

Height Gage

A standard measuring tool of industry

Linear Height SERIES 518 — High Performance 2D Measurement System

- Excellent accuracy of $(1.1+0.6L/600)\mu\text{m}$ with $0.1\mu\text{m}/0.4\mu\text{m}$ resolution/repeatability.
- High-accuracy Height Gage incorporating a wide range of measurement functions.
- To achieve best-in-class accuracy, a high-accuracy reflective-type linear encoder and high-accuracy guide are used.
- Measurement can be implemented by icon-based commands that also support easy one-key operation.
- Perpendicularity (frontal) of $5\mu\text{m}$ and straightness of $4\mu\text{m}$ are guaranteed.
- A best-in-class large LCD with excellent visibility is used.
- Pneumatic full/semi-floating system allows adjustment of air-cushion height.
- Basic statistical functions are provided and, additionally, RS-232C data output provides the option of evaluating measurement data externally with SPC software on a PC.
- For precision Black Granite Surface Plates, refer to page E-45.



518-341A-21

With power grip
518-342A-21



SPECIFICATIONS

Inch/Metric _____ Standard capacity battery Type

Order No.	Remarks
518-341A-21 / 518-342A-21*	120V w/ English manual
518-341A-22 / 518-342A-22*	120V w/ Spanish manual
518-341D-21 / 518-342D-21*	220V w/ English manual
518-341D-22 / 518-342D-22*	220V w/ Spanish manual
518-341D-23 / 518-342D-23*	220V w/ German manual
518-341D-24 / 518-342D-24*	220V w/ French manual
518-341D-25 / 518-342D-25*	220V w/ Italian manual
518-341E-21 / 518-342E-21*	240V w/ English manual
518-341DC / 518-342DC*	220V w/ Chinese manual
518-341K / 518-342K*	220V w/ Korean manual

* Power grip pre-installed models

Inch/Metric _____ Large capacity battery Type

Order No.	Remarks
518-343A-21 / 518-344A-21*	120V w/ English manual
518-343A-22 / 518-344A-22*	120V w/ Spanish manual
518-343D-21 / 518-344D-21*	220V w/ English manual
518-343D-22 / 518-344D-22*	220V w/ Spanish manual
518-343D-23 / 518-344D-23*	220V w/ German manual
518-343D-24 / 518-344D-24*	220V w/ French manual
518-343D-25 / 518-344D-25*	220V w/ Italian manual
518-343E-21 / 518-344E-21*	240V w/ English manual
518-343DC / 518-344DC*	220V w/ Chinese manual
518-343K / 518-344K*	220V w/ Korean manual

* Power grip pre-installed models



An inspection certificate is attached as standard. Refer to page IX for details.

Technical Data

- Measuring range: 0 - 972mm
 - Slider stroke: 600mm
 - Resolution: 0.0001" / 0.001" / 0.01" / 0.1mm or (switchable) .000001" / .00001" / .0001" / .001"
 - Accuracy at 20°C*1: $(1.1+0.6L/600)\mu\text{m}$
L = Measuring length (mm)
 - Repeatability (2σ) *1: Plane: $0.4\mu\text{m}$, Bore: $0.9\mu\text{m}$
 - Perpendicularity*2: $5\mu\text{m}$ (after compensation)
 - Straightness*2: $4\mu\text{m}$ (mechanical straightness)
 - Drive method: Manual / motor (5 - 40mm/s, 7 steps)
 - Measuring force: 1N
 - Balancing method: Counter balance
 - Floating method: Full / semi-floating with built-in air compressor
 - Display: Graphic LCD (320 x 240 dot, with back light)
 - Language for display: Japanese, English, German, French, Italian, Spanish, Dutch, Portuguese, Swedish, Czech, Hungarian, Slovene, Polish, Traditional Chinese, Korean, and Simplified Chinese
 - No. of stored programs: 50 (max.)
 - No. of stored data: 60,000 (max.)
 - Power supply: AC adapter / battery (Ni-MH)
 - Battery operation time: Approx. 5 hours
(air floating & slider elevation: 25% duty cycle)
- *1 Guaranteed when using the standard eccentric $\phi 5$ probe
*2 Guaranteed when using the Lever Head (MLH-321) or Mu-checker (M-411)

Screenshot examples

Measurement screen



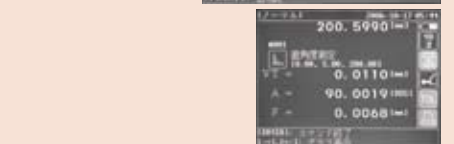
Statistical analysis result



Histogram



Perpendicularity measurement (graph)



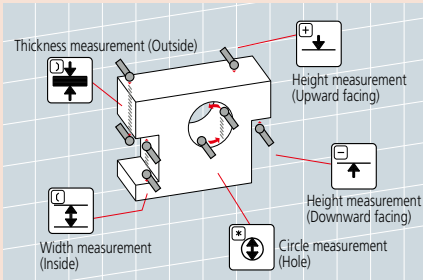
Perpendicularity measurement (value)*3

*3 To use this function, a Digimatic indicator or (Lever Head and Digital Mu-checker) is required.

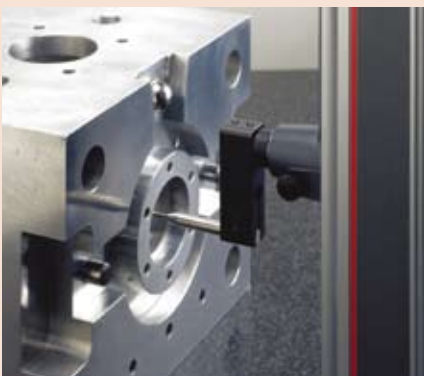
Standard accessories

- 12AAF634 5-stepped probe
- 12AAA715 Ball-diameter corrected block
- *When the correction is performed by using the taper type contact point, the ball-diameter corrected block No. 12AAA787 (for taper type contact point) is required.
- 12AAF674 Auxiliary weight (2pcs.)

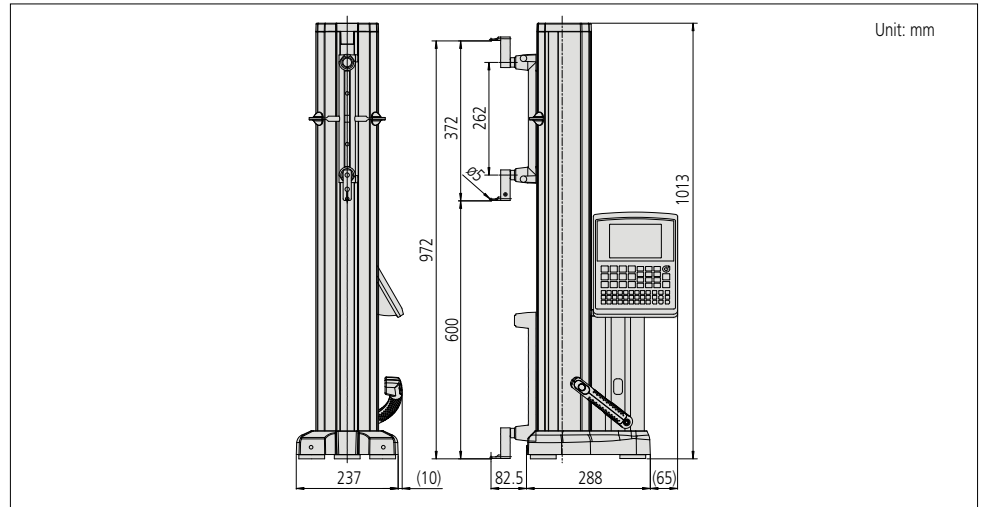
Example of measurements



The power grip makes it easy to approach the workpiece.



DIMENSIONS



Optional accessories

● For Linear Height and QM-Height ● For Linear Height only ● For QM-Height only



- (1) **12AAC072**: Depth probe
- (2) **12AAC073**: $\varnothing 20\text{mm}$ taper probe
- **12AAA787**: Block for calibrating probe diameter (applicable to taper probe)
- (3) **12AAA792**: Dial indicator ($\varnothing 8\text{mm}$ stem) holder
- (4) **12AAA793**: Probe extension holder (85mm/3.3")
- **12AAB136**: $\varnothing 10\text{mm}$ cylindrical probe
- (6) **932361**: Mu-checker lever head holder*2 (additional auxiliary weights are required (total 4 pcs).)
- **12AAF666**: $\varnothing 1\text{mm}$ ball probe (coaxial type)
- **12AAF667**: $\varnothing 2\text{mm}$ ruby ball probe (coaxial type)
- (8) **957261**: $\varnothing 2\text{mm}$ ball probe (coaxial type)
- (9) **957262**: $\varnothing 3\text{mm}$ ball probe (coaxial type)
- (10) **957263**: $\varnothing 4\text{mm}$ ball probe (coaxial type)
- (11) **12AAB552**: $\varnothing 10\text{mm}$ ball probe, L = 55mm (coaxial type)
- **12AAF668**: $\varnothing 10\text{mm}$ ball probe, L = 82mm (coaxial type)
- **12AAF669**: $\varnothing 10\text{mm}$ ball probe, L = 120mm (coaxial type)
- **12AAF670**: $\varnothing 5\text{mm}$ disk probe
- **12AAF671**: $\varnothing 10\text{mm}$ disk probe
- (12) **957264**: $\varnothing 14\text{mm}$ disk probe
- (13) **957265**: $\varnothing 20\text{mm}$ disk probe
- **12AAF672**: $\varnothing 1\text{mm}$ ball offset probe
- (14) **12AAA788**: $\varnothing 4\text{mm}$ ball offset probe
- $\varnothing 5\text{mm}$ ball offset probe **No.05HAA394**
- (15) **12AAA789**: $\varnothing 6\text{mm}$ ball offset probe
- (16) **226116**: Test indicator ($\varnothing 6\text{mm}$ stem) adapter
- Sample workpiece **No.12AAA879**
- (17) **226117**: M2 CMM stylus adapter*1
- (18) **226118**: M3 CMM stylus adapter*1
- CMM ball and disk hard probes are available. $\varnothing 2$ **No.932377A**, $\varnothing 3$ **No.932378A**, $\varnothing 5$ **No.932379A**, $\varnothing 6$ **No.932380A**, $\varnothing 10$ **No.532328**
- Disc probe $\varnothing 20$ **No.532345**, $\varnothing 30$ **No.930803**
- **12AAF712**: Battery pack
- **12AAF715**: Set with cover for large capacity battery*2
- **12AAG245**: Single large-capacity battery*3
- Scriber **No.05HZA173**
- Digimatic Mini-Processor DP-1VR
- No.264-504**
- SPC Cable **No.936937** (1m)
- No.965014** (2m)
- AC Adaptor **No.526688**

*1 Styli for CMMs can be provided

*2 Set with cover for large capacity battery

*3 Single piece of large capacity battery

Various peripheral devices

- **12AAA795**: Thermal printer (Attachment for fixing the connecting cable is provided as standard.)
- **12AAH035**: FDD unit (USB)
- **12AAA802**: Thermal printing paper (10 pcs.)
- **12AAA804**: Cable for page printer (2m)
- **12AAA807**: RS-232C cable (2m/80")
- **12AAG920**: RS-232C cable (3m/118")
- Digimatic cable **No.936937** (1m)
- No.965014** (2m)
- RS-232C cable (Cable specification) Cross (less than 3m) Connector D-sub 9 pin (female): Use commercial D-sub 9 pin (female)

Height Gage

A standard measuring tool of industry

QM-Height SERIES 518 — High Precision ABSOLUTE Digital Height Gage

- GO/±NG judgment by large size LCD with backlight. High-performance Height Gage with best-in-class accuracy and perpendicularity.
- Newly developed high accuracy and high resolution ABSOLUTE linear encoder for position detection. Once origin is set, origin setting is not required each time you turn the power ON (except in the case of a large environmental temperature change).



518-226

- GO/±NG judgment is performed by setting upper and lower tolerances. If a judgment result is out of tolerance, the display backlighting changes from green to red, so tolerance judgment can be made at a glance.



- Frequent-use measurement such as inside/outside diameter and pitch calculation can be implemented by icon-based commands that also support easy one-key operation.
- Possible to measure inside/outside diameters via a unique method (detect the circle apex and process by tracing measurement*).
- * Tracing measurement stroke is approx. 1mm upwards and downwards from the measurement start point.
- Slider elevation knob (for travel) / wheel (for measurement) allows fine and coarse adjustment. Axial grip (detachable standard accessory) can be used to move the Height Gage easily on the surface plate.
- With SPC and RS-232C output.
- For precision Black Granite Surface Plates, refer to page E-45.

ABSOLUTE

(Refer to page VIII for details.)



An inspection certificate is attached as standard. Refer to page IX for details.

Standard accessories

- 05HZA148** 5-stepped probe
- 12AAA715** Ball-diameter corrected block
- Auxiliary grip

SPECIFICATIONS

Metric	Order No.	518-220/518-224*	518-222/518-226*
Range		0 - 350mm	0 - 600mm
Resolution		0.001 / 0.005mm	
Accuracy	Accuracy* ¹	$\pm(2.8+5L/1000)\mu\text{m}$ L = Measuring length (mm)	
	at 20°C	$2\sigma \leq 1.8\mu\text{m}$	
	Repeatability* ¹		
Perpendicularity		8 μm (0 - 350mm)	13 μm (0 - 600mm)
Guiding method		Roller bearing	
Drive method		Manual	
Scale type		ABSOLUTE electrostatic linear encoder	
Measuring force		1.6 \pm 0.5N	
Display		LCD	
Power supply		AC adapter (optional) / battery (LR6 x 4)	
Battery operation time		Approx. 800hrs (when backlight is not used)	
		Approx. 260 hours* ³	
		Approx. 6 hours when using back light)	
		Approx. 6 hours (when backlight is used in the full-time power-on mode)	
Mass		22kg	27kg
Operating temperature range		10 - 30°C/20 - 80%RH (Must be free from condensation)	
Storage temperature range		-10 - 50°C/5 - 90%RH (Must be free from condensation)	

* Model with setting block for ball probe (12AAA715)

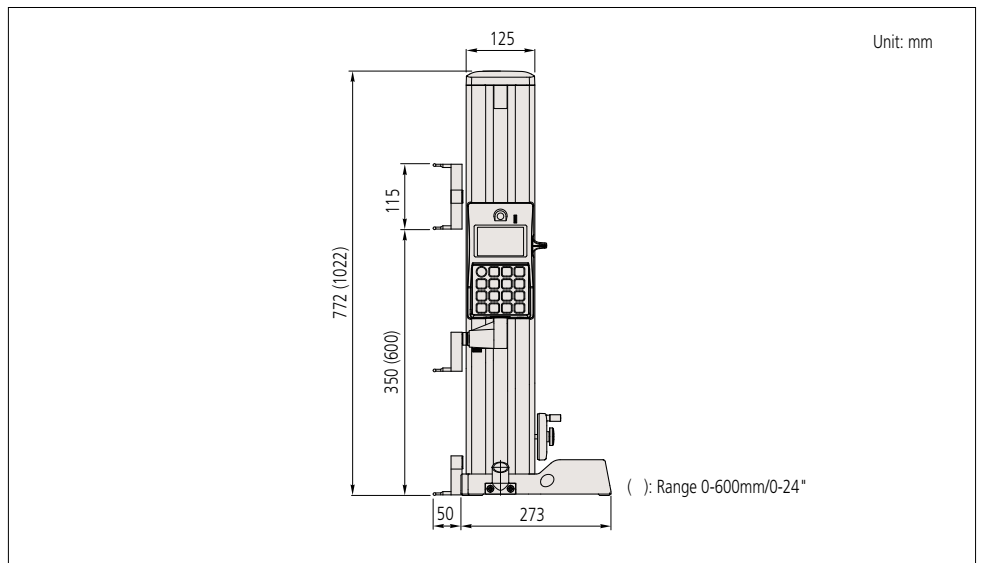
*1 Guaranteed when using the standard eccentric ϕ 5 probe

Inch/Metric	Order No.	518-221/225*	518-223/227*
Range		0 - 14"	0 - 24"
Resolution		0.001 / 0.005mm / .00005" / .0001" / .0002"	
Accuracy	Accuracy* ¹	$\pm(2.8+5L/1000)\mu\text{m}$ L = Measuring length length (mm)	
	at 20°C	$2\sigma \leq 1.8\mu\text{m}$	
	Repeatability* ¹		
Perpendicularity		8 μm (0 - 350mm)	13 μm (0 - 600mm)
Guiding method		Roller bearing	
Drive method		Manual	
Scale type		ABSOLUTE electrostatic linear encoder	
Measuring force		1.6 \pm 0.5N	
Display		LCD	
Power supply		AC adapter (optional) / battery (LR6 x 4)	
Battery operation time		Approx. 800hrs (when backlight is not used)	
		Approx. 260 hours* ³	
		Approx. 6 hours when using backlight)	
		Approx. 6 hours (when backlight is used in the full-time power-on mode)	
Mass		22kg	27kg
Operating temperature range		10 - 30°C/20 - 80%RH (Must be free from condensation)	
Storage temperature range		-10 - 50°C/5 - 90%RH (Must be free from condensation)	

* Model with setting block for ball probe (12AAA715)

*1 Guaranteed when using the standard eccentric ϕ 5 probe.

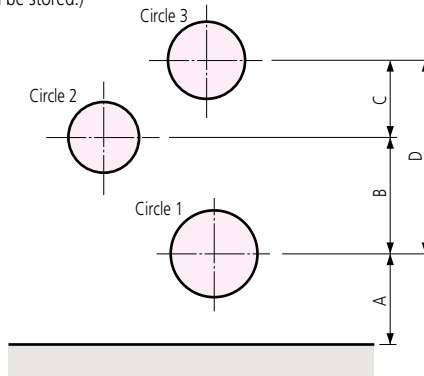
DIMENSIONS



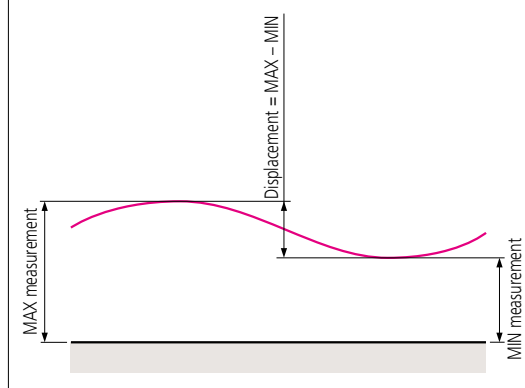
Measurement example

Circle pitch measurement

The distances A, B, C and D can be determined by measuring circles 1 to 3 once each, using the stored measurement data together with the calculation function. (Data for a maximum of nine circles can be stored.)



Maximum/minimum and displacement measurement



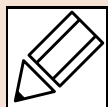
Height measurement



Inside diameter measurement



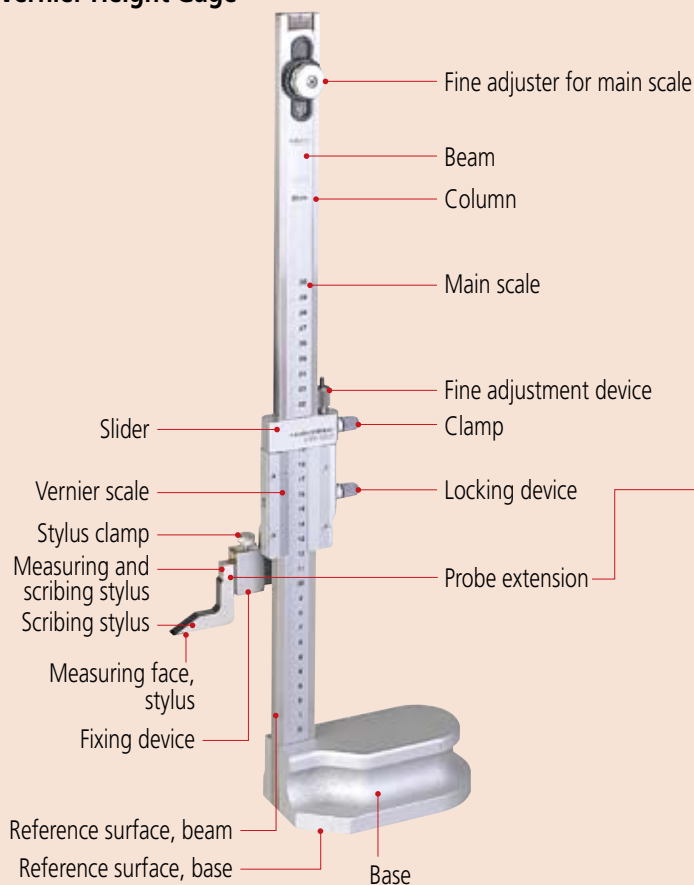
Quick Guide to Precision Measuring Instruments



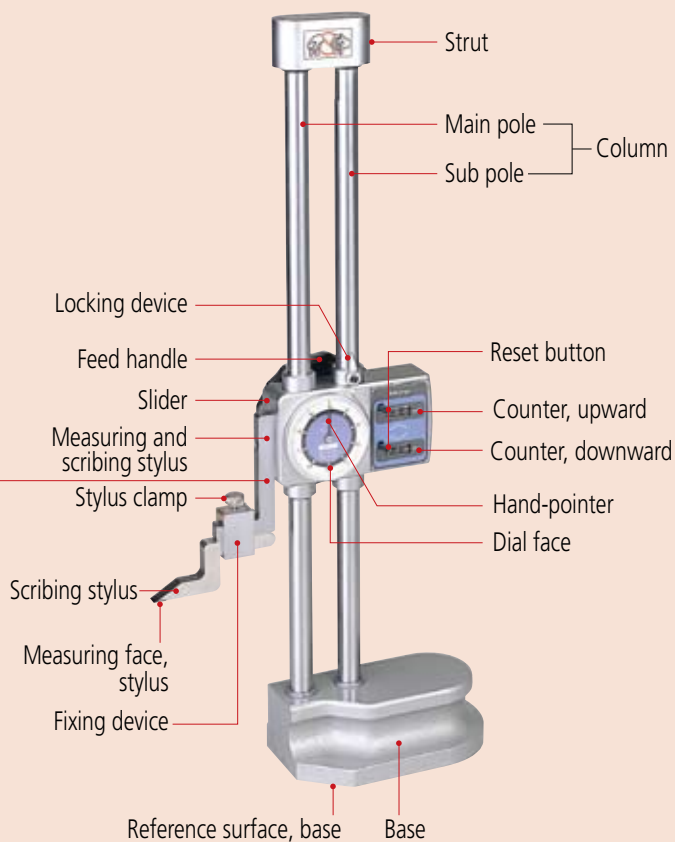
Height Gages

Nomenclature

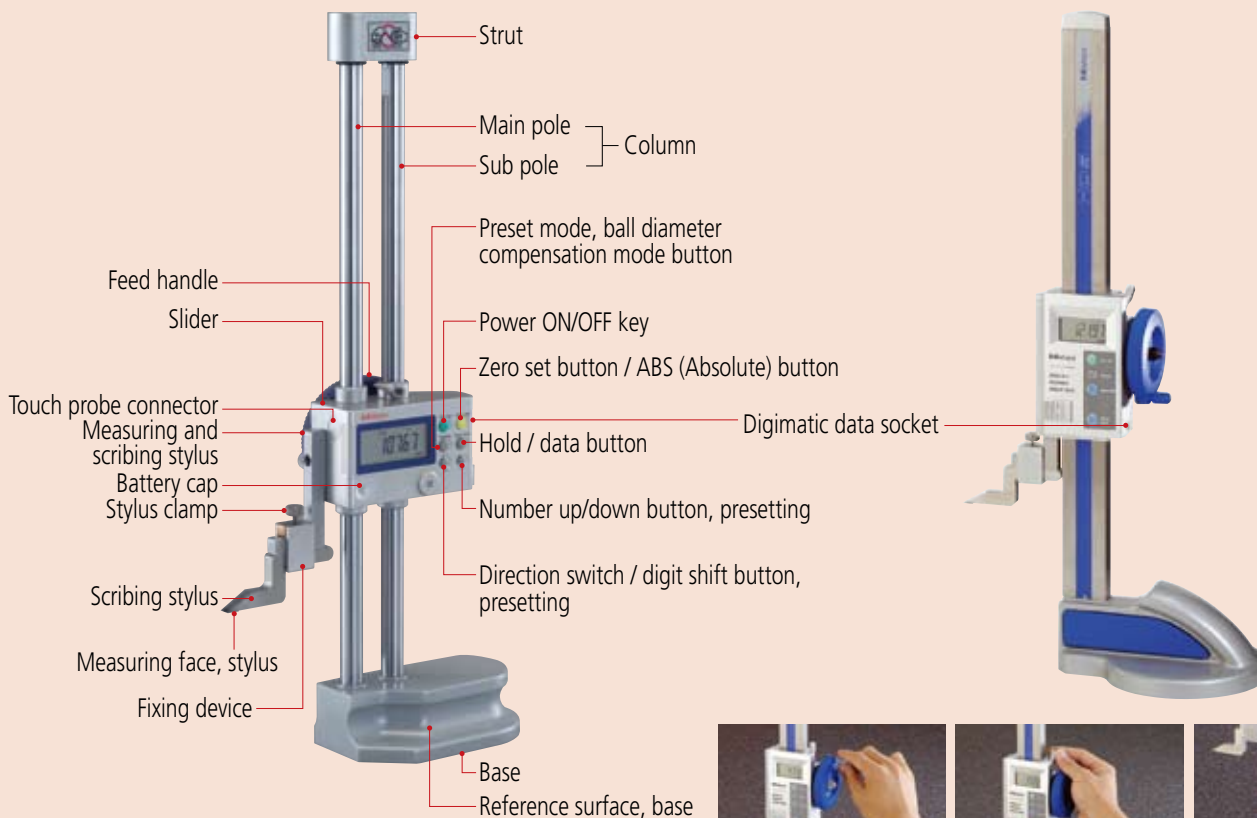
Vernier Height Gage



Mechanical Digit Height Gage



Digimatic Height Gages



Slider handwheel



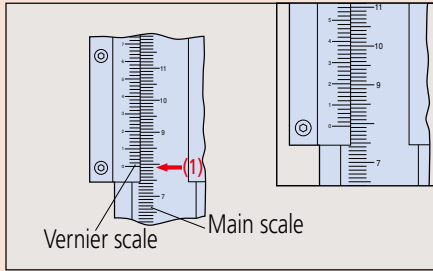
Slider clamping lever



Ergonomic base

How to read

Vernier Height gage



Graduation 0.02mm

(1) Main scale 79 mm

(2) Vernier 0.36 mm

Reading 79.36 mm

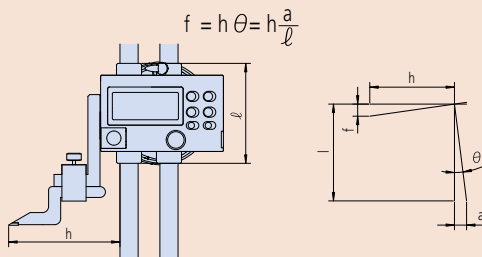
General notes on use of Height Gages

1. Potential causes of error

Like the caliper, the error factors involved include parallax effects, error caused by excessive measuring force due to the fact that a height gage does not conform to Abbe's Principle, and differential thermal expansion due to a temperature difference between the height gage and workpiece. There are also other error factors caused by the structure of the height gage. In particular, the error factors related to a warped reference edge and scriber installation described below should be studied before use.

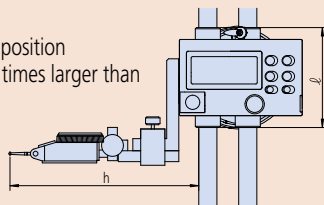
2. Reference edge (column) warping and scriber installation

Like the caliper, and as shown in the following figure, measurement errors result when using the height gage if the reference column, which guides the slider, becomes warped. This error can be represented by the same calculation formula for errors caused by nonconformance to Abbe's Principle.



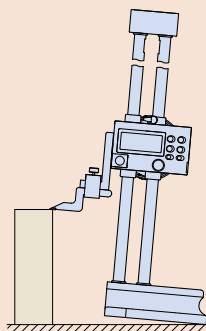
Installing the scriber (or a lever-type dial indicator) requires careful consideration because it affects the size of any error due to a warped reference column by increasing dimension h in the above formula. In other words, if an optional long scriber or lever-type dial indicator is used, the measurement error becomes larger.

Example: Effect of measuring point position
When h is 150 mm, the error is 1.5 times larger than when h is 100 mm.



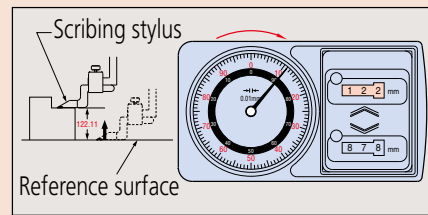
3. Lifting of the base from the reference surface

When setting the scriber height from a gauge block stack, or from a workpiece feature, the base may lift from the surface plate if excessive downwards force is used on the slider, and this results in measurement error. For accurate setting, move the slider slowly downwards while moving the scriber tip to and fro over the gauge block surface (or feature). The correct setting is when the scriber is just felt to lightly touch as it moves over the edge of the surface. It is also necessary to make sure that the surface plate and height gage base reference surface are free of dust or burrs before use.



Mechanical Digit Height gage

Measuring upwards from a reference surface

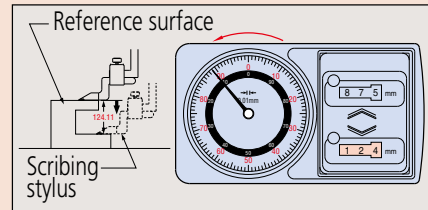


Counter 122 mm

Dial 0.11 mm

Reading 122.11 mm

Measuring downwards from a reference surface



Counter 124 mm

Dial 0.11 mm

Reading 124.11 mm

4. Error due to inclination of the main scale (column)

According to JIS standards, the perpendicularity of the column reference edge to the base reference surface should be better than:

$$\left(0.01 + \frac{L}{1000}\right) \text{ mm} \quad L \text{ indicates the measuring length (unit: mm)}$$

This is not a very onerous specification. For example, the perpendicularity limit allowable is 0.61 mm when L is 600 mm. This is because this error factor has a small influence and does not change the inclination of the slider, unlike a warped column.

5. Relationship between accuracy and temperature

Height gages are made of several materials. Note that some combinations of workpiece material, room temperature, and workpiece temperature may affect measuring accuracy if this effect is not allowed for by performing a correction calculation.

6. The tip of a height gage scriber is very sharp and must be handled carefully if personal injury is to be avoided.

7. Do not damage a digital height gage scale by engraving an identification number or other information on it with an electric marker pen.

8. Carefully handle a height gage so as not to drop it or bump it against anything.

Notes on using the height gage

- Keep the column, which guides the slider, clean. If dust or dirt accumulates on it, sliding becomes difficult, leading to errors in setting and measuring.
- When scribing, securely lock the slider in position using the clamping arrangements provided. It is advisable to confirm the setting after clamping because the act of clamping on some height gages can alter the setting slightly. If this is so, allowance must be made when setting to allow for this effect.
- Parallelism between the scriber measuring face and the base reference surface should be 0.01 mm or better.
Remove any dust or burrs on the mounting surface when installing the scriber or lever-type dial indicator before measurement. Keep the scriber and other parts securely fixed in place during measurement.
- If the main scale of the height gage can be moved, move it as required to set the zero point, and securely tighten the fixing nuts.
- Errors due to parallax error are not negligible. When reading a value, always look straight at the graduations.
- Handling after use: Completely wipe away any water and oil. Lightly apply a thin coating of anti-corrosion oil and let dry before storage.
- Notes on storage:
Avoid direct sunlight, high temperatures, low temperatures, and high humidity during storage.
If a digital height gage will not be used for more than three months, remove the battery before storage.
If a protective cover is provided, use the cover during storage to prevent dust from adhering to the column.

Depth Gage

A standard measuring tool of industry

Depth Micrometer SERIES 329, 129 — Interchangeable Rod Type

- This type uses interchangeable rods to enable wide-range measurement.
- **Order Nos. 329-250-20, 329-251-10, 329-350-10 and 329-351-10** allow integration into statistical process control and measurement systems.
- Measuring rod diameter: $\varnothing 4\text{mm}$
- Measuring rod lock.
- Ratchet stop provides constant measuring force.



SPECIFICATIONS

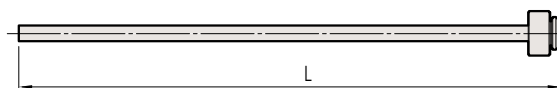
Metric				
Order No.	Range	Resolution	Base	No. of rods
Digimatic (LCD)				
329-250-10	0 - 150mm	0.001mm	101.6 x 16mm	6
329-251-10	0 - 300mm			12

Inch/Metric				
Order No.	Range	Resolution	Base	No. of rods
Digimatic (LCD)				
329-350-10	0 - 6"	.00005"/0.001mm	4" x .63"	6
329-351-10	0 - 12"			12

Metric				
Order No.	Range	Graduation	Base	No. of rods
Analog				
129-154	0 - 25mm	0.01mm	63.5 x 16mm	1
129-155			101.6 x 16mm	
129-109	0 - 50mm	0.01mm	63.5 x 16mm	2
129-113			101.6 x 16mm	
129-110	0 - 75mm	0.01mm	63.5 x 16mm	3
129-114			101.6 x 16mm	
129-111	0 - 100mm	0.01mm	63.5 x 16mm	4
129-115			101.6 x 16mm	
129-112	0 - 150mm	0.01mm	63.5 x 16mm	6
129-116			101.6 x 16mm	
129-152	0 - 300mm	0.01mm	63.5 x 16mm	12
129-153			101.6 x 16mm	

Inch				
Order No.	Range	Graduation	Base	No. of rods
Analog				
129-129	0 - 2"	.001"	4" x .63"	2
129-126	0 - 3"		2.5" x .63"	3
129-130		0 - 4"	.001"	4" x .63"
129-127	2.5" x .63"			
129-131	0 - 6"	.001"	4" x .63"	6
129-128			2.5" x .63"	
129-132	0 - 12"	.001"	4" x .63"	12
129-149			2.5" x .63"	
129-150			4" x .63"	

Interchangeable rod (Optional Accessories) (Check and adjust the origin point before measurement)



Unit: mm

Range	0 - 25mm	25 - 50mm	50 - 75mm	75 - 100mm	100 - 125mm	125 - 150mm	150 - 175mm	175 - 200mm	200 - 225mm	225 - 250mm	250 - 275mm	275 - 300mm	
Analog models	Order No.	983501	983503	983505	983507	983509	983511	983525	983527	983529	983531	983533	983535
	L	104mm	129mm	154mm	179mm	204mm	229mm	254mm	279mm	304mm	329mm	354mm	379mm
Digimatic models	Order No.	983505	983507	983509	983511	983525	983527	983529	983531	983533	983535	981781	981782
	L	154mm	179mm	204mm	229mm	254mm	279mm	304mm	329mm	354mm	379mm	404mm	429mm

Range	0 - 1"	1 - 2"	2 - 3"	3 - 4"	4 - 5"	5 - 6"	6 - 7"	7 - 8"	8 - 9"	9 - 10"	10 - 11"	11 - 12"	
Analog models	Order No.	983502	983504	983506	983508	983510	983512	983526	983528	983530	983532	983534	983536
	L	104.3mm	129.7mm	155.1mm	180.5mm	205.9mm	231.3mm	256.7mm	282.1mm	307.5mm	332.9mm	358.3mm	383.7mm
Digimatic models	Order No.	983506	983508	983510	983512	983526	983528	983530	983532	983534	983536	981783	981784
	L	155.1mm	180.5mm	205.9mm	231.3mm	256.7mm	282.1mm	307.5mm	332.9mm	358.3mm	383.7mm	409.1mm	434.5mm

Technical Data

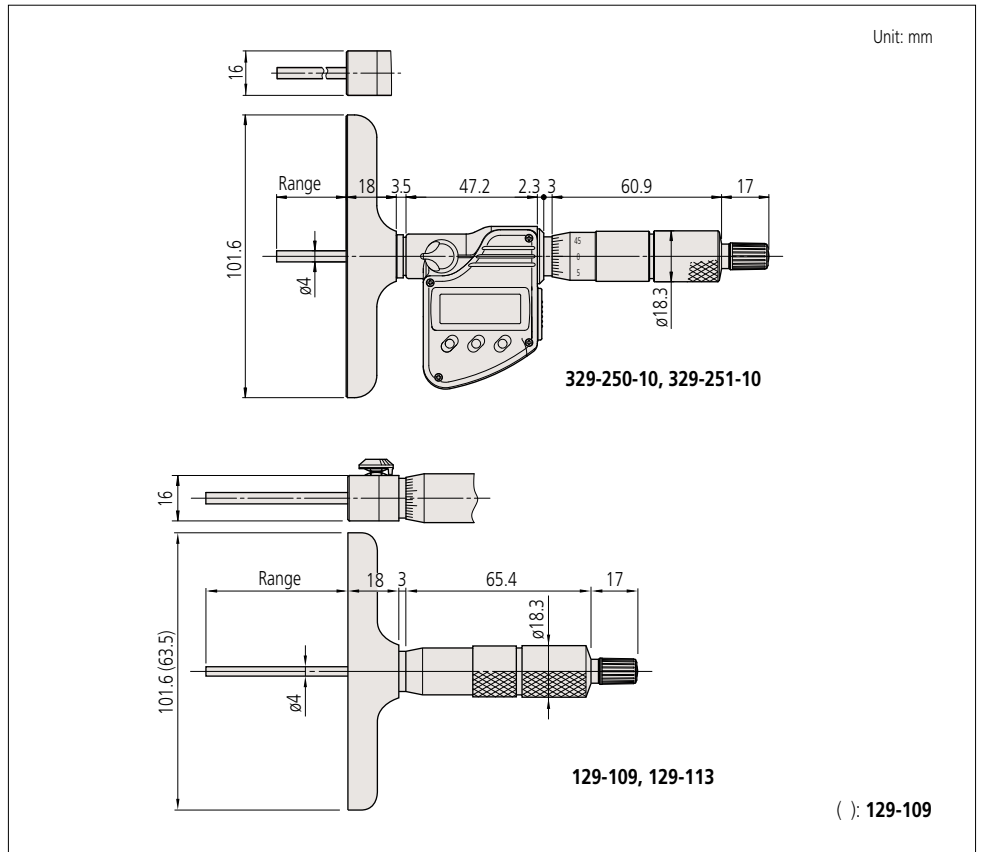
Accuracy:
 $\pm 3\mu\text{m}/\pm 0.00015"$ for micrometer head
 (Excluding quantizing error)
 $\pm (2+R/75)\mu\text{m}$ for interchangeable rod,
 $R = \text{Max. range (mm)}$
 Fraction rounded up
 $\pm [.0001+.00005 (R/3)]"$
 $R = \text{Max. measuring length (inch)}$
 Fraction rounded up
 Flatness of measuring rod face: $0.3\mu\text{m}$
 Parallelism between reference face and measuring rod face:
 $(4+R/50)\mu\text{m}$, $R = \text{Max. measuring length (mm)}$
 Fraction rounded up
 $[.00016+.00004 (R/2)]"$, $R = \text{Max. measuring length (inch)}$
 Fraction rounded up
 Battery*: SR44 (1 pc.), **938882**
 Battery life*: Approx. 1.2 years under normal use
 * Digital models



Optional accessories for 329-250-10, 329-251-10, and 329-350-10 and 329-351-10.

For details, refer to page A-21.
 Connection cables
05CZA662: SPC cable with data button (1m)
05CZA663: SPC cable with data button (2m)
USB Input Tool Direct
06ADV380B: SPC cable for **USB-ITN-B** (2m)
 Connection cables for U-WAVE-T
02AZD790B: SPC cable for **U-WAVE** with data button (160mm)
02AZE140B: SPC cable for footswitch

DIMENSIONS



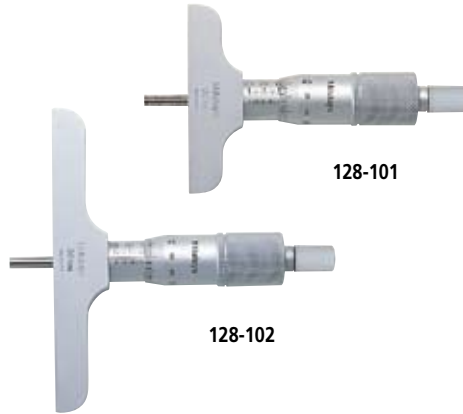
D

Depth Gage

A standard measuring tool of industry

Depth Micrometer SERIES 128

- Measuring rod diameter: $\varnothing 4\text{mm}$
- Measuring rod lock is attached.
- *Measuring rod is attached on the rear side of the micrometer.
- Carbide-tipped measuring rod model is available.
- Ratchet stop provides constant measuring force.



SPECIFICATIONS

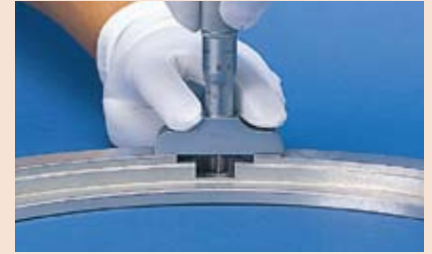
Metric			
Order No.	Range	Graduation	Base
128-101	0 - 25mm	0.01mm	63.5 x 16mm
128-103*1			
128-102			101.6 x 16mm
128-104*1			

*1 with carbide-tipped measuring rod

Inch			
Order No.	Range	Graduation	Base
128-105	0 - 1"	.001"	2.5" x .63"
128-106			4" x .63"

Technical Data

Accuracy: $\pm 3\mu\text{m}$ ($\pm .00015"$)
 Flatness of reference face:
 1.3 μm (.00005") for 63.5mm (2.5") length base,
 2 μm (.00008") for 101.6mm (4") length base
 Flatness of measuring spindle face: 0.3 μm



Depth Micro Checker SERIES 515

- The Depth Micro Checker is designed to check and help set the range-end points of a depth micrometer.

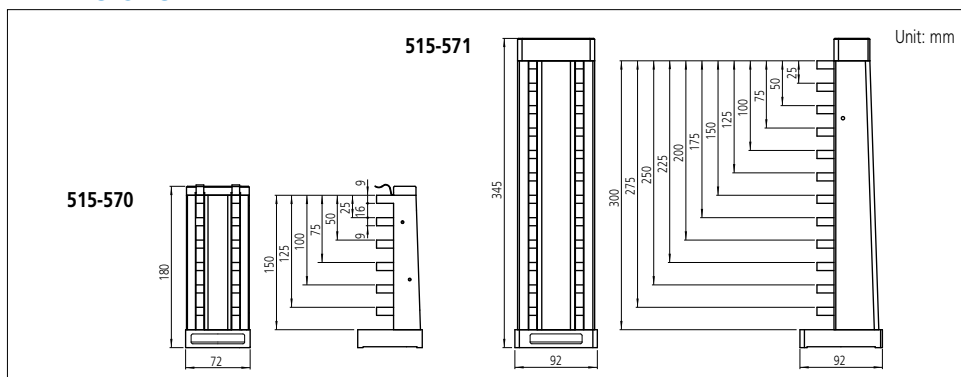


SPECIFICATIONS

Metric			
Order No.	Range	Block pitch accuracy	Anvil block accuracy
515-570	0 - 150mm	$\pm(1+L/150)\mu\text{m}$, L = Length to check (mm)	$\pm 0.5\mu\text{m}$
515-571	0 - 300mm		

Inch			
Order No.	Range	Block pitch accuracy	Anvil block accuracy
515-575	0 - 6"	$\pm(40+L/0.15)\mu\text{inch}$, L = Length to check (inch)	40 μinch

DIMENSIONS



An inspection certificate is attached as standard. Refer to page IX for details.



A 25mm anvil block provides the reference surface for the depth micrometer rod



These marks indicate that a product has successfully passed IP67-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



Dust- and watertight IP67

ABSOLUTE

(Refer to page VIII for details.)

Optional accessories for IP67 coolant proof models

For details, refer to page A-21.

Connecting cables

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

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

USB Input Tool Direct

06ADCV380A: SPC cable for USB-ITN-B (2m)

Connecting cables for **U-WAVE-T**

02AZD790A: SPC cable for U-WAVE with data button (160mm)

02AZE140A: SPC cable for footswitch

Optional accessories for other than IP67 coolant proof models

For details, refer to page A-21.

959143: Data hold unit

Connecting cables for **IT/DP/MUX**

959149: SPC cable with data button (1m)

959150: SPC cable with data button (2m)

USB Input Tool Direct

06ADV380C: SPC cable for USB-ITN-C (2m)

Connecting cables for **U-WAVE-T**

02AZD790C: SPC cable for U-WAVE with data button (160mm)

02AZE140C: SPC cable for footswitch

ABSOLUTE Digimatic Depth Gauge SERIES 571

- Coolant proof models achieve IP67 protection level.
- Enables stable depth measurement with a resolution of 0.01mm.
- ABSOLUTE Digital Caliper (Refer to page D-7 for ABSOLUTE function.)
- Sliding operation of models with the measuring ranges 150mm (6"), 200mm (8") and 300mm (12") is smooth and comfortable.
- Battery: SR44 (Part No. **938882**, 1 pc)
- Battery life: Approx. 20,000 hours [3 years (1 year: 300mm/12" models)] under normal use.
- Optional longer extension bases are available. (Except for models with measuring ranges of 600, 750, 1000mm)



SPECIFICATIONS

Metric					
Order No.	Range	Resolution	Accuracy*	Repeatability	Base (W x T)
571-201-20	0 - 150mm	0.01mm	±0.02mm	0.01mm	100 x 6mm
571-202-20	0 - 200mm		±0.03mm		
571-203-20	0 - 300mm		±0.02mm		
571-251-10**	0 - 150mm		±0.03mm		
571-252-10**	0 - 200mm		±0.02mm		
571-253-10**	0 - 300mm	±0.03mm	±0.05mm	100 x 6.3mm	250 x 10mm
571-204-10	0 - 450mm	0.01mm	±0.06mm		
571-205-10	0 - 600mm		±0.07mm		
571-206-10	0 - 750mm				
571-207-10	0 - 1000mm				

* Excluding quantizing error
** IP67 Coolant Proof model

Inch/Metric					
Order No.	Range	Accuracy*	Repeatability	Base (W x T)	
571-211-20	0 - 6"	±.001"/±0.02mm	0.005"/0.01mm	3.93" x .23"	
571-212-20	0 - 8"	±.001"/±0.02mm			
571-213-10	0 - 12"	±.0015"/±0.03mm			
571-261-10**	0 - 6"	±.001"/±0.02mm			
571-262-10**	0 - 8"	±.001"/±0.02mm			
571-263-10**	0 - 12"	±.0015"/±0.03mm	9.8" x .39"		
571-214-10	0 - 18"	±.002"/±0.05mm			
571-215-10	0 - 24"	±.002"/±0.05mm			
571-216-10	0 - 30"	±.0025"/±0.06mm			
571-217-10	0 - 40"	±.0025"/±0.07mm			

* Excluding quantizing error
** IP67 Coolant Proof model

DIMENSIONS

571-201-20, 571-202-20, 571-203-20, 571-251-10, 571-252-10
*(): No. 571-251-10, 571-252-10

Unit: mm

Range	L	Base thickness
0 - 150mm	237	6
0 - 200mm	287	6
0 - 300mm	403 (404)	6 (6.3)
0 - 450mm	635	10
0 - 600mm	785	10
0 - 750mm	935	10
0 - 1000mm	1200	10

(): Coolant Proof models

571-253-10

571-204-10, 571-205-10, 571-206-10, 571-207-10

Depth Gage

A standard measuring tool of industry

Vernier Depth Gage SERIES 527

- Standard gage for depth measurement.
- Optional longer extension bases are available. (Except for models with measuring ranges of 600 and 1000mm)



527-201

SPECIFICATIONS

Metric

Order No.	Range	Vernier reading	Accuracy	Base (W x T)	Remarks
527-201	0 - 150mm	0.05mm	±0.05mm	100 x 6.5mm	—
527-202	0 - 200mm		—		
527-203	0 - 300mm		—		
527-204	0 - 600mm		±0.10mm	250 x 10mm	—
527-205	0 - 1000mm		±0.15mm		—

Inch

Order No.	Range	Vernier reading	Accuracy	Base (W x T)	Remarks
527-111	0 - 6"	.001"	±.001"	3.93" x .25"	with fine adjustment
527-112	0 - 8"		—		
527-113	0 - 12"		±.0015"	9.8" x .39"	
527-114	0 - 24"		±.002"		
527-115	0 - 40"		±.003"		

DIMENSIONS

Unit: mm

Range	L
0 - 150mm	260
0 - 200mm	310
0 - 300mm	410
0 - 600mm	800
0 - 1000mm	1200

Models with the measuring ranges of over 600mm have different configurations.



These marks indicate that a product has successfully passed IP67-level testing, which is carried out by the independent German certification organization TÜV Rheinland.



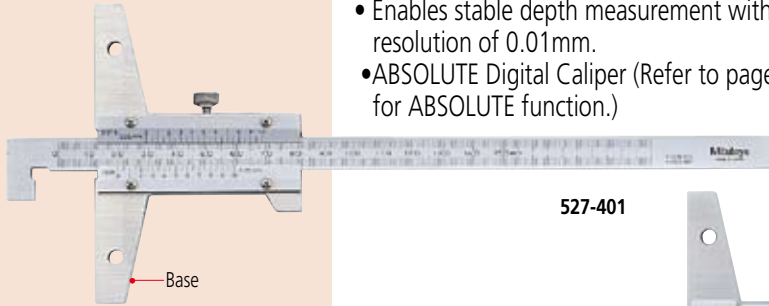
Dust- and watertight IP67

ABSOLUTE

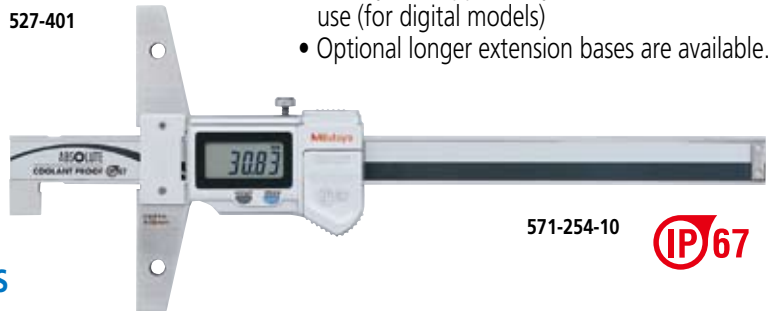
(Refer to page VIII for details.)

Depth Gage SERIES 527, 571 — Hook End Type

- The end of the main beam is hook-shaped to allow depth and thickness measurements of a projected portion or lip in a hole, in addition to standard depth measurement.
- Coolant proof models achieve IP67 protection level.
- Enables stable depth measurement with a resolution of 0.01mm.
- ABSOLUTE Digital Caliper (Refer to page D-8 for ABSOLUTE function.)
- Digital models display the compensation value by pressing the OFF switch to allow direct reading.
- Slider operation of the digital models is smooth and comfortable.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. Refer to page A-3.
- Battery: SR44 (Part No. **938882**, 1 pc.)
- Battery life: Approx. 3 years under normal use (for digital models)
- Optional longer extension bases are available.



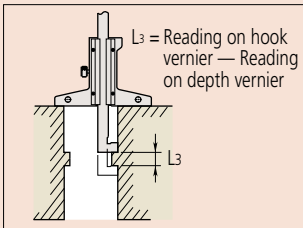
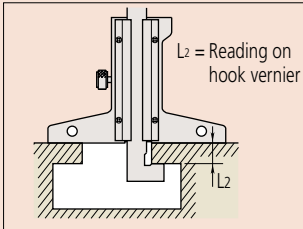
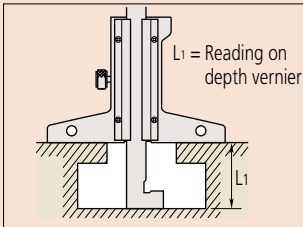
527-401



571-254-10



Applications



SPECIFICATIONS

Metric				
Order No.	Range: L1 (L2 and L3)	Resolution	Accuracy*	Base (WxT)
Digimatic (LCD)				
571-254-10**	10 - 160mm (0 - 150mm)	0.01mm	±0.03mm	100x6mm
571-255-10**	10 - 210mm (0 - 200mm)			
527-401	10 - 150mm (0 - 150mm)	0.05mm	±0.05mm	100x6.5mm
527-402	10 - 200mm (0 - 200mm)			
527-403	10 - 300mm (0 - 300mm)			

* Excluding quantizing error

** IP67 Coolant Proof model

Inch/Metric				
Order No.	Range: L1 (L2 and L3)	Resolution	Accuracy*	Base (WxT)
Digimatic (LCD)				
571-264-10	.4" - 6.4" (0 - 6")	.0005" / 0.01mm	±0.0015" / ±0.03mm	100x6mm
571-265-10	.4" - 8.4" (0 - 8")			

* Excluding quantizing error

Metric				
Order No.	Range: L1 (L2 and L3)	Vernier reading	Accuracy	Base (WxT)
Analog				
527-411	10 - 150mm (0 - 150mm)	0.02mm	±0.03mm	100x6.5mm
527-412	10 - 200mm (0 - 200mm)			
527-413	10 - 300mm (0 - 300mm)			

Optional accessories for digital models

For details, refer to page A-21.

Connection cables for coolant proof models

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

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

USB Input Tool Direct

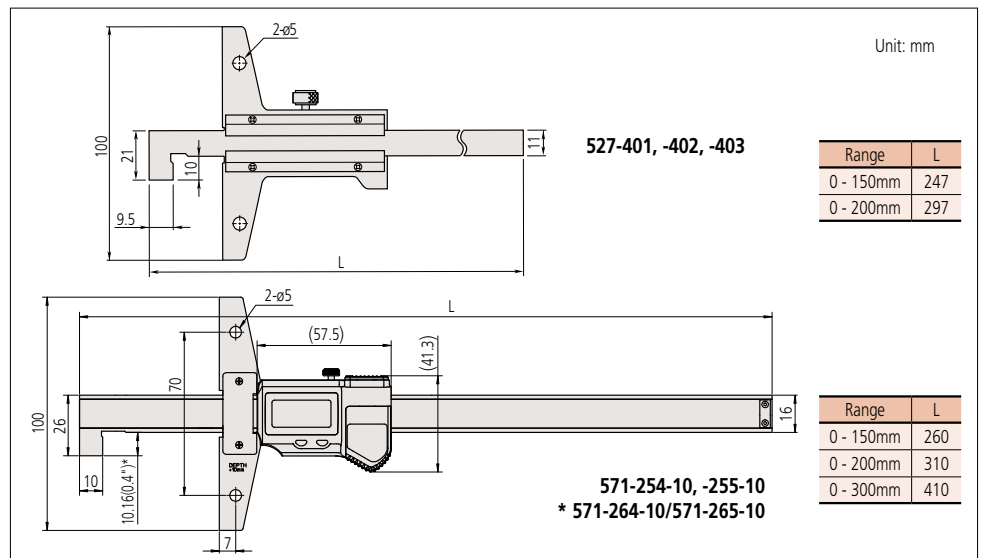
06ADCV380A: SPC cable for USB-ITN-B (2m)

Connecting cables for **U-WAVE-T**

02AZD790A: SPC cable for U-WAVE with data button (160mm)

02AZE140A: SPC cable for footswitch

DIMENSIONS

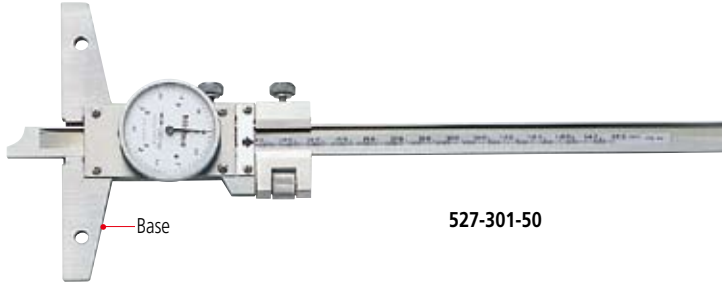


Depth Gage

A standard measuring tool of industry

Dial Depth Gage SERIES 527 — with Fine Adjustment

- Easy-to-read dial caliper with rack and pinion magnification mechanism.
- Optional longer extension bases are available.



527-301-50

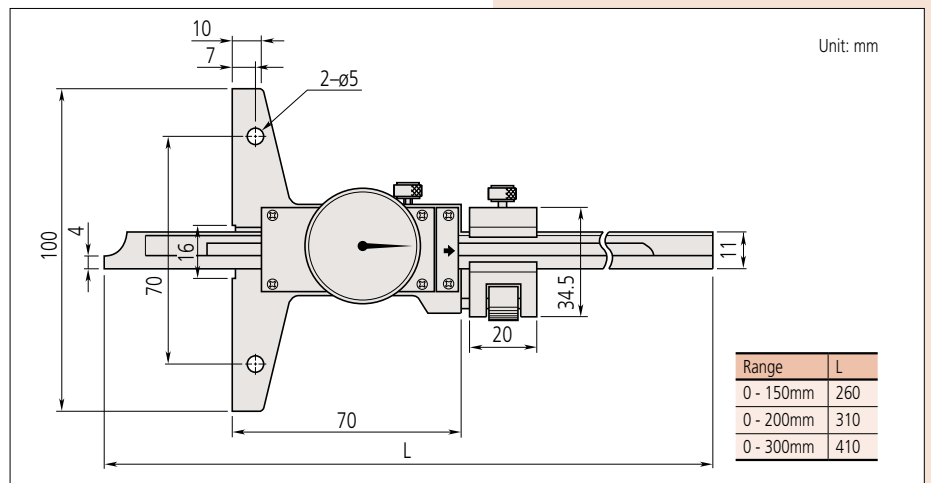


SPECIFICATIONS

Metric				
Order No.	Range	Dial reading	Accuracy	Base (WxT)
527-301-50	0 - 150mm	0.05mm	±0.05mm	100x6.5mm
527-302-50	0 - 200mm		±0.08mm	
527-303-50	0 - 300mm			

Inch				
Order No.	Range	Dial reading	Accuracy	Base (WxT)
527-311-50	0 - 6"	.001"	±.001"	100x6.5mm
527-312-50	0 - 8"		±.0015"	
527-313-50	0 - 12"			

DIMENSIONS



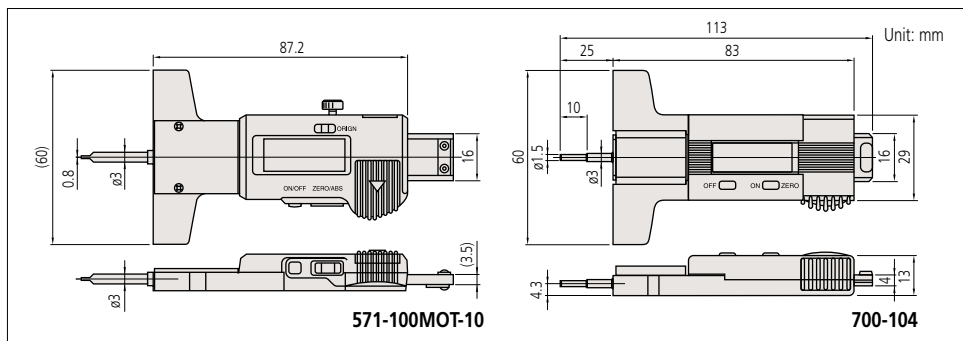
Tire Tread Depth Gage SERIES 700 — with Fine Adjustment

- Specially designed to measure tire tread depth. Plastic construction for lightweight handling.
- Depth can be measured easily just by pressing the spring-loaded plunger into the tread.
- Resolution of 0.1mm makes misreading almost impossible.
- With zero-setting function.



700-104

DIMENSIONS



SPECIFICATIONS

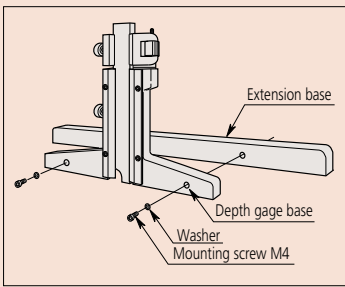
Metric						
Order No.	Range	Resolution	Accuracy*	Battery	Battery life	Maximum response speed
571-100MTO-10	0 - 25mm	0.1mm	±0.02mm	SR44 (1 pc.), 938882	Approx. 2 years under normal use	1600 mm/sec
700-104			±0.2mm			

Inch/Metric						
Order No.	Range	Resolution	Accuracy*	Battery	Battery life	Maximum response speed
571-200MTO-10	0 - 1"	.001"/0.1mm	±.0005"	SR44 (1 pc.), 938882	Approx. 2 years under normal use	1600 mm/sec
700-105			±.008"			

* Excluding quantizing error

* Excluding quantizing error

Example of attaching the extension base



Extension Bases
Optional accessory for Depth Gage

- Attaches to the base (reference face) plate of a depth gage to extend its span.
- Refer to the illustrations at left for attachment details.
- These extension bases cannot be attached to 0 - 600mm, 0 - 1000mm, 0-24" and 0-40" range models.



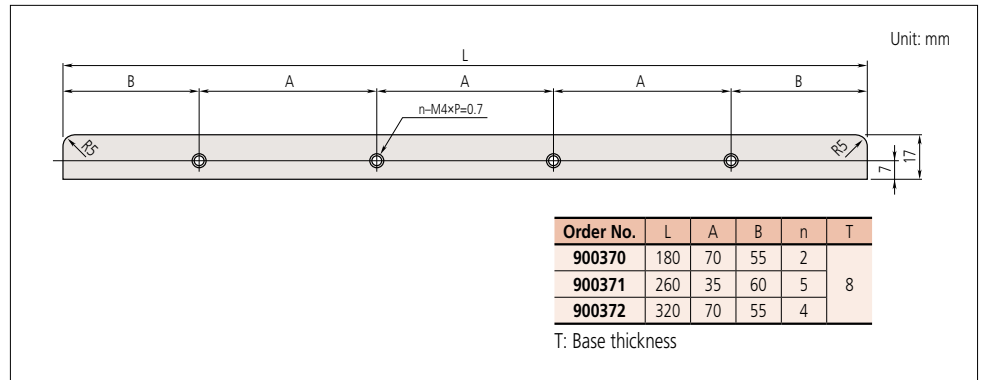
900372

SPECIFICATIONS

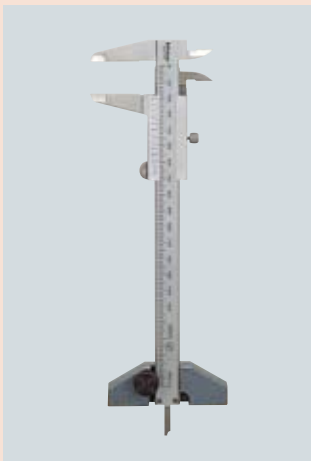
Metric		
Order No.	Size L	n
900370	180mm	2
900371	260mm	5
900372	320mm	4

Inch		
Order No.	Size L	n
900367	7"	2
900368	10"	5
900369	12"	4

DIMENSIONS

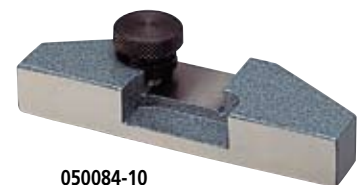


Example of attaching the extension base



Depth Gage Attachment
Optional Accessory for Calipers

- Attaching this depth gage attachment to the depth measurement face of the caliper makes depth measurement accurate and secure.

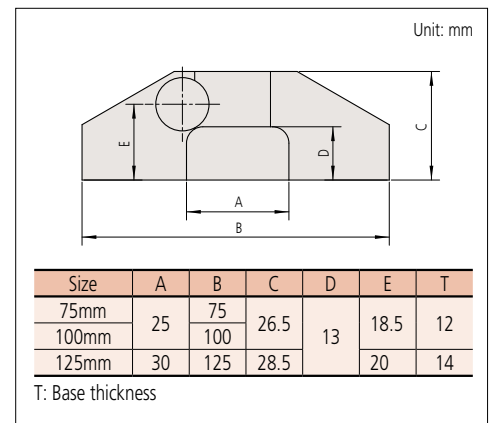


050084-10

SPECIFICATIONS

Metric		
Order No.	Size	Applicable measuring range of caliper
050083-10	75mm	100mm, 150mm, 200mm, 4", 6" and 8"
050084-10	100mm	100mm, 150mm, 200mm, 4", 6" and 8"
050085-10	125mm	300mm and 12"

DIMENSIONS

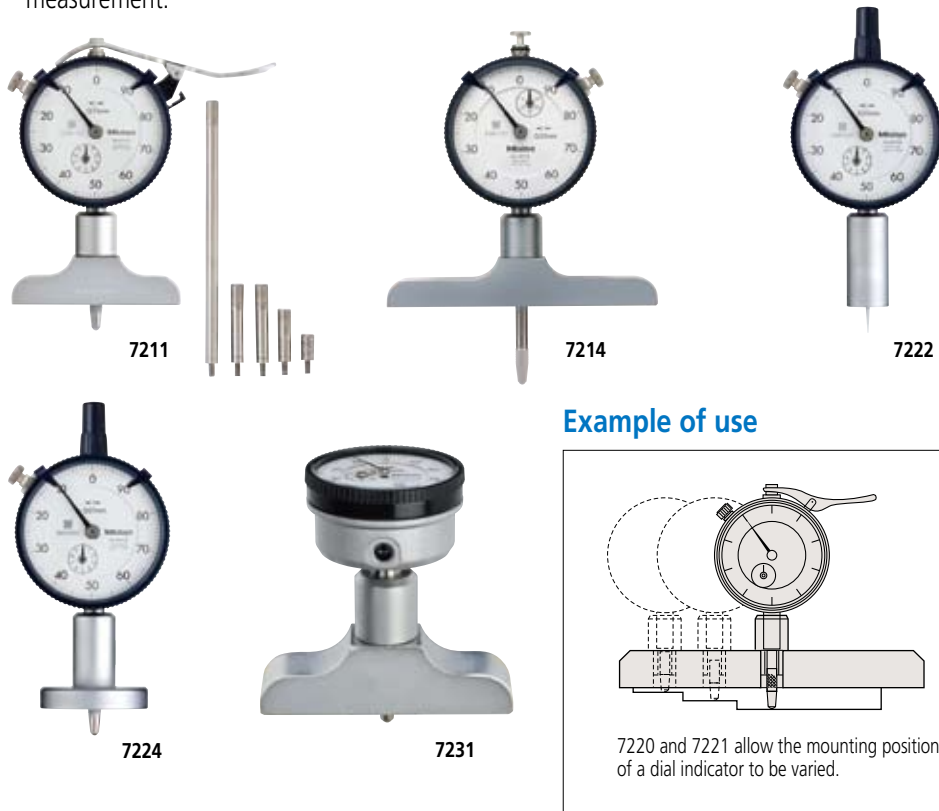


Depth Gage

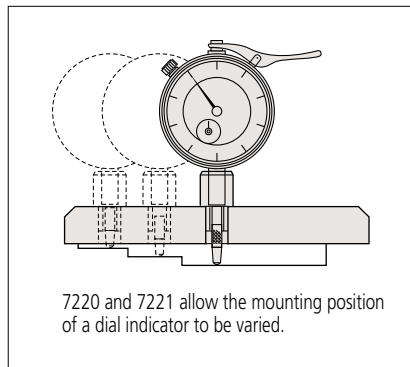
A standard measuring tool of industry

Dial Depth Gage SERIES 7

- Optimal for hole, narrow groove and step measurement.



Example of use



Caution should be used when exchanging the contact point of a depth gage (Dial/Digimatic Indicator)

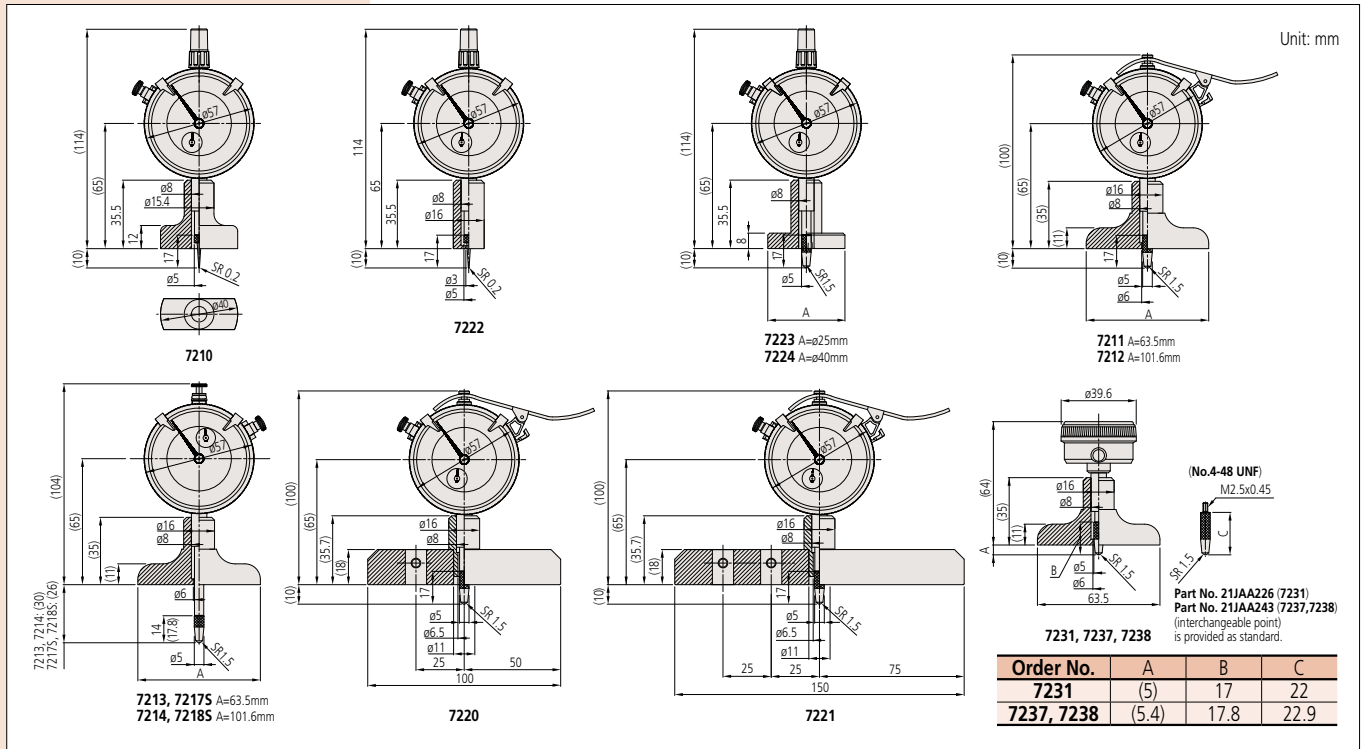
The measurement range may not be maintained when mounting a differently sized contact point than the standard accessory. Zero-setting will not be possible if the contact-point diameter is too large for the plunger hole in the bottom face of the base. Parallelism adjustment with the bottom face of the base is required when mounting a flat contact point such as the flat/needle or carbide-tipped contact point.

Metric												
Order No.	Range	Graduation	Accuracy	Stroke	Measuring force	Base			Mounting position of a dial indicator	Contact point	Extension rod	Indicator (dial indicator)
						W	T	Flatness				
7210*	0 - 10mm	0.01mm	±15µm	10mm	1.4N	40mm	16mm	5µm	1	Provided with a needle point (No.137413)	—	2902SB
7211	63.5mm					Provided with a carbide-tipped ball point (No.21JAA224)						
7212	101.6mm					Provided with a carbide-tipped ball point (No.21JAA225)						
7213	63.5mm					Provided with a carbide-tipped ball point (No.21JAA225)						
7214	101.6mm		±30µm	30mm	2.5N	100mm	18mm	5µm	2	Provided with a carbide-tipped ball point (No.21JAA224)	5 pcs. (10, 20, 30, 30, 100mm)	2952SB
7220	150mm					Provided with a carbide-tipped ball point (No.21JAA224)						
7221	0 - 200mm		±15µm	10mm	1.4N	ø16mm	18mm	5µm	1	Provided with a needle point (No.137413)	—	2902SB
7222*	ø25mm					Provided with a carbide-tipped ball point (No.21JAA224: 17.8mm)						
7223	ø40mm					Provided with a carbide-tipped ball point (No.21JAA226: 22mm)						
7224	63.5mm					Provided with a carbide-tipped ball point (No.21JAA226: 22mm)						
7231	0 - 200mm		5mm			63.5mm	16mm			5 pcs. (10, 20, 30, 30, 100mm)	1162 (Back plunger type)	

* with needle probe

Inch												
Order No.	Range	Graduation	Accuracy	Stroke	Measuring force	Base			Mounting position of a dial indicator	Contact point	Extension rod	Indicator (dial indicator)
						W	T	Flatness				
7217S	0 - 8"	.0005"	±.002"	1"	2.5N	63.5mm	16mm	.0002"	1	Carbide ball point (No.21JZA242)	3 pcs. (1", 2", 4")	2904SB
7218S						101.6mm				Provided with a carbide-tipped ball point (No.21JZA242)		
7237				.2"	1.4N	63.5mm				Provided with a carbide-tipped ball point (No.21JZA242: 17.8mm)		
7238				101.6mm		Provided with a carbide-tipped ball point (No.21JZA243: 22.9mm)						

DIMENSIONS



ABSOLUTE Digimatic Depth Gage SERIES 547

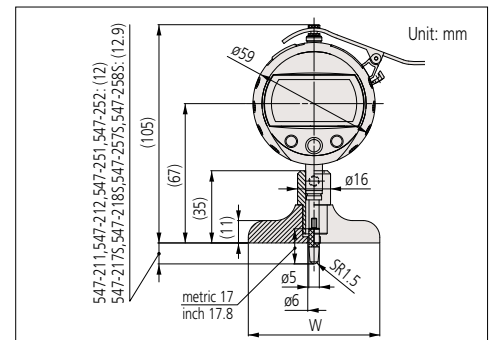
- Easy-to-read dial effectively prevents misreading.
- Allows integration into statistical process control and measurement systems for models with measurement data output connector. Refer to page A-3.

ABSOLUTE

(Refer to page VIII for details.)



DIMENSIONS



SPECIFICATIONS

Metric

Order No.	Range	Graduation	Stroke	Accuracy*1	Measuring force	Base			Contact point*2	Extension rod	Indicator
						W	T	flatness			
547-211	0 - 200mm	0.01mm	12.7mm	±20µm	1.5N	63.5mm	16mm	5	Provided with a carbide-tipped ball point (No.21JAA224)	5 pcs. (10, 20, 30, 30, 100mm)	543-400B*3
547-212						101.6mm					
547-251		0.001mm		63.5mm							
547-252				101.6mm							

Inch/Metric

Order No.	Range	Graduation	Stroke	Accuracy*1	Measuring force	Base			Contact point*2	Extension rod	Indicator
						W	T	flatness			
547-217S	0 - 8"	.0005"/0.01mm	.5"	±.001"	1.5N	2.5"	.63"	.0002"	Provided with a carbide-tipped ball point (No.21JZA242)	4 pcs. (.5", 1", 2", 4")	543-402B*3
547-218S						4"					
547-257S		.00005"/0.001mm		2.5"							
547-258S				4"							

*1 Excluding quantizing error

*2 Refer to page D-69 for the precautions to be observed when changing the depth gage contact point (Dial indicator and Digimatic indicator).

*3 The measuring force of this indicator is different from that of the standard Code No. 543-400B/543-402B.