SURFTEST SJ-500/SV-2100
SURFACE ROUGHNESS MEASURING SYSTEM

Surface roughness testers offer benchtop or portable operation and the choice of data analysis by PC or an easy-to-use dedicated processor.
Dedicated data processor type
Surftest SJ-500/SV-2100

**Improved operability**

* 7.5 Color TFT LCD
  The dedicated data processor has a high-visibility 7.5" color TFT LCD. Icon display and touch panel operation provide user-friendly display and easy operation.
* Positioning by joystick and manual control knobs on the processor
  Easy-to-operate joystick. Fine positioning of stylus required for small-hole measurements can be easily performed using the manual fine-adjustment knobs.
* Multiple trace function
  A machine can be programmed to take up to three traces, one after the other.
* Auto leveling table (optional)
  Automatically levels the surface to be tested for easy, strain-free setup.

**Various types of analysis**

* Capable of fine-contour analysis
  Supports 43 types of analysis parameters, complying with surface roughness standards such as ISO 1997 and JIS 2001. Also capable of various fine-contour analysis.
  * Contour analyses: Area, circle, angle, coordinate difference, step, inclination

**High-durability**

* Ceramic guideway
  A ceramic guideway, inherently free from wear and deterioration with age, is employed to maintain the traversing straightness of the drive unit (X-axis) indefinitely. Maintenance-free design, since anti-corrosion treatment is not required for ceramic.

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**SJ-500**
Traverse: 1.97" (50mm)
Compact, high-performance type

**SV-2100M4**
Traverse: 3.94" (100mm)
Manual column type

**SV-2100S4/H4/W4**
Traverse: 3.94" (100mm)
Power column type

**Dedicated data processor**
Advanced processing and easy operation
Easy operation, high-accuracy analysis of surface roughness and fine contours!

High-visibility color display panel
A high-visibility 7.5” color TFT LCD, color icon display and touch-operated panel provide user-friendly, easy operation. Built-in thermal printer. Fine contour analysis provided as standard.

Efficient positioning by joystick and adjustment knobs
Both a fast-traverse joystick (X-axis: .78”/s (20mm/s) for SJ-500, 1.98”/s (40mm/s) for SV-2100, Z-axis: .78”/s (20mm/s) for SV-2100S4/H4/W4) and manual fine-adjustment knobs, essential for positioning in small hole measurement, are standard features.

Positioning in small hole measurement
- Positioning in Y/Z-directions with column fine-adjustment knob (or detector elevation knob) and optional cross-travel table.
- Positioning at the trace start point with X-axis fine-adjustment knob.

Supports 16 languages
Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Simplified Chinese, Traditional Chinese, Czech, Polish, Hungarian, Turkish, Swedish, Dutch

Multiple trace programming function
A machine can be programmed to take up to three consecutive traces by one-key operation, as shown in the figure below.

- SJ-500/SV-2100M4
  Consecutive tracing in X-axis direction only

- SV-2100S4/H4/W4
  X-axis tracing with programmed Z-axis shifts possible

Measurement
Traverse

Example of 3-axis adjustable table
The user is guided through the leveling procedure to determine the amount of adjustment needed.

Navigation function aids leveling
When using an optional 3-axis adjustment table or leveling table, a navigation screen is available to help the operator level the surface to be tested.

Example: SV-2100S4 input screen

Example:

Example of 3-axis adjustable table
A portable tester also boasting high performance in desktop applications

Surftest SJ-500

High accuracy, high performance, user-friendly display and easy operation

Class-leading traverse straightness:
8µin/2" (0.2µm/50mm)
High-speed traverse at up to 0.78"/s (20mm/s)
under joystick control
Smooth positioning using the vertical adjustment knob

Vertical adjustment knob
Essential for positioning the stylus close to the workpiece!

Support for testing problematic features
Supports measurement in the axial direction for shrouded features, such as found on crankshafts, by simply swiveling the detector through 90 degrees.

Drive unit inclination adjustment mechanism
Digital Adjustment Tilting (DAT) function is supplied as standard for efficient leveling of workpieces: ±1.5°
DAT function: Patent pending (Japan, U.S., Germany)

DAT function
On
Preparatory measurement
Adjustment value display
Adjust according to displayed value using leveling knob
Actual measurement
OK
Reduction of setting time
Accurate leveling
Easy operation

Off
Preparatory measurement
Adjust using leveling knob
Verification measurement
OK
Checking counter
Repeat
NG
A desktop tester that's easy to use for portable applications

Surftest SV-2100

By setting the origin point at start-up, the Absolute scale system allows accurate positioning for repeated or multiple measurements.

High-speed traverse at up to 1.98"/s (40mm/s) (X-axis) under joystick control
Smooth positioning, using the Z-axis fine-adjustment knobs
Stable, high-accuracy measurement with a traverse straightness of 6µin/4" (0.15µm/100mm)

1. Capable of a series of automatic measurements, plus auto leveling (optional) and stylus retraction. Accurate positioning for repeated or multiple measurements possible.

2. SV-2100S4/H4/W4 models are equipped with an emergency stop button.

3. Base sizes and vertical travel range on column

<table>
<thead>
<tr>
<th>Model No.</th>
<th>Vertical travel range</th>
<th>Vertical traverse method</th>
<th>Base size</th>
</tr>
</thead>
<tbody>
<tr>
<td>SV-2100S4</td>
<td>13.8&quot; (350mm)</td>
<td></td>
<td>23.6&quot; x 17.72&quot; (600x450mm)</td>
</tr>
<tr>
<td>SV-2100H4</td>
<td>21.6&quot; (550mm)</td>
<td>Power and manual</td>
<td>39.4&quot; x 17.72&quot; (1000x450mm)</td>
</tr>
<tr>
<td>SV-2100W4</td>
<td>13.8&quot; (350mm)</td>
<td>Manual only</td>
<td>23.6&quot; x 17.72&quot; (600x450mm)</td>
</tr>
<tr>
<td>SV-2100M4</td>
<td>13.8&quot; (350mm)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dedicated data processor

Data processing unit

- Data saving (internal memory)
- High-speed printing
- Expansion slot for external memory (CF card)

- High-visibility 7.5” color LCD
- Touch panel with color icon display
- Joystick

- Display supports 16 languages
- Key panel

Customizable menu screen

The menu customization function allows display of frequently used menu icons

One-touch display of various screens

Home screen

Evaluation setup screen
Measurement setup screen
Calibration screen
Contour analysis screen

Statistical processing

Statistical data processing possible (up to 300 data samples)
Statistical processing items: MAX, MIN, average, standard deviation, histogram, probability of acceptance.

Statistical data input
Statistical results

Saving and recalling measurement setups

Up to 10 measurement setups can be saved to and recalled from internal memory.

One-touch recall of stored setups

Click the desired measurement setup file
Measurement screen opens
Analysis to international standards
Evaluates surface roughness using up to 43 parameters complying with international standards such as ISO 1997 and JIS 2001. Bearing Area Curve (BAC), Amplitude Distribution Curve (ADC), and power spectrum (wavelength display) are readily available in graph form.

Easy, icon-based input of setup conditions
Setups are aided by icons representing ISO/JIS roughness standard parameters with appropriate values selected from recommended lists.

A large variety of optional accessories
Options supporting measurement including an auto leveling table, a 3-axis adjustment table, and a leveling table. Furthermore, these can be easily operated via a navigation function. (Supported accessories differ depending on the model.)

Fine-contour analysis
Various contour analyses (area, circle, angle, coordinate difference, step, inclination) are supplied as standard.

Built-in thermal printer
Measurement data is printed by the high-definition, high-speed thermal printer. In addition to calculation results and evaluation results, BAC, ADC and other curves can also be printed.
**PC data processing type**

**Surftest SJ-500P**

A superior data processing tester with PC data analysis for higher efficiency.

* If a power column type with PC data-processing is desired, consider the SV-3100 series

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**FORMTRACEPAK: Best-seller for surface roughness analysis**

A best-seller dedicated software especially for surface roughness measurement and analysis capable of free print format settings for original inspection certificates.

- Measurement and results display screen
- Setup definition screen
- Printing screen
# Specifications

## Specifications

<table>
<thead>
<tr>
<th>Type of data processing</th>
<th>Dedicated data processor</th>
<th>PC system</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model No.</strong></td>
<td>SJ-500</td>
<td>SJ-500P</td>
</tr>
<tr>
<td>SJ-500</td>
<td>SJ-500</td>
<td>SJ-500</td>
</tr>
<tr>
<td>SV-2100M4</td>
<td>SV-2100M4</td>
<td>SV-2100M4</td>
</tr>
<tr>
<td>SV-2100S4</td>
<td>SV-2100S4</td>
<td>SV-2100S4</td>
</tr>
<tr>
<td>SV-2100H4</td>
<td>SV-2100H4</td>
<td>SV-2100H4</td>
</tr>
<tr>
<td>SV-2100W4</td>
<td>SV-2100W4</td>
<td>SV-2100W4</td>
</tr>
</tbody>
</table>

### Order No.*

- SJ-500: 178-533-01A
- SJ-500P: 178-533-02A
- SV-2100M4: 178-637-01A
- SV-2100S4: 178-681-01A
- SV-2100H4: 178-683-01A
- SV-2100W4: 178-685-01A
- SJ-500P: 178-531-01A

### Travel range (operation)

- **X axis**: 2" (50mm) (power drive/manual)
- **Z2 axis (column)**: 350mm (manual)

### Measuring range

- **Z1 axis (detector unit)**: 3200µin / 3200µin
- **Z2 axis (column)**: ––––––

### Resolution

- **X axis**: 1.97µin (0.05µm)
- **Z1 axis (detector unit)**: 0.4µin / 3200µin range, 0.4µin / 3200µin range, 0.004µin / 320µin range (0.01µm / 800µm range, 0.001µm / 80µm range, 0.0001µm / 8µm range)
- **Z2 axis (column)**: ––––––

### Power drive speed

- **X axis**: 0 - 0.78"/s (0 - 20mm/s (via joystick)
- **Z2 axis (column)**: 0 - 20mm/s (via PC)

### Traverse guideway straightness

- **X & Y axis**: 0.75 mN or 4 mN

### Stylus up/down operation

- **X & Y axis**: 0.75 mN: 60°, R2 µm or 4 mN: 90°, R5µm

### Applicable standards

- JIS’82 / JIS’94 / JIS'01 / ISO'97 / ANSI / VDA

### Analysis graphs

- Dedicated data processor type: ADC, BAC, power spectrum graph
- PC system type: ADC, BAC Graph, power spectrum graph, auto-correlation graph, slope distribution graph, local peak distribution graph, parameter distribution graph

### Curved surface compensation

- Dedicated data processor type: Parabolic compensation, Hyperbolic compensation, Elliptical compensation, Circular compensation
- PC system type: Parabolic compensation, Hyperbolic compensation, Elliptical compensation, Circular compensation, Inclination (Entire, Arbitrary), Polynomial compensation

### Contour analysis

- Dedicated data processor type: Area, Circle, Angle, Coordinate difference, Step, Inclination
- PC system type (SURFPAK-EZ): Area, Circle, Angle, Coordinate difference, Step, Inclination

### Filters

- Dedicated data processor type: 2CR-75%, 2CRPC-75%, Gaussian, Robust-spline
- PC system type: 2CR-75%, 2CR-50%, 2CRPC-75%, 2CRPC-50%, Gaussian, Robust-spline

### Base size (width x depth)

<table>
<thead>
<tr>
<th>Main unit</th>
<th>Display unit</th>
<th>Electronic unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Width</strong></td>
<td><strong>Height</strong></td>
<td><strong>Width</strong></td>
</tr>
<tr>
<td>16.7” x 3.7” x 6.3” (425x94x160mm)</td>
<td>32.8” x 17.7” x 34” (716x450x863mm)</td>
<td>14.5” x 9.6” x 2.8” (372x245x71.8mm)</td>
</tr>
</tbody>
</table>

### Mass

<table>
<thead>
<tr>
<th>Main unit</th>
<th>Display unit</th>
<th>Electronic unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Width</strong></td>
<td><strong>Height</strong></td>
<td><strong>Width</strong></td>
</tr>
<tr>
<td>5.9 lbs (2.7kg)</td>
<td>308.6 lbs (140kg)</td>
<td>308.6 lbs (140kg)</td>
</tr>
</tbody>
</table>
Dimensions

SJ-500

Dedicated data processor

Electronic unit

SV-2100W4

SV-2100M4

SV-2100S4 / SV-2100H4

SV-2100S4 / H4 / W4

Unit: mm

T-groove dimensions (common to all types)

Measuring range

Dimensions

Measuring range

T-groove dimensions (common to all types)
Optional Accessories

Manual column stand: 178-085 (for SJ-500)

Suitable for desktop use in inspection rooms and such.

**No.178-085** *Except measuring unit*
Vertical adjustment range: 11.8" (300mm)
Dimension (W x D x H): 23.6" x 17.7" x 28" (*600 x 450 x 710mm*)
Weight: 242 lbs (110kg)

DAT leveling table: 178-048

- **Inclination adjustment angle**: ±2°
- Maximum load: 15.4 lbs (7kg)
- Table dimensions: 5.12" x 3.94" (130 x 100mm)
- Mass: 7.7 lbs (3.5kg)

This table can be used by itself or in conjunction with other leveling tables.


This is a stage that performs fully automatic leveling as measurement starts, freeing the user from this tedious operation. Fully automatic leveling can be done quickly by anyone. In addition, the operation is easy and reliable.

<table>
<thead>
<tr>
<th>Inclination adjustment angle</th>
<th>±2°</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum load</td>
<td>15.4 lbs (7kg)</td>
</tr>
<tr>
<td>Table dimensions</td>
<td>5.12&quot; x 3.94&quot; (130 x 100mm)</td>
</tr>
<tr>
<td>Mass</td>
<td>7.7 lbs (3.5kg)</td>
</tr>
</tbody>
</table>

DAT leveling table: 178-043-1 (with analog heads) 178-042-1 (with digital heads)

<table>
<thead>
<tr>
<th>No.178-043-1</th>
<th>No.178-042-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Order No.</td>
<td>178-043-1</td>
</tr>
<tr>
<td>Table dimensions</td>
<td>5.12&quot; x 3.94&quot; (130 x 100mm)</td>
</tr>
<tr>
<td>Maximum load</td>
<td>33 lbs (15kg)</td>
</tr>
<tr>
<td>Inclination adjustment angle</td>
<td>±1.5°</td>
</tr>
<tr>
<td>Swiveling angle</td>
<td>±3°</td>
</tr>
<tr>
<td>X/Y-axis travel range</td>
<td>±0.49&quot; ±12.5mm)</td>
</tr>
<tr>
<td>Resolution</td>
<td>0.01mm</td>
</tr>
<tr>
<td>Dimensions</td>
<td>8.66&quot; x 7.4&quot; x 3.27&quot; (220 x 189 x 83mm)</td>
</tr>
<tr>
<td>Mass</td>
<td>13.2 lbs (6kg)</td>
</tr>
</tbody>
</table>

Quick chuck: 211-032

This chuck is useful when measuring small workpieces. The knurled ring makes clamping very easy.

<table>
<thead>
<tr>
<th>Retention range</th>
<th>OD: 0.039&quot; - 1.42&quot; (1 - 36mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner latch OD</td>
<td>0.039&quot; - 1.42&quot; (1 - 36mm)</td>
</tr>
<tr>
<td>Inner latch ID</td>
<td>0.55&quot; - 2.76&quot; (14 - Ø70mm)</td>
</tr>
<tr>
<td>Outer latch OD</td>
<td>0.039&quot; - 2.95&quot; (1 - Ø75mm)</td>
</tr>
<tr>
<td>Outer latch ID</td>
<td>0.55&quot; - 2.76&quot; (14 - Ø70mm)</td>
</tr>
<tr>
<td>Dimensions</td>
<td>4.64&quot; x 1.61&quot; (118 x 41mm)</td>
</tr>
<tr>
<td>Mass</td>
<td>2.65 lbs (1.2kg)</td>
</tr>
</tbody>
</table>

Micro-chuck: 211-031

This chuck is suitable for clamping extra-small diameter workpieces (Ø1mm or less), which cannot be clamped with the centering chuck.

<table>
<thead>
<tr>
<th>Clamping range</th>
<th>OD: 0 - 0.06&quot; (0 - 1.5mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>4.64&quot; - 1.91&quot; (118 x 48.5mm)</td>
</tr>
<tr>
<td>Mass</td>
<td>1.32 lbs (0.6kg)</td>
</tr>
</tbody>
</table>
Optional Accessories

3-axis adjustment table: 178-047

This table helps make the alignment adjustments required when measuring cylindrical surfaces. The corrections for the pitch angle and the swivel angle are determined from a preliminary measurement and the Digimatic micrometers are adjusted accordingly. A flat-surfaced workpiece can also be leveled with this table.

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inclination adjustment angle</td>
<td>±1.5°</td>
</tr>
<tr>
<td>Swiveling angle</td>
<td>±2°</td>
</tr>
<tr>
<td>Y-axis range</td>
<td>0.49&quot; ±(12.5mm)</td>
</tr>
<tr>
<td>Resolution of heads</td>
<td>0.001mm</td>
</tr>
<tr>
<td>Table dimensions</td>
<td>5.12&quot; x 3.94&quot; (130x100mm)</td>
</tr>
<tr>
<td>Maximum load</td>
<td>33 lbs (15kg)</td>
</tr>
</tbody>
</table>

System configuration including optional accessories (for SV-2100M4 / S4 / H4 / W4)

- 3-axis adjustment table: 178-047
- Detector (0.75mN): 178-396-2
- Detector (4mN): 178-397-2
- Vibration isolator: 178-023
- Vibration isolator: 178-025
- Vibration isolator: 178-024
- Table: 178-002
- Cross-travel table: 218-001 (mm), 218-011 (inch)
- Extension rod 1.97" (50mm): 12AAG202
- Extension rod 3.94" (100mm): 12AAG203
- V-block with clamp: 172-142
- Center support: 172-197
- Holder with clamp: 176-107
- V-block with clamp: 172-234
- V-block with clamp: 172-378
- Rotary table: 172-196
- Swivel center support: 172-144
- V-block: 172-143
- Leveling table: 178-043-1 (with analog heads), 178-042-1 (with digital heads), 178-040
- DAT leveling table: 178-081, 178-083
- DAT leveling table: 178-041 (mm), 178-051 (inch)
- Calibration stand: 12AA175
- Vibration isolation stand: 64AAB357
- Printer paper (5 rolls): 12AAA876
- Memory card: 12AAA841
- SPC cable: 12AA112
- Dedicated data processor

Related accessories:
- Printer paper (5 rolls): 12AAA876
- Dedicated data processor
- Memory card: 12AAA841
- SPC cable: 12AA112

Note: The image includes diagrams and tables illustrating the system configuration and optional accessories.
Optional Accessories

System configuration including optional accessories (for SJ-500 with optional manual column stand)

- 178-047: 3-axis adjustment table
- 218-001, 218-011: Cross-travel table
- 218-002: Table
- 178-003, 218-011: Cross-travel table
- 218-002: Table
- 178-004: Extension rod 3.94" (100mm)
- 178-005: Extension rod 1.97" (50mm)
- 178-046: Vibration isolator
- 178-041: Table 12AAG203
- 178-051: Table 12AAG204
- 178-040: DAT leveling table
- 178-016: Leveling table
- 178-018: Leveling table (with analog heads)
- 178-019: Leveling table (with digital heads)
- 178-024: Stand
- 178-023: Vibration isolator
- 178-025: Vibration isolator
- 178-041: Cross-travel table
- 178-051: Cross-travel table
- 178-041: Vibration isolator
- 178-051: Vibration isolator
- 998291: V-block
- 178-019: Precision vise
- 178-003: Rotary vise
- 178-018: Rotary vise
- 172-142: Center support
- 172-143: Center support riser
- 172-147: Swivel center support
- 172-140: V-block with clamp
- 172-145: V-block with clamp
- 172-146: Rotary table
- 64AAB357: Vibration Isolation Stand 30" x 48" x 30" (762x1219x762mm)

Roughness specimen (standard accessory): 178-601

<table>
<thead>
<tr>
<th>Display</th>
<th>Ra = about 3 µm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td>Ni (TiN surface coating)</td>
</tr>
</tbody>
</table>

Reference step specimen: 178-611 (mm), 178-612 (inch)

| Nominal value of step | 2µm 10µm, 79µin 394µin |

For sensitivity calibration of detector

Roughness specimen: 178-604

For checking stylus tip

| Display | Ra = about 3 µm, about 0.4 µm |
## Optional Styli

### Detectors

Detector (0.75mN): **178-396-2**  
Detector (4mN): **178-397-2**

### Extension rods

Extension rods  
(12AAG202: 1.97" (50mm), 12AAG203: 3.94" (100mm))

### Styli

#### Standard stylus

<table>
<thead>
<tr>
<th>Tip radius</th>
<th>1µm</th>
<th>2µm</th>
<th>5µm</th>
<th>10µm</th>
<th>250µm</th>
<th>Color coding</th>
<th>Tip angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AAE882</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>60°</td>
</tr>
<tr>
<td>12AAE924</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Black</td>
<td>90°</td>
</tr>
<tr>
<td>12AAC731</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No color</td>
<td></td>
</tr>
<tr>
<td>12AAB403</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>12AAB415</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No notch or color</td>
<td></td>
</tr>
<tr>
<td>12AAE883</td>
<td></td>
<td></td>
<td></td>
<td>(250µm)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Double-length for deep hole

<table>
<thead>
<tr>
<th>Tip radius</th>
<th>1µm</th>
<th>2µm</th>
<th>5µm</th>
<th>10µm</th>
<th>250µm</th>
<th>Color coding</th>
<th>Tip angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AAE898</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>60°</td>
</tr>
<tr>
<td>12AAE914</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Black</td>
<td>90°</td>
</tr>
<tr>
<td>12AAE892</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No color</td>
<td></td>
</tr>
<tr>
<td>12AAE908</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>12AAE884</td>
<td></td>
<td></td>
<td></td>
<td>(0.8mm)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### For small hole

<table>
<thead>
<tr>
<th>Tip radius</th>
<th>1µm</th>
<th>2µm</th>
<th>5µm</th>
<th>10µm</th>
<th>250µm</th>
<th>Color coding</th>
<th>Tip angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AAE882</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>White</td>
<td>60°</td>
</tr>
<tr>
<td>12AAE924</td>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Black</td>
<td>90°</td>
</tr>
<tr>
<td>12AAC731</td>
<td>**</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No color</td>
<td></td>
</tr>
<tr>
<td>12AAB403</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yellow</td>
<td></td>
</tr>
<tr>
<td>12AAB415</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No notch or color</td>
<td></td>
</tr>
</tbody>
</table>

#### For very small hole

<table>
<thead>
<tr>
<th>Tip radius</th>
<th>1µm</th>
<th>2µm</th>
<th>5µm</th>
<th>10µm</th>
<th>250µm</th>
<th>Color coding</th>
<th>Tip angle</th>
</tr>
</thead>
<tbody>
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<td>12AAE882</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No notch or color</td>
<td></td>
</tr>
</tbody>
</table>

#### For extra small hole

<table>
<thead>
<tr>
<th>Tip radius</th>
<th>1µm</th>
<th>2µm</th>
<th>5µm</th>
<th>10µm</th>
<th>250µm</th>
<th>Color coding</th>
<th>Tip angle</th>
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<td></td>
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<td>Yellow</td>
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</tr>
<tr>
<td>12AAB415</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No notch or color</td>
<td></td>
</tr>
</tbody>
</table>

#### For deep hole (double-length and triple-length)

<table>
<thead>
<tr>
<th>Tip radius</th>
<th>1µm</th>
<th>2µm</th>
<th>5µm</th>
<th>10µm</th>
<th>250µm</th>
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</tbody>
</table>

#### Customized special interchangeable stylus are available on request, Please contact any Mitutoyo office for more information.
## Styli

### For deep groove (10mm)

- **12AAC735 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

- **12AAE893 (250µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

### For deep groove (20mm)

- **12AAE892 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

- **12AAE911 (5µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

### For deep groove (30mm)

- **12AAE895 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

- **12AAE912 (5µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

### For gear tooth

- **12AB737 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

- **12ABE897 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

### For rolling circle waviness surface

- **12ABE888 (250µm)**
  - Tip radius

### For knife-edge detector

- **12ABC738 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

- **12ABE897 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

### For eccentric arm

- **12ACB739 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

- **12ABE899 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

### For bottom surface

- **12ABE899 (2µm)**
  - Tip radius
  - Tip angle: 60°
  - Tip angle: 90°

---

**Color coding**

- Black
- No color
- Yellow

---

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Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top-quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

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www.mitutoyo.com

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