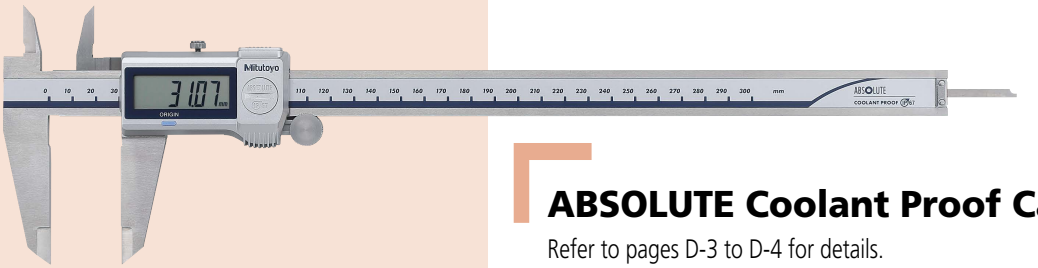
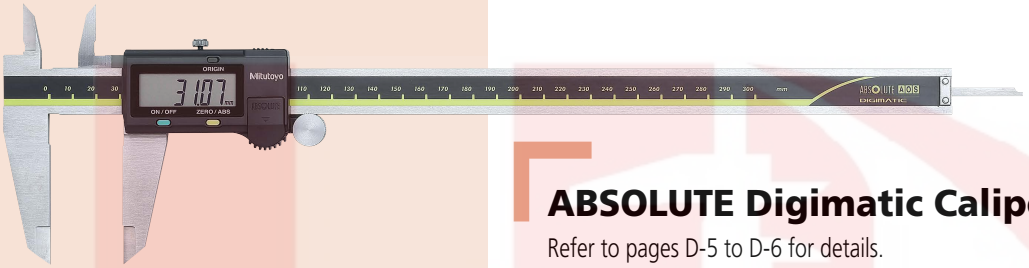
NewProducts



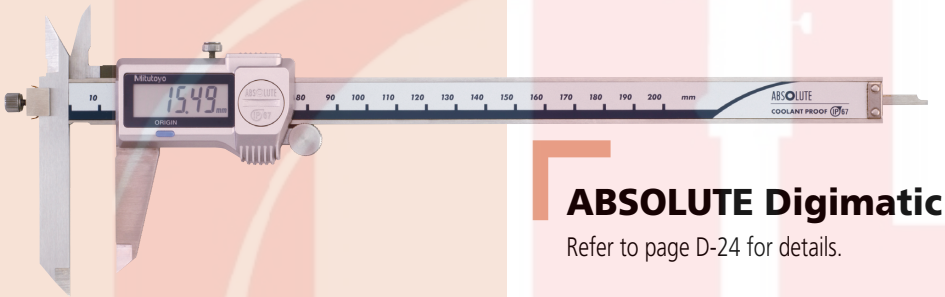
ABSOLUTE Coolant Proof Caliper

Refer to pages D-3 to D-4 for details.



ABSOLUTE Digimatic Caliper

Refer to pages D-5 to D-6 for details.



ABSOLUTE Digimatic Offset Caliper

Refer to page D-24 for details.

High-Performance Height Gage QM-Height

Refer to pages D-55 to D-56 for details.

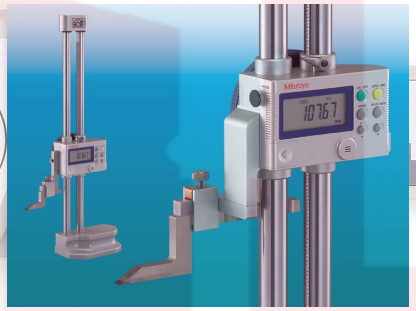
D

Calipers

Coolant Proof Digimatic Caliper

Height Gages

Digimatic Height Gage



High-performance Height Gage

Depth Gages

Depth Micrometer

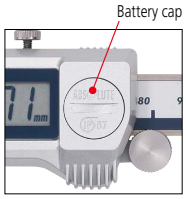
INDEX

Calipers

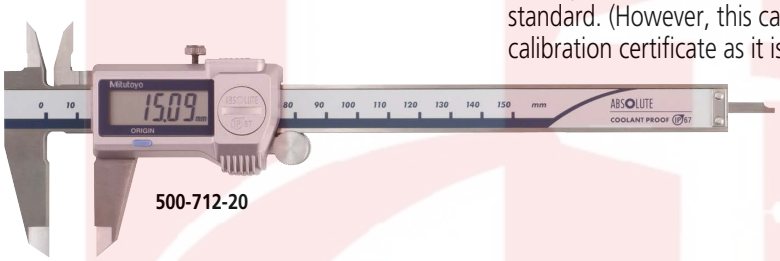
An industry standard measuring tool

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

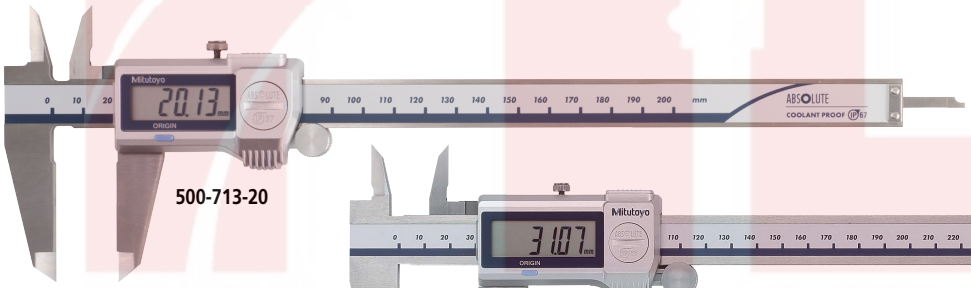
MeasurLink® ENABLED
Data Management Software by Mitutoyo



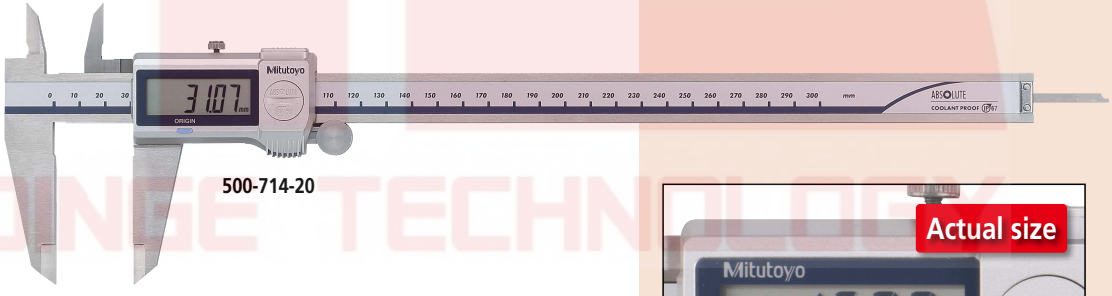
- ABS Coolant Proof Caliper with Dust/Water Protection conforming to IP67 Level. Can be used in workshop conditions exposed to coolant, water, dust or oil. 100% air-leak test ensures every caliper conforms to IP67.
- Large characters on the display provide better visibility, and hige-contrast LCD reduces 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

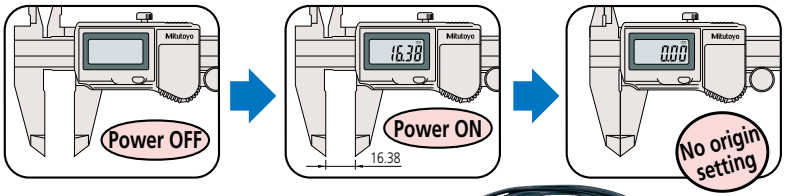


500-713-20



500-714-20

No need to reset the origin after switching on



Optional accessories

Connecting cables for IT/DP/MUX*1

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

*1 Cannot be used for other than water resistant type Digital calipers with external output function.
*2 IP67 model is water/dust-proofed suitable for the factory floor.
Buzzer type is not water/dust-proofed.

USB Input Tool Direct
06AFM380A: SPC cable for **USB-ITN-A** (2 m)

U-WAVE-T*2: **02AZD730G** (IP67 type)
02AZD880G (Buzzer type)
Wireless data output*2 U-WAVE fit
U-WAVE-TC: **264-620** (IP67 type)
264-621 (Buzzer type)

U-WAVE-TCB Transmitter*2
(**Mitutoyo *Bluetooth*® U-WAVE**)
264-624 (IP67 type)
264-625 (Buzzer type)
Refer to page A-10 for details.

Connecting unit for U-WAVE-TC/TCB
02AZF310 (IP67 type)
Refer to pages A-10 and A-12 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-25 for details).

ABSOLUTE™

IP67

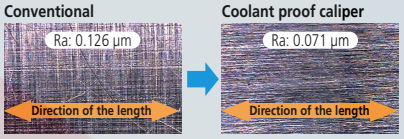
TÜVRheinland CERTIFIED
Dust- and Water-Protected
www.tuv.com ID 0000045042

PROPRIETARY INSPECTION CERTIFICATE
Mitutoyo guarantees the product quality. Mitutoyo guarantees the product quality.

An inspection certificate is supplied as standard. Refer to page U-9 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
- 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

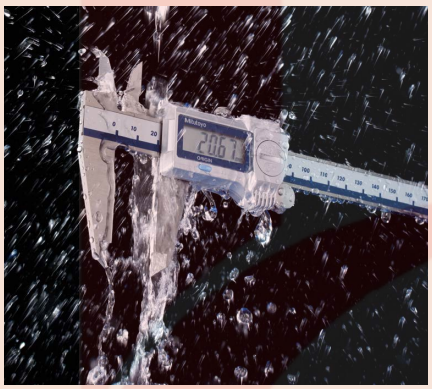
* Although these models are IP67 rated, care should be taken to dry tool after use.

Remarkably easy to read display

D

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

IP 6 7

First characteristic number	Protection from solid objects (people or things)	
	Brief description	Description
6	Dust-proof	No ingress of dust allowed.

Second characteristic number	Protection from liquids (water, etc.)	
	Brief description	Description
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)	Maximum permissible error (mm)* E_{MPE}	Maximum permissible error (mm)* S_{MPE}	Measurement data output port	Mass (g)	Thumb roller	Remarks
500-702-20	0 - 150	±0.02	±0.04	—	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		
500-723-20	0 - 150				168		Carbide-tipped jaws for outside and inside measurement
500-724-20	0 - 200				198		
500-714-20	0 - 300	±0.03	±0.05	✓	350	✓	—
500-718-20					345	—	
500-704-20				—	350	✓	
500-708-20					345	—	

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

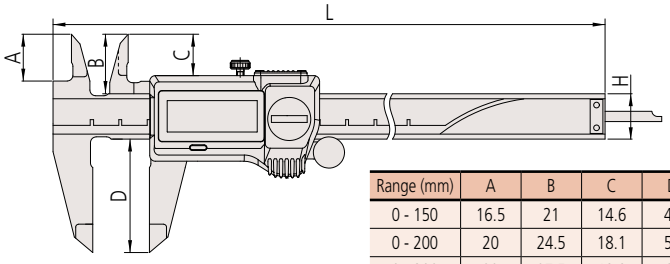
Inch / Metric

Order No.	Range (in)	Maximum permissible error* E_{MPE}	Maximum permissible error* S_{MPE}	Measurement data output port	Mass (g)	Thumb roller	Remarks
500-731-20	0 - 6	±0.001 in/ ±0.02 mm	±0.002 in/ ±0.04 mm	—	168	✓	Carbide-tipped jaws for outside measurement
500-732-20	0 - 8				198		
500-733-20	0 - 6				168		Carbide-tipped jaws for outside and inside measurement
500-734-20	0 - 8				198		
500-735-20	0 - 6			✓	168		Carbide-tipped jaws for outside measurement
500-736-20	0 - 8				198		
500-737-20	0 - 6				168	✓	Carbide-tipped jaws for outside and inside measurement
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	±0.0025 in/ ±0.05 mm	✓	350	✓	—
500-754-20				—	350		

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

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

Mitutoyo

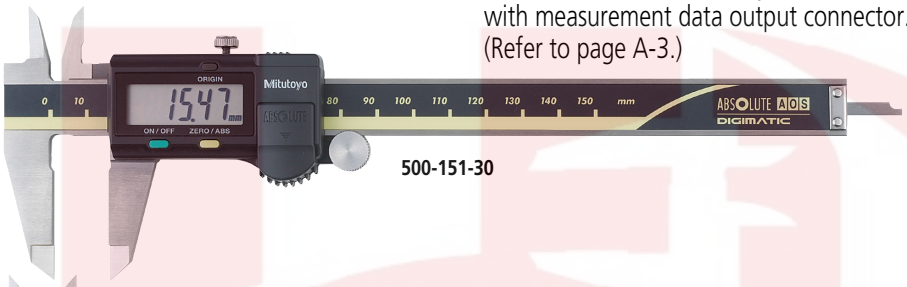
Calipers

An industry standard measuring tool

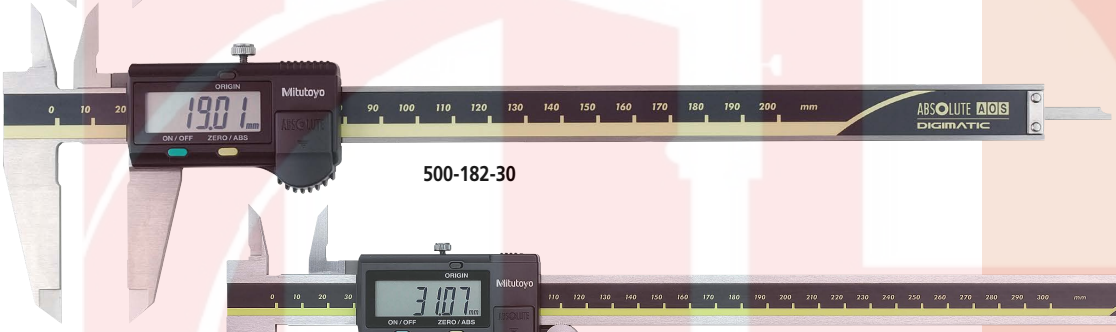
ABSOLUTE Digimatic Caliper SERIES 500 — with exclusive ABSOLUTE Encoder Technology

MeasurLink® ENABLED
Data Management Software by Mitutoyo

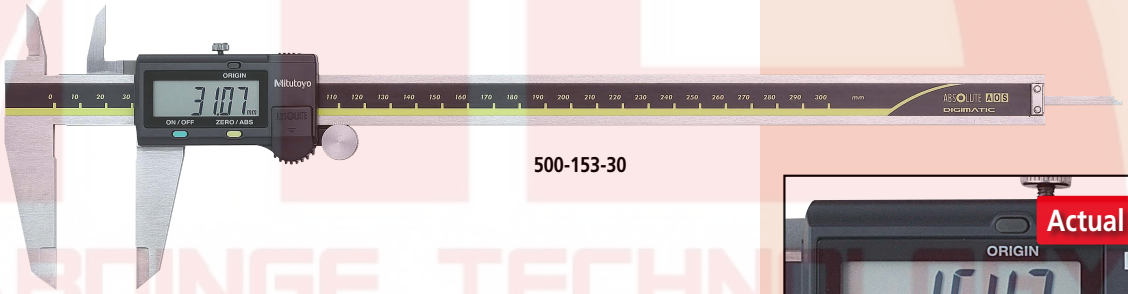
- An ABSOLUTE electromagnetic induction linear encoder system is incorporated.
- New ergonomic design with finger rest.
- The ZERO/ABS button allows the display to be Zero-Set at any slider position along the scale for comparison measurements. Scale overspeed-error has been eliminated for maximum reliability.
- 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.)



500-151-30

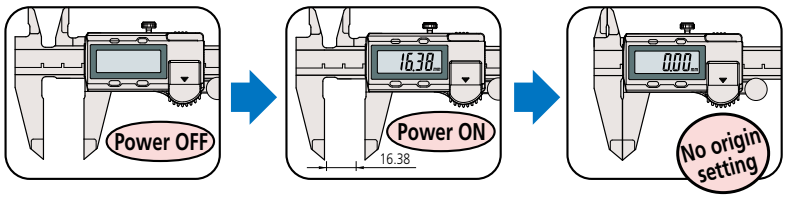


500-182-30



500-153-30

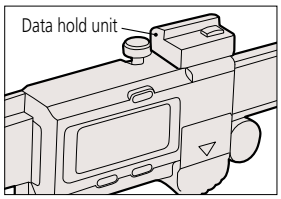
No need to reset the origin after switching on



Optional accessories

Dedicated for the models equipped with a digimatic output function. For details, refer to page A-21.

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 fit
U-WAVE-TC: **264-621** (Buzzer type)

- **U-WAVE-TCB Transmitter**
  (**Mitutoyo *Bluetooth*® U-WAVE**)
  264-625 (Buzzer type)
  Refer to page A-10 for details.

Connecting unit for U-WAVE-TC/TCB 02AZF300 (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-25 for details).

ABSOLUTE™

PROPRIETARY INSPECTION CERTIFICATE

An inspection certificate is supplied as standard. Refer to page U-9 for details.

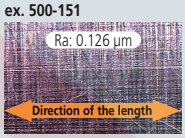
Technical Data

- 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

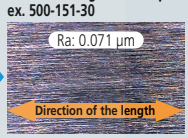
Smooth slider movement makes for comfortable operation.

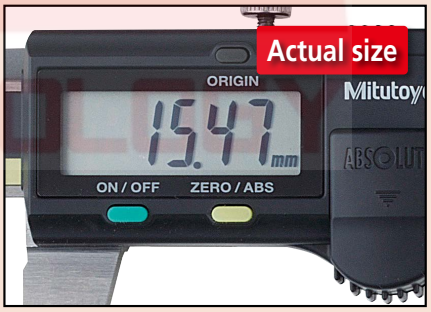
High quality guide surface finish for smooth slider movement

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)	Maximum permissible error (mm)*2 E_{MPE}	Maximum permissible error (mm)*2 S_{MPE}	Mass (g)	Depth bar	Fine adjustment	Remarks
500-150-30	0 - 100	±0.02	±0.04	143	ø1.9 mm rod	with thumb roller	—
500-180-30*1						—	
500-151-30	0 - 150			168	Blade	with thumb roller	
500-154-30							Carbide-tipped jaws for outside measurement
500-155-30							Carbide-tipped jaws for outside and inside measurement
500-158-30					ø1.9 mm rod		—
500-181-30*1					Blade	—	
500-152-30	0 - 200			198		with thumb roller	
500-156-30							Carbide-tipped jaws for outside measurement
500-157-30							Carbide-tipped jaws for outside and inside measurement
500-182-30*1						—	
500-153-30	0 - 300	±0.03	±0.05	350		with thumb roller	—

*1 Without SPC data output
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Inch / Metric

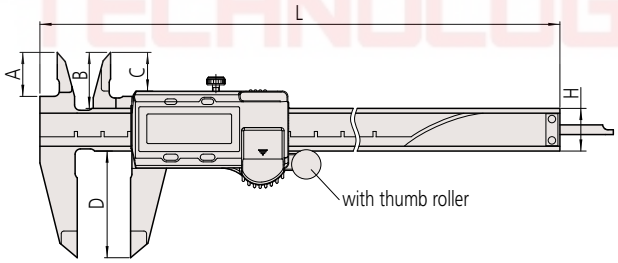
Order No.	Range (in)	Maximum permissible error*2 E_{MPE}	Maximum permissible error*2 S_{MPE}	Mass (g)	Depth bar	Fine adjustment	Remarks
500-170-30	0 - 4	±0.001 in/ ±0.02 mm	±0.002 in/ ±0.04 mm	143	ø0.075 inch rod	with thumb roller	—
500-195-30*1							
500-171-30	0 - 6			168	Blade		
500-174-30							Carbide-tipped jaws for outside measurement
500-175-30							Carbide-tipped jaws for outside and inside measurement
500-178-30					ø0.075 inch rod		—
500-196-30*1					Blade		
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			198			—
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	0 - 12	±0.0015 in/ ±0.03 mm	±0.0025 in/ ±0.05 mm	350			—
500-167-30							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 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

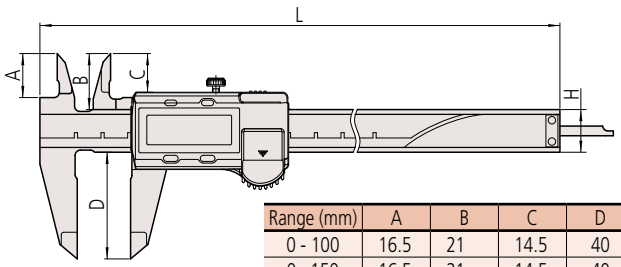
DIMENSIONS

Unit: mm

With thumb roller



Without thumb roller



Range (mm)	A	B	C	D	H	L
0 - 100	16.5	21	14.5	40	16	182
0 - 150	16.5	21	14.5	40	16	233
0 - 200	20	24.5	18	50	16	290
0 - 300	22	27.5	19.8	64	20	404

Jaw thickness: 3.5 mm for 0 to 100 mm/0 to 150 mm/0 to 200 mm models and 3.8 mm for 0 to 300 mm model

D

Calipers

An industry standard measuring tool

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

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- 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.

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-25 for details).

ABSOLUTE™

500-502-10 500-501-10 500-500-10

Technical Data

- Battery: SR44 (1 pc.), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 3.5 years under normal use
- Max. response speed: Unlimited

SPECIFICATIONS

Metric

Order No.	Range (mm)	Maximum permissible error (mm)*		Resolution (mm)	Mass (g)
		E_{MPE}	S_{MPE}		
500-500-10	0 - 450	±0.05	±0.07	0.01	1170
500-501-10	0 - 600	±0.05	±0.07		1350
500-502-10	0 - 1000	±0.07	±0.09		3300

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

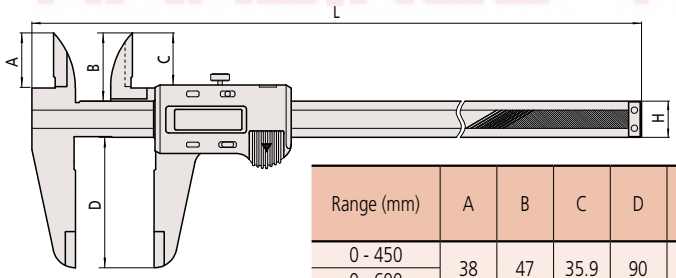
Inch / Metric

Order No.	Range (in)	Maximum permissible error (mm)*		Resolution	Mass (g)
		E_{MPE}	S_{MPE}		
500-505-10	0 - 18	±0.05	±0.07	0.0005 in/ 0.01 mm	1170
500-506-10	0 - 24	±0.05	±0.07		1350
500-507-10	0 - 40	±0.07	±0.09		3300

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

Unit: mm

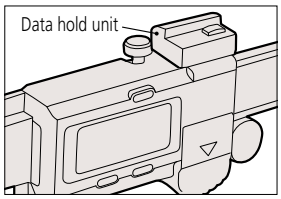


Range (mm)	A	B	C	D	H	L	Outside jaw width
0 - 450	38	47	35.9	90	25	630	6
0 - 600						780	
0 - 1000	50	60	49.8	130	32	1240	8

Optional accessories

Dedicated for the models equipped with a digimatic output function. For details, refer to page A-21.

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

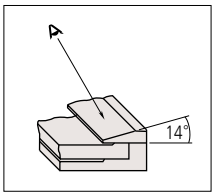
02AZD790C: SPC cable with data button (160 mm)
02AZE140C: SPC cable for foot switch

Calipers

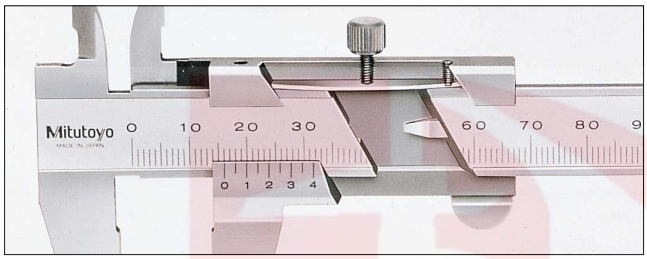
An industry standard measuring tool

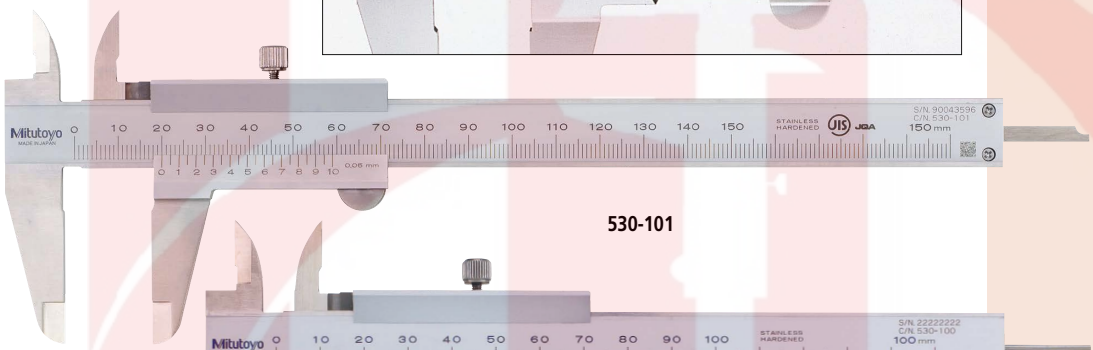
Vernier Caliper
SERIES 530 — Standard model

- 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.

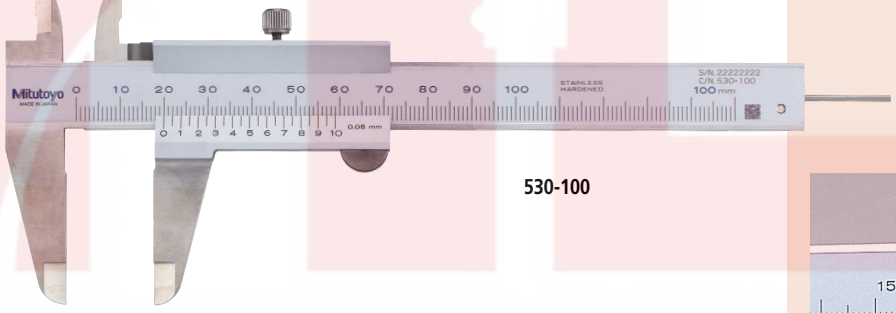


- Can measure steps, since the end faces of the beam and slider are the zero reference point (measuring face). Standard calipers allow four types of measurement, i.e. outside, inside, depth, and step.
- Carbide-tipped jaw calipers are optimal for rough finished parts, castings, grinding stones, etc.
- Decimal and fractional graduated scales (metric/inch and inch models only).

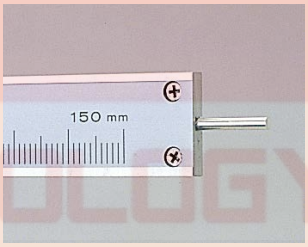




530-101



530-100

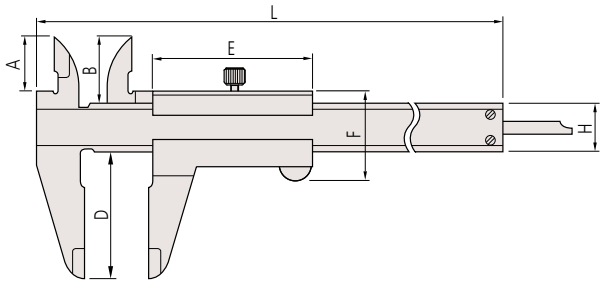


530-102 (Round depth bar type)

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

DIMENSIONS

Unit: mm



Range (mm)	A	B	D	E	F	H	L	Outside jaw thickness
0 - 100	17	21.5	40	53.5	30	16	182	3
0 - 150	17	21.5	40	53.5	30	16	229	3
0 - 200	20.5	25	50	53.5	30	16	288	3
0 - 300	22	27.5	64	66.5	36	20	404	3.8
0 - 600	38	47	90	89	50	25	780	6
0 - 1000	50	60	130	111	61	32	1240	8

Note: **530-100** and **530-102** incorporate a round depth bar (ø1.9 mm).
The depth bar shown in the illustration above is a different type.

SPECIFICATIONS

Metric

Order No.	Range (mm)	Maximum permissible error (mm)*1 • E_{MPE} (outside measurement) • S_{MPE} (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 - 200	±0.05		0.05	—
530-123		±0.03		0.02	High accuracy model
530-109	0 - 300	±0.08		0.05	—
530-124		±0.04		0.02	High accuracy model

Order No.	Range (mm)	Maximum permissible error (mm)*2		Depth bar	Graduation (mm)	Remarks
		E_{MPE}	S_{MPE}			
530-100	0 - 100	±0.05	±0.07	ø1.9 mm rod	0.05	—
530-102	0 - 150	±0.05	±0.07			—
530-320		±0.05	±0.07	Blade		Carbide-tipped jaws for outside measurement
530-335		±0.05	±0.07			Carbide-tipped jaws for outside and inside measurement
530-321	0 - 200	±0.05	±0.07			Carbide-tipped jaws for outside measurement
530-322	0 - 300	±0.08	±0.10			Carbide-tipped jaws for outside measurement
530-501	0 - 600	±0.10	±0.12	—		—
530-502	0 - 1000	±0.15	±0.17			

*1 Partial Measuring Face Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in JIS B 7507: 2016, revised based on ISO 13385-1: 2011.
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Metric/Inch with metric/inch double scale

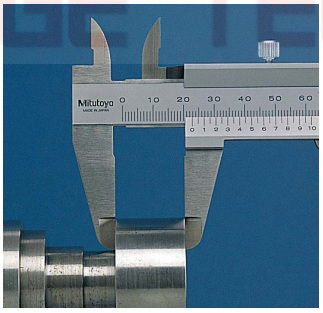
Order No.	Range (mm)	Maximum permissible error (mm)		Depth bar	Graduation	Remarks
		E_{MPE}	S_{MPE}			
530-104	0 - 150	±0.05	±0.07	Blade	0.05 mm (1/128 in)	—
530-316						Clamping screw below the slider
530-312		±0.03	±0.05		0.02 mm (0.001 in)	High accuracy model: ±0.03 mm
530-114	0 - 200	±0.05	±0.07		0.05 mm (1/128 in)	—
530-118		±0.03	±0.05		0.02 mm (0.001 in)	High accuracy model: ±0.03 mm
530-115	0 - 300	±0.08	±0.10		0.05 mm (1/128 in)	—
530-119		±0.04	±0.06		0.02 mm (0.001 in)	High accuracy model: ±0.04 mm

Inch with inch/inch double scale

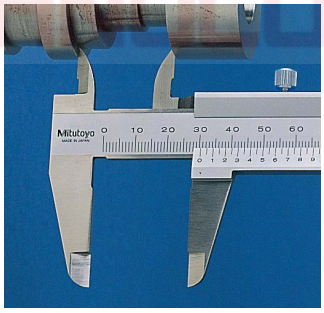
Order No.	Range (in)	Maximum permissible error (in)		Depth bar	Graduation (in)	Remarks
		E_{MPE}	S_{MPE}			
530-105	0 - 6	±0.5/128	±0.5/128	Blade	0.001	—
530-116	0 - 8	±0.5/128	±0.5/128			

Measurement Applications

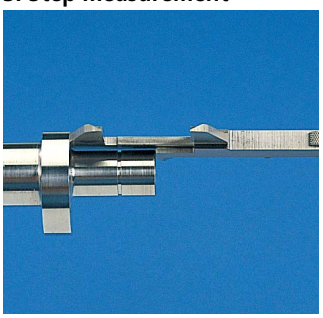
1. Outside measurement



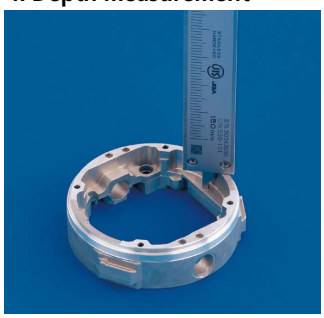
2. Inside measurement



3. Step measurement



4. Depth measurement



D

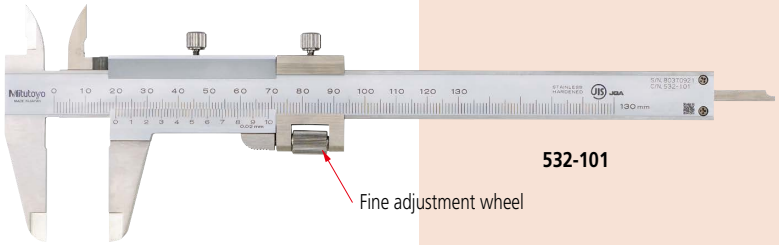
Mitutoyo

Calipers

An industry standard measuring tool

Vernier Caliper
SERIES 532 — with fine adjustment

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



SPECIFICATIONS

Metric

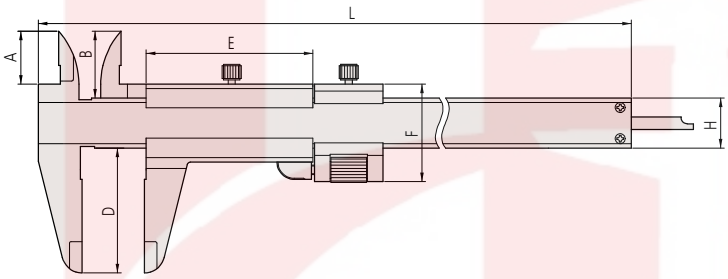
Order No.	Range (mm)	Maximum permissible error (mm)*1 • E_{MPE} (outside measurement) • S_{MPE} (inside measurement)	Depth bar	Remarks
532-101*2	0 - 130	±0.03	Blade	with fine adjustment
532-102*2	0 - 180	±0.03		
532-103*2	0 - 280	±0.04		

Metric/Inch with metric/inch double scale

Order No.	Range (mm)	Maximum permissible error (in)*1 • E_{MPE} (outside measurement) • S_{MPE} (inside measurement)	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			

*1 Partial Measuring Face Contact Error, E_{MPE} and Shift Error, S_{MPE} 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-39 for details.
*2 Graduation: 0.02 mm

DIMENSIONS



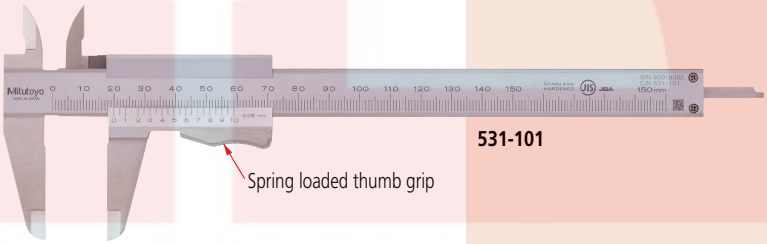
Unit: mm

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
SERIES 531 — with thumb grip

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



SPECIFICATIONS

Metric

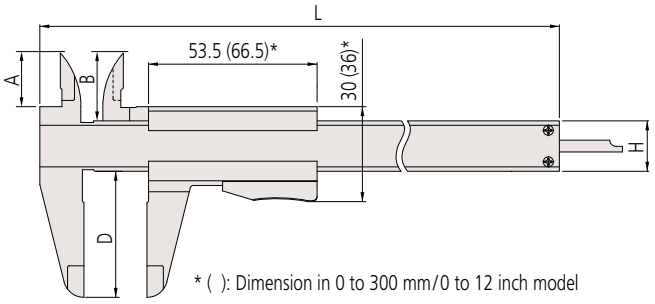
Order No.	Range (mm)	Maximum permissible error (mm)*1 • E_{MPE} (outside measurement) • S_{MPE} (inside measurement)	Depth bar	Remarks
531-101*2	0 - 150	±0.05	Blade	—
531-102*2	0 - 200			
531-103*2	0 - 300	±0.08		

Metric/Inch with metric/inch double scale

Order No.	Range (mm)	Maximum permissible error (in)*1 • E_{MPE} (outside measurement) • S_{MPE} (inside measurement)	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

*1 Partial Measuring Face Contact Error, E_{MPE} and Shift Error, S_{MPE} 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-39 for details.
*2 Graduation: 0.05 mm

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

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-25 for details).

ABSOLUTE™

IP67

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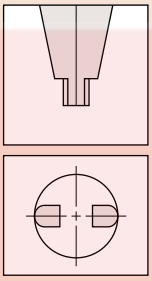
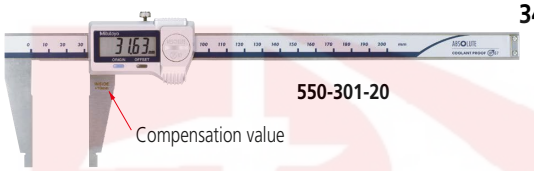
ABSOLUTE Digimatic Caliper SERIES 550 — with Nib Style Jaws

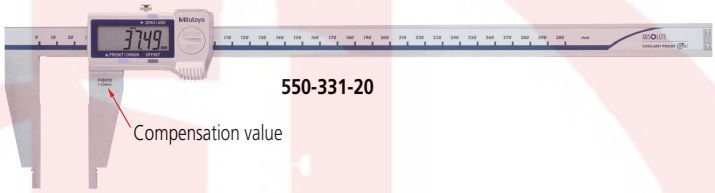
MeasurLink® ENABLED
Data Management Software by Mitutoyo

- 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**).



Radiused jaws for accurate ID measurement





Technical Data

- 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-21.

- **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 fit

- **U-WAVE-TC**: **264-620** (IP67 type)
  264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter**
  (**Mitutoyo *Bluetooth*® U-WAVE**)
  264-624 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.
  * For IP67 models (up to 300 mm)

SPECIFICATIONS

Metric

Order No.	Range (mm)*1	Maximum permissible error (mm)*2		Remarks
		E_{MPE}	S_{MPE}	
550-301-20	0 - 200 (10.1 - 210)	±0.03	±0.03	IP67, with offset
550-331-20	0 - 300 (10.1 - 310)	±0.04	±0.04	IP67, with offset/preset function for easy inside measurement
550-203-10	0 - 450 (20.1 - 470)	±0.05	±0.05	—
550-205-10	0 - 600 (20.1 - 620)	±0.05	±0.05	—
550-207-10	0 - 1000 (20.1 - 1020)	±0.07	±0.07	—

*1 ( ): Inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note: **Series 550** is not equipped with a depth bar.

Inch / Metric

Order No.	Range (in)*1	Maximum permissible error (in)*2		Remarks
		E_{MPE}	S_{MPE}	
550-311-20	0 - 8 (0.404 - 8.4)	±0.0015	±0.0015	IP67, with offset
550-341-20	0 - 12 (0.404 - 12.4)	±0.002	±0.002	IP67, with offset/preset function for easy inside measurement
550-223-10	0 - 18 (0.504 - 18.5)	±0.002	±0.002	—
550-225-10	0 - 24 (0.504 - 24.5)	±0.002	±0.002	—
550-227-10	0 - 40 (1.004 - 41)	±0.003	±0.003	—

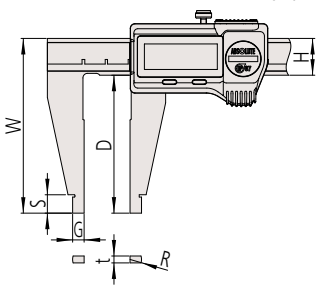
*1 ( ): Inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note: **Series 550** is not equipped with a depth bar.

DIMENSIONS

Unit: mm

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)*							
0 - 1000 (0 - 40 in)*	140	10 (12.7)*	24	172	32	8	10 (12.7)*

* Inch model



D

Mitutoyo

Calipers

An industry standard measuring tool

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

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-25 for details).

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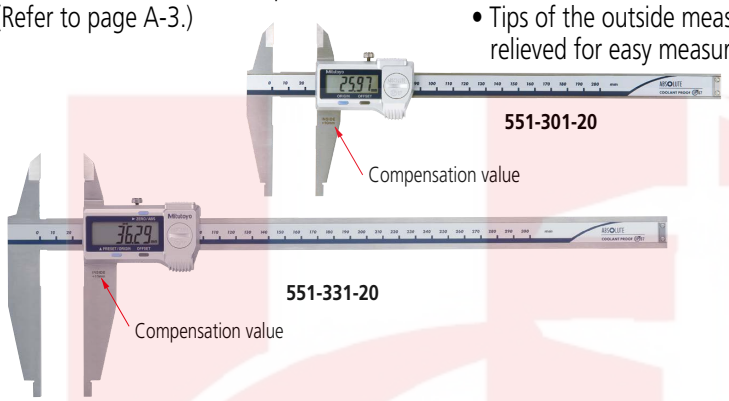
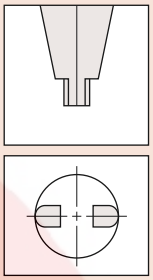
- Offers a resolution of 0.01 mm with corresponding accuracy.
- Incorporates an Absolute measurement system. No need to reset the origin after switching on. (Refer to page D-4 and D-6 for details on the Absolute function.)
- Allows integration into statistical process control and measurement systems 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.





Radiused jaws for accurate ID measurement

D

SPECIFICATIONS

Metric

Order No.	Range (mm)*1	Maximum permissible error (mm)*2		Remarks
		E_{MPE}	S_{MPE}	
551-301-20	0 - 200 (10.1 - 210)	±0.03	±0.03	IP67, with offset
551-331-20	0 - 300 (10.1 - 310)	±0.04	±0.04	IP67, with offset/preset function for easy inside measurement
551-204-10	0 - 500 (20.1 - 520)	±0.06	±0.06	—
551-206-10	0 - 750 (20.1 - 770)	±0.06	±0.06	
551-207-10	0 - 1000 (20.1 - 1020)	±0.07	±0.07	

*1 ( ): Inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note: **Series 551** is not equipped with a depth bar.

Inch / Metric

Order No.	Range (in)*1	Maximum permissible error (in)*2		Remarks
		E_{MPE}	S_{MPE}	
551-311-20	0 - 8 (0.404 - 8.4)	±0.0015	±0.0015	IP67, with offset
551-341-20	0 - 12 (0.404 - 12.4)	±0.002	±0.002	IP67, with offset/preset function for easy inside measurement
551-224-10	0 - 20 (0.504 - 20.5)	±0.0025	±0.0025	—
551-226-10	0 - 30 (0.504 - 30.5)	±0.0025	±0.0025	
551-227-10	0 - 40 (1.004 - 41)	±0.003	±0.003	

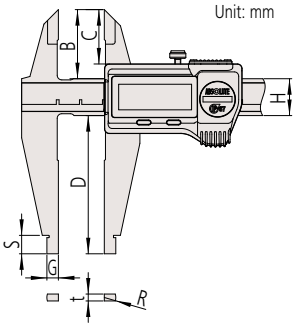
*1 ( ): Inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note: **Series 551** is not equipped with a depth bar.

DIMENSIONS

Unit: mm

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							
0 - 1000 (0 - 40 in)*	56	43.8		10 (12.7)*	20	32	8	10 (12.7)*

* Inch model



Technical Data

- 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-21.

- **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

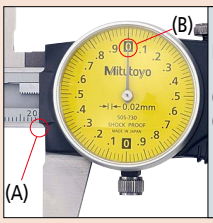
Wireless Data Output U-WAVE fit

- **U-WAVE-TC**: **264-620** (IP67 type)
  264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter**
  (**Mitutoyo *Bluetooth*® U-WAVE**)
  264-624 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.
  * For IP67 models (up to 300 mm)

Dial Caliper
SERIES 505

An inspection certificate is supplied as standard.
Refer to page U-9 for details.

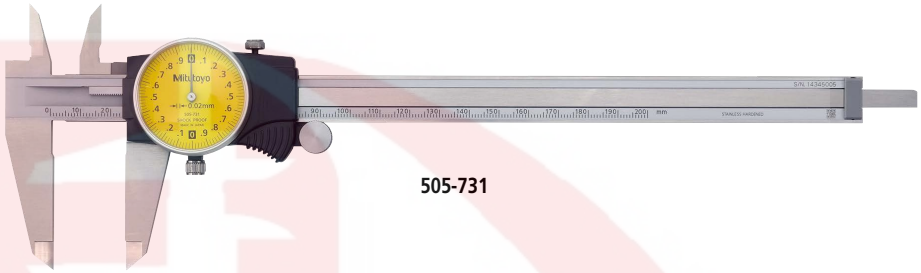
- Newly designed dial movement for ultra-smooth sliding.
- Easy-to-read yellow dial.
- Large finger-rest aids ease-of-use.
- Jaw tips are relieved for easy measurement of thin parts.
- Allows step measurement.



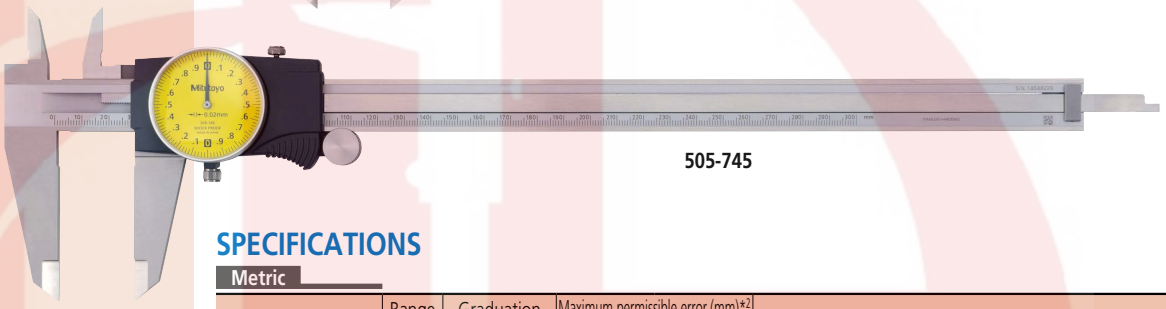
Reading

(A) Main scale reading	20.	mm
(B) Dial reading	0.00	mm
	20.00	mm

505-730



505-731



505-745

SPECIFICATIONS

Metric

Order No.	Range (mm)	Graduation (mm)	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
505-730	0 - 150	0.02, 2/rev	±0.03	±0.05	
505-734			±0.03	±0.05	Carbide-tipped jaws for outside measurement
505-735			±0.03	±0.05	Carbide-tipped jaws for outside and inside measurement
505-731	0 - 200		±0.03	±0.05	—
505-745	0 - 300		±0.04	±0.06	
505-732*1	0 - 150	0.01, 1/rev	±0.02	±0.04	
505-733*1	0 - 200		±0.03	±0.05	

*1 Silver cover type
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

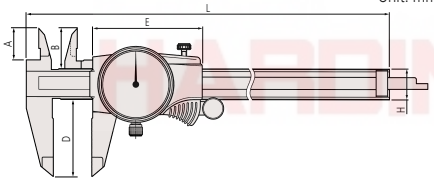
Inch

Order No.	Range (in)	Graduation (in)	Maximum permissible error (in)*2		Remarks
			E_{MPE}	S_{MPE}	
505-740J	0 - 6	0.001, 0.2/rev	±0.001	±0.002	
505-742J*1		0.001, 0.1/rev	±0.001	±0.002	
505-742-56J			±0.001	±0.002	
505-742-51J			±0.001	±0.002	
505-736*1			±0.001	±0.002	Carbide-tipped jaws for outside measurement
505-738*1			±0.001	±0.002	Carbide-tipped jaws for outside and inside measurement
505-744		0.001, 0.2/rev	±0.001	±0.002	Carbide-tipped jaws for outside measurement
505-741J	0 - 8		±0.002	±0.0025	
505-743J*1		0.001, 0.1/rev	±0.002	±0.0025	—
505-737*1		0.001, 0.2/rev	±0.002	±0.0025	Carbide-tipped jaws for outside measurement
505-739*1			±0.002	±0.0025	Carbide-tipped jaws for outside and inside measurement
505-749	0 - 12		±0.002	±0.0025	—
505-746*1		0.001, 0.1/rev	±0.002	±0.0025	
505-750		0.001, 0.2/rev	±0.002	±0.0025	Carbide-tipped jaws for outside measurement
505-747*1		0.001, 0.1/rev	±0.002	±0.0025	Carbide-tipped jaws for outside and inside measurement
505-748*1			±0.002	±0.0025	Carbide-tipped jaws for outside and inside measurement

*1 Silver cover type
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

Unit: mm



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

Calipers

An industry standard measuring tool

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

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-25 for details).

ABSOLUTE™

IP66

TÜVRheinland CERTIFIED — Dust- and Water-Protected — www.tuv.com ID 0000022582

- 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

Order No.	Range (mm)*1	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
552-302-10	0 - 450 (20.1 - 470)	±0.04	±0.04
552-303-10	0 - 600 (20.1 - 620)	±0.04	±0.04
552-304-10	0 - 1000 (20.1 - 1020)	±0.05	±0.05
552-305-10	0 - 1500 (20.1 - 1520)	±0.09	±0.09
552-306-10	0 - 2000 (20.1 - 2020)	±0.12	±0.12

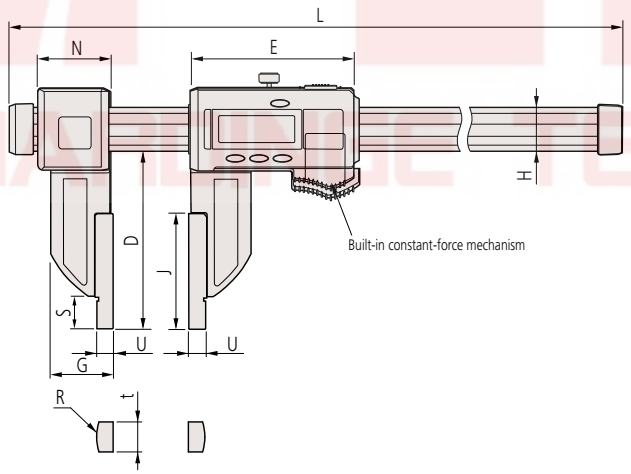
Inch/Metric

Order No.	Range (in)*1	Maximum permissible error (in)*2	
		E_{MPE}	S_{MPE}
552-312-10	0 - 18 (0.504 - 18.5)	±0.002	±0.002
552-313-10	0 - 24 (0.504 - 24.5)	±0.002	±0.002
552-314-10	0 - 40 (1.004 - 40.5)	±0.002	±0.002
552-315-10	0 - 60 (1.004 - 60.5)	±0.004	±0.004
552-316-10	0 - 80 (1.004 - 80.5)	±0.005	±0.005

*1 ( ): Dimension in inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
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-39 for details.

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)

Technical Data

- 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.

D

Optional Accessories

For details, refer to page A-21.

- 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

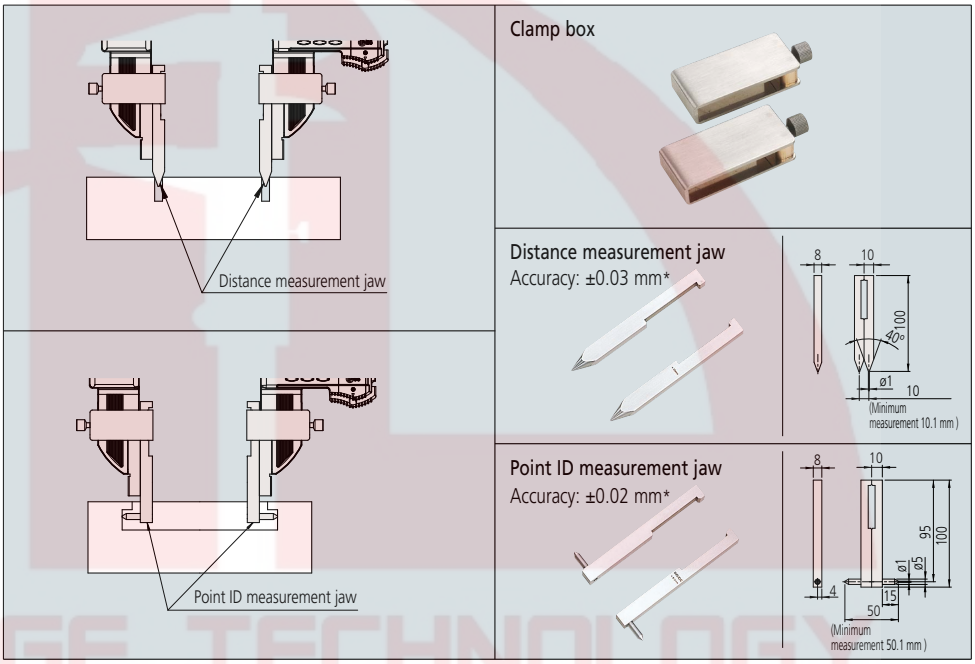
Optional accessories

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	



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

D

Calipers

An industry standard measuring tool

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

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-25 for details).

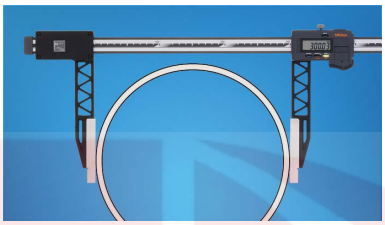
ABSOLUTE™

IP66

Dust- and Water-Protected
TÜVRheinland CERTIFIED
www.tuv.com ID 0000022582

- 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.)

552-151-10



SPECIFICATIONS

Metric

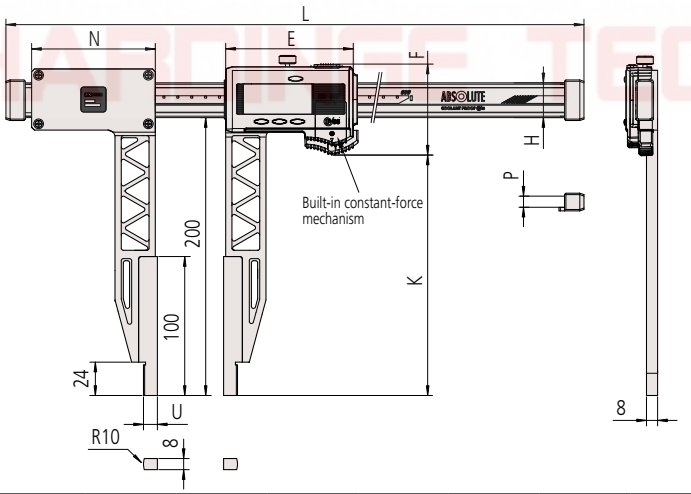
Order No.	Range (mm)*1	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
552-150-10	0 - 450 (20.1 - 470)	±0.06	±0.06
552-151-10	0 - 600 (20.1 - 620)	±0.06	±0.06
552-152-10	0 - 1000 (20.1 - 1020)	±0.07	±0.07
552-153-10	0 - 1500 (20.1 - 1520)	±0.11	±0.11
552-154-10	0 - 2000 (20.1 - 2020)	±0.14	±0.14

Inch / Metric

Order No.	Range (in)*1	Maximum permissible error (in)*2	
		E_{MPE}	S_{MPE}
552-160-10	0 - 18 (0.504 - 18.5)	±0.0025	±0.0025
552-161-10	0 - 24 (0.504 - 24.5)	±0.0025	±0.0025
552-162-10	0 - 40 (1.004 - 40.5)	±0.003	±0.003
552-163-10	0 - 60 (1.004 - 60.5)	±0.0045	±0.0045
552-164-10	0 - 80 (1.004 - 80.5)	±0.0055	±0.0055

*1 ( ): Dimension in inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
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-39 for details.

DIMENSIONS



Unit: mm

Range	E	F	H	K	L	N	P	U
0 - 450 mm (0 - 18 in)	91.8	65.5	25	173	680	89	8	10 (0.25 in)
0 - 600 mm (0 - 24 in)					830			
0 - 1000 mm (0 - 40 in)	113.8	73	32	170.5	1280	110	12	10 (0.5 in)
0 - 1500 mm (0 - 60 in)					1790			
0 - 2000 mm (0 - 80 in)					2300			

( ): Inch/Metric type

Technical Data

- 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-21.

- 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

D

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-25 for details).

ABSOLUTE™

IP66

Dust- and Water-Protected

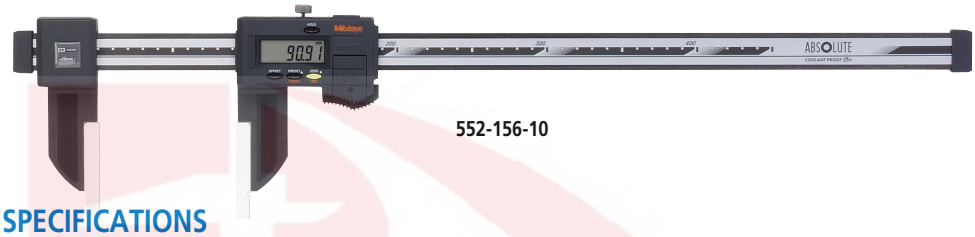
TÜVRheinland CERTIFIED

www.tuv.com ID 0000022582

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

Technical Data

- 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-21.

- 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

SPECIFICATIONS

Metric

Order No.	Range (mm)*1	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
552-155-10	0 - 450 (20.1 - 470)	±0.04	±0.04
552-156-10	0 - 600 (20.1 - 620)	±0.04	±0.04

*1 ( ): Dimension in inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
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-39 for details.

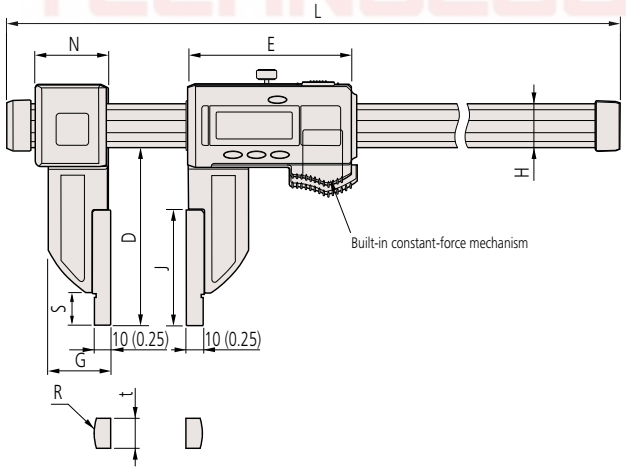
Inch / Metric

Order No.	Range (in)*1	Maximum permissible error (in)*2	
		E_{MPE}	S_{MPE}
552-165-10	0 - 18 (0.504 - 18.5)	±0.002	±0.002
552-166-10	0 - 24 (0.504 - 24.5)	±0.002	±0.002

*1 ( ): Dimension in inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
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-39 for details.

DIMENSIONS

Unit: mm



Range	D	E	G	H	J	L	N	R	S	t
0 - 450 mm (0 - 18 in)	100	91.8	35	25	65	640	41.2	R10	18	8
0 - 600 mm (0 - 24 in)	100	91.8	35	25	65	790	41.2	R10	18	8

( ): Inch/Metric type

D

Mitutoyo

Calipers

An industry standard measuring tool

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

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-25 for details).

ABSOLUTE™

IP66

Dust- and Water-Protected
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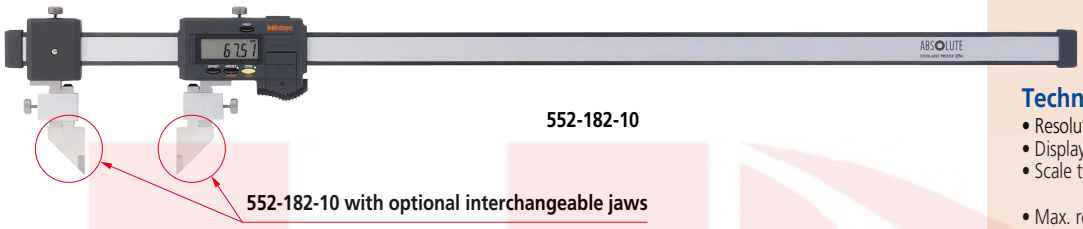
www.tuv.com ID 0000022582

- 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.



552-182-10

552-182-10 with optional interchangeable jaws

SPECIFICATIONS

Metric

Order No.	Range (mm)	Maximum permissible error (mm)*	
		E_{MPE}	S_{MPE}
552-181-10	0 - 450	±0.04	
552-182-10	0 - 600		
552-183-10	0 - 1000	±0.05	
552-184-10	0 - 1500	±0.09	
552-185-10	0 - 2000	±0.12	

Inch / Metric

Order No.	Range (in)	Maximum permissible error (in)*	
		E_{MPE}	S_{MPE}
552-191-10	0 - 18	±0.002	
552-192-10	0 - 24		
552-193-10	0 - 40		
552-194-10	0 - 60	±0.004	
552-195-10	0 - 80	±0.005	

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Note1: The Maximum permissible error (MPE) values described above were measured using a dedicated outside measurement inspection tool.

Note2: 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-39 for details.

Technical Data

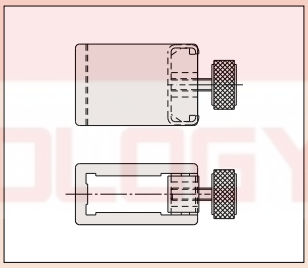
- Resolution: 0.01 mm or 0.0005 in/0.01 mm
- Display: LCD
- Scale type: ABSOLUTE electromagnetic induction linear encoder
- Max. response speed: Unlimited
- Battery: SR44 (1 pc.), **938882**, for initial operational checks (standard accessory)
- Battery life: Approx. 5,000 hours in continuous use
- Dust/Water 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-21.

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

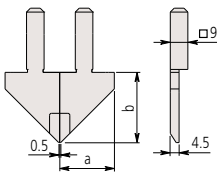
- USB Input Tool Direct
  06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
  02AZD790A: SPC cable with data button (160 mm)
  02AZE140A: SPC cable for foot switch

Optional accessories

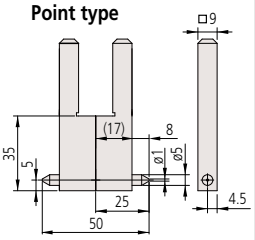
Interchangeable jaws

SPECIFICATIONS

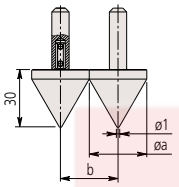
Standard type



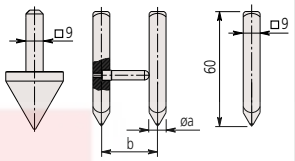
Point type



Centerline Type

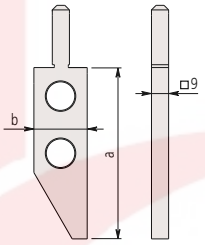


Scriber Type

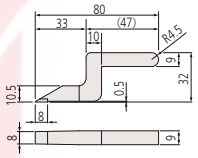


Unit: mm

Surface Plate Type



Scriber for height gages



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

Point Type

Order No.	Components	a	b
07CZA058	**07CZA041**×2 pcs.	25 mm	50 mm
07CZA059	**07CZA048**×2 pcs.	1 in	2 in

Centerline Type

Order No.	Components	a	b
07CZA057	**07CZA039**×2 pcs.	30 mm	30 mm
07CZA060	**07CZA047**×2 pcs.	1.2 in	1.2 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)

Note: Note that the error arising from the combination of surface plates is outside the scope of accuracy guarantee.

Scriber for height gages

Order No.
07GZA000

Type	Applicable calipers	Range	Maximum permissible error* E_{MPE}	Maximum permissible error* S_{MPE}
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)	
Point type	**552-181-10** (**552-191-10**)	Inside: 50.1 - 500 mm (2.004 - 20 in)	—	±0.09 mm (±0.0035 in)
		Outside: 0 - 450 mm (0 - 18 in)	±0.09 mm (±0.0035 in)	—
	552-182-10 (**552-192-10**)	Inside: 50.1 - 650 mm (2.004 - 26 in)	—	±0.09 mm (±0.0035 in)
		Outside: 0 - 600 mm (0 - 24 in)	±0.09 mm (±0.0035 in)	—
	552-183-10 (**552-193-10**)	Inside: 50.1 - 1050 mm (2.004 - 42 in)	—	±0.10 mm (±0.0040 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)	—	±0.14 mm (±0.0055 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)	—	±0.17 mm (±0.0070 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)		
	552-183-10 (**552-193-10**)	30.1 - 1030 mm (1.204 - 41.2 in)		±0.10 mm (±0.0040 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)		±0.11 mm (±0.0045 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)		
	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 + Point type	**552-181-10** (**552-191-10**)	Outside: 0 - 450 mm (1 - 18 in)	±0.12 mm (±0.0050 in)	—
	552-182-10 (**552-192-10**)	Outside: 0 - 600 mm (1 - 24 in)	±0.12 mm (±0.0050 in)	—
	552-183-10 (**552-193-10**)	Outside: 0 - 1000 mm (1 - 40 in)	±0.13 mm (±0.0055 in)	—
	552-184-10 (**552-194-10**)	Outside: 0 - 1500 mm (1 - 60 in)	±0.17 mm (±0.0070 in)	—
	552-185-10 (**552-195-10**)	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)

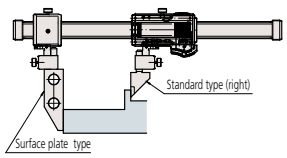
( ): Inch/Metric models

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

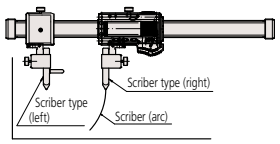
Note: The values described in the above table are MPE values when attached to a caliper.

Typical applications

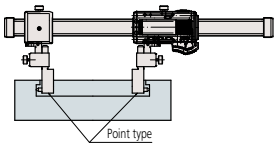
Surface plate type + Standard type



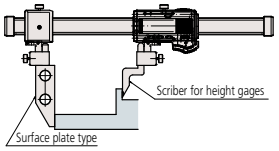
Scriber type



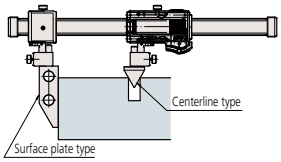
Point type



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.

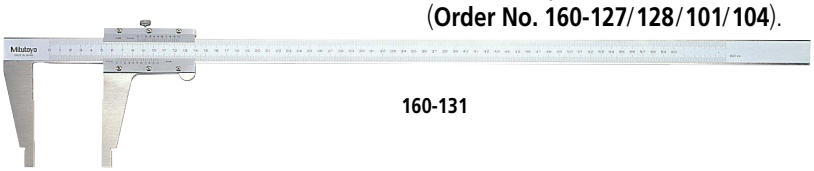
D

Calipers

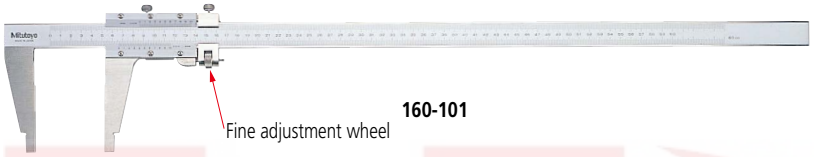
An industry standard measuring tool

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

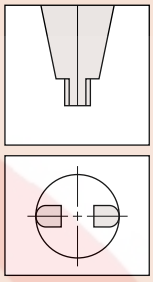
- Inside and outside measurements can be read directly from the upper and lower vernier scales.
- The jaws have radiused measuring faces for accurate inside diameter (ID) measurement.
- With fine adjustment (**Order No. 160-127/128/101/104**).



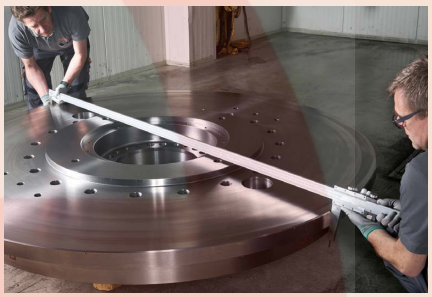
160-131



160-101



Radiused jaws for accurate ID measurement



SPECIFICATIONS

Metric with inside measurement vernier scale

Order No.	Range (mm)*1	Minimum reading (mm)	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
160-130	0 (20.1) - 450	0.05	±0.10	±0.10	without fine adjustment
160-131	0 (20.1) - 600		±0.10	±0.10	
160-132	0 (20.1) - 1000		±0.15	±0.15	

*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Metric with inside measurement vernier scale

Order No.	Range (mm)*1	Minimum reading (mm)	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
160-127	0 (10.1) - 300	0.02	±0.04	±0.04	with fine adjustment
160-128	0 (20.1) - 450		±0.05	±0.05	
160-101	0 (20.1) - 600		±0.05	±0.05	
160-104	0 (20.1) - 1000		±0.07	±0.07	

*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Metric/Inch with metric/inch double scale

Order No.	Range (mm)*1	Minimum reading	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
160-150	0 (10.1) - 300	0.02 mm/ 0.001 in	±0.04	±0.04	+10 mm/0.394 in to reading in inside measurement
160-151	0 (20.1) - 450		±0.05	±0.05	+20 mm/0.787 in to reading in inside measurement
160-153	0 (20.1) - 600		±0.05	±0.05	
160-155	0 (20.1) - 1000		±0.07	±0.07	

*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Inch with inside measurement vernier scale

Order No.	Range (in)*1	Minimum reading (in)	Maximum permissible error (in)*2		Remarks
			E_{MPE}	S_{MPE}	
160-124	0 (0.304) - 12	0.001	±0.0015	±0.0015	—
160-116	0 (0.504) - 18		±0.002	±0.002	
160-102	0 (0.504) - 24		±0.002	±0.002	
160-105	0 (1.004) - 40		±0.003	±0.003	

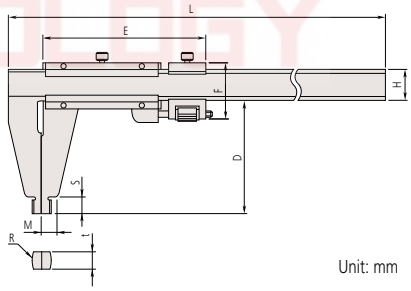
*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Inch/Metric with inch/metric double scale

Order No.	Range (in)*1	Minimum reading	Maximum permissible error (in)*2		Remarks
			E_{MPE}	S_{MPE}	
160-125	0 (0.304) - 12	0.001 in/ 0.02 mm	±0.0015	±0.0015	+0.3 in/7.62 mm to reading in inside measurement
160-119	0 (0.504) - 18		±0.002	±0.002	+0.5 in/12.7 mm to reading in inside measurement
160-103	0 (0.504) - 24		±0.002	±0.002	
160-106	0 (1.004) - 40		±0.003	±0.003	+1 in/25.4 mm to reading in inside measurement

*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

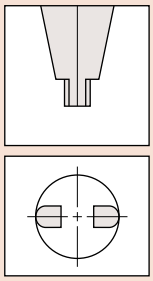


Unit: mm

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*	100	89	—	25	630	14.8	R10	18	6
0 - 450 mm/0 - 18 in		112	51				R10		6
0 - 600 mm*	100	89	—	25	780	14.8	R10	18	6
0 - 600 mm/0 - 24 in		112	51				R10		6
0 - 1000 mm*	140	111	—	32	1240	17	R10	24	8
0 - 1000 mm/0 - 40 in		150	62.5				R10		8

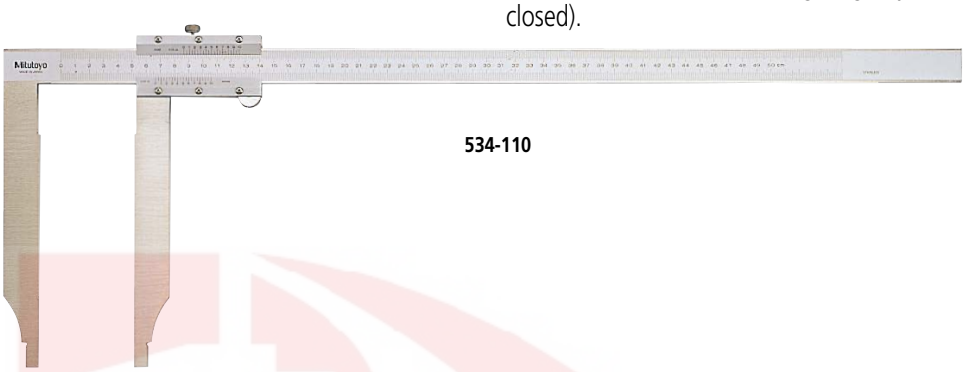
* Without fine adjustment

Long Jaw Vernier Caliper
SERIES 534



Round jaws for accurate ID measurement

- 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)*1	Graduation (mm)	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
534-109	0 (10.1) - 300	0.05	±0.07	±0.07	without fine adjustment
534-110	0 (20.1) - 500		±0.13	±0.13	

*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

Metric/Inch with metric/inch double scale

Order No.	Range (mm)*1	Graduation	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
534-101	0 (10.1) - 300	0.05 mm/1/128 in	±0.07	±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	±0.04	
534-102	0 (20.1) - 500	0.05 mm/1/128 in	±0.13	±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	±0.06	
534-103	0 (20.1) - 750	0.05 mm/1/128 in	±0.16	±0.16	
534-107		0.02 mm/0.001 in	±0.08	±0.08	
534-104	0 (20.1) - 1000	0.05 mm/1/128 in	±0.20	±0.20	
534-108		0.02 mm/0.001 in	±0.10	±0.10	

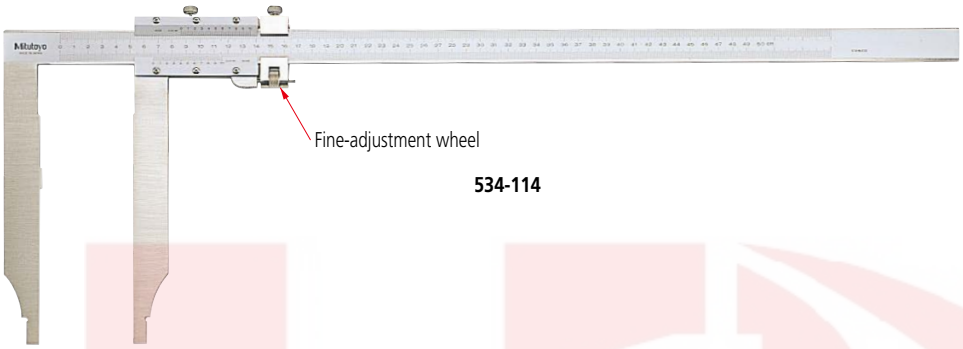
*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note: For external dimensions, refer to the **series 534** on page D-23.

Calipers

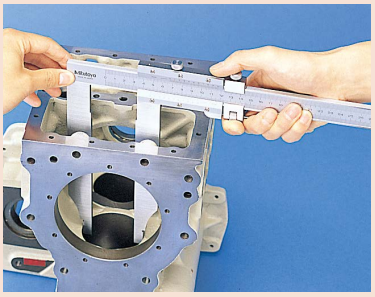
An industry standard measuring tool

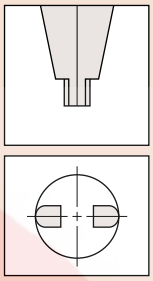
Long Jaw Vernier Caliper SERIES 534

- 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





Radiused jaws for accurate ID measurement

SPECIFICATIONS

Metric with inside measurement vernier scale

Order No.	Range (mm)*1	Graduation (mm)	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
534-113	0 (10.1) - 300	0.02	±0.04	±0.04	with fine adjustment
534-114	0 (20.1) - 500		±0.06	±0.06	
534-115	0 (20.1) - 750		±0.08	±0.08	
534-116	0 (20.1) - 1000		±0.10	±0.10	

*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

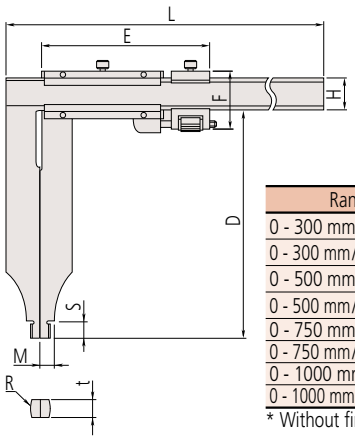
Inch with inside measurement vernier scale

Order No.	Range (in)*1	Graduation (in)	Maximum permissible error (in)*2		Remarks
			E_{MPE}	S_{MPE}	
534-117	0 (0.304) - 12	0.001	±0.002	±0.002	with fine adjustment
534-118	0 (0.804) - 20		±0.003	±0.003	
534-119	0 (0.804) - 30		±0.004	±0.004	
534-120	0 (0.804) - 40				

*1 ( ): Minimum dimension in ID measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

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						
0 - 750 mm*		150	—	32	995		R10		6
0 - 750 mm/0 - 30 in			62.5				R10		8
0 - 1000 mm*			—		1230				
0 - 1000 mm/0 - 40 in			62.5				R10		8

* Without fine adjustment

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Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink® (refer to page A-25 for details).

IP67

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

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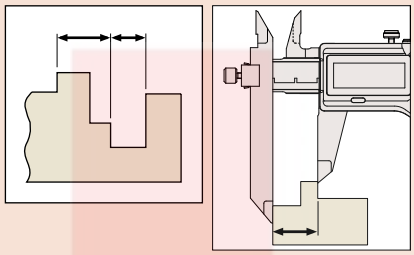
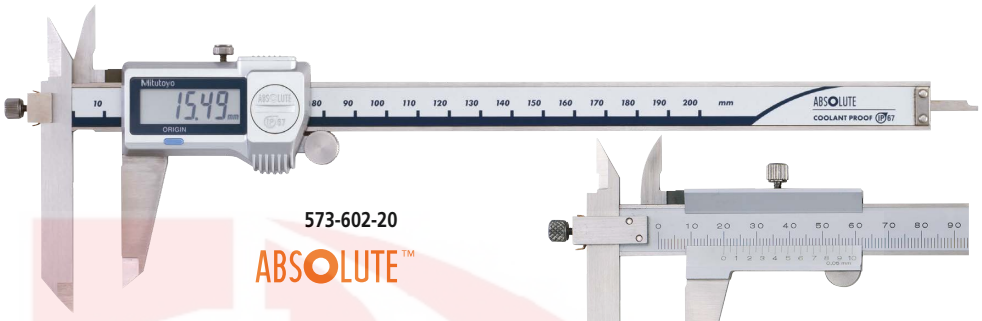
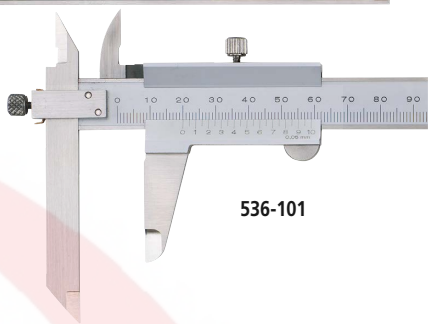
- The beam-mounted jaw can be adjusted to facilitate measurement of stepped sections and hard-to-get-at workpiece features.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Allows integration into statistical process control and measurement systems for models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







Technical Data

- 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-21.
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 fit

- **U-WAVE-TC**: **264-620** (IP67 type)
  264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter**
  (**Mitutoyo *Bluetooth*® U-WAVE**)
  264-624 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.
  Note: Cannot be used with **573-611-20**, **573-612-20** and **573-614**

SPECIFICATIONS

Metric Digimatic model

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
573-601-20	0 - 150	±0.02	±0.04
573-611-20*1	0 - 150	±0.02	±0.04
573-602-20	0 - 200	±0.02	±0.04
573-612-20*1	0 - 200	±0.02	±0.04
573-604-20	0 - 300	±0.03	±0.05
573-614-20*1	0 - 300	±0.03	±0.05

Inch/Metric Digimatic model

Order No.	Range (in)	Maximum permissible error (in)*2	
		E_{MPE}	S_{MPE}
573-701-20	0 - 6	±0.001	±0.002
573-702-20	0 - 8	±0.001	±0.002
573-704-20	0 - 12	±0.0015	±0.0025

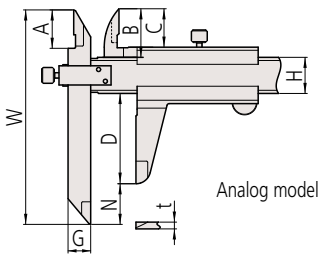
Metric Analog model

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
536-101	0 - 150	±0.05	±0.07
536-102	0 - 200	±0.05	±0.07
536-103	0 - 300	±0.08	±0.10

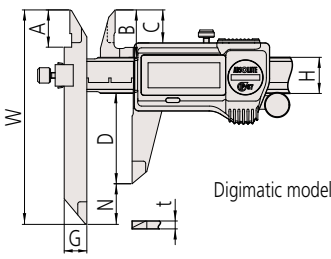
*1 Without thumb roller
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

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)	95	3.5
573-602-20		0 - 200	20	24.5	18.1	50			(4)		
573-604-20		0 - 300	22	27.5	19.8	64	15	20	(23.5)	135	3.8
536-101	Analog model	0 - 150	17	21.5	17	40	10	16	(18)	95	3
536-102		0 - 200	20.5	25	20.5	50			(4)		
536-103		0 - 300	22	27.5	22	64	15	20	(23.5)	135	3.8

D

Mitutoyo

Calipers

An industry standard measuring tool

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

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Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink® (refer to page A-25 for details).

IP67

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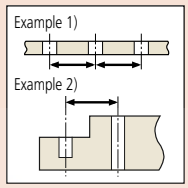
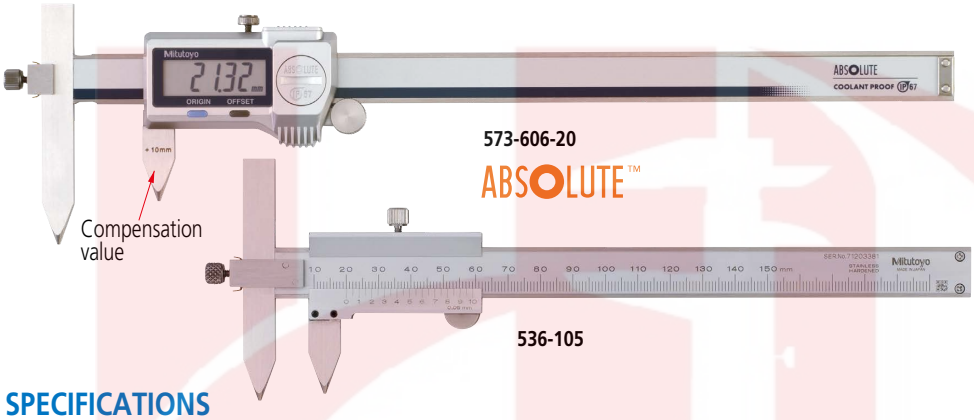
- Specially designed for hole Center-to-Center measurements on the same, or offset, planes.
- Digimatic models are IP67 Absolute type. Slider action is smooth, firm and comfortable.
- Direct reading of pitch measurements is available due to the offset-value setting function.
- Allows integration into 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.





D

SPECIFICATIONS

Metric Digimatic model

Order No.	Range (mm)	Maximum permissible error (mm)*2 E_{MPE}	S_{MPE}
573-605-20	10.1 - 160		±0.03
573-615-20*1	10.1 - 160		±0.03
573-606-20	10.1 - 210		±0.03
573-616-20*1	10.1 - 210		±0.03
573-608-20	10.1 - 310		±0.04
573-618-20*1	10.1 - 310		±0.04

Inch / Metric Digimatic model

Order No.	Range (in)	Maximum permissible error (in)*2 E_{MPE}	S_{MPE}
573-705-20	0.404 - 6.4		±0.0015
573-706-20	0.404 - 8.4		±0.0015
573-708-20	0.404 - 12.4		±0.0015

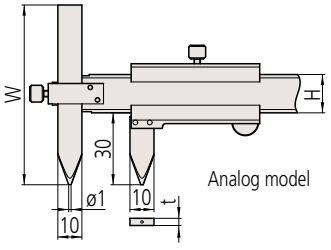
Metric Analog model

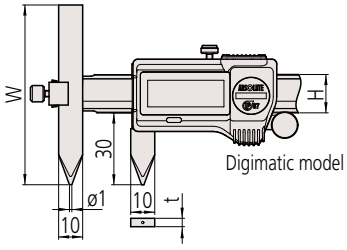
Order No.	Range (mm)	Maximum permissible error (mm)*2 E_{MPE}	S_{MPE}
536-105	10.1 - 150		±0.05
536-106	10.1 - 200		±0.05
536-107	10.1 - 300		±0.08

*1 Without thumb roller
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

Unit: mm





Range (mm)	H	W	t	Applicable hole
10 - 150	16	75	3	ø1.5 - ø9.5 mm
10 - 200				
10 - 300	20	100	3.8	

Range	H	W	t	Applicable hole
10 - 160 mm/0.4 - 6.4 in	16	75	3.5	ø1.5 - ø9.5 mm
10 - 210 mm/0.4 - 8.4 in				
10 - 310 mm/0.4 - 12.4 in	20	100	3.8	

Technical Data

- 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-21.

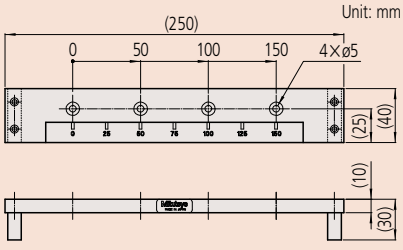
- **959143**: Data hold unit
- Connecting cables for **IT / DP / MUX**
  05CZA624: SPC cable with data button (1 m)
  05CZA625: SPC cable with data button (2 m)
- USB Input Tool Direct
  06AFM380A: SPC cable for **USB-ITN-A** (2 m)
- Connecting cables for **U-WAVE-T**
  02AZD790A: SPC cable with data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

Wireless Data Output U-WAVE fit

- **U-WAVE-TC**: **264-620** (IP67 type)
  264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter**
  (**Mitutoyo *Bluetooth*® U-WAVE**)
  264-624 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.
  Note: Cannot be used with **573-708-20**

- Inspection equipment for offset caliper
  05FAJ735

Unit: mm



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Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink® (refer to page A-25 for details).

ABSOLUTE™

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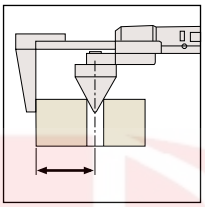
ABSOLUTE Back-Jaw Centerline Caliper SERIES 573 - Center-to-Center & Edge-to-Center Types

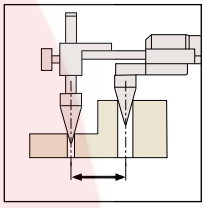
MeasurLink® ENABLED
Data Management Software by Mitutoyo

- 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.



573-718-20

573-716-20



Technical Data

- 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

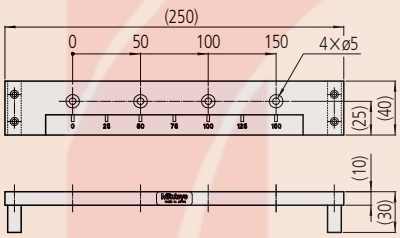
Optional Accessories

For details, refer to page A-21.

- **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

- Inspection equipment for offset caliper
  05FAJ735

Unit: mm



SPECIFICATIONS

Metric Edge-to-center distance type

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
573-718-20*1	10.1 - 200		±0.10
573-719-20*1	10.1 - 300		±0.15

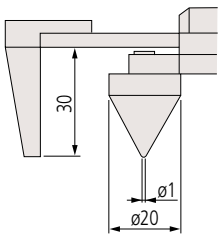
Metric Center-to-center distance type

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
573-716-20*1	10.1 - 200		±0.10
573-717-20*1	10.1 - 300		±0.15

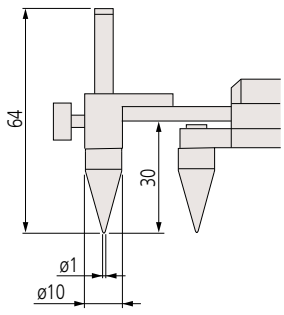
*1 Applicable hole diameter: ø1.5 - ø19.5 mm
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

Unit: mm



573-718-20
573-719-20



573-716-20
573-717-20

D

Mitutoyo

Calipers

An industry standard measuring tool

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

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Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink® (refer to page A-25 for details).

IP67

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- 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

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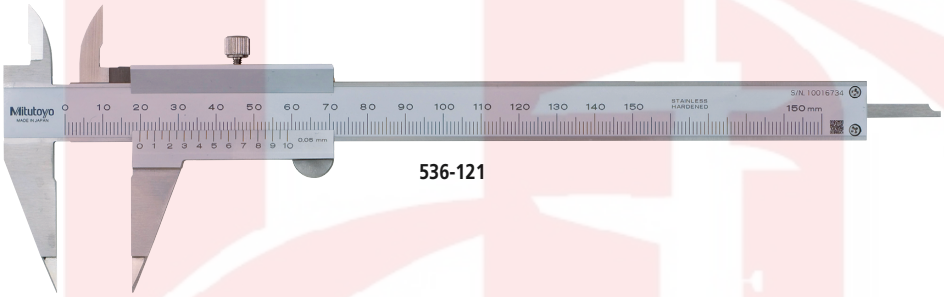


536-121

Technical Data

- 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-21.

- 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 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.

D

SPECIFICATIONS

Metric Digimatic model

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
573-621-20	0 - 150	±0.02	±0.04
573-625-20	0 - 150	±0.02	±0.04
573-622-20*1	0 - 150	±0.02	±0.04
573-626-20*1	0 - 150	±0.02	±0.04

Inch / Metric Digimatic model

Order No.	Range (in)	Maximum permissible error (in)*2	
		E_{MPE}	S_{MPE}
573-721-20	0 - 6	±0.001	±0.002
573-725-20	0 - 6	±0.001	±0.002

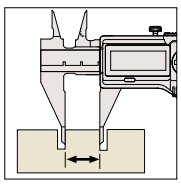
Metric Analog model

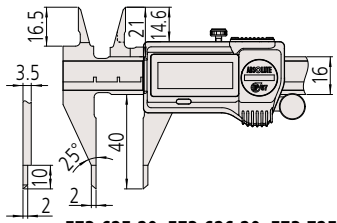
Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
536-121	0 - 150	±0.05	±0.07

*1 Without thumb roller
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

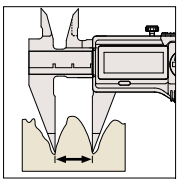
DIMENSIONS

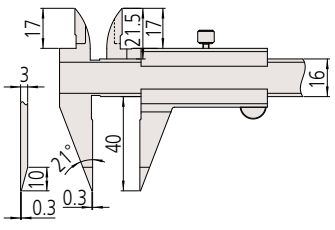
Unit: mm



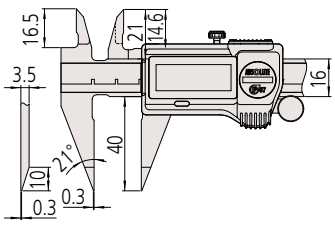


573-625-20, 573-626-20, 573-725-20





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-25 for details).

IP67

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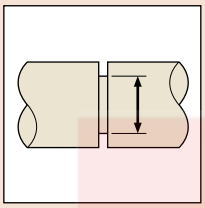
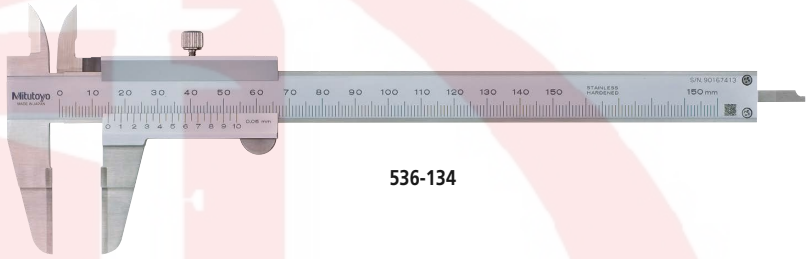
Blade Type Caliper
SERIES 573, 536 — ABSOLUTE Digimatic and vernier types

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

Technical Data

- 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-21.

- 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 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.

SPECIFICATIONS

Metric Digimatic model

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
573-634-20	0 - 150	±0.02	±0.04
573-635-20*1	0 - 150	±0.02	±0.04

Inch / Metric Digimatic model

Order No.	Range (in)	Maximum permissible error (in)*2	
		E_{MPE}	S_{MPE}
573-734-20	0 - 6	±0.001	±0.002

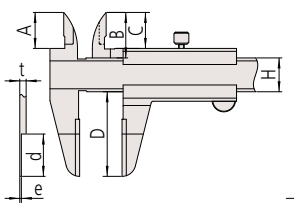
Metric Analog model

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
536-134	0 - 150	±0.05	±0.07
536-135	0 - 200	±0.05	±0.07
536-136	0 - 300	±0.08	±0.10

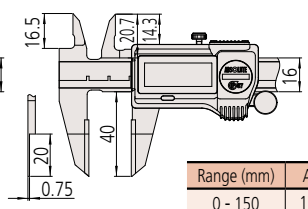
*1 Without thumb roller
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

Unit: mm



Analog model



Digimatic model

Range (mm)	A	B	C	D	d	e	H	t
0 - 150	17	21.5	17	40	20	0.75	16	3
0 - 200	20.5	25	20.5	50	25			
0 - 300	22	27.5	22	64	30	1	20	3.8

D

Mitutoyo

Calipers

An industry standard measuring tool

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

MeasurLink® ENABLED
Data Management Software by Mitutoyo

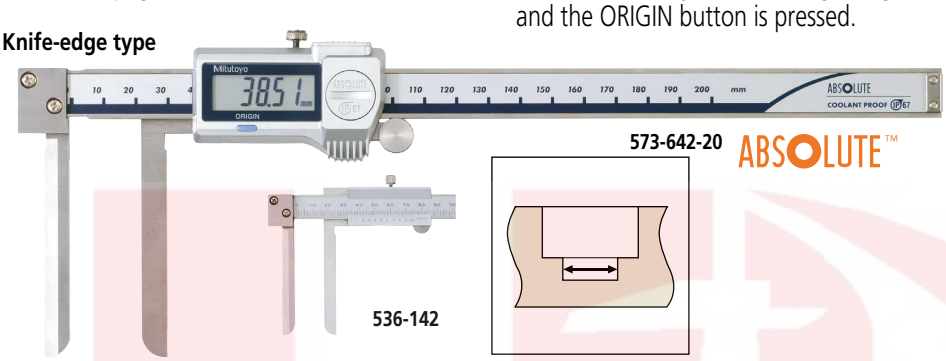
Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink® (refer to page A-25 for details).

IP67

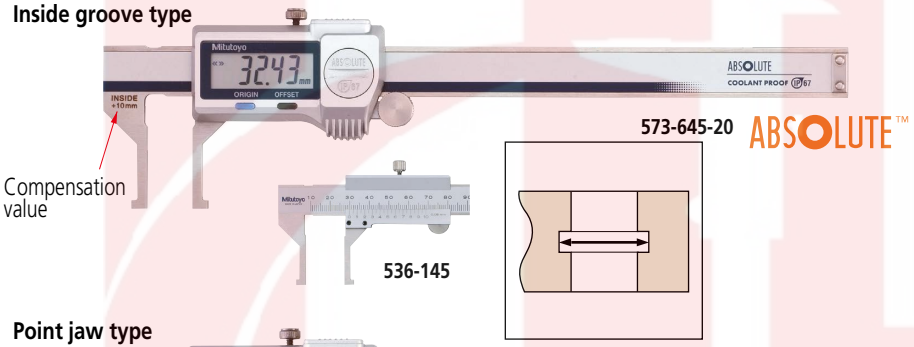
Dust- and Water-Protected
TÜVRheinland CERTIFIED
www.tuv.com ID 0000045042

- 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.

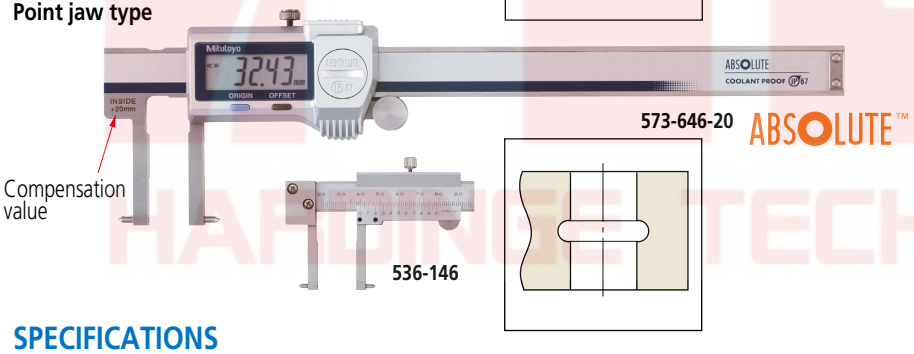
Knife-edge type



Inside groove type



Point jaw type



Technical Data

- Resolution*1: 0.01 mm or 0.00005 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-21.

- 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 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.
  Note: Cannot be used with **573-642-20**, **573-643-20** and **573-742-20**

SPECIFICATIONS

Metric Digimatic model

Order No.	Range (mm)	Maximum permissible error (mm)*3 E_{MPE}	Maximum permissible error (mm)*3 S_{MPE}	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		±0.03	Point jaw type, Measurable min.
573-648-20*1	20.1 - 170		±0.03	Point jaw type, Measurable min.

Metric Analog model

Order No.	Range (mm)	Maximum permissible error (mm)*3 E_{MPE}	Maximum permissible error (mm)*3 S_{MPE}	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.

Inch/Metric Digimatic model

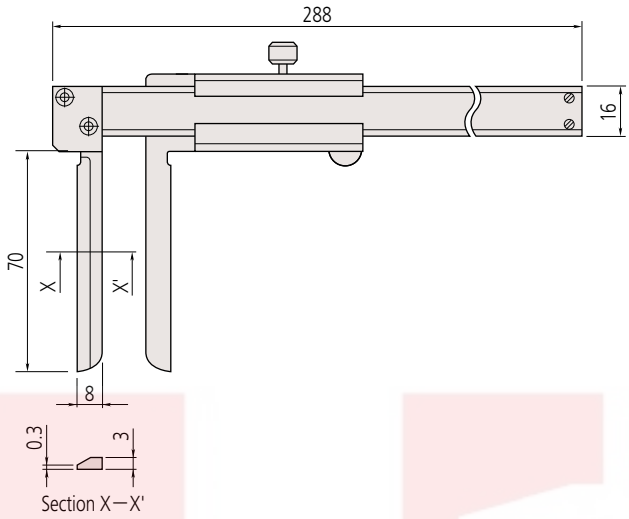
Order No.	Range (in)	Maximum permissible error (in)*3 E_{MPE}	Maximum permissible error (in)*3 S_{MPE}	Remarks
573-742-20	0.4 - 8		±0.0025	Knife-edge type, Measurable min.
573-745-20*2	0.404 - 6.4		±0.0025	Inside groove type, Measurable min.
573-746-20*2	0.804 - 6.8		±0.0015	Point jaw type, Measurable min.

*1 Without thumb roller
*2 Includes the offsetting function, which indicates the actual measurement value.
*3 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

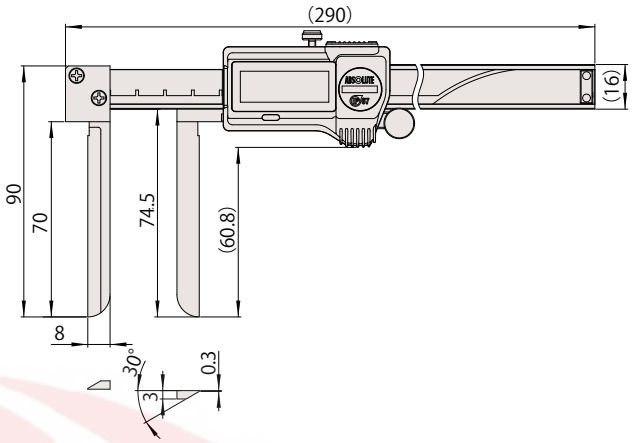
DIMENSIONS

Unit: mm

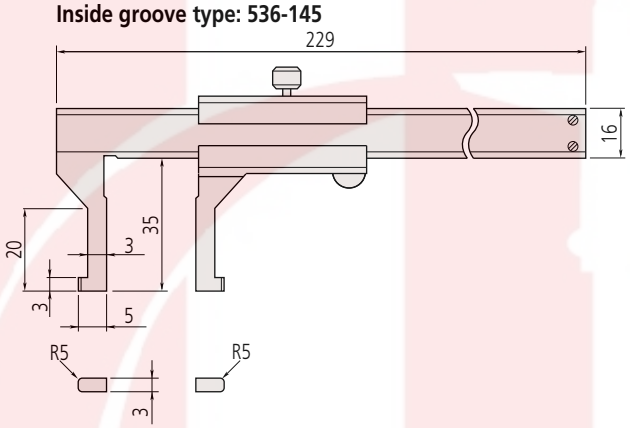
Knife-edge type: 536-142



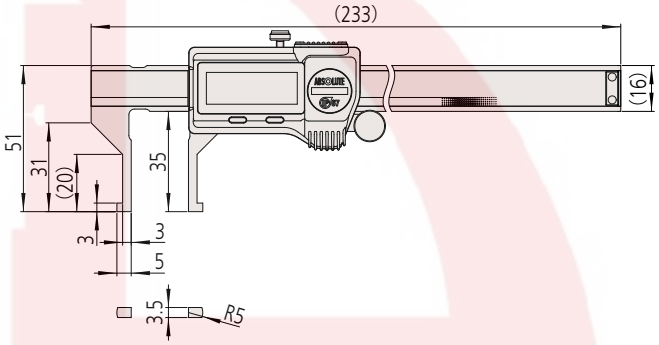
Knife-edge type: 573-642-20, 573-643-20, 573-742-20



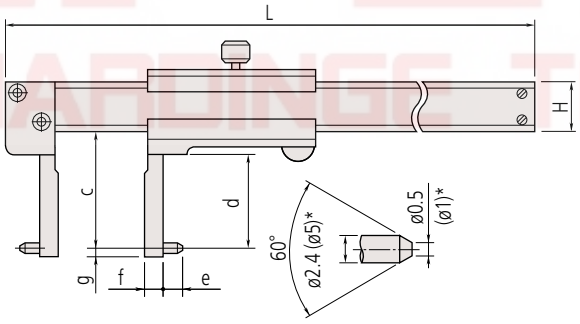
Inside groove type: 536-145



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

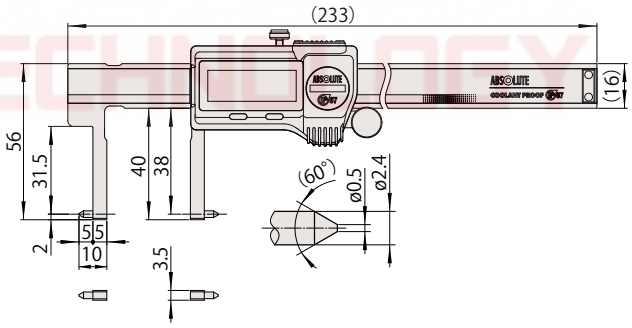


Point jaw type: 536-146, 147, 148, 149



*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

Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink® (refer to page A-25 for details).

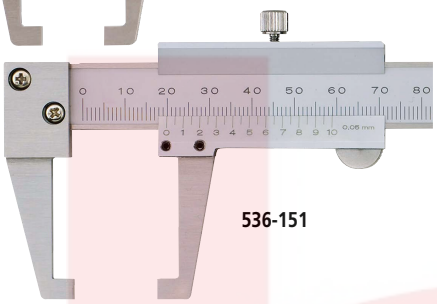
IP67

Dust- and Water-Protected
TÜVRheinland CERTIFIED
www.tuv.com ID 0000045042

- 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.)

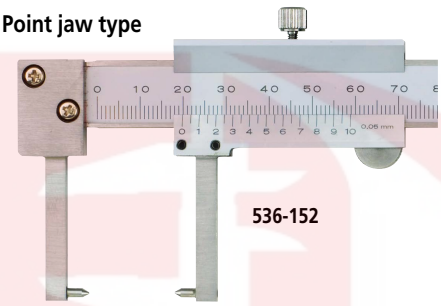
573-651-20

ABSOLUTE™

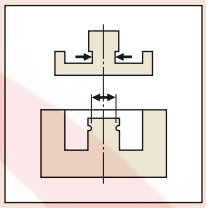


536-151

Point jaw type



536-152



SPECIFICATIONS

Metric Digimatic model

Order No.	Range (mm)	Maximum permissible error (mm)*3	
		E_{MPE}	S_{MPE}
573-651-20	0 - 150	±0.03	
573-652-20*1	0 - 150	±0.03	
573-653-20*2	0 - 150	±0.03	
573-654-20*1*2	0 - 150	±0.03	

Inch / Metric Digimatic model

Order No.	Range (in)	Maximum permissible error (in)*3	
		E_{MPE}	S_{MPE}
573-751-20	0 - 6	±0.0015	
573-752-20*1	0 - 6	±0.0015	

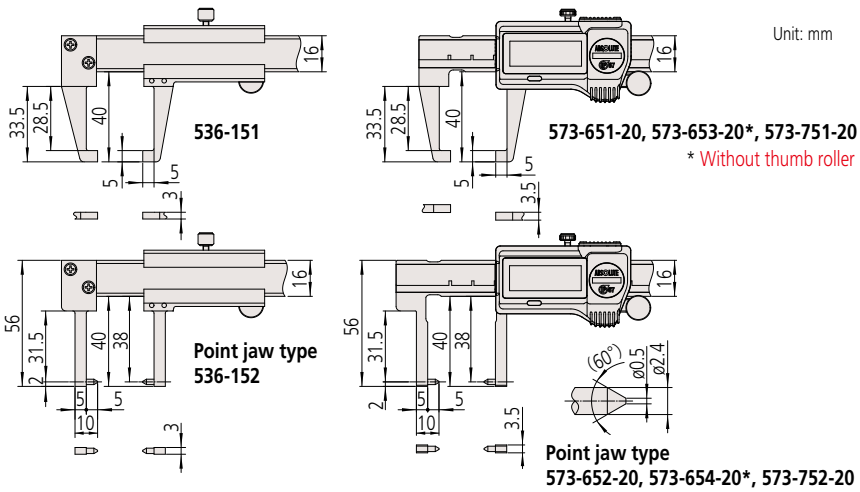
Metric Analog model

Order No.	Range (mm)	Maximum permissible error (mm)*3	
		E_{MPE}	S_{MPE}
536-151	0 - 150	±0.05	
536-152*1	0 - 150	±0.05	

*1 Point jaw type
*2 Without thumb roller
*3 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

Unit: mm



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**

Technical Data

- 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-21.

- 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 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 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-25 for details).

IP67

Dust- and Water-Protected

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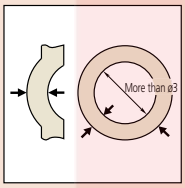
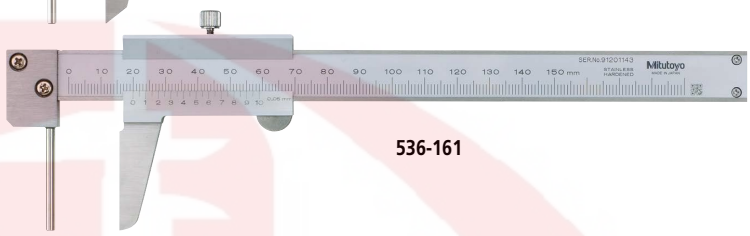
ID 0000045042

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.)





Technical Data

- 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-21.

- 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 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.

SPECIFICATIONS

Metric Digimatic model

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
573-661-20	0 - 150	±0.05	
573-662-20*1	0 - 150	±0.05	

Inch/Metric Digimatic model

Order No.	Range (in)	Maximum permissible error (in)*2	
		E_{MPE}	S_{MPE}
573-761-20	0 - 6	±0.002	

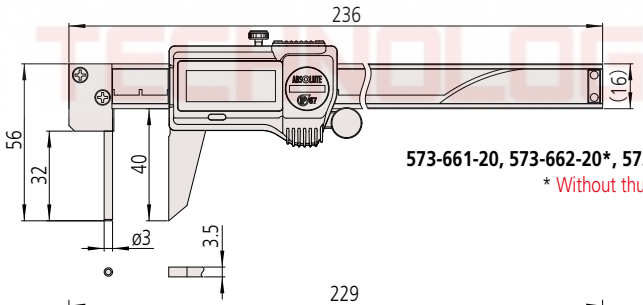
Metric Analog model

Order No.	Range (mm)	Maximum permissible error (mm)*2	
		E_{MPE}	S_{MPE}
536-161	0 - 150	±0.05	

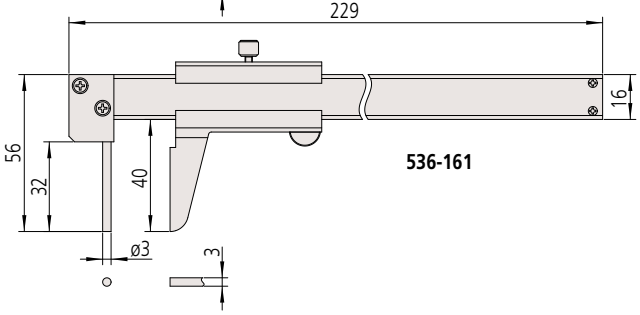
*1 Without thumb roller
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS

Unit: mm



573-661-20, 573-662-20*, 573-761-20
* Without thumb roller



536-161

Jaw thickness: 3.5 mm for **573-661-20, 573-662-20, 573-761-20**
3 mm for **536-161**

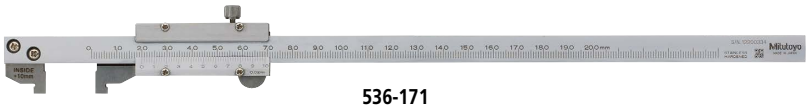
D

Calipers

An industry standard measuring tool

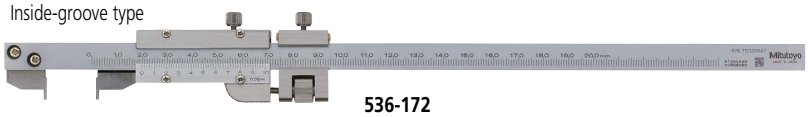
Hook Type Vernier Caliper SERIES 536

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

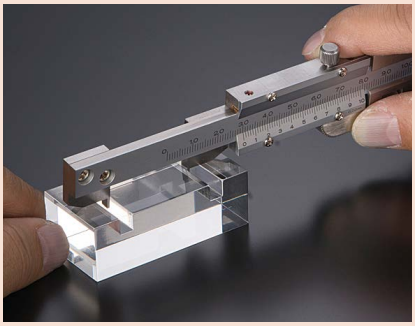


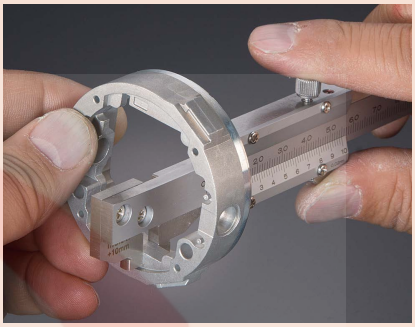
536-171

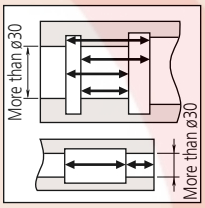
Inside-groove type



536-172







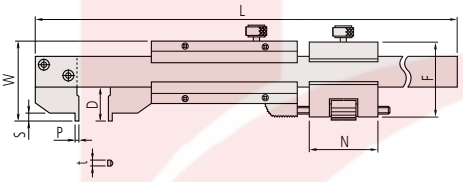
SPECIFICATIONS

Metric

Order No.	Range (mm)*1	Graduation (mm)	Maximum permissible error (mm)*2		Remarks
			E_{MPE}	S_{MPE}	
536-171	0 - 200 (10.1 - 200)	0.02	±0.03	±0.03	—
536-172	0 - 200 (2.1 - 200)		±0.03	±0.03	with fine adjustment

*1 ( ): Dimension in inside measurement
*2 Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS



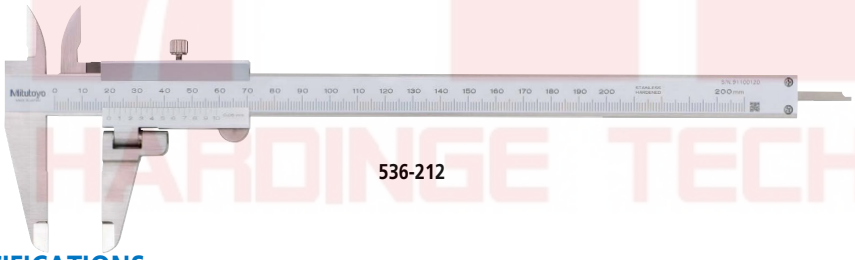
Unit: mm

Order No.	D	F	L	N	P	S	t	W
536-171*1	12	—	320	—	5	4	3.5	28
536-172*2		28.5		20	1			

*1 Inside measuring face is R5.
*2 Inside measuring face is flat.

Swivel Vernier Caliper SERIES 536 — Moving Jaw type

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



536-212

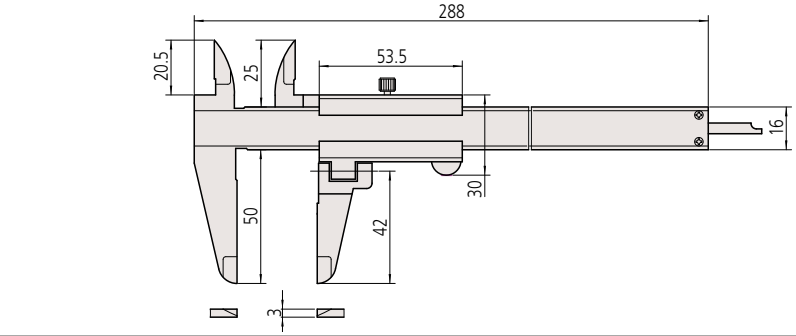
SPECIFICATIONS

Metric

Order No.	Range (mm)	Graduation (mm)	Maximum permissible error (mm)*		Remarks
			E_{MPE}	S_{MPE}	
536-212	0 - 200	0.05	±0.05	±0.07	with depth bar

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.

DIMENSIONS



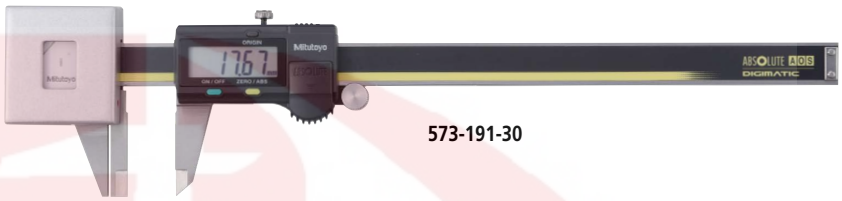
Unit: mm

D

ABSOLUTE Low Force Caliper SERIES 573

MeasurLink® ENABLED
Data Management Software by Mitutoyo

- 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

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

- 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-21.
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 fit

- **U-WAVE-TC**: **264-620** (IP67 type)
  264-621 (Buzzer type)
- **U-WAVE-TCB Transmitter**
  (**Mitutoyo *Bluetooth*® U-WAVE**)
  264-624 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 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-10 and A-12 for details.

SPECIFICATIONS

Metric

Order No.	Range (mm)	Maximum permissible error (mm)*	
		E_{MPE}	S_{MPE}
573-191-30	0 - 180	±0.05	

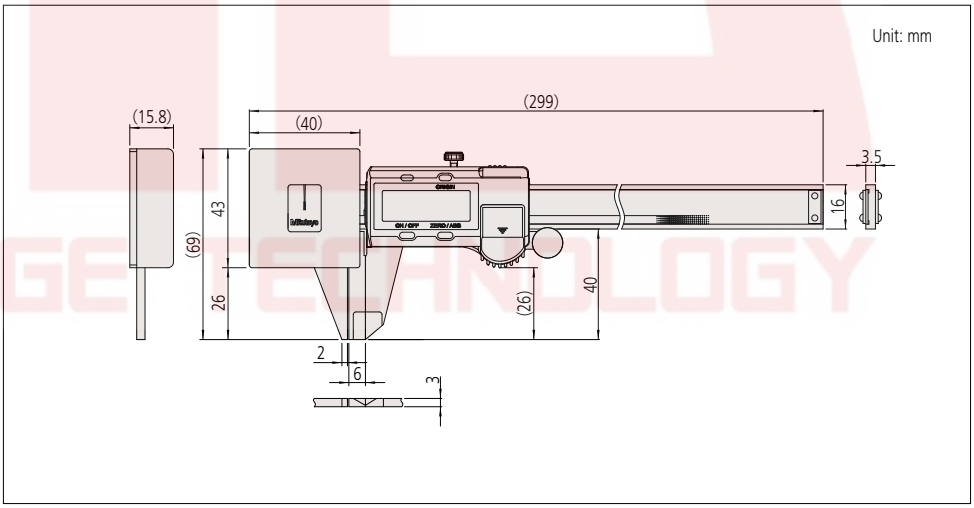
Inch/Metric

Order No.	Range (in)	Maximum permissible error (in)*	
		E_{MPE}	S_{MPE}
573-291-30	0 - 7	±0.002	

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note: Dedicated for outside measurement (depth bar is not fitted).

DIMENSIONS

Unit: mm



D

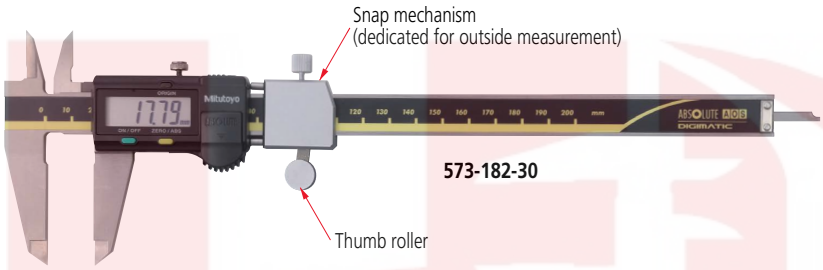
Calipers

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)	Maximum permissible error (mm)*	
		E_{MPE}	S_{MPE}
573-181-30	0 - 100	±0.02	±0.04
573-182-30	0 - 150		

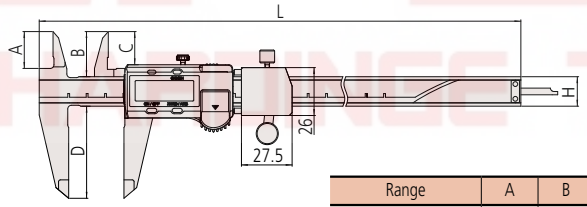
Inch / Metric

Order No.	Range (in)	Maximum permissible error (in)*	
		E_{MPE}	S_{MPE}
573-281-30	0 - 4	±0.001	±0.002
573-282-30	0 - 6		

* Partial Surface Contact Error, E_{MPE} and Shift Error, S_{MPE} are terms (notations) used in ISO 13385-1:2019.
Note: Dedicated for outside measurement (depth bar is not fitted).

DIMENSIONS

Unit: mm

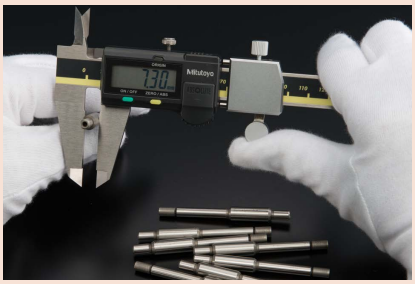


Thickness of outer jaw: 3.5 mm

Range	A	B	C	D	H	L
0 - 100 mm / 0 - 4 in	16.5	21	14.5	40	16	233
0 - 150 mm / 0 - 6 in	20	24.5	18	50	16	290

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-25 for details).

ABSOLUTE™



Technical Data

- Resolution: 0.01 mm or 0.0005 in / 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-21.
- **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
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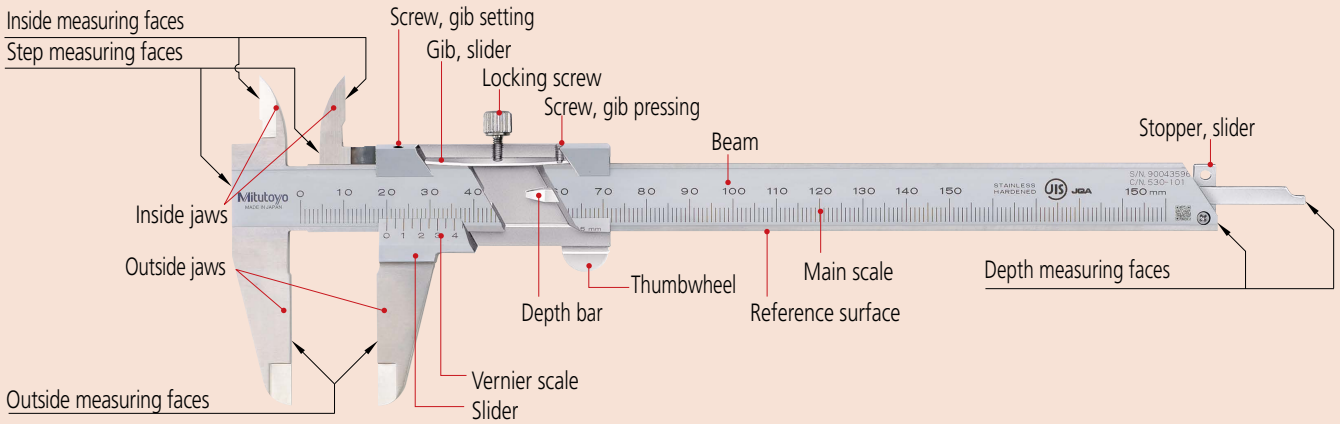
  (**Mitutoyo *Bluetooth*® U-WAVE**)
  264-624 (IP67 type)
  264-625 (Buzzer type)
  Refer to page A-10 for details.
- Connecting unit for **U-WAVE-TC / TCB**:
  02AZF300 (Buzzer type)
  Note: IP67 model is water / dust-proofed suitable for the factory floor.
  Buzzer type is not water / dust-proofed.
  Refer to pages A-10 and A-12 for details.

Quick Guide to Precision Measuring Instruments

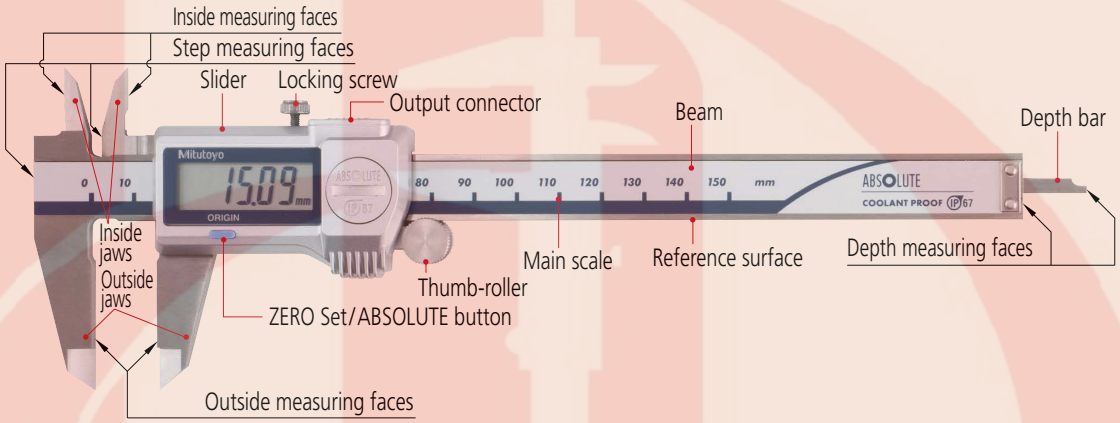
Calipers

Nomenclature

Vernier Caliper

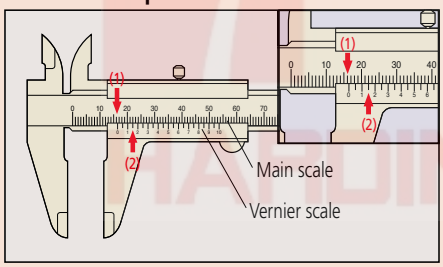


Absolute Digimatic Caliper



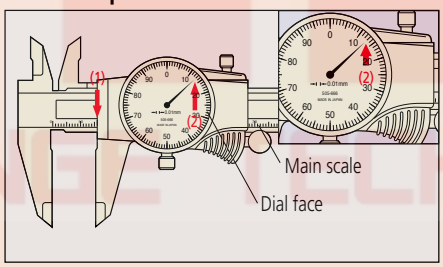
How to Read the Scale

• Vernier Calipers



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

• Dial Calipers

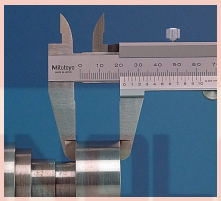


Graduation	0.01 mm
(1) Main scale	16 mm
(2) Dial face	0.13 mm
Reading	16.13 mm

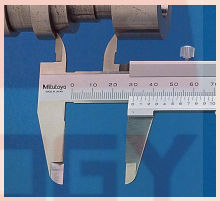
Note: Above left, 0.15 mm (2) is read at the position where a main scale graduation line corresponds with a vernier graduation line.

Measurement examples

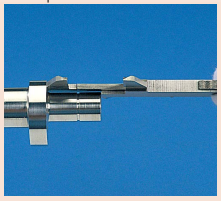
1. Outside measurement



2. Inside measurement



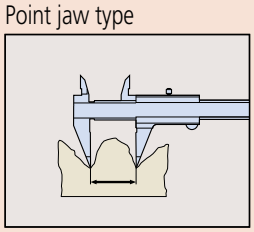
3. Step measurement



4. Depth measurement

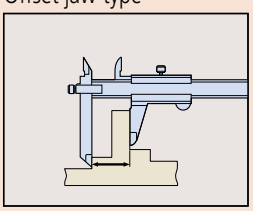
Special Purpose Caliper Applications

Point jaw type



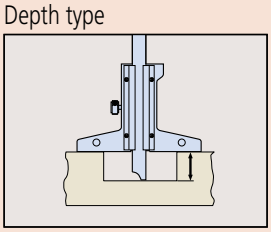
For uneven surface measurement

Offset jaw type



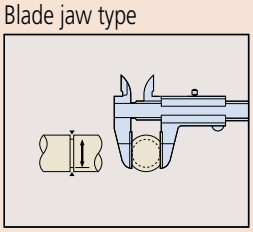
For stepped feature measurement

Depth type



For depth measurement

Blade jaw type



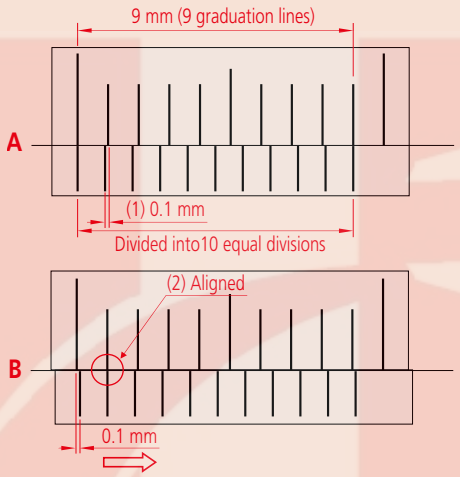
For diameter of narrow groove measurement

D

Mitutoyo

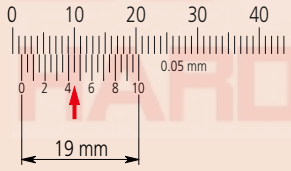
Vernier scale

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.



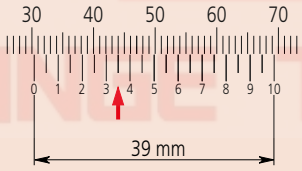
Some early calipers divided 19 divisions on the main scale by 20 vernier divisions to provide 0.05 mm resolution. However, the closely spaced lines proved difficult to read and so, since the 1970s, a long vernier scale that uses 39 main scale divisions to spread the lines is generally used instead, as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

• 19 mm Vernier scale



Scale reading 1.45 mm

• 39 mm vernier scale (long vernier scale)

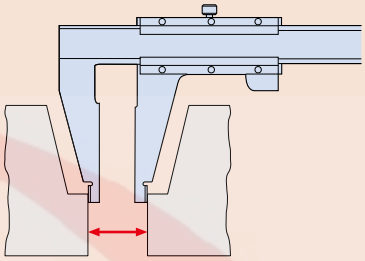


Scale reading 30.35 mm

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.



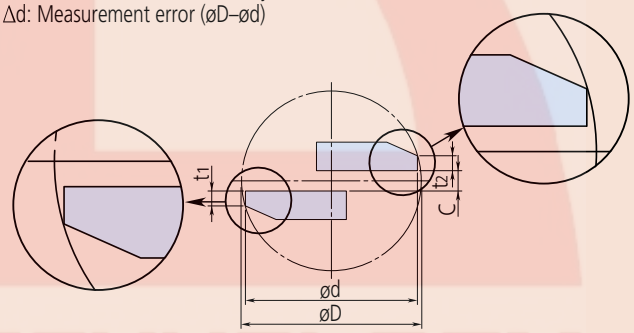
Small hole measurement with an M-type caliper

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

øD: True internal diameter
ød: Measured diameter
t_1, t_2: Thickness of the inside jaw
C: Distance between the inside jaws
Δd: Measurement error (øD–ød)

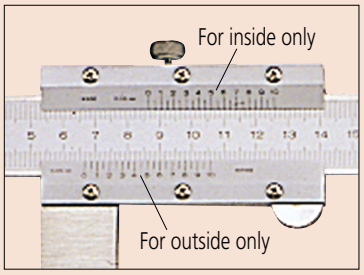
True internal diameter (øD: 5 mm) Unit: mm

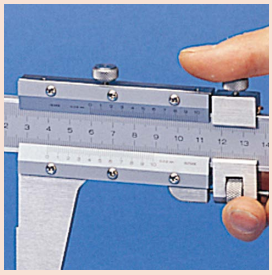
t_1+t_2+C	0.3	0.5	0.7
Δd	0.009	0.026	0.047



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.

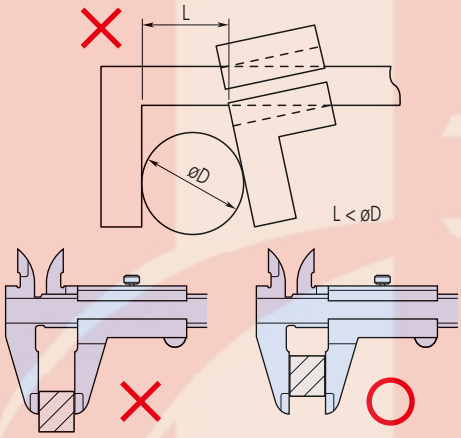




General notes on use of the caliper

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 E_{MPE} error tolerances. Therefore, these factors do not cause problems as long as the caliper satisfies the E_{MPE} 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

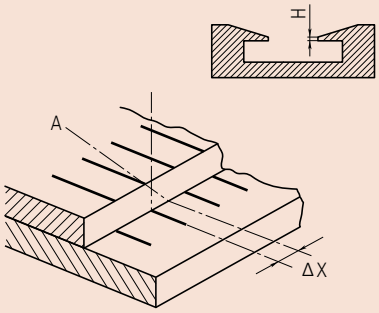
Insert the inside jaw as deeply as possible before measurement.
Read the maximum indicated value during inside measurement.
Read the minimum indicated value during groove width measurement.

3. Depth measurement

Read the minimum indicated value during depth measurement.

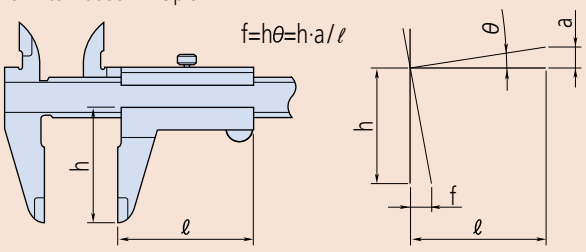
4. Parallax error when reading the scales

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) ×0.01 mm=0.008 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±1) $\times 10^{-6}$/K, note that other workpiece materials, the room temperature and the workpiece temperature may affect measurement accuracy.

7. Handling

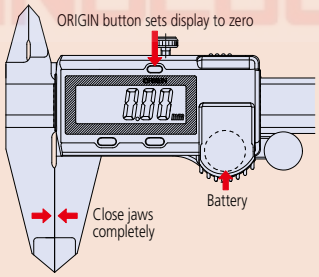
Caliper jaws are sharp, and therefore the instrument must be handled with care to avoid personal injury.
Avoid damaging the scale of a digital caliper and do not engrave an identification number or other information on it with an electric marker pen.
Avoid damaging a caliper by subjecting it to impact 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 conventional 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 **Conventional JIS** Instrumental error
JIS B 7507-1993

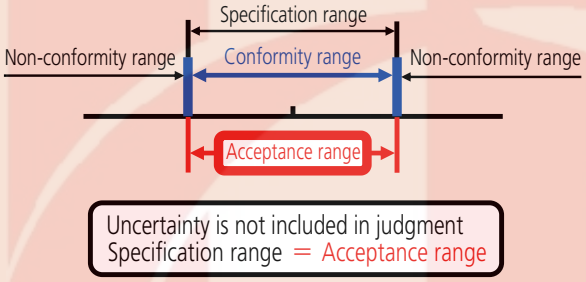
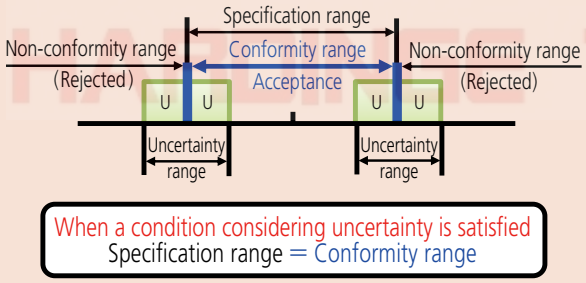


Fig. 2 **New JIS** Maximum permissible error (MPE)
JIS B 7507: 2016 (ISO/TR 14253-6: 2012)



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 gage 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.

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

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.

Fig. 3: Determining partial measuring surface contact error

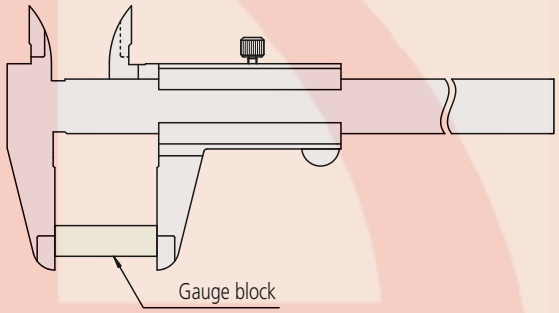
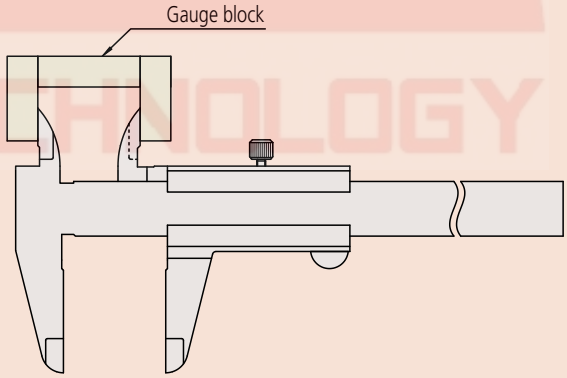


Fig. 4: Determining scale shift error



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

Support for ISO 13385-1:2019

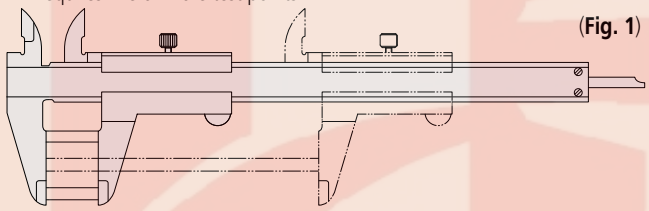
The ISO standard for calipers, ISO 13385-1, was revised and published as ISO 13385-1:2019 in August 2019. The major point of this revision is that it more specifically quantifies the notation and the inspection methods, etc. related to caliper accuracy. This quantification does not affect the quality of calipers manufactured in the past, as they were measured and inspected in an agreed, standardized way in line with certain methods and criteria. The following paragraphs explain points and changes in the revised ISO 13385-1:2019.

Partial surface contact error $E_{(MPE)}$

The partial surface contact error of a caliper is an indication error applied to outside measurement.
The ISO-2019 standard quantifies for each measuring range the testing method and criteria, such as test points, number of tests, and testing arrangement that were previously left to the manufacturers' own criteria. (**Fig. 1**, **Table 1**)

Ex.) For a caliper with a measuring range of 150 mm, the revised standard requires five or more test points.

(**Fig. 1**)



Number of partial surface contact error test points (**Table 1**)

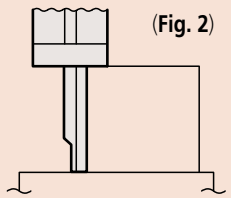
Measuring range (mm)	Minimum number of test points
150	5
300	6
1000	7
1000 or more	8

Furthermore, the revised standards require testing in 90% or more points within the product measuring range as well as testing at the root and tip of the jaw at the maximum/minimum point. Therefore, it is important to conduct tests following the newly defined standard.
The following is an example of measurement for a 150 mm caliper. To comply with the ISO-2019 standard, the minimum number of test points is five for a 150 mm caliper. (**Table 1**)
Five or more test points are necessary to comply with the ISO-2019 standard. These include testing at the maximum and minimum point, as well as at the root and tip of the measuring unit. These test points must add up to a total of five.

Shift Error $S_{(MPE)}$

The Shift Error for calipers is the error of indication for areas other than the outside measuring face. In the ISO-2019 standard, all measurement errors (inside, depth, step, and I.D. measurement error) other than the outside measurement error (E_{MPE}) are Scale Shift Errors (S_{MPE}). Test points and their number were newly quantified as the type of errors included in the Scale Shift Error were better specified. (**Fig. 2**, **3**, **Table 3**)

(**Fig. 2**)



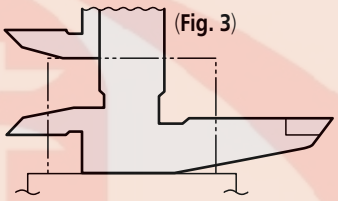
Scale Shift Error measurement example-depth measurement

Ex.) Step and depth measurement

[ISO 13385-1:2019] (**Table 3**)

Test numbering	Test point	Reference standard
1	Less than 50 mm	Gauge block

(**Fig. 3**)



Scale Shift Error measurement example-step measurement

For example, for depth measurement or step measurement, the standard specifically requires one or more test points at less than 50 mm and a testing arrangement using gauge blocks.
(See **Table 3**)

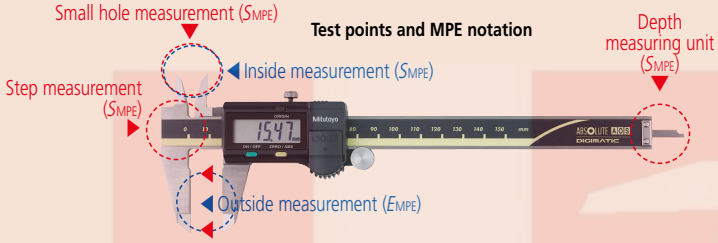
D

Accuracy notation change (Regarding MPE notation)

The "instrumental error" used until now will change to "MPE (E_{MPE}/ S_{MPE})". Scale Shift Error (S_{MPE}) will describe the permissible error including those for depth and step.(**Table 4**)

Standards	E_{MPE}	S_{MPE}			
	Outside measurement	Inside measurement	Depth measurement	Step measurement	I.D. measurement
ISO13385-1:2019	Accuracy notation for outside measurement	Permissible values including those for all measurements: inside, depth, step, etc.			
ISO13385-1:2011 (JISB7507:2016)	Accuracy notation for outside measurement	Inside measurement = E_{MPE}	Depth, step, = E_{MPE} + 0.02 mm		

Maximum permissible error includes the repeatability and quantizing error.



Ex.) 200 mm caliper (**Table 4-1**)

Accuracy ±0.02 mm (conventional notation)

Breakdown		
	Outside measurement	±0.02
	Inside measurement	±0.02

For depth and step measurement, add 0.02 mm to the outside measurement value.

S_{MPE} is described for measurements other than the outside measurement, but the maximum permissible error for inside measurement remains the same as before.
The permissible values for measurements other than the outside measurement (inside, depth, step, and inside diameter measurement) must be described as S_{MPE} in line with the ISO-2019 standard. Since the permissible values for depth and step measurement are larger than those for inside measurement, this could give an impression that accuracy has suffered. However, this is simply due to the change of notation in accordance with the ISO-2019 standard; neither has the accuracy of the inside measurement deteriorated nor has the product performance changed. (**Table 6-1**, **6-2**)

(**Table 6-1**) Unit: mm

Measured length	Scale interval, graduation or resolution	
	0.05	0.02 or 0.01
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 straightness, flatness and parallelism of the measuring surface.

Maximum permissible error E_{MPE} of Partial surface contact error in JIS B 7507

Ex.) Permissible values for a 200 mm caliper (**Table 6-2**)

Measured length (mm)	Maximum permissible error (MPE)	
	E_{MPE} (mm)	S_{MPE} (mm)
0 ≤ L ≤ 50	±0.02	±0.04
50 ≤ L ≤ 100	±0.02	±0.04
100 ≤ L ≤ 150	±0.02	±0.04
150 ≤ L ≤ 200	±0.02	±0.04

Ex.) Breakdown of S_{MPE}

Inside measurement	Step measurement	Depth measurement	I.D. measurement
±0.02	±0.04	±0.04	+0.01 −0.03

Accuracy notation change (for custom products)

The ISO-2019 standard stipulates the accuracy notation for compliant products. However, nothing is stipulated for custom products that are not compliant with said standard (such as calipers with dedicated measuring faces), so for these products the notation of accuracy is left to the discretion of each manufacturer. Mitutoyo, with many custom calipers, describes MPE for all of its calipers based on the following line of thinking. For example, MPE is "Scale Shift Error (S_{MPE})" for "calipers whose measuring face is other than the zero-setting face = calipers with exclusive measuring method" such as centerline calipers, inside calipers, etc. (**Figure 5, Table 7**)
Accuracy is described using S_{MPE} measured not using the number of test points stipulated in the ISO-2019 standard, but rather with the same number of test points and testing method as before.

(**Figure 5**) Non-ISO model (Ex.)

573-605-20

(**Table 7-1**)

Maximum permissible error (MPE)	
E_{MPE} (mm)	S_{MPE} (mm)
—	±0.04

Number of test points: 3

573-646-20

(**Table 7-2**)

Maximum permissible error (MPE)	
E_{MPE} (mm)	S_{MPE} (mm)
—	±0.03

Number of test points: 3

D

Appendix: List of maximum permissible errors (MPE) for typical products

The following list shows MPE for ISO-compliant models.

Series 500	Maximum permissible errors	
Measured length	E_{MPE} (mm)	S_{MPE} (mm)
0 ≤ L ≤ 50	±0.02	±0.04
50 ≤ L ≤ 100	±0.02	±0.04
100 ≤ L ≤ 150	±0.02	±0.04
150 ≤ L ≤ 200	±0.02	±0.04
200 ≤ L ≤ 300	±0.03	±0.05
300 ≤ L ≤ 400	±0.04	±0.06
400 ≤ L ≤ 500	±0.05	±0.07
500 ≤ L ≤ 600	±0.05	±0.07
600 ≤ L ≤ 700	±0.06	±0.08
700 ≤ L ≤ 800	±0.06	±0.08
800 ≤ L ≤ 900	±0.07	±0.09
900 ≤ L ≤ 1000	±0.07	±0.09

Series 505 (0.01 mm)	Maximum permissible errors	
Measured length	E_{MPE} (mm)	S_{MPE} (mm)
0 ≤ L ≤ 50	±0.02	±0.04
50 ≤ L ≤ 100	±0.02	±0.04
100 ≤ L ≤ 150	±0.02	±0.04
150 ≤ L ≤ 200	±0.03	±0.05
200 ≤ L ≤ 300	—	—
300 ≤ L ≤ 400	—	—
400 ≤ L ≤ 500	—	—
500 ≤ L ≤ 600	—	—
600 ≤ L ≤ 700	—	—
700 ≤ L ≤ 800	—	—
800 ≤ L ≤ 900	—	—
900 ≤ L ≤ 1000	—	—

Series 505 (0.02 mm)	Maximum permissible errors	
Measured length	E_{MPE} (mm)	S_{MPE} (mm)
0 ≤ L ≤ 50	±0.02	±0.04
50 ≤ L ≤ 100	±0.03	±0.05
100 ≤ L ≤ 150	±0.03	±0.05
150 ≤ L ≤ 200	±0.03	±0.05
200 ≤ L ≤ 300	±0.04	±0.06
300 ≤ L ≤ 400	—	—
400 ≤ L ≤ 500	—	—
500 ≤ L ≤ 600	—	—
600 ≤ L ≤ 700	—	—
700 ≤ L ≤ 800	—	—
800 ≤ L ≤ 900	—	—
900 ≤ L ≤ 1000	—	—

The reference point (0) is at 10.1 mm for **Series 550** and **551**.

Series 550	Maximum permissible errors	
Measured length	E_{MPE} (mm)	S_{MPE} (mm)
10.1 (0) ≤ L ≤ 50	±0.02	±0.02
50 ≤ L ≤ 100	±0.03	±0.03
100 ≤ L ≤ 200	±0.03	±0.03
200 ≤ L ≤ 300	±0.04	±0.04
300 ≤ L ≤ 400	±0.04	±0.04
400 ≤ L ≤ 450	±0.05	±0.05
450 ≤ L ≤ 500	±0.05	±0.05
500 ≤ L ≤ 600	±0.05	±0.05
600 ≤ L ≤ 700	±0.06	±0.06
700 ≤ L ≤ 800	±0.06	±0.06
800 ≤ L ≤ 900	±0.07	±0.07
900 ≤ L ≤ 1000	±0.07	±0.07

The minimum inside measurement size is 20.1 mm for **550-203**, **205**, and **207**.

Series 551	Maximum permissible errors	
Measured length	E_{MPE} (mm)	S_{MPE} (mm)
10.1 (0) ≤ L ≤ 50	±0.02	±0.02
50 ≤ L ≤ 100	±0.03	±0.03
100 ≤ L ≤ 200	±0.03	±0.03
200 ≤ L ≤ 300	±0.04	±0.04
300 ≤ L ≤ 400	±0.04	±0.04
400 ≤ L ≤ 500	±0.06	±0.06
500 ≤ L ≤ 600	±0.06	±0.06
600 ≤ L ≤ 700	±0.06	±0.06
700 ≤ L ≤ 750	±0.06	±0.06
750 ≤ L ≤ 800	±0.06	±0.06
800 ≤ L ≤ 900	±0.07	±0.07
900 ≤ L ≤ 1000	±0.07	±0.07

The minimum inside measurement size is 20.1 mm for **551-204**, **206**, and **207**.

Series 530	Maximum permissible errors	
Measured length	E_{MPE} (mm)	S_{MPE} (mm)
0 ≤ L ≤ 50	±0.05	±0.07
50 ≤ L ≤ 100	±0.05	±0.07
100 ≤ L ≤ 150	±0.05	±0.07
150 ≤ L ≤ 200	±0.05	±0.07
200 ≤ L ≤ 300	±0.08	±0.10
300 ≤ L ≤ 400	±0.09	±0.11
400 ≤ L ≤ 500	±0.10	±0.12
500 ≤ L ≤ 600	±0.10	±0.12
600 ≤ L ≤ 700	±0.12	±0.14
700 ≤ L ≤ 800	±0.13	±0.15
800 ≤ L ≤ 900	±0.14	±0.16
900 ≤ L ≤ 1000	±0.15	±0.17

Note: Excludes JIS products