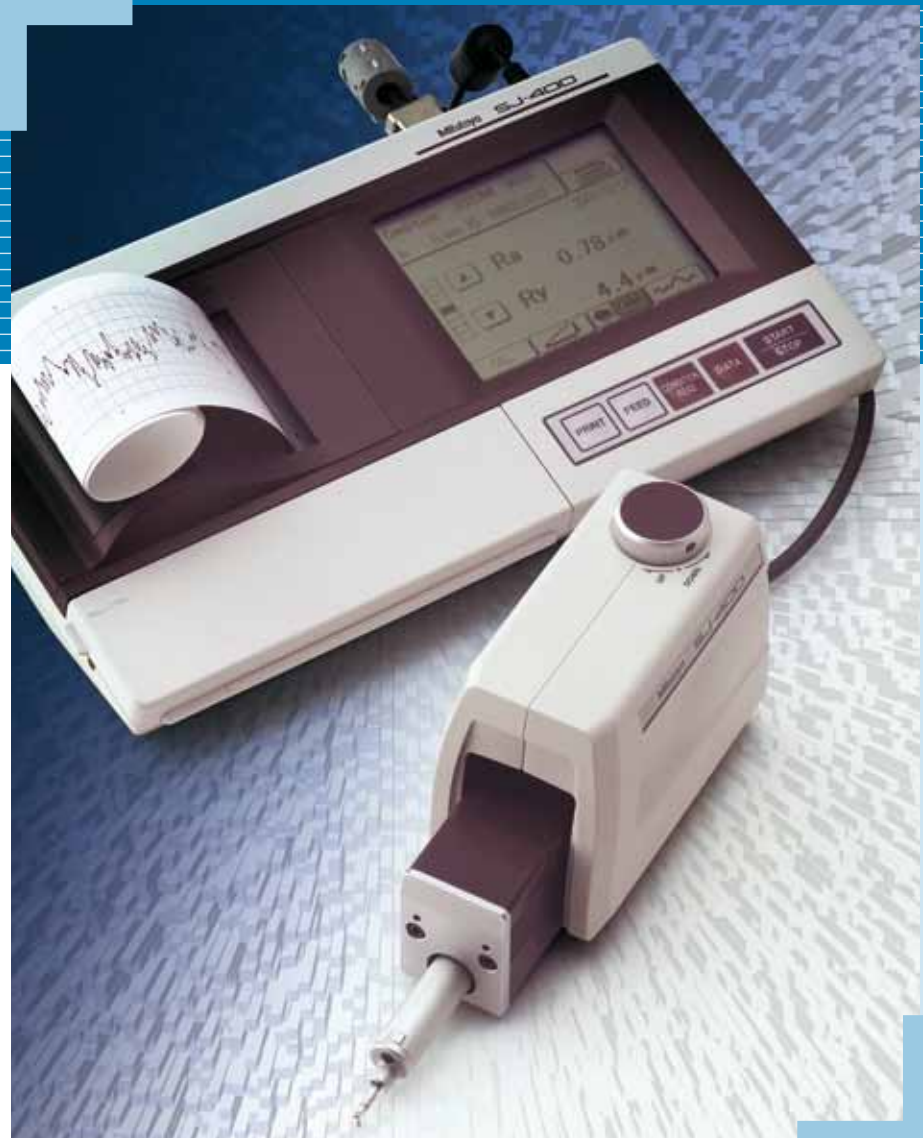


SURFTEST SJ-400

PRE1039(7)



Reference-plane surface measuring machine

Surftest SJ-400

A long-awaited hand-held surface roughness tester with a high-performance specification is here at last! Compact design, skidless measurement, high-precision roughness testing, multiple functions and easy to use.



High-accuracy measurements with a hand-held tester

A high-resolution probe head with a wide measuring range and a very straight drive unit provide superior measurement accuracy in its class.

Measurement/evaluation of stepped features and straightness

The skidless measurement function makes light work of measuring ultra-fine steps, straightness and waviness. Integrated evaluation functions allow surface features to be rapidly displayed on the LCD monitor.

Measurement of surface roughness of cylinders across the cylinder axis

The skidless measurement and R-surface compensation functions make it possible to evaluate cylinder surface roughness.

Roughness parameters conforming to international standards

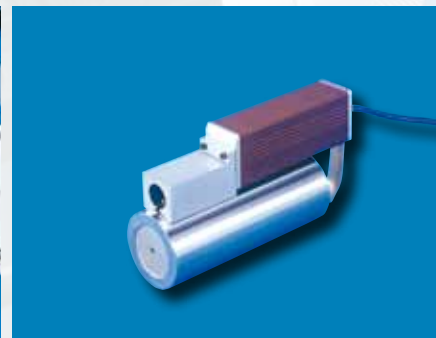
The SJ-400 series offers 35 different roughness parameters that conform to the latest ISO, DIN, and ANSI standards as well as to JIS standards (1994/1982).



Measuring deep grooves



Measurement with probe facing upwards



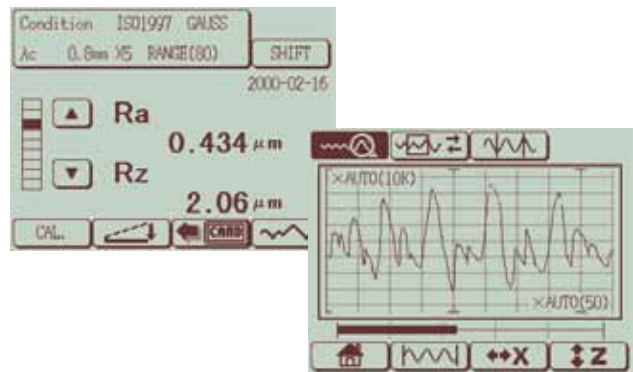
Measuring a cylinder using the support foot

Mitutoyo

SURFTTEST SJ-400



Surftest with standard accessories in carrying case



Modern data processing with extended analysis

Using the SJ-400 series, data can be processed just as in higher-end machines. The system is expanded with the surface-roughness analysis system SURFPAK-SJ, which provides data analysis and reporting functions.

Checking calculation results and assessed profiles (without printout) directly from the display

The calculated result and the evaluated profile are clearly displayed on the large, integrated, touch-sensitive LCD monitor (touch panel).



R-surface measurement



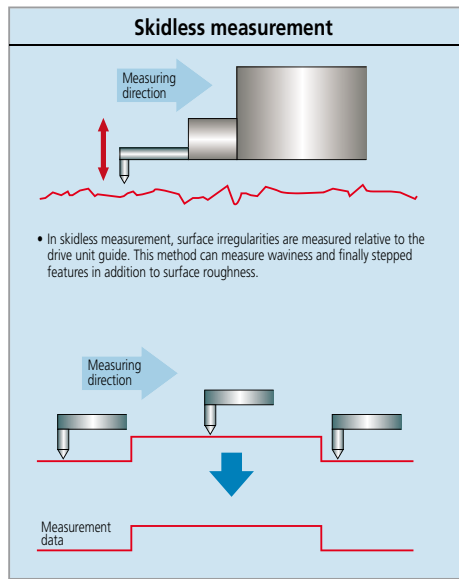
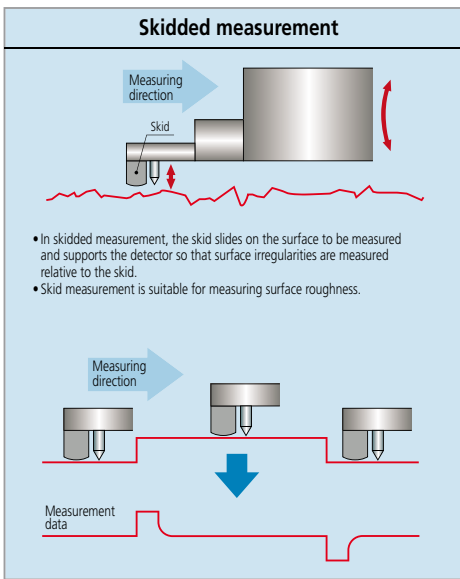
Measuring fine features



Measurement with measuring stand

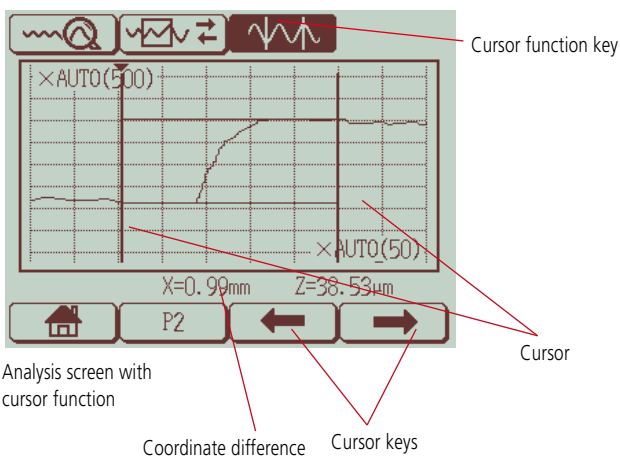
Skidless measurement with the SJ-400

The multifunctional Surfptest SJ-400 is capable of skidded and skidless measurements. So analysis can be performed under either of the measuring conditions listed below:



Simplified surface feature evaluation with the cursor function

This function can be used to determine the coordinate difference between any two points, such as a step height or distance.

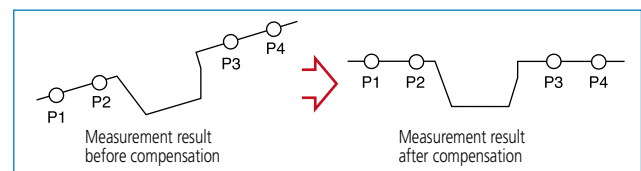


A wide range of optional accessories

A probe and a probe skid can be selected that best suits the measurement. See pages 9-11.

Cutting, merging, compensation and recalculation

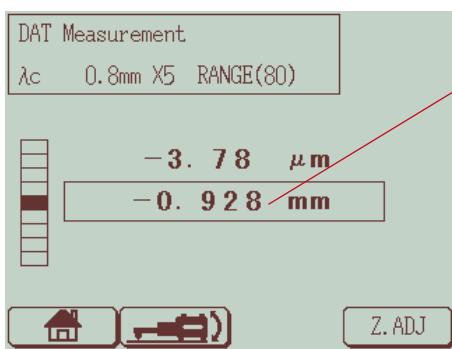
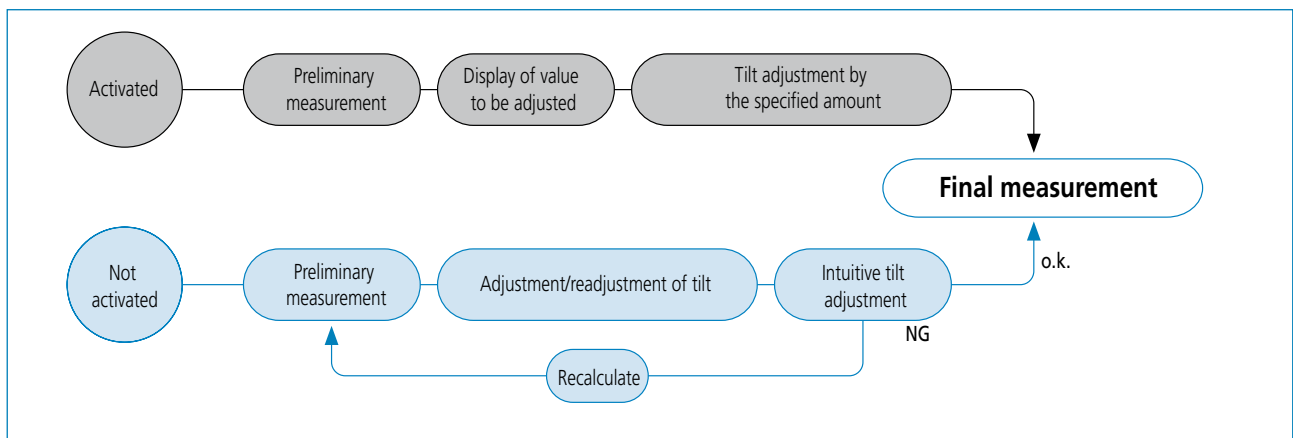
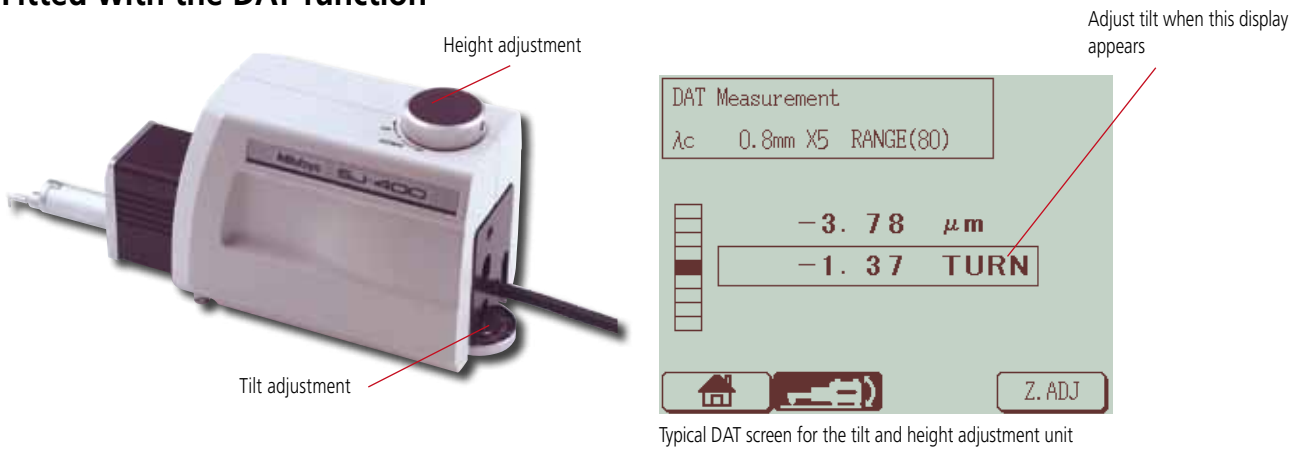
Once a measurement has been made, any unwanted areas (for example, a scratch) on the profile can be deleted and the parameters recalculated.



Powerful levelling support

To assist the levelling process in skidless measurement the SJ-400 is fitted as standard with a tilt adjustment function. This unique and useful function enables high-precision measurement and is extremely easy to use.

Fitted with the DAT function



DAT screen showing the amount of adjustment needed



Levelling table (for DAT)

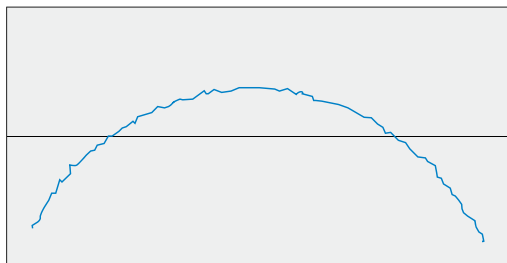
All the measurement functions you need in a compact instrument

Support for R-surface roughness measurement (skidless measurement)

Workpieces with a spherical or cylindrical surface cannot normally be evaluated. However, these form elements can be eliminated from the measured profile using a filter (R-surface compensation) to produce a normal roughness profile.

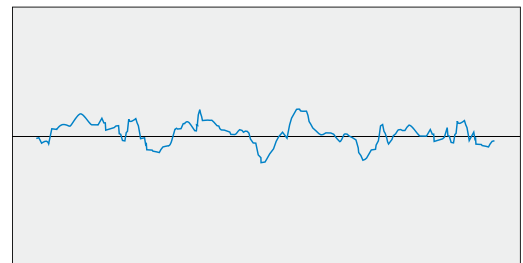


Measuring a cylindrical surface



Profile (as measured)

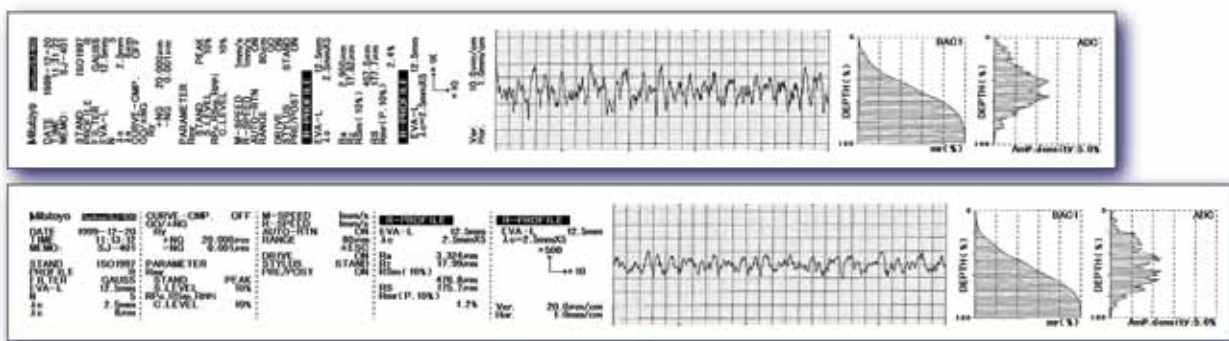
R-surface compensation applied



Resultant profile

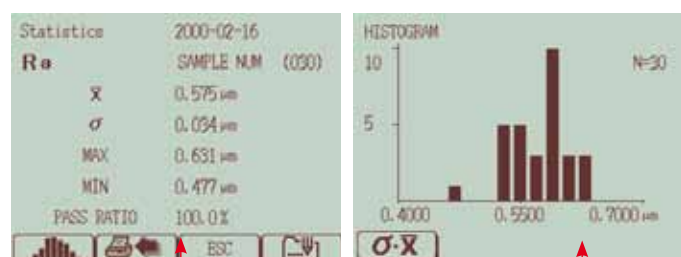
Built-in thermal printer

A high quality, high-speed thermal printer outputs the measurement results. The total result can be output both as BAC and ADC curves as well as an evaluated profile or calculated result. These results and profiles can be printed out in landscape format, in a clearly understandable form, just as they appear on the display.



Statistical processing function

This function performs statistical evaluations of multiple measurements for one roughness parameter. It is possible to display and print histograms in addition to statistical results (mean, standard deviation, maximum value/minimum value, and acceptance ratio).



Statistic

Switchable

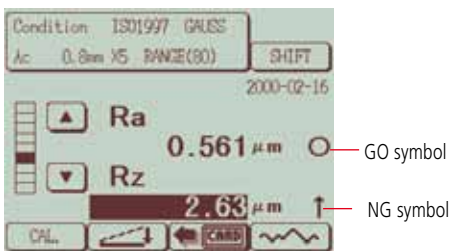
Histogram

SURETEST SJ-400

SURFTEST SJ-400

GO/NG evaluation function

Tolerances can be set for the roughness parameters and a symbol indicates the GO/NG status of each parameter value after evaluation. A value is highlighted if it is out of tolerance.



GO/NG evaluation function

Auto-calibration function

The SJ-400 series is equipped with two calibration methods for probe head calibration: Ra calibration and step calibration. In both calibration methods only the reference value inscribed on the precision standard needs to be entered. No other adjustment is required.



Sample calibration function display

Recalculation function

Recalculation of data

With all profiles, you can calculate characteristic data required subsequently from the data already obtained.

Recalculation of profile and characteristic data

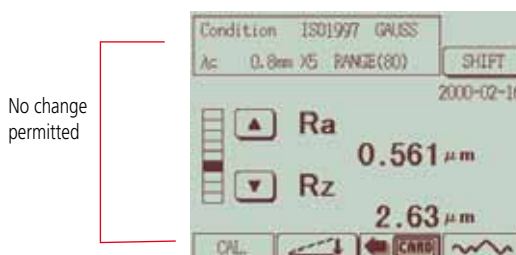
After generating a roughness profile, you can use an extended recalculation function to calculate characteristic data from the waviness and primary profiles.

Arbitrary length measurement function

The evaluation length can be set in 0.1 mm increments. The SJ-400 series machines are therefore excellent for making both narrow- and wide-range measurements.

Key masking function

This function deactivates key operation on the touch-sensitive panel. Since only the function keys are active, there is no risk of the calibration or setup being changed accidentally.



No change permitted

Saving/calling up measurement and setup data

You can save the measurement setup and measurement data in the calculation unit or on the memory card (available as an optional accessory) and subsequently recall that data. Outputting the measurement data as a batch printout after onsite measurement significantly raises measurement efficiency (with memory card only).

User-defined function

With this function, you can select only the parameters necessary for calculation/display from a variety of roughness parameters. It is also possible to add parameters later for recalculation.

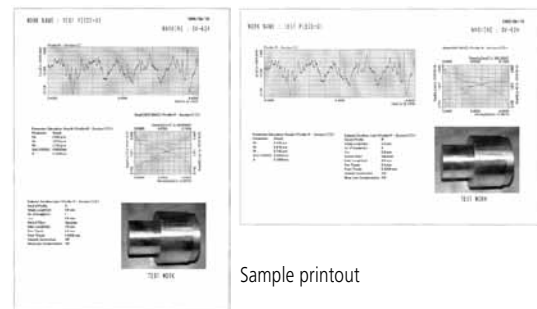
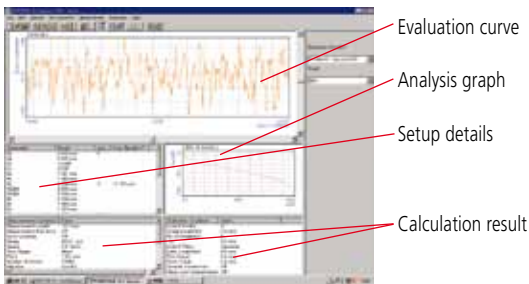
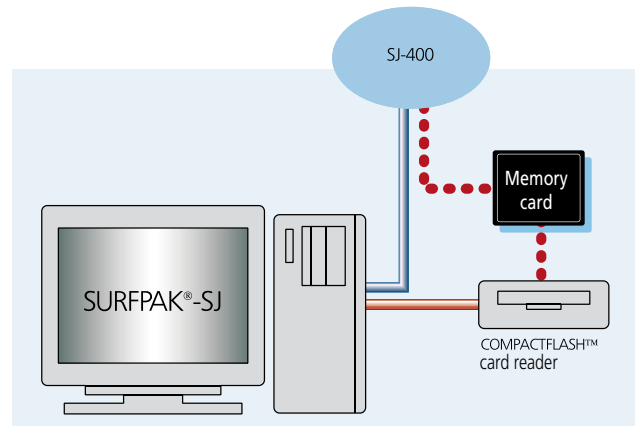


Typical user-defined screen

Extended evaluation with the SURFPAK-SJ analysis program

The SURFPAK-SJ surface roughness analysis program

In conjunction with SURFPAK-SJ, the SJ-400 series machines have the same excellent characteristics and analysis performance as is achieved by high-end testers. The SURFPAK-SJ makes available a large number of roughness parameters and analysis graphs, and also allows the elimination of unnecessary data and the evaluation of other surface features, including step and pitch. In addition, the SJ-400 series can make a total evaluation of a complete set of surface features. This turns what was a small system into a high-end desktop evaluation system.



SURFPAK-SJ specifications

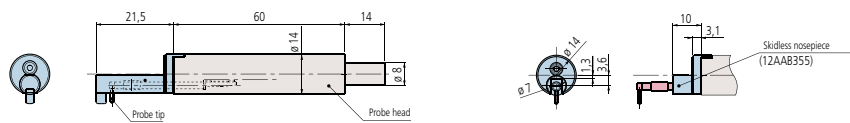
Roughness standards	ISO 4287: 1997, ANSI / ASME B46.1-1995, JIS B0601 1994, etc.	
Evaluation profiles	Primary profile (R), roughness profile (R), WC, WCA, WE WEA DIN 4776 profile, E (envelope deviation profile), motif (roughness-motif, waviness-motif)	
Parameters	P, R, WC, WCA, WE-WEA, DIN4776, E	Ra, Rq, Rz, Rz(JIS), Ry, Ry (DIN), Rc, Rpi, Rp, Rpmax Rvi, Rv, Rvmax, Rti, Rt, R3zi, R3z, R3y, S, Pc (Ppi), Sm, HSC, mr, dc, plateau ratio, mrd, Rk, Rpk, Rvk, Mr1, Mr2, Δa, Δq, λa, λq, Sk, Ku, Lo, Lr, A1, A2
	R - motif	Rx, R AR, SR, SAR, NR, NCRX, CPM
	W - motif	Wte, Wx, W, AW, SW, SAW, NW
Analysis graphs	ADC, BAC 1, BAC 2, power spectrum, auto-correlation, Walsh power spectrum, Walsh auto-correlation, slope distribution, peak distribution, parameter distribution	
Digital filters	2CR-75 %, 2CR-50 %, 2CR-75 % (phase corrected), 2CR-50 % (phase corrected), Gaussian filter -50 % (phase corrected)	
Cutoff length	lc: 0,08 mm, 0,25 mm, 0,8 mm, 2,5 mm, 8 mm fl: 0,25 mm, 0,8 mm, 2,5 mm, 8 mm or arbitrary value fh: 0,25 mm, 0,8 mm, 2,5 mm, 8 mm or arbitrary value	
Evaluation length (L)	0.3 mm feed + up to max. forward travel	
Data compensation	Tilt, R-plane (curved surface), ellipse, parabola, hyperbola, square deviation, polynomial	
Data filter	Filtering to avoid an over-range error, filtering in a specific range for recalculation, automatic filtering (according to previous setup)	
Recording magnification	Vertical: 100 x – 500.000 x Horizontal: 1 x – 10.000 x	
Special functions for report generation	Bitmap image paste-up function, multiple data layout function	
System requirements	(Windows™ 98 / Windows™ NT 4.0) Windows™ 2000, Windows™ XP	

Optional accessories

Detectors

Nr. 178-396-2 0.75 mN measuring force, with 12AAB331 standard probe (2 µm tip radius)
 Nr. 178-397 4 mN measuring force, with 12AAB403 standard probe (5 µm tip radius)

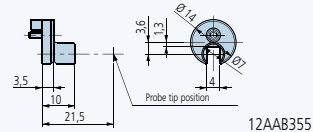
Probe dimensions



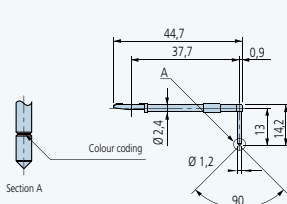
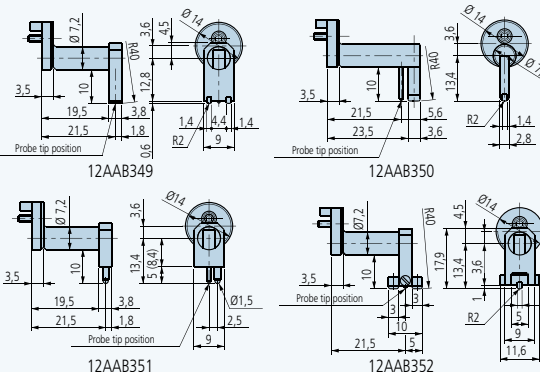
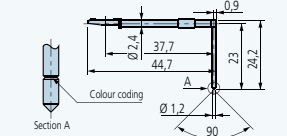
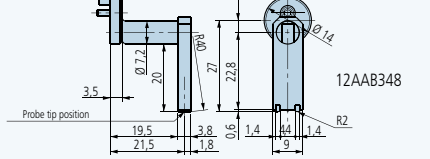
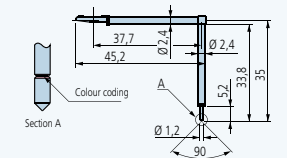
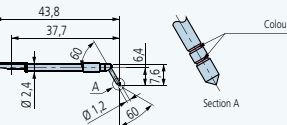
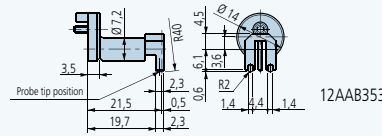
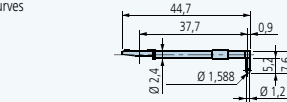
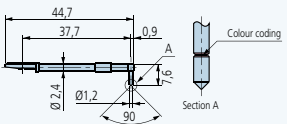
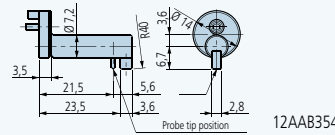
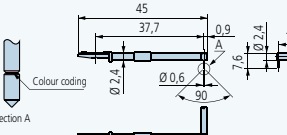
Probes	Skid-attached nosepieces
Standard probe 12AAC731 (2 µm) 12AAB403 (5 µm) 12AAB415 (10 µm)	 12AAB344 12AAB345
Small holes 12AAC732 (2 µm) 12AAB404 (5 µm) 12AAB416 (10 µm)	 12AAB346
Small holes 12AAC733 (2 µm) 12AAB405 (5 µm) 12AAB417 (10 µm)	 12AAB347
Small holes 12AAC734 (2 µm) 12AAB406 (5 µm) 12AAB418 (10 µm)	<hr/>
Deep holes 12AAC740 (2 µm) 12AAB413 (5 µm) 12AAB425 (10 µm) 12AAC741 (2 µm) 12AAB414 (5 µm) 12AAB426 (10 µm)	<hr/>

Probe tip angle 60° at probe tip radius of 2 µm
 Probe tip angle 90° at probe tip radius of 5 µm resp. 10 µm

Skidless nosepiece



Optional accessories

Probes	Skid-attached nosepieces
<p>Deep grooved*</p>  <p>12AAC735 (2 µm) 12AAB409 (5 µm) 12AAB421 (10 µm)</p>	 <p>12AAB349 12AAB350 12AAB351 12AAB352</p>
<p>Deep grooved*</p>  <p>12AAC736 (2 µm) 12AAB408 (5 µm) 12AAB420 (10 µm)</p>	 <p>12AAB348</p>
<p>Deep grooved*</p>  <p>12AAC737 (2 µm) 12AAB407 (5 µm) 12AAB419 (10 µm)</p>	<hr/>
<p>Gear teeth</p>  <p>12AAB339 (2 µm) 12AAB410 (5 µm) 12AAB422 (10 µm)</p>	 <p>12AAB353</p>
<p>WE curves</p>  <p>12AAB338</p>	<hr/>
<p>Edges</p>  <p>12AAC738 (2 µm) 12AAB411 (5 µm) 12AAB423 (10 µm)</p>	 <p>12AAB354</p>
<p>Eccentric*</p>  <p>12AAC739 (2 µm) 12AAB412 (5 µm) 12AAB424 (10 µm)</p>	<hr/>

* The measuring force is not guaranteed when this probe is used.

OPTIONAL ACCESSORIES

XY/levelling tables



Code No.	178-042-1	178-043-1
Table size	130 x 100 mm	
Maximum table loading	15 kg	
Tilt (level) adjustment	± 1,5°	
Swivel adjustment	± 3°	
XY travel range	± 12,5 mm	
XY resolution	0,001 mm*	0,001 mm
Dimensions	262 x 233 x 83 mm	220 x 189 x 83 mm
Mass	6,3 kg	6 kg

*Digital display for X- and Y-Achses

Precision vice



Code No.	178-019
Type	Simultaneous-moving jaws
Jaw opening	36 mm
Jaw width	44 mm
Jaw depth	16 mm
Height	38 mm

Measuring stand

Height adjustment: 200 mm
Dimensions: 400 x 250 x 550 mm
Mass: 13 kg



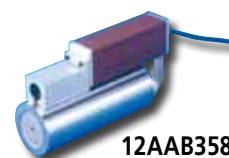
Levelling table

Levelling range: ±1.5°
Table dimensions: 130 x 100 mm
Max. table loading: 15 kg



Cylinder attachment

For cylindrical workpieces
Diameter: 15 mm to 60 mm



Measurement data output

DIGIMATIC signal cable

For connection to the DP-1 VR.
1 m: 936937
2 m: 965014

DP-1 VR

For statistically processing measurement data.



Miscellaneous equipment

Memory card

For storage/retrieval of setups (up to 20), measurement records and statistical data.
Capacity: 512 MB



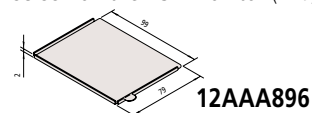
Step reference specimen

For calibrating probe head sensitivity steps:
2 µm/10 µm



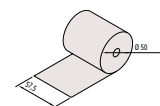
LCD protective film

For protecting the touch-sensitive screen on the LCD monitor (x10)



Printer paper

Five rolls (25 m)
Standard paper: 270732



Specifications

		Surftest SJ-401	Surftest SJ-402
Code No.		178-956-3D	178-958-3D
		Measuring method	
Measuring range	Z-axis	800 µm, 80 µm, 8 µm	
	X-axis	25 mm	50 mm
Drive unit	Straightness	0,3 µm / 25 mm	0,5 µm / 50 mm
	Measuring speed	0,05, 0,1, 0,5, 1,0 mm/s	
	Return speed	0,5, 1,0, 2,0 mm/s	
Height-tilt unit	Tilt range	± 1,5°	
	Height range	10 mm	
Recorded profiles		P profile (P), R profile (R), filtered waviness profile (W), DIN 4776, MOTIF (R, W)	
Roughness parameters		Ra, Ry, Rz, Rz1max, Rmax (VDA), Rq, Rqc, R3z, Rmr(c), Rt, Rp, Rv, RSm, Rmr, Rdc, RΔa, RΔq, RS, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, RLo, Rpi, R, AR, Rx, Rku, Rhsc, Rsk, W, AW, Wte, Wx, Vo	
Analysis graphs		Bearing Area Curve (BAC), Amplitude Distribution Curve (ADC)	
No. of sampling lengths		X1, X3, X5, XL* L* = or any value	
Adjustable measuring length		0,1 – 25 mm (0.1 mm increments)	
Evaluation length (L)		0,08, 0,25, 0,8, 2,5, 8 mm	
Printer type		Thermal, printing width 48 mm, paper width 58 mm	
Display magnification	Vertical	10 - 100.000 , Auto	
	Horizontal	1 - 1.000 , Auto	
Standard probe	Type	Differential inductance	
	Resolution	0,000125 µm	
	Stylus	2 µm / 60°	
	Contact force	0,75 mN	
	Skid radius	40 mm	
	Skid force	< than 400 mN	
Functions	User-defined	Display/Roughness parameter selectable	
	Data filter	R-surface, Tilt compensation	
	Cursor	Displays the coordinate difference between any two points	
	DAT	Helps levelling during skidless measurement	
	Displacement detection mode	Inputs the probe head displacement while the drive unit is stopped	
	Statistical processing	Maximum value, minimum value, standard deviation (s), histogram	
	Tolerance evaluation	Upper and lower limit values can be entered	
	Setup storage capacity	Fine data records / setups (drive unit)	
Printer		Thermal printer	
Cut-off wavelengths		0,08, 0,25, 0,8, 2,5, 8 mm	
Digital filters		2CR, PC75 (phase corrected), Gauss	
Calibration		Ra, automatic by input of the calibrated value and measurement of the roughness specimen supplied	
Power supply		AC adapter, built-in rechargeable battery	
Rechargeable battery	charging time	15 hours	
	Number of measurements	(for 600 measurements without printing)	
Power consumption		43 W (max.)	
Dimensions/mass	Display	307 x 165 x 94 mm	
	Levelling unit	131 x 63 x 99 mm	
	Probe system	128 x 36 x 47 mm	
Roughness standards		JIS, DIN, ISO, ANSI	
Display screen		Touch-sensitive LCD	
Data output		Connection to data processing system (optional)	
External control		RS-232C input/output, DIGIMATIC output	
Weight	Display	1.2 kg	
	Leveling unit	0.4 kg	
	Probe system	0.6 kg	



Mitutoyo SJ-40

0.401

ON/OFF ZERO/ABS



SURFTEST SJ-400



Reference-plane surface measuring machine

PRE1039(7)



Ask for our general brochure!

Mitutoyo presents a practically structured range of advanced solutions for state of the art surface measurement.

Further information can be found in our product lounge Form measurement:
www.mitutoyo.eu

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- Vision Measuring Systems
- Form Measurement
- Optical Measuring
- Sensor Systems
- Test Equipment and Seismometers
- Digital Scale and DRO Systems
- Small Tool Instruments and Data Management

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