Lever/Cartridge Probe Heads
SERIES 519 — Electronic micrometer

SPECIFICATIONS

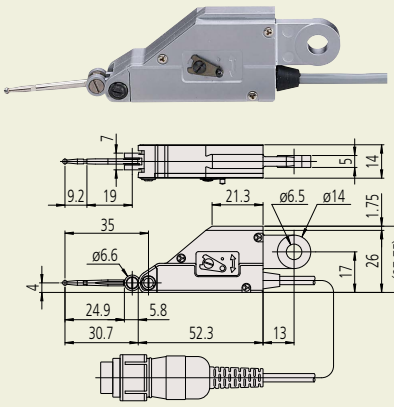
Lever heads

Order No.	519-521	519-522	519-326	519-327
Model	MLH-521	MLH-522	MLH-326	MLH-327
Measuring range (mm)	±0.5			
Stroke (mm)	±0.6			±0.65
Measuring force (N)	Approx. 0.2	Approx. 0.02	Approx. 0.15	
Linearity (%)	±0.3			±0.5
Stylus support	Pivot bearing	Pivot bearing	Parallel-leaf spring	Pivot bearing

Note: A ø2 mm ball-ended stylus is supplied as standard with all probes.

Common specifications
- Connection: Half-bridge
- Cable length: 2 m
- Connector type: MAS-5100 (DIN5P) or equivalent

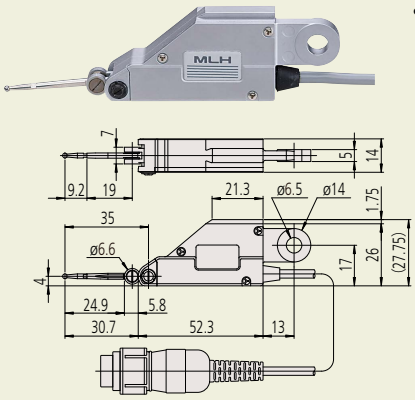
519-521
MLH-521



- Interchangeable styli:
  ø1: **520940** (Standard accessory)
  ø2: **520939** (Standard equipment)
  ø3: **520938** (Standard accessory)

Unit: mm

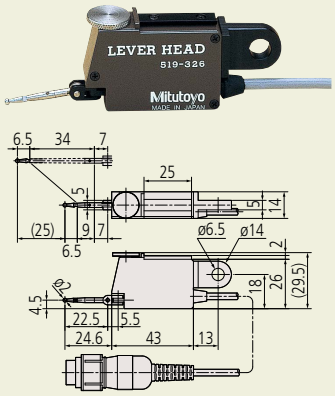
519-522
MLH-522



- Interchangeable styli:
  ø1: **520940** (Standard accessory)
  ø2: **520939** (Standard equipment)
  ø3: **520938** (Standard accessory)

Unit: mm

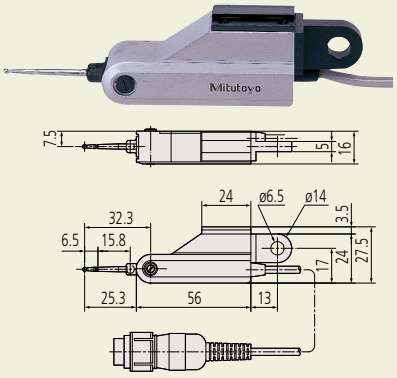
519-326
MLH-326



- Interchangeable styli:
  ø1: **102824** (Optional)
  ø2: **102825** (Standard equipment)
  ø3: **102826** (Optional)
- Extension bar
  L=9 mm (Standard equipment)
  L=34 mm (When a bar for extending the distance to the stylus tip is supplied)

Unit: mm

519-327
MLH-327



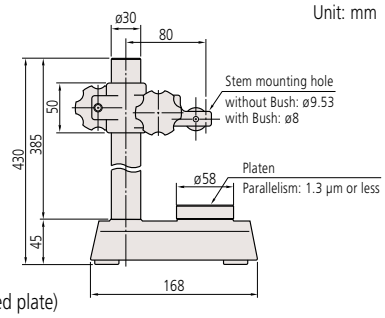
- Interchangeable styli:
  ø1: **102824** (Optional)
  ø2: **102825** (Standard equipment)
  ø3: **102826** (Optional)

Unit: mm

Transfer Stand

519-109-10
(with a serrated plate)

Unit: mm



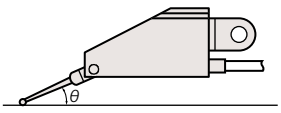
Main Specifications

Order No.	Effective transfer range (mm)	Fine adjustment range (mm)	Mounting hole (mm)
519-109-10	0 - 320	1	Without Bush: ø9.53 With Bush: ø8

Note on stylus angle

If the stylus of a pivot bearing type probe makes an angle with a workpiece surface, as in the figure, calibration should be performed for accurate measurement. Alternatively, the displayed value may be corrected by multiplying it by the appropriate correction factor as given in the table.
Model **519-326** does not need correction.

Angle (θ)	Correction factor
0°	1.00
10°	0.98
20°	0.94
30°	0.87
40°	0.77
50°	0.64
60°	0.50

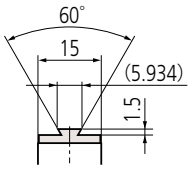


Display value × Correction factor = Corrected value

Dimensions of dovetail plate on probe body

Enables mounting on a lever head mounting bracket or stem.

Unit: mm



Lever-head mounting brackets (optional)

Optional accessories for Mitutoyo test indicators can be used.

Stems

ø4 dovetail-grooved stem
21CZB131

ø6 dovetail-grooved stem
21CZB128

ø8 dovetail-grooved stem
21CZB129

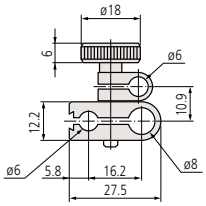
ø9.5 dovetail-grooved stem
21CZB130

Clamp

Clamp for ø6/8 dovetail-grooved stem
902053

Clamp for ø6/9.5 dovetail-grooved stem
900320

Unit: mm



902053

Holder

Holding arm A (Square 9×9, Length 100)
900209

Holding arm B (ø8, Length 115)
900211

SPECIFICATIONS

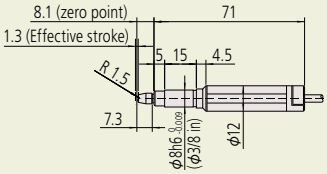
Cartridge heads (special order only)

Order No.	519-331	519-332	519-346	519-347	519-385	519-341	519-348
Model	MCH-331	MCH-332	MCHS-346	MCHS-347	MCH-385	MCHP-341	MCHS-348
Measuring range (mm)	±0.5	±0.5	±0.25	±0.5	±1.5	±2.5	±1.0
Stroke (mm)	±0.65	±0.65	+0.34 −0.26	+0.85 −0.65	+2.35 −1.65	+3.2 −2.8	+1.35 −1.15
Measuring force (N)	Approx. 0.25	Approx. 0.25	Approx. 0.7	Approx. 0.7	Approx. 0.7	Approx. 0.9	Approx. 0.7
Stem Dia. (mm)	ø8	ø3/8 in	ø8	ø8	ø8	ø8	ø8
Linearity (%)	±0.5	±0.5	±0.3	±0.3	±0.3	±0.5	±0.3
Plunger support	Plain bearing		Linear ball-bearing				

519-331 / (519-332)
MCH-331 / (MCH-332)

- M2.5×5 (4-48 UNF) interchangeable contact points for dial indicators can be used.

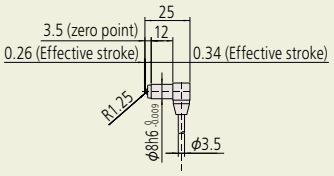
Unit: mm



519-346
MCHS-346

- Dedicated contact point only that cannot be replaced.

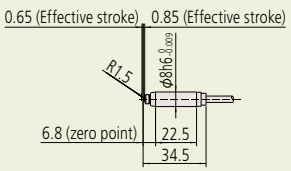
Unit: mm



519-347
MCHS-347

- Dedicated contact point only that cannot be replaced.

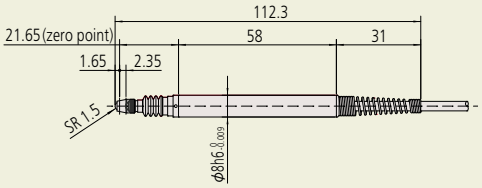
Unit: mm



519-385
MCH-385

- M2.5×5 interchangeable contact points for dial indicators can be used.

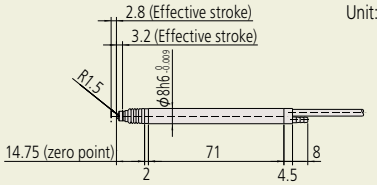
Unit: mm



519-341
MCHP-341

- M2.5×5 interchangeable contact points for dial indicators can be used.
- Recommended air pressure 0.05 MPa

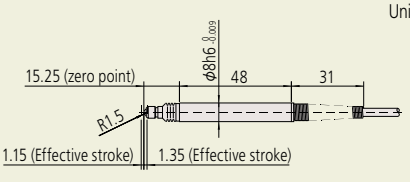
Unit: mm



519-348
MCHS-348

- M2.5×5 interchangeable contact points for dial indicators can be used.

Unit: mm



G

Display unit for Mu-checker (analog/digital)
SERIES 519 — Electronic micrometer

- Single touch zero-set function is standard.
- Switchable measurement ranges make the Mu-checker suitable for a range of applications, especially those that involve moderately fast-changing measurement values which suit the use of analog readout.
- Two types of analog display are available and one digital type.

Analog Mu-checker

Standard type
519-551
M-551

Differential type
519-553
M-553

SPECIFICATIONS

	Metric		Inch	
Order No.	**519-551***	**519-553***	**519-552***	**519-554***
Model	**M-551**	**M-553**	**M-552**	**M-554**
Type	Standard type (one probe required)	Differential type (one/two probes required)	Standard type (one probe required)	Differential type (one/two probes required)
Display range	±5 µm/±15 µm/±50 µm/±150 µm/±500 µm/±1500 µm		±5 µm/±15 µm/±50 µm/±150 µm/±500 µm/±1500 µm ±0.00015 in/±0.0005 in/±0.0015 in/±0.005 in/±0.015 in/±0.05 in	
Graduation	0.1 µm/0.5 µm/1 µm/5 µm/10 µm/50 µm		0.1 µm/0.5 µm/1 µm/5 µm/10 µm/50 µm 0.000005 in/0.00001 in/0.00005 in/0.0001 in/0.0005 in/0.001 in	
Differential mode	±A	±A, ±B, ±A±B	±A	±A, ±B, ±A±B
Display accuracy (linearity)	±1% of full-scale reading			
Analog output	±1.0 V at full-scale reading			
Analog output accuracy	Within ±0.1% of full-scale reading (excluding probe)			
Zero-setting adjustment range	±15%/FS (error: ±0.2%/FS)			
External dimensions	134 (W) ×183 (D) ×208 (H) mm			
Mass	2.4 kg			
Power input	AC adapter 100, 120, 220, 240 V AC 50/60 Hz			
Probe	Various probes (refer to pages G-21 and G-22)			

* To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix are required for PSE.

Digital Mu-checker

Digital Mu-checker
519-561
M-561

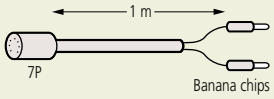
SPECIFICATIONS

	Metric	Inch
Order No.	**519-561***	**519-562***
Model	**M-561**	**M-562**
Type	Differential type digital Mu-Checker (2 connecting heads)	
Display range	±2.000 mm/±0.2000 mm	±2.000 mm/±0.2000 mm/±0.08 in/±0.008 in
Resolution	0.001 mm/0.0001 mm	0.001 mm/0.0001 mm/0.00005 in/0.000005 in
Differential mode	±A, ±B, ±A±B	
Measurement mode	ABS/CMP	
Analog output	±1 V at full-scale reading	
Digital output	Digimatic code out	
External dimensions	134 (W) ×183 (D) ×208 (H) mm	
Mass	Approx. 2.6 kg	
Power input	AC adapter 100, 120, 220, 240 V AC 50/60 Hz	
Probe	Various probes (refer to pages G-21 and G-22)	

* To denote your AC power cable add the following suffixes to the order No.: A for UL/CSA, D for CEE, DC for CCC, E for BS, K for KC, C and No suffix are required for PSE.

Optional Accessories

- SPC Cable for connecting digital Mu-checker (**936937**)
  Used for connecting to the Digimatic mini-processor. (Not suitable for analog Mu-checkers)
- Output cable A (**934795**)
  Used for connecting to external devices, such as data recorders, etc.



- Analog, limit out (7P) connector (**529035**)
  Used for output to external data recorders, sequencers, etc.

Main features

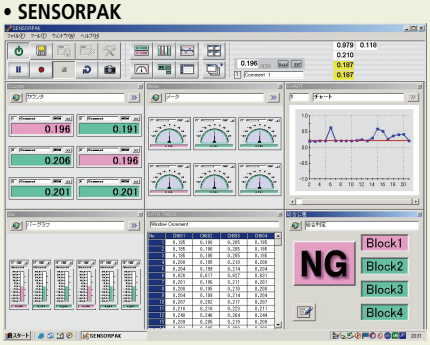
- External control (Zero-set, Preset etc.)
- Direction switching
- Error messaging
- Tolerance judgment output
- Each data output (RS-232C, BCD, segment)
- Peak measurement (maximum value, minimum value, runout) and arithmetic operation (addition, average, maximum value, minimum value, maximum width) between axes

Optional Accessories

- Output connector: **02ADB440**
- D-EV External display unit*1: **02ADD400**
- SPC cable (0.5 m): **02ADD950**
- SPC cable (1 m): **936937**
- SPC cable (2 m): **965014**
- AC adapter: **357651**
- AC cable (Japan): **02ZAA000***2
- AC cable (USA): **02ZAA010***2
- AC cable (EU): **02ZAA020***2
- AC cable (UK): **02ZAA030***2
- AC cable (China): **02ZAA040***2
- AC cable (Korea): **02ZAA050***2
- Terminal connecting cable: **02ADD930***2

*1 Refer to page G-25 for details of **D-EV**.
*2 Required when using AC adapter.

- **SENSORPAK**



Note: Refer to page G-16 for more details.

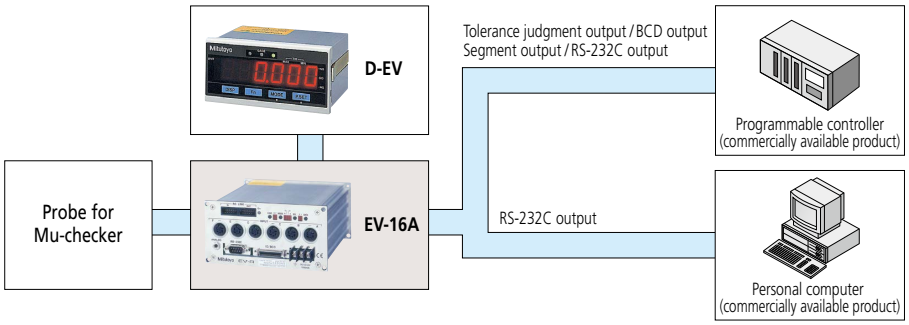
EV-16A Counter
SERIES 519 — 6-channel, No-display Type

519-355
EV-16A

- Up to six probes can be connected to one unit. Up to ten counters can be connected to one personal computer using the RS Link function to enable the configuration of a multi-point measurement system comprising a maximum of 60 gages.
- I/O outputs for RS-232C, BCD, tolerance judgment and segment output are available.
- Maximum, minimum and runout measurement between channels (in the same unit) is possible in addition to normal measurement on individual channels.

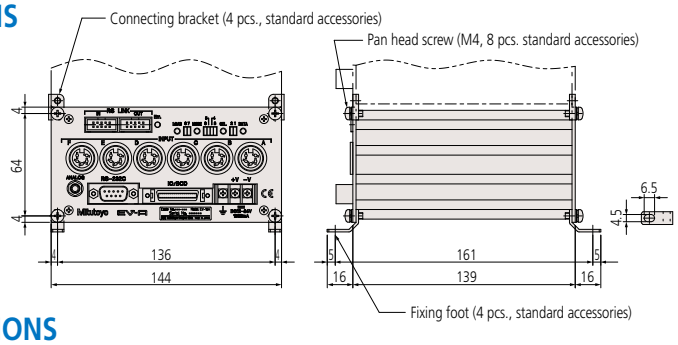
SYSTEM CONFIGURATION

Mitutoyo probes, **EV-16A** counters and **D-EV** display units combined with commercial controllers and personal computers enable construction of a powerful, multi-channel system that can be built to meet the needs of almost any measurement application.



DIMENSIONS

Unit: mm

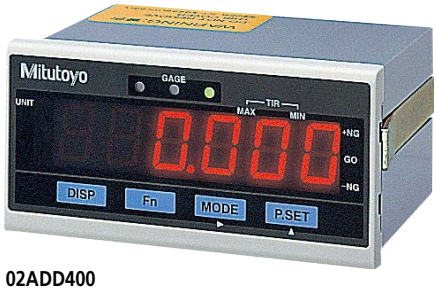


SPECIFICATIONS

Order No.		519-355
Model		EV-16A
Number of gage inputs		6
Display range (mm)		±2.000, ±0.200
Resolution (mm)		0.001, 0.0001
Display processing		8 digits for parameters (display setting), 1 for error display
Error messaging		Power supply voltage error, Gage error, etc.
External display		Dedicated external display unit **D-EV** (optional) can be connected
Number of input switches		4
Input switch function		Measurement mode switching, Parameter settings
I/O	Tolerance judgment output	1 to 6 gages (L1, L2, L3), open-collector
	BCD output	Parallel BCD output (positive/negative-true logic), open-collector
	Segment output	A function to enable only output from the terminal corresponding to the counting values, open-collector
	Control output	Normal operation signal (NOM), open-collector
	Control input	Output channel designation (segment, in BCD mode), presetting, peak value clear, range changeover (at segment output), holding counting value, open-collector or no-voltage contact signal (with/without contact point)
Interface	RS-232C	Measurement data output and control input, EIA RS-232C-compatible Use cross cables for home position DTE (terminal definition)
	RS link	Max. connected units: 10 Connecting cable length: Max. 10 m (sum of link cable length) Data transfer time: 1.1 sec./60 ch (when transmission rate is 19200 bps)
Power supply	Voltage	12 to 24 V DC (Terminal block: M3)
	Consumption	1 A
Operating temperature (humidity) ranges		0 to 40 °C (RH 20 to 80%, non-condensing)
Storage temperature (humidity) ranges		-10 to 50 °C (RH 20 to 80%, non-condensing)
External dimensions		144 (W) ×72 (H) ×139 (D) mm
Mass		Approx. 1000 g
Standard accessories		Fixing foot (4), connecting bracket (4), fixing screw M4×8 (8)
Applicable probes		For probes, refer to pages G-21 and G-22.

D-EV
Display unit for the EV counter

- Display unit for the **EV** counter.
- Connecting this display unit helps configuration of the **EV** counter.
- Able to display each gage measurement value and GO/NG judgment result, total GO/NG judgment result for all gages, setting details, and errors.



02ADD400

Optional Accessories

- AC adapter: **357651**
- AC cable (Japan): **02ZAA000***
- AC cable (USA): **02ZAA010***
- AC cable (EU): **02ZAA020***
- AC cable (UK): **02ZAA030***
- AC cable (China): **02ZAA040***
- AC cable (Korea): **02ZAA050***
- Terminal connecting cable: **02ADD930***

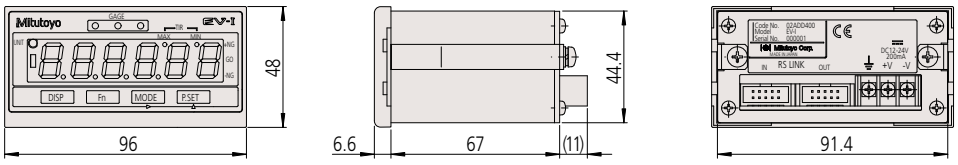
* Required when using AC adapter.

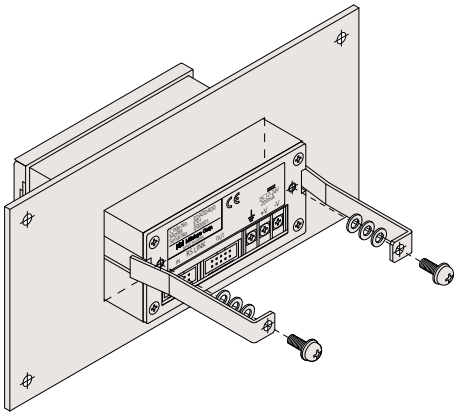
SPECIFICATIONS

Order No.	**02ADD400**
Model	**D-EV**
Number of connections	1 **EV** counter per unit
Number of digits	Sign plus 6 digits (8 digits internal to **EV** counter)
LED display	Channel display (also for judgment result display): 3 (3-color LED) Measurement mode display (current data, maximum value, minimum value, runout): 2 Status display: 1 (2 colors)
Operation switches	4
Function of operation switch	Channel switching, measurement mode switching (current data, maximum value, minimum value, runout), parameter setting, presetting, tolerance setting
Input/output	RS Link connectors: 1 each for IN, OUT
Error message	Overspeed, gage error etc.
Power supply	12 to 24 V DC, 200 mA (Terminal block: M3)
Operating temperature (humidity) ranges	0 to 40 °C (RH 20 to 80%, non-condensing)
Storage temperature (humidity) ranges	–10 to 50 °C (RH 20 to 80%, non-condensing)
External dimensions	96 (W) ×48 (H) ×84.6 (D) mm
Mass	150 g

DIMENSIONS

Unit: mm



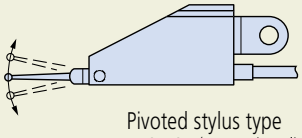


Quick Guide to Precision Measuring Instruments

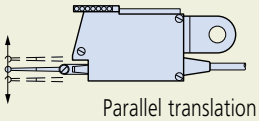
Mu-checker

Probe
A sensor that converts movement of a contact point, on a stylus or plunger, into an electrical signal.

Lever probes
Lever probes are available in two types. The most common type uses a pivoted stylus so the contact point moves in a circular arc; this type is subject to cosine effect and, therefore, measurements may require linearity correction if the direction of measurement is much different to the direction of movement of the contact point. The less common type uses a parallel translation leaf-spring mechanism so contact point movement is linear; this type requires no correction.

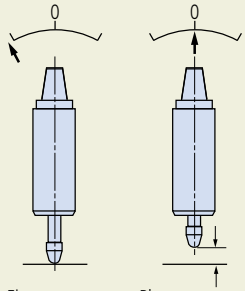


Pivoted stylus type
519-521 (measuring direction can be switched with the up/down lever)
519-522 (measuring direction is not switchable)



Parallel translation type
519-326 (measuring direction can be switched with the upper dial)

Pre-travel
The distance from first contact with a workpiece until the measurement indicator reads zero.



First contact. Plunger moves until the indicator reads zero.

Measuring force
The force applied to the workpiece by the probe when the indicator registers zero. It is indicated in newtons (N).

Digimatic code
A communication protocol for connecting the output of measuring tools with various Mitutoyo data processing units. This allows output connection to a Digimatic Mini Processor **DP-1VA LOGGER** for performing various statistical calculations and creating histograms, etc.

Open-collector output
A direct connection to the collector of a driving transistor.

Comparative measurement
A measurement method where a workpiece dimension is found by measuring the difference in size between the workpiece and a master gage that represents the nominal dimension.
This method is usually applied when the measurement to be made is greater than the measuring range of the instrument.

Linearity
The ratio of proportionality between measuring system output and measured distance.
If this is not constant within acceptable limits then correction is required.

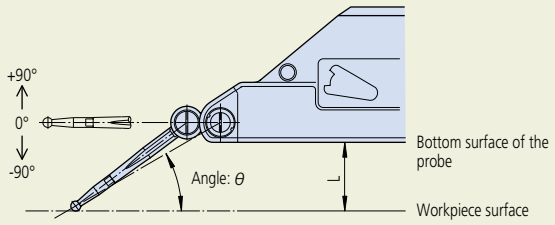
0 (zero) point
A reference point on the master gage in a comparative measurement.

Sensitivity
The ratio of the electric micrometer output signal to the input signal to the amplifier. The sensitivity is normal if a value as expected from the given displacement is displayed.

Tolerance setting
Tolerance limits can be set on the electronic micrometer to provide an automatic judgment as to whether a measured value falls within the tolerance.

Lever-head angle
Before measurement, be sure to confirm that probe sensitivity adjustment has been completed.
Changing the probe angle will cause variation in the measured values.
Adjust the probe angle to obtain an optimum sensitivity before starting measurement. If it is difficult, adjust the sensitivity with the probe angle set to 0°, and after measurement, correct the measured values according to the actual probe angle (by multiplying the measured value by a correction factor).

Tips Correction using a correction factor may result in lower accuracy than when adjusting sensitivity with the actual probe angle.



Angle: θ	Distance from the workpiece surface: L *	Correction factor
0°	—	1.00
10°	Approx. 3.1 mm	Approx. 0.98
20°	Approx. 8.8 mm	Approx. 0.94
30°	Approx. 13.9 mm	Approx. 0.87
40°	Approx. 18.3 mm	Approx. 0.77
50°	Approx. 21.6 mm	Approx. 0.64
60°	Approx. 23.8 mm	Approx. 0.50

* Value when using a carbide probe with spherical diameter of ø2 that is installed before shipment. When using a ø1 (or ø3) carbide probe, subtract (or add) 1/2 of the difference in spherical diameter.