

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.
- The TFT LCD provides excellent visibility and operability.
- 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-51.
- Backup/Restore of data and measurement part programs can be implemented using USB storage devices (FAT16/32 format compatible).



518-351A-21



With power grip
518-352A-21

SPECIFICATIONS

Inch/Metric	Model without power grip	
Order No.	Remarks	
518-351A-21	Model for North America, English manual	
518-351A-22	Model for South America, Spanish manual	
518-351D-21	Model for EU, English manual	
518-351E-21	Model for the UK, English manual	
518-351DC	Model for China, Chinese manual	
518-351K	Model for Korea, Korean manual	

Inch/Metric	Model with power grip	
Order No.	Remarks	
518-352A-21	Model for North America, English manual	
518-352A-22	Model for South America, Spanish manual	
518-352D-21	Model for EU, English manual	
518-352E-21	Model for the UK, English manual	
518-352DC	Model for China, Chinese manual	
518-352K	Model for Korea, Korean manual	

* Power grip pre-installed models



An inspection certificate is supplied as standard. Refer to page X for details.

Technical Data

- Measuring range: 0 - 977mm
 Slider stroke: 600mm
 Resolution: 0.0001 / 0.001 / 0.01 / 0.1mm or (switchable) .00001" / .0001" / .001" / .01"
 Accuracy at 20°C*1: $(1.1+0.6L/600)\mu\text{m}$
 L = Measuring length (mm)
- Repeatability (2σ)*1: Plane: 0.4μm, Bore: 0.9μm
 Perpendicularity*2: 5μm (after compensation)
 Straightness*2: 4μm (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: 5.7-inch color TFT LCD
 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 ø5 probe
 *2 Guaranteed when using the Lever Head (MLH-521) or Mu-checker (M-511)

Screenshot examples

Measurement screen

Statistical processing result

Histogram processing result

Squareness measurement result: Graphical display

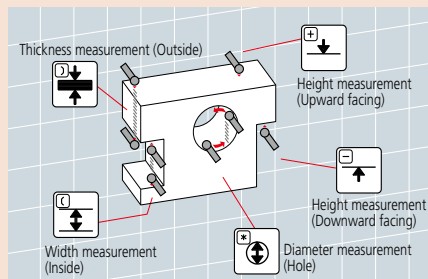
To use this function, a Digimatic indicator or a lever head plus a digital Mu-checker are required.

Squareness measurement result: Numeric display

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

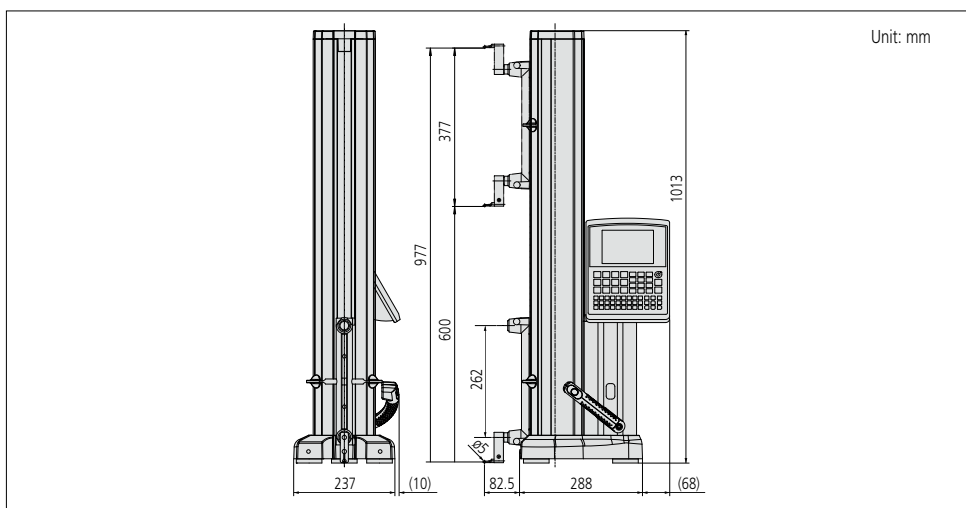


The power grip makes it easy to approach the workpiece.



The sample workpiece shown in the above photo is an optional accessory (12AAA879).

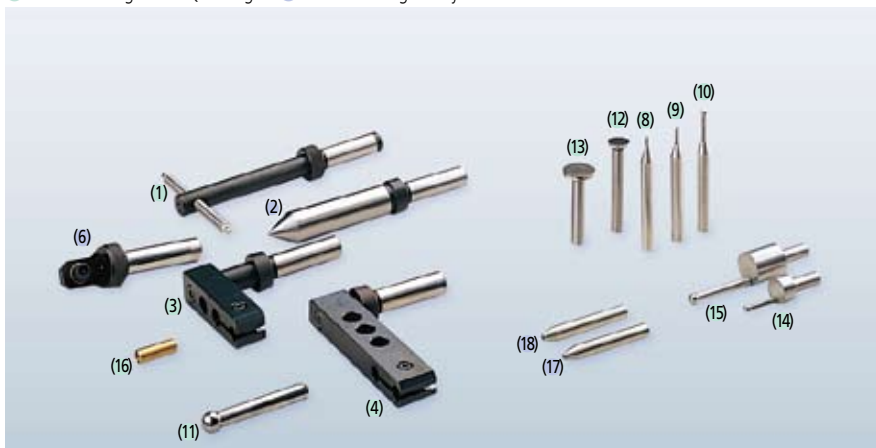
DIMENSIONS



Unit: mm

Optional accessories

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



- (1) 12AAC072: Depth probe
- (2) 12AAC073: $\varnothing 20$ mm taper probe
- (3) 12AAA792: Dial indicator ($\varnothing 8$ mm stem) holder
- (4) 12AAA793: Probe extension holder (85mm/3.3")
- 12AAB136: $\varnothing 10$ mm cylindrical probe
- (6) 932361: Mu-checker lever head holder*
*Additional auxiliary weights are required (total 4 pcs).
- 12AAF666: $\varnothing 1$ mm ball probe (coaxial type)
- 12AAF667: $\varnothing 2$ mm ruby ball probe (coaxial type)
- (8) 957261: $\varnothing 2$ mm ball probe (coaxial type)
- (9) 957262: $\varnothing 3$ mm ball probe (coaxial type)
- (10) 957263: $\varnothing 4$ mm ball probe (coaxial type)
- (11) 12AAB552: $\varnothing 10$ mm ball probe, L = 55mm (coaxial type)
- 12AAF668: $\varnothing 10$ mm ball probe, L = 82mm (coaxial type)
- 12AAF669: $\varnothing 10$ mm ball probe, L = 120mm (coaxial type)
- 12AAF670: $\varnothing 5$ mm disk probe
- 12AAF671: $\varnothing 10$ mm disk probe
- (12) 957264: $\varnothing 14$ mm disk probe
- (13) 957265: $\varnothing 20$ mm disk probe
- 12AAF672: $\varnothing 1$ mm ball offset probe
- (14) 12AAA788: $\varnothing 4$ mm ball offset probe
- $\varnothing 5$ mm ball offset probe 05HAA394
- (15) 12AAA789: $\varnothing 6$ mm ball offset probe
- (16) 226116: Test indicator ($\varnothing 6$ mm stem) adapter
- Sample workpiece 12AAA879
- (17) 226117: M2 CMM stylus adapter*¹
- (18) 226118: M3 CMM stylus adapter*¹
- CMM ball and disk hard probes are available.
 $\varnothing 2$ 932377A, $\varnothing 3$ 932378A
 $\varnothing 5$ 932379A, $\varnothing 6$ 932380A
 $\varnothing 10$ 532328
Disc probe
 $\varnothing 20$ 532345, $\varnothing 30$ 930803
- 12AAF712: Battery pack

Various peripheral devices

- 12AAN048*² Receipt printer (for Japan)
- 12AAN049*² Receipt printer (for North America)
- 12AAN050*² Receipt printer (for EU; excluded U.K.)
- 12AAN051*² Receipt printer (for U.K.)
- 12AAN052: Receipt paper (10-roll set)
- 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)

*1 For enabling CMM styli to be used.

*2 Attachment for fixing the connecting cable is provided as standard.

Height Gage

A standard measuring tool of industry

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

- Best-in-class accuracy $\pm(2.4+2.1L/600)\mu\text{m}$
- 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).



518-236

- 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.
- Built-in air-suspension feature mechanism using an internal pump enables smooth movement over a surface plate. (Lower-cost version without air suspension also available.)
- With SPC and RS-232C output.
- Continuous battery life of 300 hours*⁵ using four alkaline batteries. (Also works with four NiMH AA/HR6 rechargeable batteries.)

SPECIFICATIONS

Metric	518-230	518-232	518-234	518-236
Code No.	518-230	518-232	518-234	518-236
Measuring range (stroke)	0 -465mm (350mm)	0 -715mm (600mm)	0 -465mm (350mm)	0 -715mm (600mm)
Resolution (selectable)	0.001mm/0.005mm	0.001mm/0.005mm	0.001mm/0.005mm	0.001mm/0.005mm
Accuracy at Measurement* ¹	$\pm(2.4+2.1L/600)\mu\text{m}$			
20°C Repeatability* ¹	$2\sigma \leq 1.8\mu\text{m}$			
Perpendicularity* ² (20°C)	7μm	12μm	7μm	12μm
Guiding method	Roller bearing			
Drive method	Manual (wheel)			
Measurement principle	Electromagnetic induction absolute encoder			
Measuring force	1.5±0.5N			
Data output ports	Digimatic / USB* ³			
Air-suspension feature	Not included	Not included	Included (for positioning only)* ⁴	Included (for positioning only)* ⁴
Power supply	Alkaline AA/LR6 batteries x 4 (standard accessories) / AC adapter (optional accessory) / Supports NiMH (HR6) rechargeable batteries x 4			
Battery life guidelines* ⁵	Approx. 300 hours (continuous use) LED: Other than full-time illumination	Approx. 300 hours (continuous use) LED: Other than full-time illumination	Approx. 300 hours (continuous use) LED: Other than full-time illumination	Approx. 300 hours (continuous use) LED: Other than full-time illumination
	Approx. 100 hours (continuous use) LED: Full-time illumination	Approx. 100 hours (continuous use) LED: Full-time illumination	Approx. 3.3 days when the air-suspension feature is used for 0.5 hours/day	Approx. 3.3 days when the air-suspension feature is used for 0.5 hours/day
Mass	25kg	29kg	25kg	29kg
Size (mm)	Stroke 350mm type: 280(W)x273(D)x784(H)mm Stroke 600mm type: 280(W)x273(D)x1016(H)mm			
Operating temperature range (recommended)	0 - 40°C (10 - 30°C)			
Operating temperature range	20 - 80%RH (Must be free from condensation)			
Storage temperature range	-10°C - 50°C			
Storage humidity range	5 - 90% RH (Must be free from condensation)			

*1 The indication accuracy and repeatability represent the values obtained from the height measurement of a flat surface using the standard holder with ø5 ball contact point. In the case of diameter, minimum (maximum) value, circle pitch or difference measurement, measuring errors may be larger than the accuracy ratings listed in the table due to variations in measuring force during a scanning measurement, which differs from height measurement.

*2 Indicates the value obtained from the measurement of a straight surface placed perpendicular to the the base reference surface using the Lever Head (MLH-321) and Mu-checker (M-411).

*3 Requires special communication driver and software. Consult your local Mitutoyo Sales Office for details. These can be downloaded from the Mitutoyo web site. <http://www.mitutoyo.co.jp/eng/>

*4 When using a model with the air-suspension feature, it is advisable to use a JIS 1 class, or higher, surface plate. Using on surfaces with scratches or unevenness may prevent the system operating to the specified performance.

*5 Battery life depends on the operating conditions. In particular, it is more economical to use the optional AC adapter to power the instrument if the application requires prolonged use of the air-suspension feature.

ABSOLUTE™

(Refer to page X for details.)



An inspection certificate is supplied as standard. Refer to page X for details.

Standard accessories

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

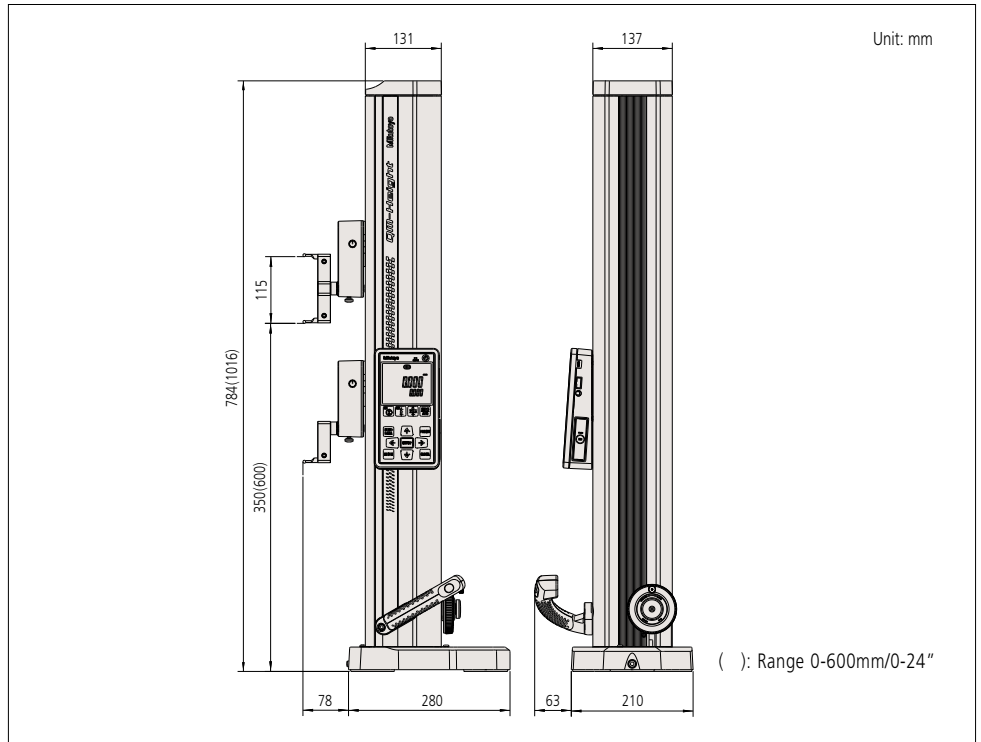
Optional accessories

- 12AAC072: Depth probe
- 12AAA792: Dial indicator (ø8mm stem) holder
- 12AAA793: Probe extension holder (85mm/3.3")
- 12AAF667: ø2mm ruby ball probe (coaxial type)
- 957261: ø2mm ball probe (coaxial type)
- 957262: ø3mm ball probe (coaxial type)
- 957263: ø4mm ball probe (coaxial type)
- 957264: ø14mm disk probe
- 957265: ø20mm disk probe
- 12AAA788: ø4mm ball offset probe
- 12AAA789: ø6mm ball offset probe
- 226116: Test indicator (ø6mm stem) adapter
- Sample workpiece 12AAA879
- Scriber 05HZA173
- Digimatic connecting cable 936937 (1m)
- 965014 (2m)
- AC Adapter 06AEG180JA/D/E/K/DC
- 05HZA143: 9x9 adapter (clamp 901385 is required)
- 05GZA033: Clamp (for 9x9 adapter)
- 05HZA144: 6.35x12.7 adapter (clamp assy. 901385 is required)
- 901385: Clamp assy. (for 6.35x12.7 adapter)
- 02AZE990: U-WAVE mounting plate

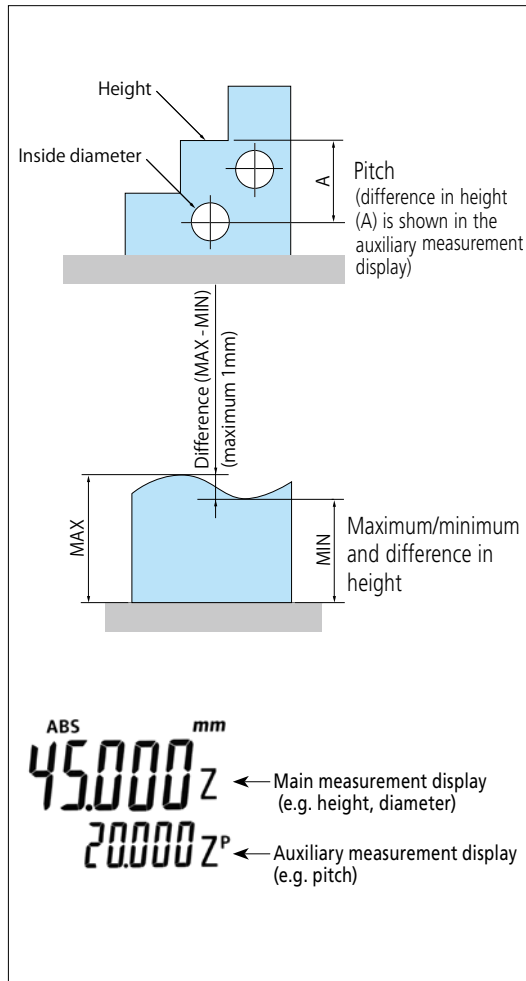
Inch/Metric

Inch/Metric	518-231	518-233	518-235	518-237
Code No.	518-231	518-233	518-235	518-237
Measuring range	0-465mm (0 - 350mm/0-14")	0-715mm (0 - 600mm/0-24")	0-465mm (0 - 350mm/0-14")	0-715mm (0 - 600mm/0-24")
Resolution (selectable)	0.001mm/0.005mm/0.0005"/0.001"/0.0002"	0.001mm/0.005mm/0.0005"/0.001"/0.0002"	0.001mm/0.005mm/0.0005"/0.001"/0.0002"	0.001mm/0.005mm/0.0005"/0.001"/0.0002"
Accuracy at Measurement* ¹	$\pm(2.4+2.1L/600)\mu\text{m}$			
20°C Repeatability* ¹	$2\sigma \leq 1.8\mu\text{m}$			
Perpendicularity* ² (20°C)	7μm	12μm	7μm	12μm
Guiding method	Roller bearing			
Drive method	Manual (wheel)			
Measurement principle	Electromagnetic induction absolute encoder			
Measuring force	1.5±0.5N			
Data output ports	Digimatic / USB* ³			
Air-suspension feature	Not included	Not included	Included (for positioning only)* ⁴	Included (for positioning only)* ⁴
Power supply	Alkaline AA/LR6 batteries x 4 (standard accessories) / AC adapter (optional accessory) / Supports NiMH (HR6) rechargeable batteries x 4			
Battery life guidelines* ⁵	Approx. 300 hours (continuous use) LED: Other than full-time illumination	Approx. 300 hours (continuous use) LED: Other than full-time illumination	Approx. 300 hours (continuous use) LED: Other than full-time illumination	Approx. 300 hours (continuous use) LED: Other than full-time illumination
	Approx. 100 hours (continuous use) LED: Full-time illumination	Approx. 100 hours (continuous use) LED: Full-time illumination	Approx. 3.3 days when the air-suspension feature is used for 0.5 hours/day	Approx. 3.3 days when the air-suspension feature is used for 0.5 hours/day
Mass	25kg	29kg	25kg	29kg
Size (mm)	Stroke 350mm type: 280(W)x273(D)x784(H)mm Stroke 600mm type: 280(W)x273(D)x1016(H)mm			
Operating temperature range (recommended)	0 - 40°C (10 - 30°C)			
Operating temperature range	20 - 80%RH (Must be free from condensation)			
Storage temperature range	-10°C - 50°C			
Storage humidity range	5 - 90% RH (Must be free from condensation)			

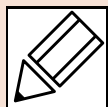
DIMENSIONS



Measurement example



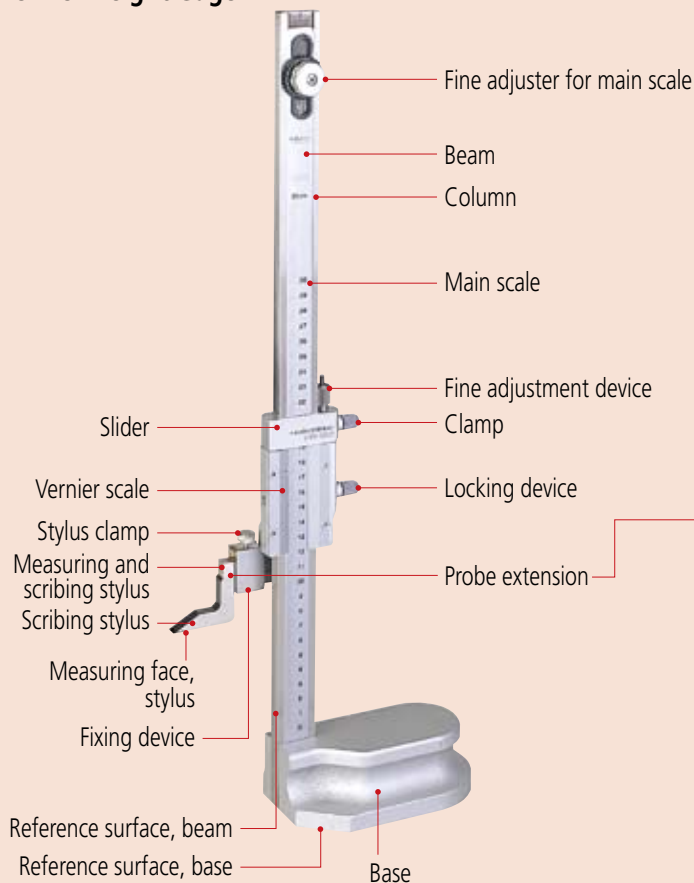
Quick Guide to Precision Measuring Instruments



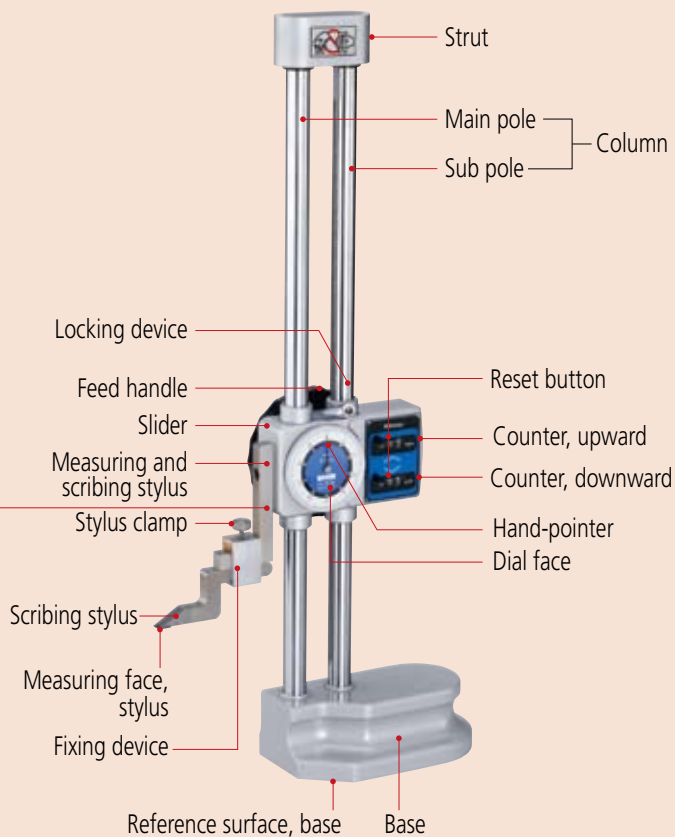
Height Gages

Nomenclature

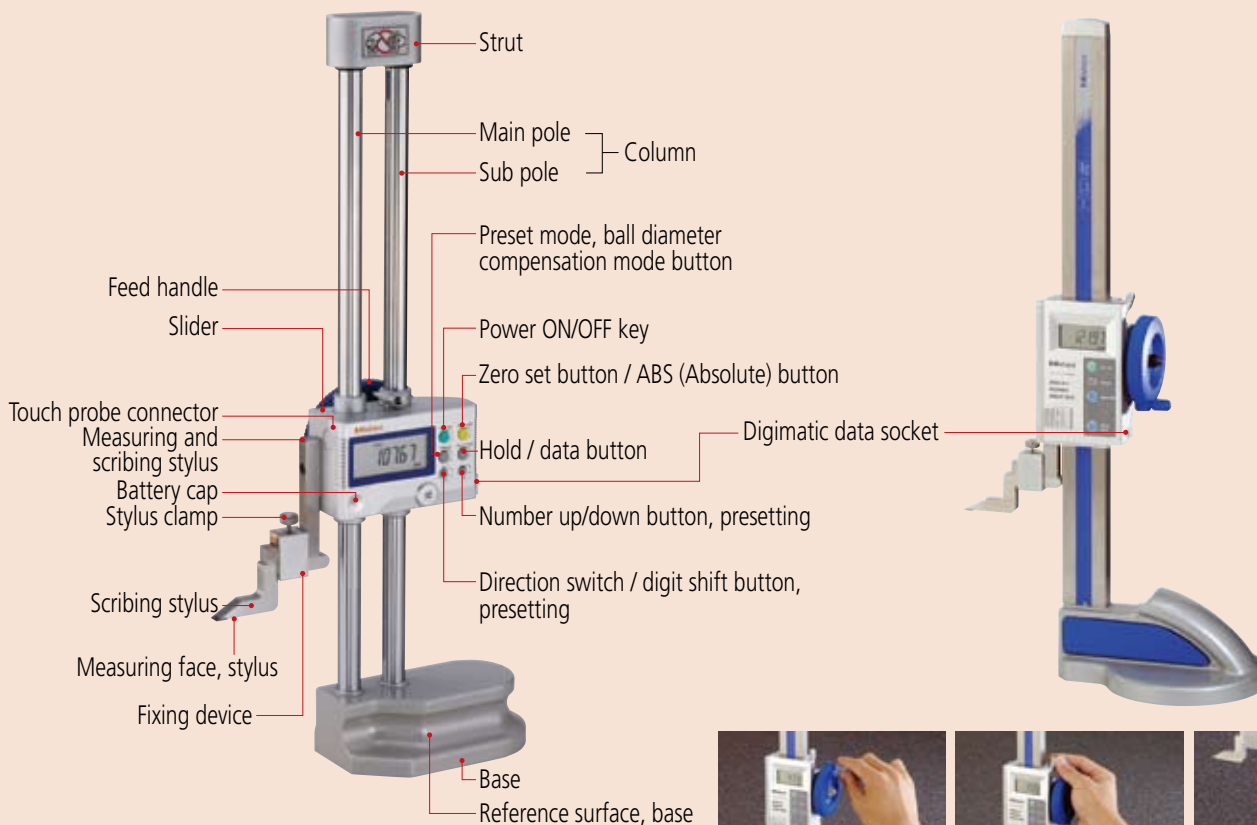
Vernier Height Gage



Mechanical Digit Height Gage



Digimatic Height Gages



Slider handwheel



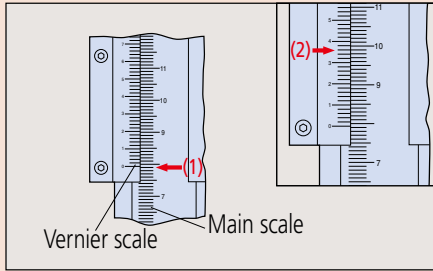
Slider clamping lever



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

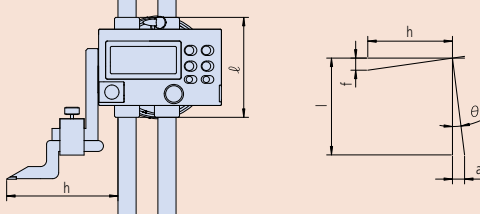
1. Potential causes of error

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

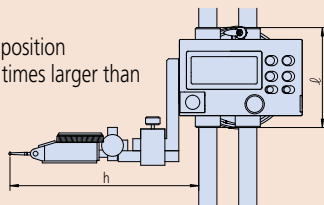
Like the caliper, and as shown in the following figure, measurement errors result when using the height gage if the reference column, which guides the slider, becomes warped. This error can be represented by the same calculation formula for errors caused by nonconformance to Abbe's Principle.

$$f = h \theta = h \frac{a}{L}$$



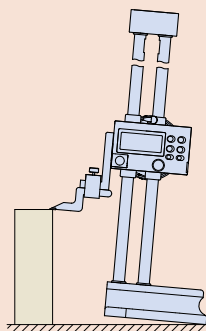
Installing the scriber (or a lever-type dial indicator) requires careful consideration because it affects the size of any error due to a warped reference column by increasing dimension h in the above formula. In other words, if an optional long scriber or lever-type dial indicator is used, the measurement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



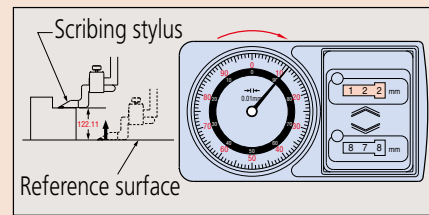
3. Lifting of the base from the reference surface

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

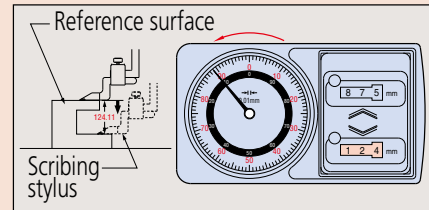


Counter 122 mm

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

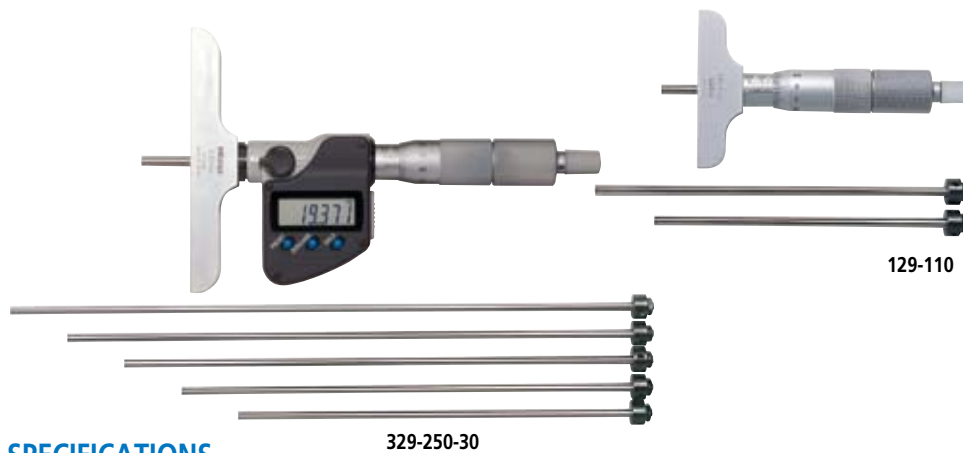
- Keep the column, which guides the slider, clean. If dust or dirt accumulates on it, sliding becomes difficult, leading to errors in setting and measuring.
- When scribing, securely lock the slider in position using the clamping arrangements provided. It is advisable to confirm the setting after clamping 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. 329-250-30, 329-251-30, 329-350-30, and 329-351-30** 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)				
329-250-30	0 - 150mm	0.001mm	101.6 x 16mm	6
329-251-30	0 - 300mm			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		63.5 x 16mm	2
129-113			101.6 x 16mm	
129-110	0 - 75mm		63.5 x 16mm	3
129-114			101.6 x 16mm	
129-111	0 - 100mm		63.5 x 16mm	4
129-115			101.6 x 16mm	
129-112	0 - 150mm		63.5 x 16mm	6
129-116			101.6 x 16mm	
129-152	0 - 300mm		63.5 x 16mm	12
129-153			101.6 x 16mm	

Inch/Metric				
Order No.	Range	Resolution	Base	No. of rods
Digimatic (LCD)				
329-350-30	0 - 6"	.00005"/0.001mm	4" x .63"	6
329-351-30	0 - 12"			.0001"/0.001mm

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			4" x .63"	
129-127	0 - 4"		2.5" x .63"	4
129-131			4" x .63"	
129-128	0 - 6"		2.5" x .63"	6
129-132			4" x .63"	
129-149	0 - 12"		2.5" x .63"	12
129-150			4" x .63"	

* For the function of Digimatic models **329-250-30, 329-251-30, 329-350-30, and 329-351-30**, refer to page D-62. These models are not waterproof.

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

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)
 Flatness of reference face:
 $1.3\mu\text{m} (.00005")$ for 63.5mm (2.5") length base,
 $2\mu\text{m} (.00008")$ for 101.6mm (4") length base
 Flatness of measuring rod face: 0.3 μm
 Parallelism between reference face and measuring rod face:
 $(4+R/50)\mu\text{m}$, R = Max. measuring length (mm)
 Fraction rounded up
 $\pm(2+R/75)\mu\text{m}$ for interchangeable rod,
 R = Max. range (mm)
 Fraction rounded up
 Battery: **SR44** (1 pc), **938882**,
 for initial operational checks (standard accessory)
 Battery life*: Approx. 2.4 years under normal use
 * Digital models
 Scale type: Electromagnetic induction absolute encoder



Optional accessories for 329-250-30, 329-251-30, 329-350-30, and 329-351-30.

For details, refer to page A-21.
 Connection cable for **329-250-30, 329-251-30, 329-350-30, and 329-351-30**
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

Functions of 329-250-30, 329-251-30, 329-350-30, and 329-351-30

ORIGIN set: Resets the ABS (absolute) origin at the current position. (ABS measurement system)

ZERO set: The display is set to zero at the current position for incremental (comparative) mode measurements. Absolute system measurement mode can easily be restored when required.

Preset: Enters a specified value into the display at the current position.

Hold: The displayed value is temporarily held at the current value so that the instrument can be moved before the display is read. Useful for making measurements in difficult-to-access.

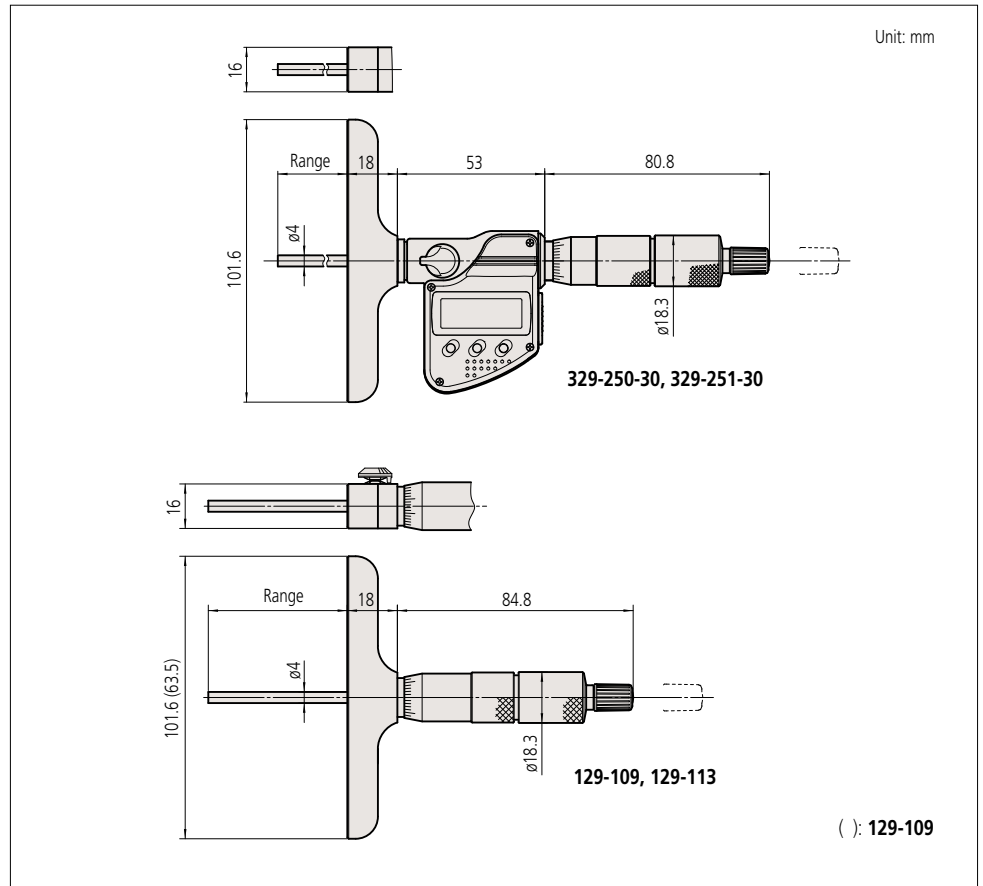
Measurement data output: Equipped with a Digimatic data output port to incorporate instrument into an SPC or networked measurement system.

Auto-power ON/OFF: If the instrument is not used for approximately 20 minutes, the display turns off while keeping the current origin of the ABS measurement system. The display is restored when the spindle is rotated.

Error alarm: If overflow of the display or a calculation error occurs, the measurement function stops and a message is displayed. Measurement will not be continued so as to avoid an erroneous display value. Warning light indicates low battery.

Function lock: PRESET (origin set) and ZERO (zero set) buttons can be locked in order to prevent them being changed unintentionally.

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			

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

*1 with carbide-tipped measuring rod

Depth Micro Checker SERIES 515

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

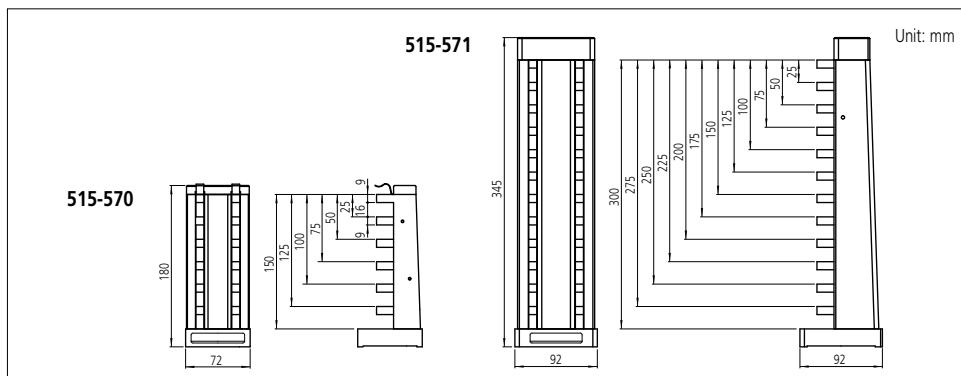


SPECIFICATIONS

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		

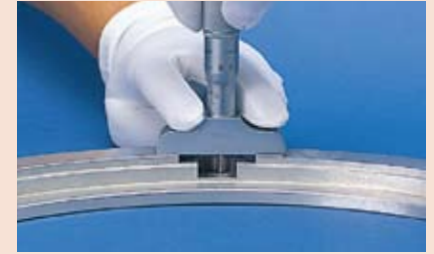
Inch			
Order No.	Range	Block pitch accuracy	Anvil block accuracy
515-575	0 - 6"	$\pm(40+L/0.15)\mu\text{inch}$, L = Length to check (inch)	40 μinch

DIMENSIONS

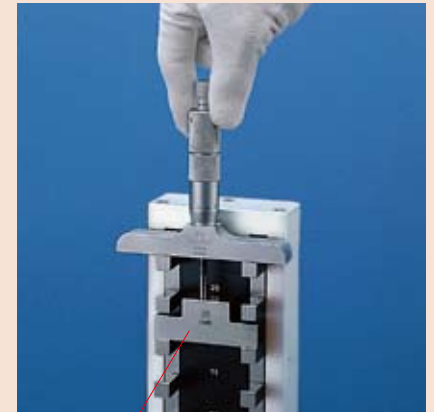


Technical Data

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



An inspection certificate is supplied as standard. Refer to page X for details.



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

Optional accessories for IP67 coolant proof models

For details, refer to page D-39.

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 D-39.

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)

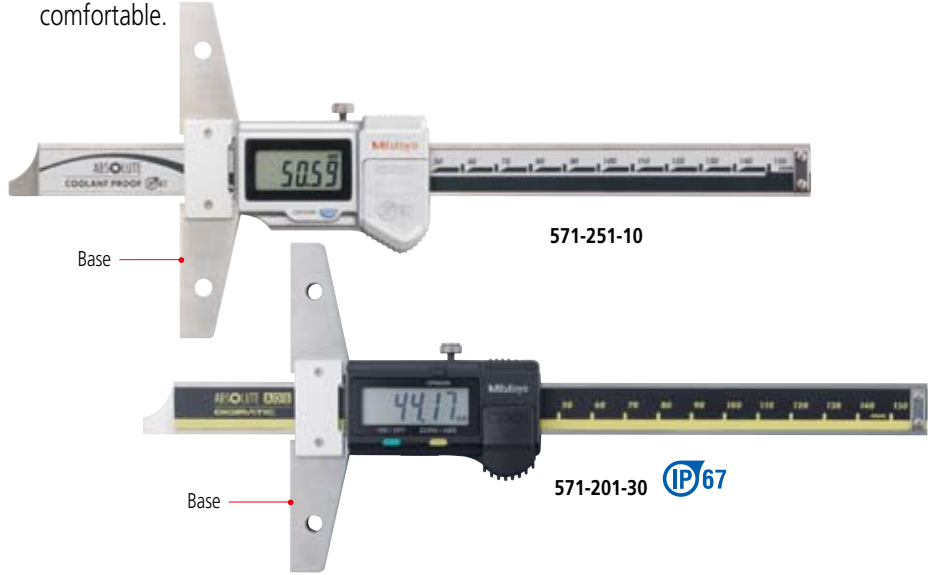
Connecting cables for **U-WAVE-T**

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-8 for ABSOLUTE function.)
- Sliding operation of models with the measuring ranges 150mm (6"), 200mm (8") and 300mm (12") is smooth and comfortable.
- Battery: **SR44** (1 pc), **938882**. For initial operational checks (standard accessory)
- 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)	Battery life
571-201-30	0 - 150mm	0.01mm	±0.02mm	0.01mm	100 x 6mm	5years
571-202-30	0 - 200mm		±0.03mm			3.5years
571-203-20	0 - 300mm		±0.02mm			3years
571-251-10**	0 - 150mm	0.01mm	±0.02mm	0.01mm	100 x 6.3mm	1years
571-252-10**	0 - 200mm		±0.03mm			3years
571-253-10**	0 - 300mm		±0.05mm			3years
571-204-10	0 - 450mm	0.01mm	±0.06mm	250 x 10mm	250 x 10mm	3years
571-205-10	0 - 600mm		±0.07mm			3years
571-206-10	0 - 750mm		±0.06mm			3years
571-207-10	0 - 1000mm		±0.07mm			3years

* Excluding quantizing error
** IP67 Coolant Proof model

Inch/Metric					
Order No.	Range	Accuracy*	Repeatability	Base (W x T)	Battery life
571-211-30	0 - 6"	±.001"/±0.02mm	0.005"/0.01mm	3.93" x .23"	5years
571-212-30	0 - 8"	±.001"/±0.02mm			3.5years
571-213-10	0 - 12"	±.0015"/±0.03mm			3years
571-261-10**	0 - 6"	±.001"/±0.02mm	0.005"/0.01mm	9.8" x .39"	1years
571-262-10**	0 - 8"	±.001"/±0.02mm			3years
571-263-10**	0 - 12"	±.0015"/±0.03mm			1years
571-214-10	0 - 18"	±.002"/±0.05mm	0.005"/0.01mm	9.8" x .39"	3years
571-215-10	0 - 24"	±.002"/±0.05mm			3years
571-216-10	0 - 30"	±.0025"/±0.06mm			3years
571-217-10	0 - 40"	±.0025"/±0.07mm			3years

* Excluding quantizing error
** IP67 Coolant Proof model

DIMENSIONS

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

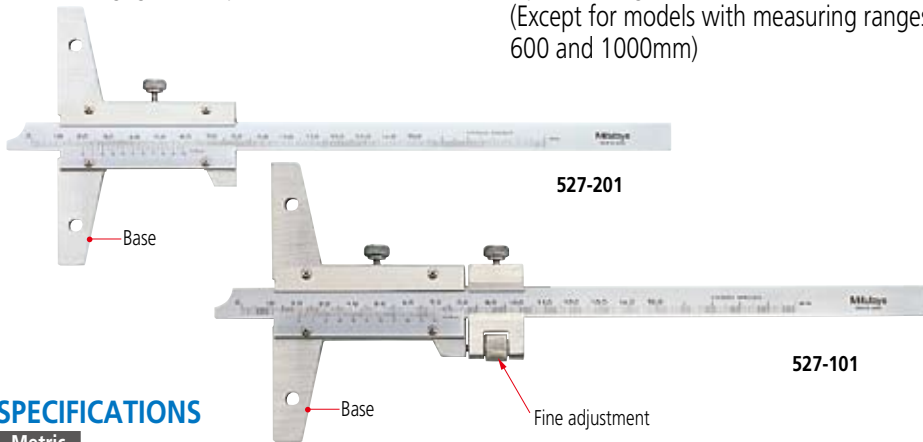
(): Coolant Proof models

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)



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		±0.08mm		—
527-203	0 - 300mm		±0.10mm	—	
527-204	0 - 600mm		±0.15mm	250 x 10mm	—
527-205	0 - 1000mm		—		—

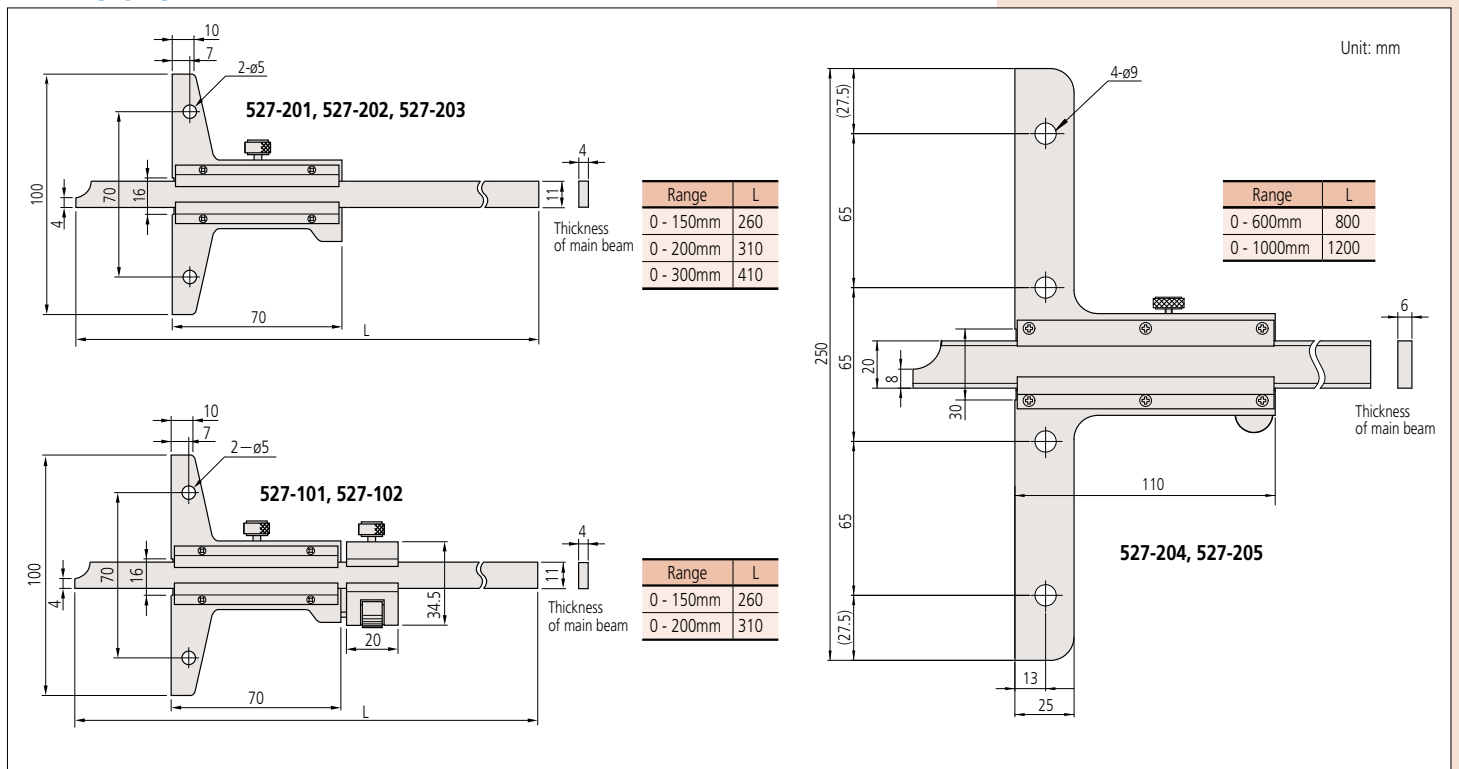
Metric

Order No.	Range	Vernier reading	Accuracy	Base (W x T)	Remarks
527-101	0 - 150mm	0.02mm	±0.03mm	100 x 6.5mm	with fine adjustment
527-102	0 - 200mm				

Inch

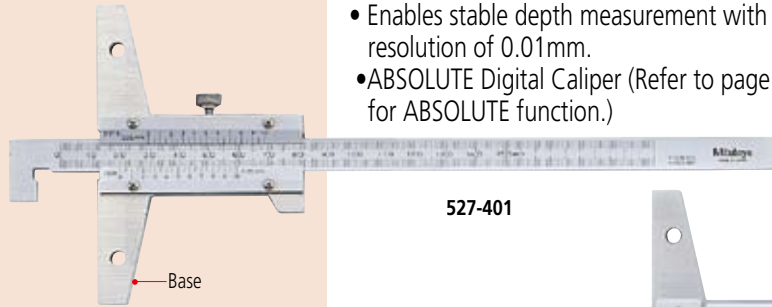
Order No.	Range	Vernier reading	Accuracy	Base (W x T)	Remarks
527-111	0 - 6"	.001"	±.001"	3.93" x .25"	with fine adjustment
527-112	0 - 8"		±.0015"		
527-113	0 - 12"		±.002"	9.8" x .39"	
527-114	0 - 24"		±.003"		
527-115	0 - 40"		—		

DIMENSIONS



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** (1 pc), **938882**. For initial operational checks (standard accessory)
- Battery life: Approx. 3 years under normal use (for digital models)
- Optional longer extension bases are available.

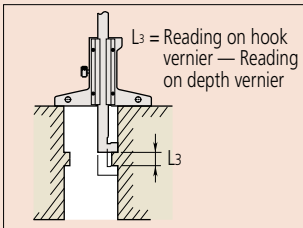
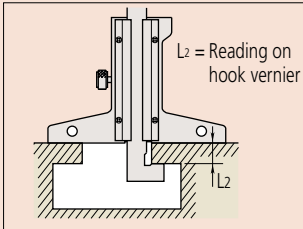
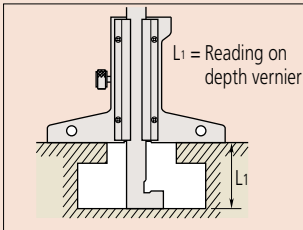


527-401



571-254-10 **IP67**

Applications



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

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)			
Analog				
527-401	10 - 150mm (0 - 150mm)	0.05mm	±0.05mm	100x6.5mm
527-402	10 - 200mm (0 - 200mm)		±0.08mm	
527-403	10 - 300mm (0 - 300mm)			

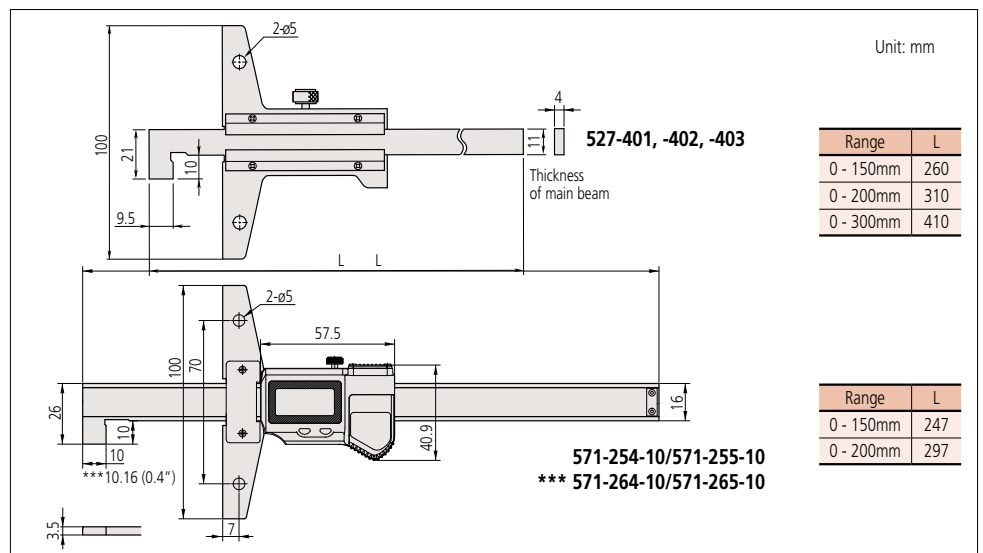
* Excluding quantizing error ** IP67 Coolant Proof model

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)		±0.04mm	
527-413	10 - 300mm (0 - 300mm)			

DIMENSIONS



Depth Gage

A standard measuring tool of industry

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.
- Extension base is three times the length of the base for models of less than 300mm range.
- These extension bases cannot be attached to 0-600mm, 0-1000mm, 0-24" and 0-40" range models.

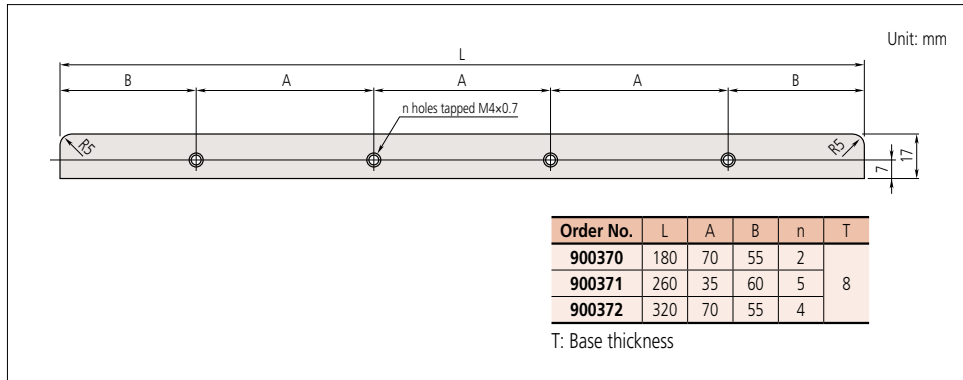


900372

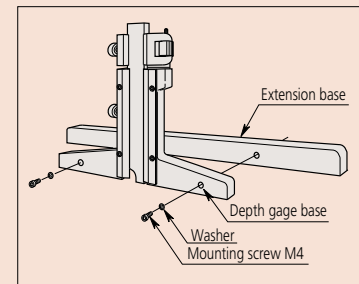
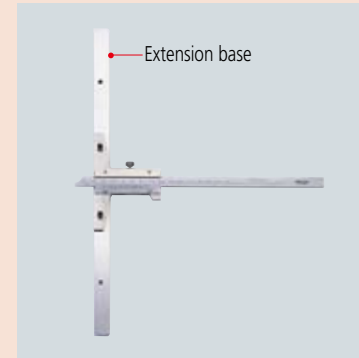
SPECIFICATIONS

Metric			Inch		
Order No.	Size L	n	Order No.	Size L	n
900370	180mm	2	900367	7"	2
900371	260mm	5	900368	10"	5
900372	320mm	4	900369	12"	4

DIMENSIONS

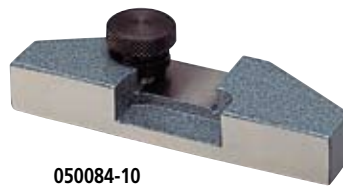


Example of attaching the extension base



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.

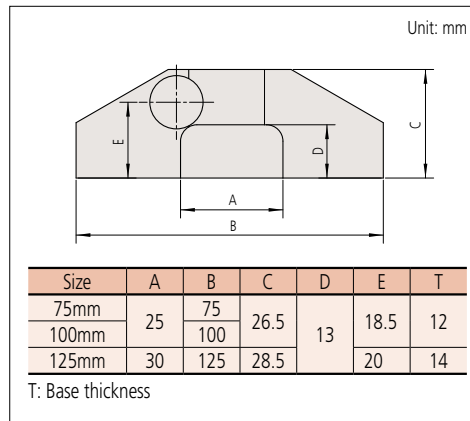


050084-10

SPECIFICATIONS

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



Example of attaching the extension base



Dial Depth Gage SERIES 7

Note:

*1

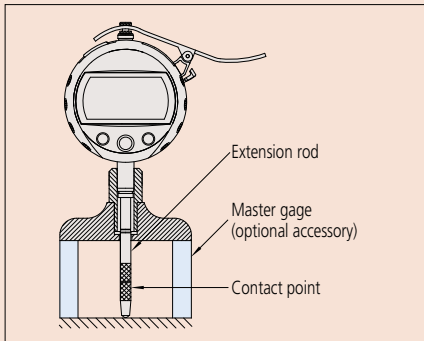
Caution should be exercised when exchanging a contact point of a Depth Gage (Dial/Digimatic Indicator)

- If a different size contact point is mounted, displacement of the contact point from the base contact surface will be changed and as a result, measurement range may not be maintained.
- A contact point cannot be mounted to a Depth Gage, if its diameter is too large for the hole diameter 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.

*2

Caution should be exercised when using an extension rod

- If the total length of the extension rod exceeds 110mm (4.5") use the instrument in a vertical position (contact point downward).
- Use a master gage (such as Gauge blocks) to perform zero-setting when the extension rod is mounted. (Master gage is an optional accessory.)



*3

Indicators

- Indicators for a Depth Gage is used for the Depth Gage. When the indicator is exchanged and extension rod is connected longer, the contact-point may incline significantly.
- Code No.543-400B / 543-402B for Depth Gage has a measuring force less than 1.5N.

- Optimal for hole, narrow groove and step measurement.



7211



7214



7222

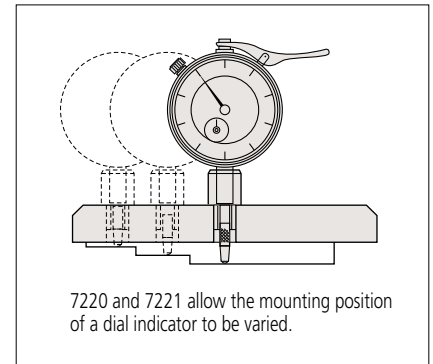


7224



7231

Example of use



7220 and 7221 allow the mounting position of a dial indicator to be varied.

Metric

Order No.	Range	Graduation	Accuracy	Stroke	Measuring force	Base			Mounting position of a dial indicator	Contact point*1	Extension rod*2	Indicator*3 (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 for Depth Gage
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					3 pcs. (30, 60, 90mm)						
7214	101.6mm											
7220	0 - 200mm		±30μm	30mm	2.5N	100mm	18mm	5μm	2	Provided with a carbide-tipped ball point (No.21JAA224)	5 pcs. (10, 20, 30, 30, 100mm)	2902SB for Depth Gage
7221	150mm											
7222	0 - 10mm					±15μm				10mm		
7223	ø25mm		Provided with a carbide-tipped ball point (No.21JAA224: 17mm) (No.21JAA226: 22mm)									
7224	ø40mm											
7231	0 - 200mm	±30μm	30mm	2.5N	63.5mm	16mm	5μm	1	Provided with a carbide-tipped ball point (No.21JAA224: 17mm) (No.21JAA226: 22mm)	5 pcs. (10, 20, 30, 30, 100mm)	1162T for Depth Gage (Back plunger type)	

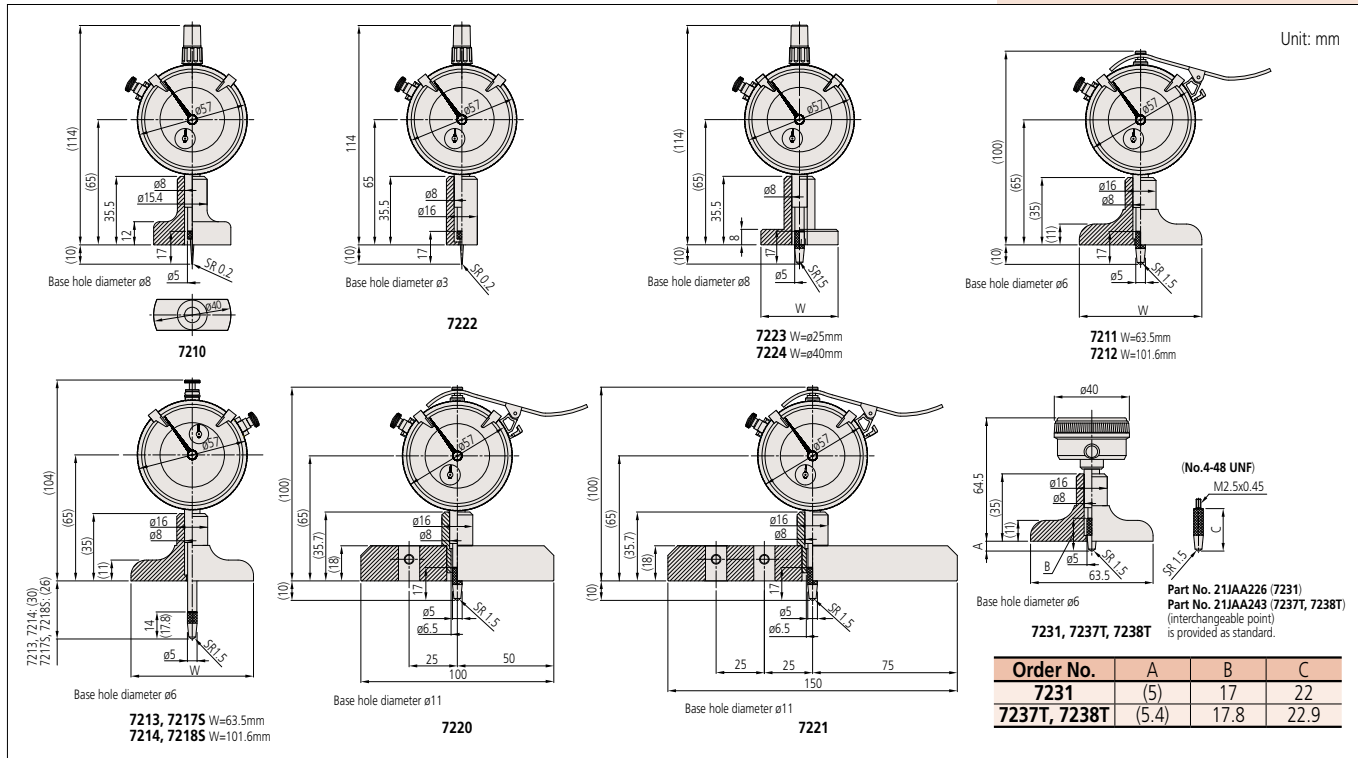
Inch

Order No.	Range	Graduation	Accuracy	Stroke	Measuring force	Base			Mounting position of a dial indicator	Contact point*1	Extension rod*2	Indicator*3 (dial indicator)
						W	T	Flatness				
7217S	0 - 8"	.001"	±.002"	1"	2.5N	63.5mm	16mm	.0002"	1	Carbide ball point (No.21JZA242)	3 pcs. (1", 2", 4")	2904SB for Depth Gage
7218S						101.6mm				Provided with a carbide-tipped ball point (No.21JZA242: 17.8mm) (No.21JZA243: 22.9mm)		
7237T				.2"	1.4N	63.5mm				4 pcs. (.5", 1", 2", 4")		
7238T						101.6mm						

Depth Gage

A standard measuring tool of industry

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.

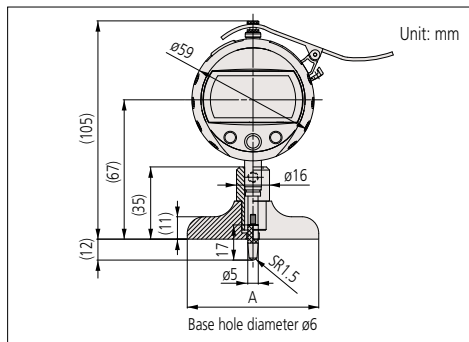
ABSOLUTE™

(Refer to page X for details.)



547-211

DIMENSIONS



SPECIFICATIONS

Order No.	Range	Graduation	Stroke	Accuracy*4	Measuring force	Base			Contact point*1	Extension rod*2	Indicator*3
						W	T	flatness			
547-211	0 - 200mm	0.01mm	12.7mm	$\pm 20\mu\text{m}$	1.5N	63.5mm	16mm	5 μm	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		2 μm					
547-252				101.6mm							
Order No.	Range	Graduation	Stroke	Accuracy*4	Measuring force	Base			Contact point*1	Extension rod*2	Indicator*3
547-217S	0 - 8"	.0005"/0.01mm	.5"	$\pm .001$ "	1.5N	2.5"	.63"	.0002"			
547-218S						4"					
547-257S		.00005"/0.001mm		2.5"		.00008"					
547-258S				4"							

*1 to *3: Refer to page D-68.

*4: Excluding quantizing error.

