Sophisticated, powerful and economical surface measuring machines from Mitutoyo.
Testing surface finish for conformance to specification is vital.

Precise surface testing requires in-depth technological expertise. As the world’s most diversified supplier of production measuring technology, Mitutoyo sets the standard in knowledge and experience in its field. A carefully structured range of sophisticated solutions for modern surface measurement has been put together in this brochure. Users with difficult requirements will find here the right configuration for accurate measurement of roughness and waviness in production and laboratory.

This brochure gives an overview of the multi-faceted Mitutoyo range of surface testing machines – from practical hand-held portable units through to stand-alone skidless measuring systems that set the standard in their class. It will provide you with a fast, reliable and efficient guide to the best solution for your particular surface measuring requirements. More detailed machine-specific brochures offer further guidance on configuring the system of your choice, the wide range of accessories available and the impressive range of software.

Whichever system you choose, a Mitutoyo surface finish tester lets you draw on the experience, competence and performance of a world-leading measurement technology specialist, backed up by customer-focused service that will not fail to impress.

Mitutoyo: top of the class in measurement technology
We’ll help you achieve this goal, with top-class user- and task-oriented surface measurement technology

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SURFTEST SJ-210</td>
<td>The portable solution for precise, effective and uncomplicated surface testing in the production environment. With a large, easily legible 2.4&quot; (6 cm) colour graphic LCD for the clear representation of measurement values.</td>
</tr>
<tr>
<td>SURFTEST SJ-310</td>
<td>Portable surface testing instrument with touch-sensitive operation panel and integral printer. For rapid portable measurement in the production environment.</td>
</tr>
<tr>
<td>SURFTEST SJ-411</td>
<td>Machines equally suitable for use as portable or benchtop surface testers, especially where skidless measurement of surface roughness and waviness is required including the ability to assess bearing-area ratio and amplitude distribution.</td>
</tr>
<tr>
<td>SURFTEST SJ-412</td>
<td>Practically based design for test room and laboratory. Economically efficient skidless tester for portable and benchtop use with an impressive range of features and excellent standard software.</td>
</tr>
</tbody>
</table>
### Features

- Intuitive menu navigation
- High-resolution detector with broad measuring range
- Removable drive unit for measurements where space is restricted
- Standard USB, RS-232C, SPC interfaces

- Intuitive menu navigation
- 5.7" (14.5 cm) colour graphic LCD
- 10 different setups can be stored internally; up to 500 with optional SD card
- 16 languages supported

### Model | Traverse | Stand
---|---|---
SJ-210 | 17.5 mm | optional

### Features

- Top quality ceramic guideway
- Measuring head can swivel 90° for transverse measurement
- Analysis of primary profile (P), roughness profile (R), filtered waviness (W) and geometric characteristics
- TFT colour display (touch screen)
- USB, RS-232C, SPC interfaces

### Model | Traverse | Stand
---|---|---
SJ-310 | 17.5 mm | optional

### Model | Traverse | Stand
---|---|---
SJ-411 | 25 mm | optional
SJ-412 | 50 mm | optional

### Model | Traverse | Stand
---|---|---
SJ-500 | 50 mm | optional
SJ-500P | 50 mm | optional
Surftest SV Series advanced skidless systems

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<tr>
<td>SURFTEST SV-2100</td>
<td>Benchtop skidless system for capturing primary, roughness and waviness profiles and geometric characteristics. The series comprises models with manual and servo-powered columns.</td>
</tr>
<tr>
<td>SURFTEST SV-3100</td>
<td>Benchtop skidless system for sophisticated measuring tasks to capture primary, roughness and waviness profiles in the test room. FORMTRACEPAK software for control of all servo-powered axes and comprehensive analysis of surface measurements.</td>
</tr>
<tr>
<td>SURFTEST SV-3000CNC</td>
<td>High performance measuring system from the MITUTOYO CNC EXTREME series. This benchtop skidless system is designed for sophisticated measuring tasks to capture primary, roughness and waviness profiles fully automatically. All axes are servo powered.</td>
</tr>
<tr>
<td>SURFTEST SV-M3000CNC</td>
<td>High performance measuring system from the MITUTOYO CNC EXTREME series. Fitted with a moving/measuring column, this skidless system is designed for sophisticated measuring tasks to capture primary, roughness and waviness profiles fully automatically. All axes are servo powered with high-speed positioning capability.</td>
</tr>
</tbody>
</table>
Features

- Ceramic guideway with 100 mm measuring range
- Measuring head can swivel 180° for top/bottom measurement
- Analysis of primary profile (P), roughness profile (R), filtered waviness (W) and geometric characteristics
- TFT colour display (touch screen)
- USB, RS-232C, SPC interfaces

Model | Traverse | Height adjustment (servo powered) | Base plate dimensions
---|---|---|---
SV-2100M | 100 mm | 350 mm | 600 x 450 mm
SV-2100M4P* | 4P* | 350 mm | 600 x 450 mm
SV-2100S | 500 mm | 550 mm | 1000 x 450 mm
SV-2100H | 500 mm | 500 mm | 1000 x 450 mm
SV-2100W | 500 mm | 1000 x 450 mm
* manual

SV-3100S4 | 100 mm | 300 mm | 600 x 450 mm
SV-3100H4 | 500 mm | 600 x 450 mm
SV-3100W4 | 500 mm | 1000 x 450 mm
SV-3100S8 | 200 mm | 300 mm | 600 x 450 mm
SV-3100H8 | 500 mm | 600 x 450 mm
SV-3100W8 | 500 mm | 1000 x 450 mm

SV-3000SCNC | 200 mm | 300 mm | 750 x 600 mm
SV-3000HCNC | 500 mm | 500 mm | 750 x 600 mm

SV-M3000CNC | 200 mm | 500 mm | with 800 mm measuring Y axis (movable column)

* manual
Powerful, portable unit for precise, simple measurement in workshop or production environment – directly on the machine, directly on the workpiece

SJ-210

Detector stroke: 360 μm
Traverse: 17.5 mm

SURFTEST SJ-210
With 2.4" (6.0 cm) colour graphic LCD.

- Intuitive menu navigation
- Measurement execution by single key operation
- Sturdy workshop design
- User-friendly 2.4" (6.0 cm) colour graphic LCD
- Display direction rotatable
- Support for DIN EN ISO, VDA, ANSI, JIS, R-Motif
- Traverse: 17.5 mm
- The detachable drive unit gives excellent flexibility, especially when working space is restricted
- High capacity battery allows up to 1000 measurements without recharging
- Stores up to 10 setups
- Automatic calibration function
- Micro SD card, USB Interface
- 16 languages
- Easy recalculation function
- 3 different models expand the range of application
- mm or mm/inch models

Extract from the wide range of parameters
Rz1max, Rmax (VDA), Ra, Rz, Rt, Rmr, Rmr(c), RSm, Rk, Rpk, Rvk
Motif: R, Rx, AR
SURFTEST SJ-210 and SJ-310

SURFTEST SJ-310
With 5.7” (14.5 cm) colour graphic LCD.

- Intuitive menu navigation
- Touch-sensitive operation panel
- Complies with many industry standards such as DIN EN ISO, VDA, ANSI and JIS, as well as custom measurements
- 10 different conditions can be stored inside the SJ-310, up to 500 with optional SD-card
- Colour-coded tolerance judgement
- 2 different evaluation conditions within 1 measurement
- Each function separately protectable by password
- 16 languages supported
- Integrated printer

S-type drive unit for transverse scanning for SJ-210/SJ-310
The S-type drive unit is designed to enable transverse scanning, for example, measuring a shrouded bearing surface in the axial direction rapidly and reliably. The transverse scanning function simplifies surface roughness measurement even in very restricted areas, which has hitherto been a problem for conventional measuring units limited to longitudinal scanning.

Drive units SJ-210/SJ-310

Software USB Communication Tool is available as a free download on www.mitutoyo.co.uk

SJ-310
Detector stroke: 360 μm
Traverse: 17.5 mm

Extract from the wide range of parameters
Rz1max, Rmax (VDA), Ra, Rz, Rt, Rmr, Rmr(c), RSm, RK, RpK, RvK, A1, A2, Mr1, Mr2, etc.
Motif: R, Rx, AR, etc.
Rapid, portable skidless measurement of surface roughness and waviness. On site and on the move, benchtop or portable.

**SJ-410**

Detector stroke: 800 μm  
Traverse SJ-411: 25 mm  
Traverse SJ-412: 50 mm

**SURFTEST SJ-410**

*With automatic compensation for radius and inclination.*

- 5.7" (14.5 cm) colour graphic LCD
- Easy & intuitive to navigate through measurement conditions, results and analysis graphics
- Touch-sensitive operation panel
- Skidless detector to measure primary profile (P), roughness profile (R), filtered waviness profile (W) and more
- Complies with many industry standards such as DIN EN ISO, VDA, ANSI and JIS, as well as custom measurements
- 10 different setups can be stored inside the SJ-411 / SJ-412, up to 500 with optional SD-card
- Colour-coded tolerance judgement
- 2 different evaluation conditions within 1 measurement
- Each function separately protectable by password
- 16 languages supported
- Integrated printer
- Optional autoset unit as well as X-axis adjustment and digital levelling unit

**Extract from the wide range of parameters**

- $R_z^{1max}$, $R_{max}$ (VDA), $R_a$, $R_z$, $R_t$, $R_{mr}$, $R_{mr(c)}$, $R_{Sm}$, $R_k$, $R_{pk}$, $R_{vk}$
- $P_t$, $P_a$, $P_z$
- $W_t$

Software USB Communication Tool is available as a free download on [www.mitutoyo.co.uk](http://www.mitutoyo.co.uk)
SURFTEST SJ

SJ-410

Traverse rate 25 mm (SJ-411) to 50 mm (SJ-412)

SJ-411 with optional granite stand
Peak performance for portable use

**SJ-500**

Detector stroke: 800 μm
Traverse: 50 mm

**SURFTEST SJ-500**

Reference plane measuring system for analyzing roughness profile, waviness profile, primary profile and evaluation of geometric characteristics.

- Suitable for portable and benchtop use
- Ceramic guideway
- Straightness deviation 0.2 μm / 50 mm
- Newly developed, menu-driven angular adjustment
- Height adjustment (parallel adjustment) of the detector system over 15 mm
- The detector system can be mounted laterally for transverse measurement
- Automatic calibration function
- Detector stroke 800 μm
- Storage of up to 10 measurement variables
- Integrated statistics functionality
- User-friendly display and simple operation
  Equipped with a 7.5” (19 cm) high-resolution TFT colour display with touch screen for user friendly and simple operation.

**Secure positioning**

A joystick integrated into the control unit allows secure and rapid positioning of the detector. Manual fine adjustment uses the hand wheel to finely position the detector, for example when measuring small bores.

**Extensive choice of analysis options**

46 surface parameters are available to analyze surface roughness (e.g. \( R_{\text{max}} \), \( R_{z1\text{max}} \)), together with a wide range of form analyses, such as radius, angle and coordinate difference.

**Extract from the wide range of parameters**

- \( R_{z1\text{max}} \)
- \( R_{\text{max}} \) (VDA)
- \( R_{a} \)
- \( R_{z} \)
- \( R_{t} \)
- \( R_{mr} \)
- \( R_{mr(c)} \)
- \( R_{S}\text{m} \)
- \( R_{k} \)
- \( R_{pk} \)
- \( R_{vk} \)
- \( P_{t} \)
- \( P_{a} \)
- \( P_{z1\text{max}} \)
- \( W_{t} \)
- Motif: \( R \), \( R_{x} \), \( AR \), \( W \), \( W_{x} \), \( AW \), \( W_{te} \)
SURFTEST SJ-500

SURFTEST SJ-500P
PC model with FORMTRACEPAK software.

FORMTRACEPAK offers total support for measurement system control, surface roughness analysis, small contour analysis and inspection reports.
Semi-automatic benchtop system

SV-2100M

Detector stroke: 800 μm
Traverse: 100 mm

SURFTEST SV-2100M (semi-automatic)
Skidless tester with manual height adjustment for analyzing roughness profile, waviness profile, primary profile and evaluation of geometric characteristics.

User-friendly display and simple operation
• Equipped with a 7.5” (19 cm) high-resolution TFT colour display with touch screen for user friendly and simple operation.

Secure positioning
• A joystick integrated into the control unit allows secure and rapid positioning of the detector. Manual fine adjustment uses the joystick to finely position the detector, for example when measuring small bores.

Extensive choice of analysis options
• 46 surface parameters are available to analyze surface roughness (e.g. Rmax according to VDA), together with a wide range of form analyses, such as radius, angle, steps and coordinate difference.

Thermal printer
• Integrated high-speed printer with high graphic resolution.

SURFTEST SV-2100M4P
PC model with FORMTRACEPAK software
• FORMTRACEPAK offers total support for measurement system control, surface roughness analysis, small contour analysis and inspection reports.

Extract from the wide range of parameters
Rz1max, Rmax (VDA), Ra, Rz, Rt, Rmr, Rmr(c), RSm, Rk, Rpk, Rvk; Pt, Pa, Pz1max; Wt
Motif: R, Rx, AR, W, Wx, AW, Wte

Mitutoyo
SURFTEST SV

SV-2100

SURFTEST SV-2100S/H/W (semi-automatic)
Skidless tester with manual height adjustment for analyzing roughness profile, waviness profile, primary profile and evaluation of geometric characteristics.

User-friendly display and simple operation
- Equipped with a 7.5” (19 cm) high-resolution TFT colour display with touch screen for user friendly and simple operation.

Secure positioning
- A joystick integrated into the control unit allows secure and rapid positioning of the detector. Manual fine adjustment uses the joystick to finely position the detector, for example when measuring small bores.

Extensive choice of analysis options
- 46 surface parameters are available to analyze surface roughness (e.g. Rmax according to VDA), together with a wide range of form analyses, such as radius, angle, steps and coordinate difference.

Thermal printer
- Integrated high-speed printer with high graphic resolution.
SURTAST SV-3100

The high-end solution for the most exacting demands in surface testing.

- Measurement of primary profile (P), roughness profile (R) and filtered waviness (W)
- Automatic calibration function
- Detector stroke 800 μm
- Resolution 0.0001 μm
- Traverse 100 or 200 mm
- Setting up of very small cut-off possible (0.025 mm)
- Ceramic guideway
- Wide range of styli available for various measurement tasks
- Styli easily interchanged
- Wide range of accessories
- Automatic levelling table (optional)
- ABS scale in Z2 axis
- High-speed positioning
- Collision prevention
- FORMTRACEPAK software supports CNC functions
- Contour measurement within range of detector stroke
- Additional axis available at any time
CNC measuring system

SURFTEST SV-3000CNC
The system offers the same impressive features as the SV-3100 basic model but enhanced with innovative CNC technologies – coupled with the tangible cost benefits of standard production.

At last! High-precision surface measurement can be incorporated cost efficiently straight into rapid production processes. Additional capabilities are provided for quick use in a CNC manufacturing environment, such as the ability to use six different axes, or full collision protection.

- High-speed positioning up to 200 mm/s
- Ceramic X-axis guideway, straightness deviation 0.5 μm/200 mm
- As many as 6 axes can be operated simultaneously
- Standard model equipped with active vibration-damping system
- High performance FORMTRACEPAK software for controlling all axes and analyzing primary profile (P), roughness profile (R) and filtered waviness (W)

Additional axis available at any time
CNC measurement system with measuring column

**SV-M3000CNC**

**Detector stroke:** 800 μm  
**Traverse:** 200 mm  
**Y-axis measurement range:** 800 mm

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**SURFTEST SV-M3000CNC**  
This system offers all the outstanding features of the Surftest SV-3000CNC basic model.

Special feature: this high-precision surface roughness measuring instrument is equipped with a measuring Y axis. The entire column (Z2 axis) can move in the Y direction when measuring, thus allowing measurements to be performed over a large area at points that are otherwise difficult to access, even on large workpieces.

Positioning speed is an astonishing 200 mm/s. The straightness of the Y axis is excellent: 2 μm / 800 mm and 0.5 μm / 50 mm.

- Fully automatic measurement of complex components  
- Measuring Y axis (movable column) of 800 mm range  
- Equipped with active vibration-damping system  
- Optionally available with rotation detector unit (for top, bottom and lateral measurements)  
- High performance FORMTRACEPAK software for controlling all axes and analyzing roughness, waviness and primary profiles
SURFTEST SV

SV-M3000CNC
FORMTRACEPAK software

FORMTRACEPAK performs the following tasks:
- Control of all servo-powered axes
- Definition of measurement variables
- Analysis of primary profile (P) roughness profile (R), waviness profile (W)
- Wide choice of parameters for each type of profile
- Definition of tolerance limits
- Automatic part program sequence
- Automatic calibration
- Creating test reports
- Export and archiving of results
- Contour measurement (within detector stroke)

Peak performance, flexibility and versatility:
FORMTRACEPAK provides extensive functionality that enables you to take full advantage of the options available for your individual application, promoting enhanced flexibility, accuracy and measuring speed.
A selection from the range of accessories

**Skidded systems**

**Standard drive unit**
For SJ-210/SJ-310
Basic model for standard traverse direction

**Transverse drive unit**
For SJ-210S/SJ-310S
The S-type drive unit is dedicated to measurements in the Y direction (orthogonal to the standard direction of measurement).

**Lifting drive unit**
For SJ-210R/SJ-310R
The R-type drive unit is designed for measurements where it is necessary to lift the stylus from the measured surface before and after measurement.

**Skidless systems (typical stylus)**

**Standard stylus**

<table>
<thead>
<tr>
<th>Code</th>
<th>Diameter</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AAC731</td>
<td>0.2 µm</td>
<td>44.2</td>
</tr>
<tr>
<td>12AA8403</td>
<td>0.5 µm</td>
<td>37.7</td>
</tr>
<tr>
<td>12AA8415</td>
<td>10 µm</td>
<td>3.9</td>
</tr>
</tbody>
</table>

**Small holes**

<table>
<thead>
<tr>
<th>Code</th>
<th>Diameter</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AAC734</td>
<td>0.2 µm</td>
<td>44.2</td>
</tr>
<tr>
<td>12AA8406</td>
<td>0.5 µm</td>
<td>37.7</td>
</tr>
<tr>
<td>12AA8418</td>
<td>10 µm</td>
<td>3.9</td>
</tr>
</tbody>
</table>

**Gear tooth**

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<tr>
<th>Code</th>
<th>Diameter</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AA8339</td>
<td>0.2 µm</td>
<td>43.8</td>
</tr>
<tr>
<td>12AA8410</td>
<td>0.5 µm</td>
<td>37.2</td>
</tr>
<tr>
<td>12AA8422</td>
<td>10 µm</td>
<td>4.6</td>
</tr>
</tbody>
</table>

**Deep grooves**

<table>
<thead>
<tr>
<th>Code</th>
<th>Diameter</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>12AAC737</td>
<td>0.2 µm</td>
<td>44.2</td>
</tr>
<tr>
<td>12AA8407</td>
<td>0.5 µm</td>
<td>37.7</td>
</tr>
<tr>
<td>12AA8419</td>
<td>10 µm</td>
<td>4.6</td>
</tr>
</tbody>
</table>

*Measurement force is not guaranteed if this stylus is used.
Tip angle 40° for tip radius of 2 µm.
Tip angle 90° for tip radius of 5 µm or 10 µm.