

Surftest SV-3100

SERIES 178 — Surface Roughness Testers



SV-3100H4 with personal computer system

The Surftest SV-3100 Series provide high-accuracy, high-level analysis, and multi-functionality in measurement of surface roughness.

FEATURES

- Mitutoyo's Surftest SV-3100 Series provide high-accuracy, high-level analysis, and multi-functionality in three dimensional analysis and measurement of fine contour, as well as the conventional type surface roughness measurement.
- Peripheral devices such as the auto-leveling table are available to enhance operability and to enable automatic measurement.
- SURFPAK-SV, a dedicated data-analyzing software is installed. This software allows data management in a consistent format, from the work site to the laboratory.
- Ceramic, which is known for its superb anti-abrasive property, is used as the X-axis drive unit guide. No lubrication of the guide is required.
- High-accuracy glass scales are built-in on X-axis (resolution: 0.05 μ m) and Z2-axis (column, resolution: 1 μ m) to insure high-accuracy positioning. The SV-3100 series manifest high-reliability especially in the horizontal roughness parameters (S, Sm), that require high-accuracy of the X-axis travel.
- Equipped with high-accuracy detector stylus.
- Equipped with various functions such as: the "straightness compensation" function, which improves the linear accuracy of the X-axis; the "circular compensation" function for the vertical movement of the stylus; and the "stylus-tip diameter compensation" function.
- The stylus and the skid can be replaced easily. Optional styli and skids are available for a wide variety of roughness measurement applications, such as measurement of small holes, deep holes, etc.
- An easy-to-operate Control Box is provided. The Control Box independent of the main unit allows positioning, measurement start/stop, retracting, and other operations to be performed remotely. The Drive Unit up/down position and the X-axis traverse can be fine controlled manually.

MiCAT

Mitutoyo Intelligent Computer Aided Technology

the standard in world
metrology software

FORM

Technical Data

X-axis

Measuring range: 100mm or 200mm
Resolution: 0.05 μ m
Measurement method: Linear encoder
Drive speed: 0 - 80mm/s
Measuring speed: 0.02 - 5mm/s
Traversing direction: Backward
Traverse linearity: (0.05+1L/1000) μ m*
(0.5 μ m/200mm: 200mm range model)

Inclining range:

$\pm 45^\circ$

Z2-axis (column)

Vertical travel: 300mm or 500mm, power drive
Resolution: 1 μ m
Measurement method: ABSOLUTE linear encoder
Drive speed: 0 - 20mm/s

Detector

Range / resolution: 800 μ m / 0.01 μ m, 80 μ m / 0.001 μ m,
8 μ m / 0.0001 μ m (up to 2400 μ m with
an optional stylus)

Detecting method: Skidless / skid measurement
Measuring force: 4mN or 0.75mN (low force type)
Stylus tip: Diamond, 90° / 5 μ mR
(60° / 2 μ mR: low force type)

Skid radius of curvature: 40mm

Detecting method: Differential inductance

Base size (W x H): 600 x 450mm or 1000 x 450mm

Base material: Granite

Dimension (W x D x H): 756 x 482 x 966mm (S4 type)
756 x 482 x 1166mm (H4 type)
1156 x 482 x 1176mm (W4 type)
766 x 482 x 966mm (S8 type)
766 x 482 x 1166mm (H8 type)
1166 x 482 x 1176mm (W8 type)

Mass

140kg (S4 type, S8 type)
150kg (H4 type, H8 type)
220kg (W4 type, W8 type)

*L = Measured length (mm)

Evaluation Capability: SURFPAK-SV

Assessed profiles

P (primary profile), R (roughness profile), WC, WCA, WE, WEA, DIN4776 profile, envelope residual profile, roughness motif, waviness motif

Evaluation parameters

Ra, Rq, Rz, Ry, Rz(JIS), Ry(DIN), Rc, Rp, Rpmax, Rpi, Rv, Rvmax, Rvi, Rt, Rti, R3z, R3zi, R3y, S, Pc (Poi), Sm, HSC, mr, δ c, plateau ratio, mrd, Rk, Rpk, Rvk, Mr1, Mr2, Δ a, Δ q, λ a, λ q, Sk, Ku, Lo, Lr, A1, A2

Roughness motif parameters: Rx, R, AR, SR, SAR, NR, NCRX, CPM

Waviness motif parameters: Wte, Wx, W, AW SW, SAW, NW

Analysis graphs

ADC, BAC1, BAC2, power spectrum chart, auto-correlation chart, Walsh power spectrum chart, Walsh auto-correlation chart, slope distribution chart, local peak distribution chart, parameter distribution chart

Digital filter 2CR-75%, 2CR-50%, 2CR-75% (phase corrected), 2CR-50% (phase corrected), Gaussian-50%

Cutoff length*

λ c: 0.025mm, 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm, 25mm

fl: 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm, 25mm

fh: 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm

Sampling length (L)*

0.025mm, 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm, 25mm

Data compensation functions

Tilt compensation, R-plane (curved surface) compensation, ellipse compensation, parabola compensation, hyperbola compensation, quadric curve automatic compensation, polynomial compensation, polynomial automatic compensation

*Arbitrary length can be specified in the range from 0.025mm to the maximum traverse length.

Optional Accessory

- 178-611:** Step gage (2µm, 10µm)
178-612: Step gage (2µm, 10µm, 79µinch, 394µinch)
178-610: Metric 4-step gage (1µm, 2µm, 5µm, 10µm)
178-047: Three-axis adjustment table (998291 is included.)
178-016: Leveling table
178-042-1: Digimatic XY leveling table (25 x 25mm)
178-052-1: Digimatic XY leveling table (1" x 1")
178-043-1: XY leveling table (25 x 25mm)
178-053-1: XY leveling table (1" x 1")
178-019: Precision vise*
998291: Precision V-block*
181-902: V-block set with clamp (Max. workpiece dia.: 25mm)
181-901: V-block set with clamp (Max. workpiece dia.: 1")
178-023: Vibration isolator
178-024: Stand for vibration isolator
218-007: Workbench
166-215: Workbench (with drawers)
218-010: Auxiliary desk
218-008: Auxiliary desk
 _____: Detectors, styli, and nosepieces (See page 414.)
 *Use with an XY leveling table

Simplified CNC Function

With the support for a wide range of optional peripherals designed for use with the CNC models enables automatic measurement.



Using Y-axis Table

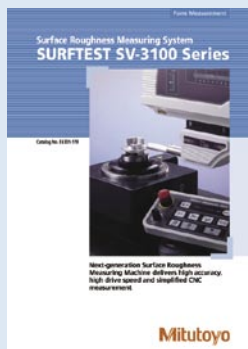


Using Rotary Table Θ1



Using Rotary Table Θ2

(See page 416 for more details.)



Refer to the SurfTest SV-3100 Series leaflet (E4301) for more details.

SPECIFICATIONS

Model No.	SV-3100S4	SV-3100S4	SV-3100H4	SV-3100H4	SV-3100W4	SV-3100W4
Order No. (mm)	178-471-1*	178-471-2*	178-472-1*	178-472-2*	178-473-1*	178-473-2*
Order No. (inch)	178-481-1*	178-481-2*	178-482-1*	178-482-2*	178-483-1*	178-483-2*
Order No. (mm)	178-451-1*	178-451-2*	178-452-1*	178-452-2*	178-453-1*	178-453-2*
Order No. (inch)	178-461-1*	178-461-2*	178-462-1*	178-462-2*	178-463-1*	178-463-2*
Measuring force of detector	0.75mN	4mN	0.75mN	4mN	0.75mN	4mN
X-axis measuring range	100mm		100mm		100mm	
Vertical travel	300mm power column		500mm power column		500mm manual column	
Granite base size (WxD)	600 x 450mm		600 x 450mm		1000 x 450mm	
Dimensions (main unit, WxDxH)	756 x 782 x 966mm		756 x 482 x 1166mm		1156 x 482 x 1176mm	
Mass (main unit)	140kg		150kg		220kg	

Model No.	SV-3100S8	SV-3100S8	SV-3100H8	SV-3100H8	SV-3100W8	SV-3100W8
Order No. (mm)	178-476-1*	178-476-2*	178-477-1*	178-477-2*	178-478-1*	178-478-2*
Order No. (inch)	178-486-1*	178-486-2*	178-487-1*	178-487-2*	178-488-1*	178-488-2*
Order No. (mm)	178-456-1*	178-456-2*	178-457-1*	178-457-2*	178-458-1*	178-458-2*
Order No. (inch)	178-466-1*	178-466-2*	178-467-1*	178-467-2*	178-468-1*	178-468-2*
Measuring force of detector	0.75mN	4mN	0.75mN	4mN	0.75mN	4mN
X-axis measuring range	200mm		200mm		200mm	
Vertical travel	300mm power column		500mm power column		500mm manual column	
Granite base size (WxD)	600 x 450mm		600 x 450mm		1000 x 450mm	
Dimensions (main unit, WxDxH)	766 x 482 x 966mm		766 x 482 x 1166mm		1166 x 482 x 1176mm	
Mass (main unit)	140kg		150kg		220kg	

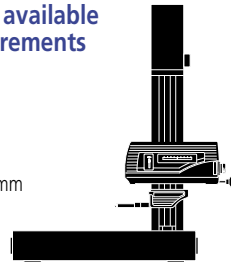
* To denote your AC line voltage add the following suffixes to the order No. (e.g.: **178-663A**):
A for UL/CSA, **D** for CEE, **E** for BS, **DC** for China, **K** for EK, **No suffix** is required for JIS/100V

Models without X-axis inclination function

A variety of models available for measuring requirements

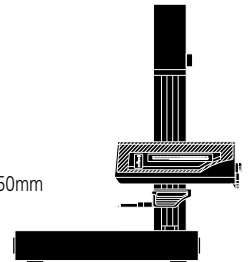
SV-3100S4

Traverse range: 100mm
 Vertical travel: 300mm
 Base size (W x D): 600 x 450mm
 Base material: Granite



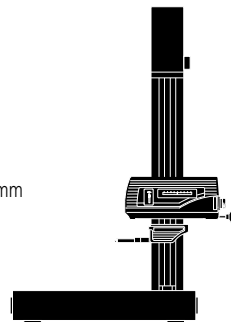
SV-3100S8

Traverse range: 200mm
 Vertical travel: 300mm
 Base size (W x D): 600 x 450mm
 Base material: Granite



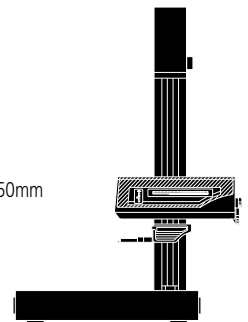
SV-3100H4

Traverse range: 100mm
 Vertical travel: 500mm
 Base size (W x D): 600 x 450mm
 Base material: Granite



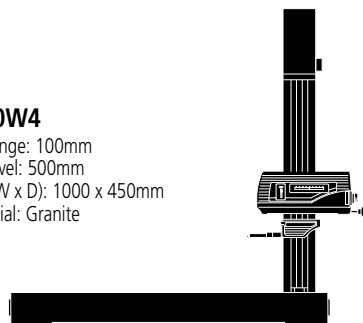
SV-3100H8

Traverse range: 200mm
 Vertical travel: 500mm
 Base size (W x D): 600 x 450mm
 Base material: Granite



SV-3100W4

Traverse range: 100mm
 Vertical travel: 500mm
 Base size (W x D): 1000 x 450mm
 Base material: Granite



SV-3100W8

Traverse range: 200mm
 Vertical travel: 500mm
 Base size (W x D): 1000 x 450mm
 Base material: Granite

