Portable Surface Roughness Tester
SURFTEST SJ-310 Series

Catalog No. E15013(2)

A portable roughness tester with colour LCD and powerful measurement capability
The Surftest SJ-310 is a compact, portable, easy-to-use surface roughness measurement instrument equipped with extensive measurement and analysis features.

### Easy to use

**Large color graphic LCD**
The color touch-screen provides excellent readability and an intuitive display that is easy to negotiate. The LCD also includes a backlight for improved visibility in dark environments. The integrated printer allows you to print measurement results on the spot.

### Highly functional

**Internal memory**
Up to 10 measurement conditions and one measured profile can be stored in the internal memory.

**Optional memory card**
The optional memory card can be used as an extended memory to store large quantities of measured profiles and conditions and adds the convenience of automatically saving data from the 10 most recent measurements (Trace 10).

**Password protection**
Access to each feature can be password-protected, which prevents unintended operations and allows protection of your settings.

**Multilingual support**
The display interface supports 16 languages, which can be freely switched.

**Stylus alarm** (patent pending in Japan, U.S.A., EU)
An alarm warns you when the cumulative measurement distance exceeds a preset limit.

### Enhanced power for making measurements on site

Despite its reduced charging time — approximately 1/4 that required for conventional models, the Surftest SJ-310 is capable of making approximately 2.5 times the number of measurements when fully charged. The detector supports a variety of measurement orientations and can make measurements up against a wall surface or while facing upward. When combined with optional accessories such as a height gauge adapter, the detector can make measurements in various orientations and settings.

### Extensive analysis and display features

**Complies with many industry standards**

**Displays assessed profiles and graphical data**
In addition to calculation results, the Surftest SJ-210 can display sectional calculation results and assessed profiles, load curves, and amplitude distribution curves.
The large 5.7-inch color graphic touch-screen LCD provides excellent readability. Furthermore, selecting icons from the touch panel display*1 provides intuitive and easy operation. The integrated high-speed printer also allows the user to perform the entire process from making measurements to printing the results with the push of a single button (START button). *1 Text display can also be selected.

You can save parameter recalculations and measurement results in text format on a memory card and import into commercial spreadsheet software on a PC. You can also connect to a PC using the USB connector and use a dedicated software application to perform everything from measurement control and condition modification to issuing inspection result reports.

A wide range of optional detectors is available, including detectors for small holes, extra small holes, gear tooth surfaces, and deep grooves.

With drastically enhanced power compared to conventional models, the Surftest SJ-310 can make 1,500 continuous measurements on a full charge achieved in 4 hours.

*2: Refer to P11 for more details
Measurement assistance and analysis features offering the ultimate in ease of use

Switches between icon and text display
The display can be switched between icon and text, providing easy, user-friendly operation. Additionally, the guidance feature provides detailed explanations of touch-screen buttons.

Easy specification of assessment conditions from a list
Setting assessment conditions is simple because you can select the desired condition from a displayed list (e.g., standard, parameter).

Zooming waveforms and analyzing coordinate differences
You can not only magnify or shrink waveforms, but also calculate the coordinate difference between two points using a ruler operation. You can quickly check the irregularity status without waiting for a printout.

Deleting unnecessary data
With the Surftest SJ-310, you can delete portions of measurement data. This feature allows you to make new calculations by deleting data that should not be included in parameter calculation, such as data on a scratch.

Displaying pass/fail results
By specifying a tolerance in advance, you can display pass/fail results in color.

Surface texture symbol entry
Measurement results can be displayed in several ways

Measurement results can be presented in the form of a 1-parameter, profile, 4-parameter or trace display.

Recalculation function

After completing measurement, you can modify the assessment conditions (standard, profile, and parameter) and easily recalculate the results using the new condition.*

Dual assessment of a single measurement

Using the result of a single measurement, you can make calculations or analyze assessment profiles under two different assessment conditions (standard, profile, filter, etc.) without using the recalculation feature.

Stylus alarm function

Displayed settings can be easily changed by pressing the left and right arrow keys under the sliding cover. For example, these keys can be used to switch the cut-off value (λ) and the number of sampling lengths (N) on the measurement screen. (Patent pending in Japan.)

Positive stylus contact indication

Stylus contact with the workpiece is indicated by color coding in the display. This is helpful when visibility of the surface to be measured is restricted (e.g. when measuring within a shrouded feature or groove).

Extensive statistical processing features

You can make a maximum of 300 statistical measurements using up to three parameters to obtain averages, standard deviations, maximums, minimums, passing rates, and histograms (upper and lower limits can be displayed). This feature is ideal for day-to-day data management.
Specifications

<table>
<thead>
<tr>
<th>Type of detector</th>
<th>Standard drive unit type</th>
<th>Retractable drive unit type</th>
<th>Transverse tracing drive unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model No.</td>
<td>SJ-310 (0.75mN type)</td>
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<td>SJ-310 (4mN type)</td>
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<tr>
<td>Order No.</td>
<td>mm</td>
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<td>178-570-01</td>
<td>178-570-01</td>
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<thead>
<tr>
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<tbody>
<tr>
<td>Mass</td>
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</table>

<table>
<thead>
<tr>
<th>Standard accessories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Philips screwdriver, Strap for stylus pen, Operation manual, Quick reference manual, Warranty</td>
</tr>
</tbody>
</table>

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<td>------------------</td>
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<tr>
<td>Model No.</td>
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<tr>
<td>Measuring range</td>
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<tr>
<td>Detector</td>
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<tr>
<td>Measuring speed</td>
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<td>LCD dimensions</td>
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<tr>
<td>Display languages</td>
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<td>Measurement result display</td>
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<td>Printing function</td>
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<td>External I/O</td>
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<td>Functions</td>
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<td>Storage</td>
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<td>Calibration</td>
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<tr>
<td>Power-saving</td>
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<tr>
<td>Power supply</td>
</tr>
<tr>
<td>Size (WxHxD)</td>
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<td></td>
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</tbody>
</table>

*1: Only for VDA/ANSI/JS/ISO 82 standards.  
*2: Only for JS/ISO 97 standard.  
*3: Only for JS/ISO 01 standard.  
*4: For connecting the calculation display unit and drive unit.  
*5: As may be not be switchable depending on a standard selected.  
*6: Standard deviation only can be selected in ANSI.16% rule cannot be selected in VDA.  
*7: Auto-sleep function is invalid when AC adapter is used.  
*8: For connecting the calculation display unit and drive unit.  
To denote your AC line voltage add the following suffixes (e.g. 178-570-01A):  
A for 120V, C for 100V, D for 230V, E for 230V (for UK), DC for 220V (for China), K for 220V (for Korea)
## Drive unit, Display unit

<table>
<thead>
<tr>
<th>Drive unit type</th>
<th>Drive unit external view*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standard drive unit</td>
<td><img src="image" alt="Standard drive unit" /></td>
</tr>
<tr>
<td>Retractable drive unit</td>
<td><img src="image" alt="Retractable drive unit" /></td>
</tr>
<tr>
<td>Transverse tracing drive unit</td>
<td><img src="image" alt="Transverse tracing drive unit" /></td>
</tr>
</tbody>
</table>

*External dimension for the models with standard detector conforms to each drive unit.

- **Display unit external view**
- **Dimensions: Display Unit and Drive Unit**
- **Cable length: 1m**
### Standard detectors

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Measuring force</th>
<th>Stylus form*</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>178-296</td>
<td>0.75 mN</td>
<td>2 µmR/60°</td>
<td>Dedicated to the standard/retractable drive unit</td>
</tr>
<tr>
<td>178-390</td>
<td>4 mN</td>
<td>5 µmR/90°</td>
<td>Dedicated to the transverse tracing drive unit</td>
</tr>
<tr>
<td>178-387</td>
<td>0.75 mN</td>
<td>2 µmR/60°</td>
<td>Dedicated to the standard/retractable drive unit</td>
</tr>
<tr>
<td>178-386</td>
<td>4 mN</td>
<td>5 µmR/90°</td>
<td>Dedicated to the transverse tracing drive unit</td>
</tr>
<tr>
<td>178-391</td>
<td>4 mN</td>
<td>10 µmR/90°</td>
<td>Dedicated to the standard/retractable drive unit</td>
</tr>
</tbody>
</table>

*Tip radius / Tip angle

### Small hole detectors

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Measuring force</th>
<th>Stylus form*</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>178-383</td>
<td>0.75 mN</td>
<td>2 µmR/60°</td>
<td>Minimum measurable hole diameter: ø4.5mm</td>
</tr>
<tr>
<td>178-392</td>
<td>4 mN</td>
<td>5 µmR/90°</td>
<td>Minimum measurable hole diameter: ø4.5mm</td>
</tr>
</tbody>
</table>

*Tip radius / Tip angle

### Extra small hole detectors

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Measuring force</th>
<th>Stylus form*</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>178-384</td>
<td>0.75 mN</td>
<td>2 µmR/60°</td>
<td>Minimum measurable hole diameter: ø2.8mm</td>
</tr>
<tr>
<td>178-393</td>
<td>4 mN</td>
<td>5 µmR/90°</td>
<td>Minimum measurable hole diameter: ø2.8mm</td>
</tr>
</tbody>
</table>

*Tip radius / Tip angle

### Gear-tooth surface detectors

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Measuring force</th>
<th>Stylus form*</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>178-388</td>
<td>0.75 mN</td>
<td>2 µmR/60°</td>
<td>Dedicated to the standard/retractable drive unit</td>
</tr>
<tr>
<td>178-398</td>
<td>4 mN</td>
<td>5 µmR/60°</td>
<td>Dedicated to the standard/retractable drive unit</td>
</tr>
</tbody>
</table>

*Tip radius / Tip angle

### Deep groove detectors

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Measuring force</th>
<th>Stylus form*</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>178-385</td>
<td>0.75 mN</td>
<td>2 µmR/60°</td>
<td>Not available for the transverse tracing drive unit</td>
</tr>
<tr>
<td>178-394</td>
<td>4 mN</td>
<td>5 µmR/90°</td>
<td>Not available for the transverse tracing drive unit</td>
</tr>
</tbody>
</table>

*Tip radius / Tip angle

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### How to identify the stylus tip radius

- Nose mounting screw (2 pcs.)
  - Black : 2µm
  - White : 5µm
  - Yellow : 10µm
### Dimensions: Display Unit and Drive Unit

#### Drive unit, Display unit

<table>
<thead>
<tr>
<th>Nosepiece for flat surfaces</th>
<th>Nosepiece for cylindrical surfaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 12AAA217</td>
<td>No. 12AAA218</td>
</tr>
<tr>
<td>• SJ-301/301R standard accessories</td>
<td>• SJ-301/301R standard accessories</td>
</tr>
<tr>
<td>• Not available for the transverse tracing drive unit.</td>
<td>• Not available for the transverse tracing drive unit.</td>
</tr>
</tbody>
</table>

**V-type adapter**

No. 12AAE644
- SJ-301S standard accessories
- Dedicated to the transverse tracing drive unit.

**Extension rod (50 mm)**

No. 12AAA210
- Not available for the transverse tracing drive unit.

**Support feet set**

No. 12AAA216
- SJ-301 standard accessory
- Not attachable to the detector side of the transverse tracing drive unit.

**Extension cable (1 m)**

No. 12BAA303
- For connecting calculation display unit and drive unit.

**Magnetic stand adapter**

No. 12AAA221 (ø8mm)  
No. 12AAA220 (ø9.5mm)

**Vertical positioning adapter**

No. 12AAA219
- Not available for the transverse tracing drive unit

**Height gage adapter**

No. 12AAA222 (9x39mm)  
No. 12AAA233 (1/4in x 1/2in)

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**Setting attachments**

Enhances measurement efficiency by facilitating the measurement setup of multiple workpieces of the same type and of the hard-to-access sections of a workpiece.

- **V-type for measuring axially**
  - No. 178-033
    - The V-width is adjustable to the cylindrical workpiece diameter, facilitating axial measurement of a wide range workpiece sizes.
    - Adjustable range: ø 5 ~ 150 mm
  - No. 178-034
    - This attachment is ideal for measuring a flat area of a workpiece that has an indentation or step that makes it difficult to attach the drive unit. You can further improve the ease of use by using this attachment with the magnetic installation base (option: No. 12AAA910).
  - No. 178-035
    - Greatly facilitates measurement of internal wall surfaces of, for example, a cylinder block.
    - Applicable diameter: ø 75 ~ ø 95 mm
    - Accessible depth: 30 ~ 135 mm

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(Note: Not available for the transverse tracing drive unit)
Optional Accessories: For External Output

**Simplified communication program for SURFTEST SJ series**

The Surftest SJ-310 series has a USB interface, enabling data to be transferred to a spreadsheet or other software. We also provide a program that lets you create inspection record tables using a Microsoft Excel* macro.

![Image of communication program]

**Required environment**:

- **OS**: Windows XP-SP3, Windows Vista, Windows 7, Windows 8

*Windows OS and Microsoft Excel are products of Microsoft Corporation.

The optional USB cable is also required.

- **USB cable for SJ-310 series**
  - No.12AAA882

This program can be downloaded free of charge from the Mitutoyo website.

http://www.mitutoyo.co.jp

**Contour / Roughness analysis software FORMTRACEPAK**

More advanced analysis can be performed by loading SJ-310 series measurement data to software program FORMTRACEPAK via a memory card (option) for processing back at base.

![Image of FORMTRACEPAK]

Refer to the FORMTRACEPAK (Catalog No.E15018) for more details.
Optional Accessories: For External Equipment

**Digimatic mini processor DP-1VR**

By connecting this printer to the Surftest SJ-210's digimatic output, you can print calculation results, perform a variety of statistical analyses, draw a histogram or D chart, and also perform complicated operations for X-R control charts.

*The symbol ‘µm’ is not printable, but measurement results can still be printed out without setting the measurement unit.

No.264-504
To denote your AC line voltage add the following suffixes (e.g. 264-504-SA).
5A for 120V, SD for 230V, SE for 230V (for UK), SDC for 220V (for China), SK for 220V (for Korea)

SJ-210 → DP-1VR Connecting cable
1m: No.936937
2m: No.965014

**Calculation results input unit INPUT TOOL**

This unit allows you to load Surftest SJ-310 calculation results (SPC output) into commercial spreadsheet software on a PC via a USB connector. You can essentially use a one-touch operation to enter the calculation results (values) into the cells in the spreadsheet software.

USB Input Tool Direct
USB-ITN-D
No.06ADV380D

USB keyboard signal conversion type*
IT-016U
No.264-016
*Requires the optional Surftest SJ-310 connection cable.
1m: No.936937
2m: No.965014

**Footswitch**

A footswitch is used to trigger measurement. This tool is very useful in cases where you need to measure the same workpiece multiple times using jigs and other fixtures.

No.12AAJ088

**Measurement Data Wireless Communication System U-WAVE**

This unit allows you to remotely load Surftest SJ-310 calculation results (SPC output) into commercial spreadsheet software on a PC.

You can essentially use a one-touch operation to enter the calculation results (values) into the cells in the spreadsheet software.

U-WAVE-R
(Connects to the PC)
No.02AZD810D

U-WAVE-T *
(Connects to the SJ-310)
No.02AZD880D
*Requires the optional Surftest SJ-310 connection cable.
No.02AZD790D

**Optional accessories and consumables for SJ-310**

- Printer paper (5 rolls) No.270732
- Durable printer paper (5 rolls) No.12AAA876
- Touch-screen protector sheet (10 sheets) No.12AAN040
- Memory card (2GB) * No.12AAL069
- Connecting cable (for RS-232C) No.12AAA882

*micro SD card (with a conversion adapter to SD card)
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