an oblique direction (A), the apparent alignment position is distorted by ΔX as shown in the figure below due to a parallax effect caused by the step height (H) between the planes of the vernier graduations and the main scale graduations, resulting in a reading error of the measured value. To avoid this error, the JIS stipulates that the step height should be no more than 0.3 mm.



5. Moving Jaw Tilt Error

If the moving jaw becomes tilted out of parallel with the fixed jaw, either through excessive force being used on the slider or lack of straightness in the reference edge of the beam, a measurement error will occur as shown in the figure. This error may be substantial due to the fact that a caliper does not conform to Abbe's Principle.



Example: Assume that the error slope of the jaws due to tilt of the slider is 0.01 mm in 50 mm and the outside measuring jaws are 40 mm deep, then the error (at the jaw tip) is calculated as $(40/50) \times 0.01 \text{ mm} = 0.008 \text{ mm}$.
If the guide face is worn then an error may be present even using the correct measuring force.

6. Relationship between measurement and temperature

The main scale of a caliper is engraved (or mounted on) stainless steel, and although the linear thermal expansion coefficient is equal to that of the most common workpiece material, steel, i.e. $(10.2 \pm 1) \times 10^{-6}/K$, note that other workpiece materials, the room temperature and the workpiece temperature may affect measurement accuracy.

7. Handling

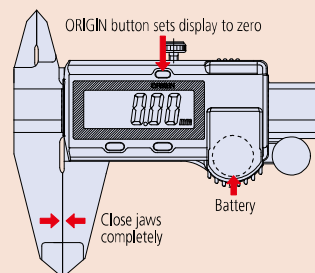
Caliper jaws are sharp, and therefore the instrument must be handled with care to avoid personal injury.
Avoid damaging the scale of a digital caliper and do not engrave an identification number or other information on it with an electric marker pen.
Avoid damaging a caliper by subjecting it to impact with hard objects or by dropping it on a bench or the floor.

8. Maintenance of beam sliding surfaces and measuring faces

Wipe away dust and dirt from the sliding surfaces and measuring faces with a dry soft cloth before using the caliper.

9. Checking and setting the origin before use

Clean the measuring surfaces by gripping a sheet of clean paper between the outside jaws and then slowly pulling it out. Close the jaws and ensure that the vernier scale (or display) reads zero before using the caliper. When using a Digimatic caliper, reset the origin (ORIGIN button) after replacing the battery.



10. Handling after use

After using the caliper, completely wipe off any water and oil. Then, lightly apply anti-corrosion oil and let it dry before storage.
Wipe off water from a waterproof caliper as well because it may also rust.

11. Notes on storage

Avoid direct sunlight, high temperatures, low temperatures, and high humidity during storage.
If a digital caliper will not be used for more than three months, remove the battery before storage.
Do not leave the jaws of a caliper completely closed during storage.

Performance evaluation method for the caliper

JIS B 7507 was revised and issued in 2016 as the Japanese Industrial Standards of the caliper, and the "Instrumental error" indicating the indication error of the caliper has been changed to "Maximum Permissible Error (MPE) of indication".

The "Instrumental error" of the old JIS adopts acceptance criteria that the specification range (precision specification) equals acceptance range, and the OK/NG judgment does not include measurement uncertainty. (Fig. 1)

The "Maximum Permissible Error (MPE) of indication" of the new JIS adopts the basic concept of the OK/NG judgment taking into account the uncertainty adopted in the ISO standard (ISO 14253-1).

The verification of conformity and nonconformity to the specifications is clearly stipulated to use the internationally recognized acceptance criteria (simple acceptance) when the specification range equals the acceptance range, and it is accepted that the specification range equals the acceptance range if a given condition considering uncertainty is met.

In this case, the internationally recognized acceptance criterion is ISO/TR 14253-6: 2012. (Fig. 2)

The following describes the standard inspection method including the revised content of JIS 2016.

Fig. 1 **Old JIS** Instrumental error

JIS B 7507-1993

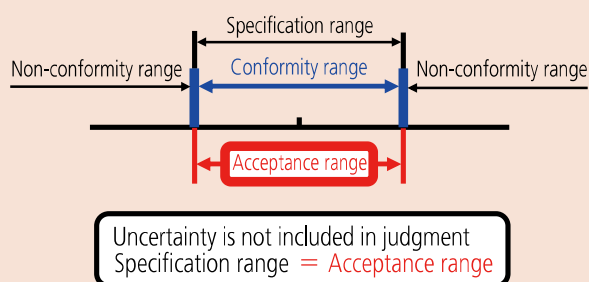
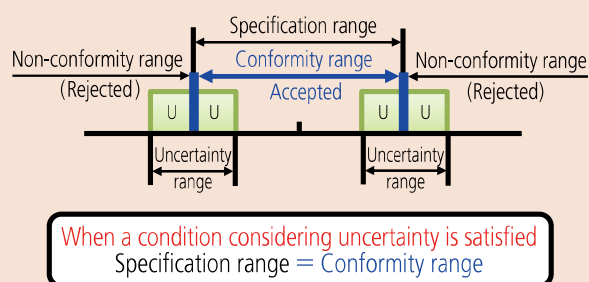


Fig. 2 **New JIS** Maximum Permissible Error (MPE)

JIS B 7507: 2016 (ISO/TR 14253-6: 2012)



Maximum Permissible Error of partial measuring surface contact error E_{MPE} [JIS B 7507: 2016]

The partial measuring surface contact error of a caliper is an indication error applied to outside measurement.

Table 1 shows the Maximum Permissible Error E_{MPE} for various measuring ranges and graduation/resolution of a caliper.

The value can be obtained by inserting a gauge block (or an equivalent standard) between the outside measuring surfaces (Fig. 3), measuring it at arbitrary positions between the jaws and then subtracting the dimension of the gauge from the maximum or minimum indicated value.

Scale Shift Error S_{MPE} [JIS B 7507: 2016]

The scale shift error in a caliper is an indication error of the inside measurement, depth measurement, etc., if measuring surfaces other than the outside measuring surfaces are used.

The Maximum Permissible Error S_{MPE} of the indication value for inside measurement is given in Table 1. The Maximum Permissible Error S_{MPE} of depth measurement is obtained by adding 0.02 mm to a value in Table 1. The indication error for inside measurement can be obtained by using gauge blocks (or equivalent standards) and standard jaws from an accessory set to form accurate inside dimensions for calibration (Fig. 4), with the error being given by the indicated value minus the gauge block size.

Unit: mm

Measurement range	Scale interval, graduation or resolution	
	0.05	0.02
50 or less	±0.05	±0.02
Over 50, 100 or less	±0.06	±0.03
Over 100, 200 or less	±0.07	
Over 200, 300 or less	±0.08	±0.04

Note: E_{MPE} includes the measurement error arising from the straightness, flatness and parallelism of the measuring surfaces.

Table 1: Maximum Permissible Error E_{MPE} of partial measuring surface contact error in a conventional caliper

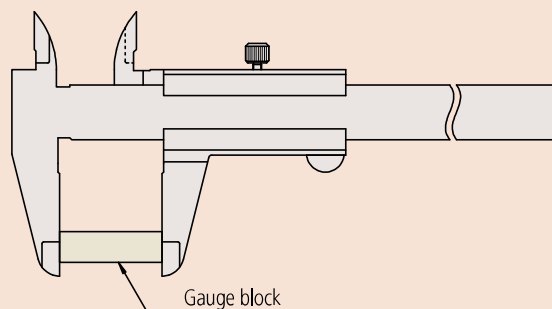


Fig. 3: Determining partial measuring surface contact error

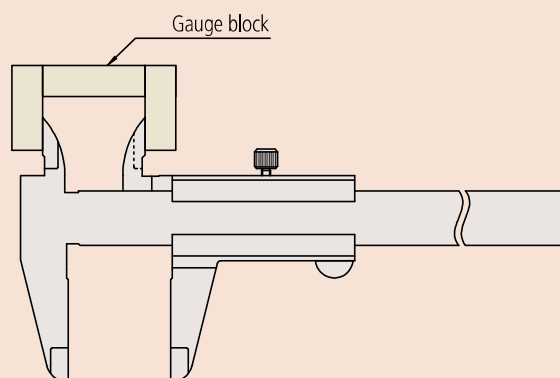


Fig. 4: Determining inside measurement indication error

The "Instrumental error" indicating the indication error of JIS has been changed to "Maximum Permissible Error (MPE) of indication" for the following three models:

- **Vernier Caliper 530 SERIES — Standard model** described on page D-9 (530-101 530-108 530-109)
- **Vernier Caliper 532 SERIES — with fine adjustment** described on page D-11 (All models)
- **Vernier Caliper 531 SERIES — with thumb grip** described on page D-11 (All models)