Surftest SJ-400
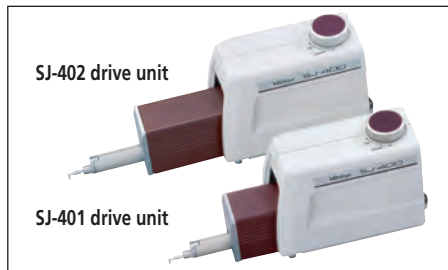
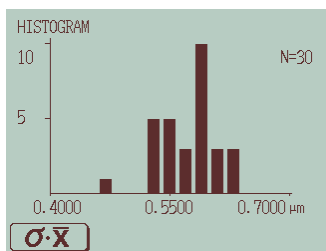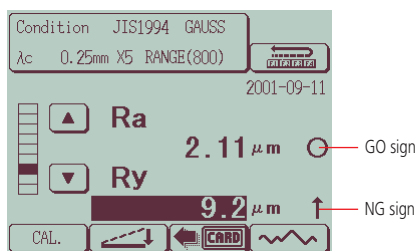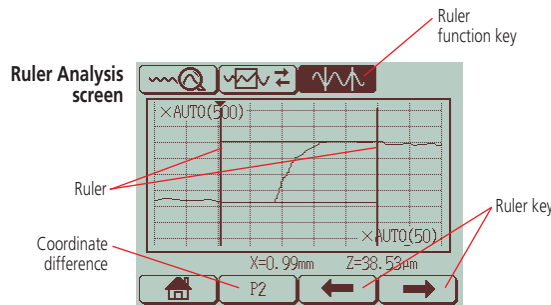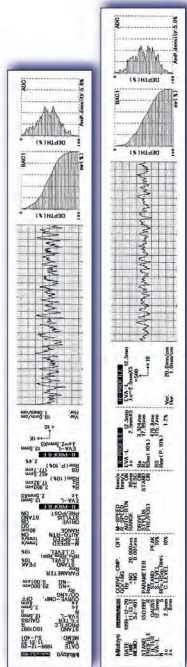## SERIES 178 — Portable Surface Roughness Tester

FEATURES

- Equipped with 36 kinds of roughness parameters that conform to the latest ISO, DIN, ANSI, and JIS standards.
- A wide-range, high-resolution detector and an straight drive unit provide superior high-accuracy measurement in its class.
  Detector
    Measuring range: 800µm
    Resolution: 0.000125µm (at 8µm range)
  Drive unit
    Straightness/traverse length
    SJ-401: 0.3µm/25mm
    SJ-402: 0.5µm/50mm

- The skidless detector and the curved surface compensation function make it efficient to evaluate cylinder surface roughness.
- Ultra-fine steps, straightness and waviness can be measured by using the skidless measurement function.
- Measured data can be output to an external PC by using an RS-232C cable (optional).
- Includes a roughness specimen.
- Digital filter function for non-distorted roughness profiles.
- GO/NG judgment function.
- Auto-calibration function.

SJ-402 drive unit

SJ-401 drive unit

Surftest SJ-401

Ruler Analysis screen

Ruler function key

Ruler

Coordinate difference

Ruler key

×AUTO(500)

×AUTO(50)

X=0.99mm   Z=38.53µm

P2

Condition   JIS1994 GAUSS
λc   0.25mm X5 RANGE(800)
2001-09-11

Ra
2.11 µm — GO sign

Ry
9.2 µm — NG sign

CAL.   CARD

HISTOGRAM
10
5
N=30
0.4000   0.5500   0.7000 µm
σ·X

Technical Data

X-axis (drive unit)
Measuring range:	1" (25mm) (SJ-401), 2"(50mm) (SJ-402)
Measuring speed:	.002, .004, .02, .04"/s (0.05, 0.1, 0.5, 1.0mm/s)
Return speed:	.02, .04, .08"/s (0.5, 1.0, 2.0mm/s)
Traversing direction:	Backward
Traverse linearity:	12 µin / 1"(0.3µm/25mm) (SJ-401), 20 µin / 2"(0.5µm/50mm) (SJ-402)
Positioning:	±1.5° (tilting), {.39" (10mm) up/down}

Detector
Range / resolution:	32000 µin / .4 µin, 3200µin / .04µin, 320 µin / .004µin (up to 96000 µin with an optional stylus) {(800µm / 0.01µm, 80µm / 0.001µm, 8µm / 0.0001µm) (up to 2400µm with an optional stylus)}
Detecting method:	Skidless / skid measurement
Measuring force:	4mN or 0.75mN (low force type)
Stylus tip:	Diamond, 90°/5µmR (60°/2µmR: low force type)
Skid radius of curvature: 40mm	
Detecting method:	Differential inductance
Power supply:	Via AC adapter / rechargeable battery
Battery life:	Max. 600 measurements (w/o printing) Recharge time: 15 hours
Data output	Via RS-232C interface / SPC output

Dimensions (WxDxH)
Control unit:	12.1 x 6.5 x 3.7"(307 x 165 x 94mm)
Height-tilt adjustment unit:	5.2 x 2.5 x 3.9" (131 x 63 x 99mm)
Drive unit:	5.0 x 1.4 x 1.9" (128 x 36 x 47mm) (SJ-401), 6.1 x 1.4 x 1.9" (155 x 36 x 47mm) (SJ-402)

Mass
Control unit:	Approx. 1.2kg
Height-tilt adjustment unit:	Approx. 0.4kg
Drive unit:	0.6kg (SJ-401), 0.7kg (SJ-402)

Evaluation Capability

Assessed profile:
   Primary profile (P), Roughness profile (R), Filtered waviness profile (W), DIN4776, MOTIF (R, W)

Evaluation parameters:
   Ra, Ry, Rz, Rq, Pc, R3z, mr, Rt, Rp, Rv, Sm, S, δc, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Lo, Ppi, R, AR, Rx, Δq , Δq, Ku, HSC, mrd, Sk, W, AW, Wte, Wx, Vo

Analysis graphs:
   Bearing Area Curve (BAC1/ 2), Amplitude Distribution Curve (ADC)

Digital filter	2CR, PC75, Gaussian
Cut-off length	.003, .01, .03, .1, .3" (0.08, 0.25, 0.8, 2.5, 8mm)

Number of sampling length: X1, X3, X5, XL

Arbitrary length (XL):	.01 to 1"(0.1 to 25mm) .01 to 2": SJ-402 (0.1 to 50mm: SJ-402), .01" increments
Sampling length (L):	.003, .01, .03, .1, .3" (0.08, 0.25, 0.8, 2.5, 8mm)
Printer	Thermal printer
Printing width	48mm (paper width: 58mm)

Recording magnification
   Vertical magnification: 20X to 100,000X, Auto   Horizontal magnification: 1X to 1,000X, Auto

Function
   Customize: Selection of display/evaluation parameter
   Data compensation: R-surface, Tilt compensation
   Ruler function:
      Displays the coordinate difference of any two points
   D.A.T. function:
      Helps to adjust leveling during skidless measurement
   Displacement detection mode
      Enables the stylus displacement to be input while the drive unit is stopped.
   Statistical processing: Max. value, Min. value, Mean value, Standard deviation (s), Pass ratio, Histogram
   Tolerance judgment: Upper and lower limit values for three parameters can be specified.
   Measuring condition storage: Five sets of measuring conditions (control unit)

Optional Accessories

178-611: Reference step specimen (mm)
178-612: Reference step specimen (inch / mm)
178-610: Step gage (step: 1μm, 2μm, 5μm, 10μm)
178-039: Manual column stand (granite base)
     (vertical travel: 250mm)
12AAB358: Cylinder attachment (workpiece dia.: 15 - 60mm)
178-016: Leveling table (tilting: ±1.5°, max. loading: 15kg)
178-048: Leveling table with D.A.T function (mm)
     (tilting: ±1.5°, max. loading: 15kg)
178-058: Leveling table with D.A.T function (inch)
     (tilting: ±1.5°, max. loading: 15kg)
178-043-1: XY leveling table (25 x 25mm)
     (tilting: ±1.5°, max. loading: 15kg, swiveling: ±3°)
178-053-1: XY leveling table (1" x 1")
     (tilting: ±1.5°, max. loading: 15kg, swiveling: ±3°)
178-042-1: Digital XY leveling table (25 x 25mm)
     (tilting: ±1.5°, max. loading: 15kg, swiveling: ±3°)
178-052-1: Digital XY leveling table (1" x 1")
     (tilting: ±1.5°, max. loading: 15kg, swiveling: ±3°)
178-049: Digital XY leveling table (25 x 25mm)
     (tilting: ±1.5°, max. loading: 15kg)
178-059: Digimatic XY leveling table (1" x 1")
     (tilting: ±1.5°, max. loading: 15kg)
178-019: Precision vise for XY leveling table
     (jaw opening: 36mm)
181-902: V-block set with clamp (workpiece dia.: max. 25mm)
181-901: V-block set with clamp (workpiece dia.: max. 1")
998291: Precision V-block for XY leveling table
     (workpiece dia.: 1 - 160mm)
12BAA781: Carrying case
12AAA841: Memory card (8MB)
12AAA882: PC connecting cable (RS-232C cable)
965014: SPC cable (2m)
264-012-10: Input tool (USB type)
264-504-5A: DP-1VR
357651: AC adapter
12BAA688: Battery pack

———: Detectors, Styli, and nosepieces (See page J-26.)

Consumable Parts

12AAA896: LCD protective sheet (10 sheets/set)
270732: Standard printer paper (25m, 5 rolls/set)
12AAA876: Durable printer paper (25m, 5 rolls/set)

Optional Software

SJ-Tools

Output software based on Microsoft-Excel* for controlling the devices and reproducing and storing the measurement data.
*Microsoft-Excel is not included in the scope of supply.
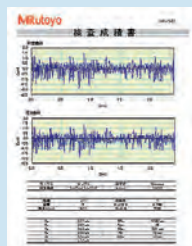Complete with exclusive accessories.
- Measurement device control
- Definition of measurement variables
- Graphic representation of the profile
- Storage of measurement records
- Documentation of measurement results
- Connecting cable

An RS-232C cable is required.
12AAA882: RS-232C connecting cable for SJ-301 series

SJ-Tools input mask for Surftest SJ series

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
FORM

SJ-Tools output record from MS-Excel

Surftest SJ-400

SERIES 178 — Portable Surface Roughness Tester

SPECIFICATIONS

Model No.	SJ-401	SJ-401	SJ-402	SJ-402
Order No. (inch)	**178-957-4A**	**178-947-4A**	**178-959-4A**	**178-945-4A**
Measuring Force of Detector	0.75mN	4mN	0.75mN	4mN
Traverse range	1" (25mm)	1" (25mm)	2" (50mm)	2" (50mm)

Carrying case is a standard accessory

SYSTEM DIAGRAM

DP-1VR

264-005 (PSR Type)
264-012-10 (USB type)

936937 (1m)
965014 (2m)

SURFPAK-SJ

12AAB358

12AAA882

178-611(mm)
178-612(inch/mm)

178-601 (mm)
178-602 (inch)
Roughness specimen

12AAA841

SJ-400

178-009

178-049 (mm)
178-054 (inch/mm)

178-042-1 (mm)
178-052-1 (inch/mm)

178-043-1 (mm)
178-053-1 (inch/mm)

178-048 (mm)
178-058 (inch/mm)

178-019

Mitutoyo