

Surftest SJ-400

SERIES 178 — Portable Surface Roughness Tester

FEATURES

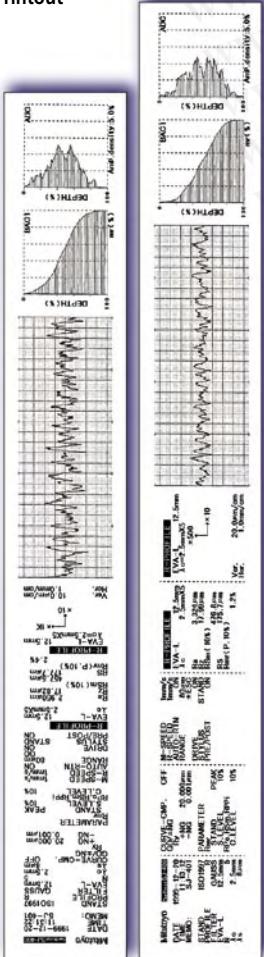
- Equipped with 36 kinds of roughness parameters that conform to the latest ISO, DIN, ANSI, and JIS standards.
- A wide-range, high-resolution detector and a drive unit provide superior high-accuracy measurement in its class.
- <Measuring range / Resolution>
800μm / 0.000125μm (at 8μm range)
- <Straightness/traverse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



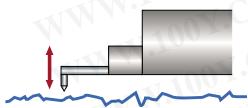
- The skidless detector and the curved surface compensation function make it so efficient to evaluate cylinder surface roughness.
- Ultra-fine steps, straightness and waviness can be measured by using the skidless measurement function.
- Measured data can be output to an external PC by using an RS-232C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



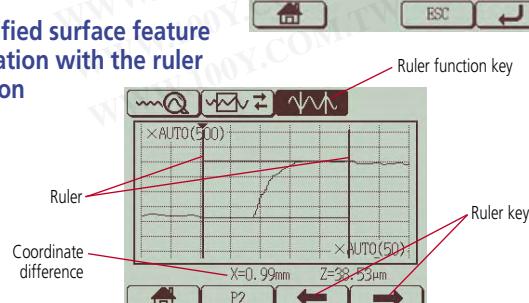
Printout



Skidless measurement



Simplified surface feature evaluation with the ruler function



Tilt compensation



勝特力材料 886-3-5753170
胜特力电子(上海) 86-21-34970699
胜特力电子(深圳) 86-755-83298787

[Http://www.100y.com.tw](http://www.100y.com.tw)

Technical Data

X-axis (drive unit)	25mm (SJ-401), 50mm (SJ-402)
Measuring range:	0.05, 0.1, 0.5, 1.0mm/s
Measuring speed:	0.5, 1.0, 2.0mm/s
Return speed:	Backward
Traversing direction:	0.3μm / 25mm (SJ-401), 0.5μm / 50mm (SJ-402)
Traverse linearity:	±1.5° (tilting), 10mm (up/down)
Positioning:	800μm / 0.01μm, 80μm / 0.001μm, 8μm / 0.0001μm (up to 2400μm with an optional stylus)
Detector	Skidless / skid measurement
Range / resolution:	4mN or 0.75mN (low force type) Diamond, 90° / 5μmR (60° / 2μmR: low force type)
Detecting method:	Skid radius of curvature: 40mm
Measuring force:	Differential inductance
Stylus tip:	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)	307 x 165 x 94mm
Control unit:	Height-tilt adjustment unit: 131 x 63 x 99mm
Height-tilt adjustment unit:	128 x 36 x 47mm (SJ-401), 155 x 36 x 47mm (SJ-402)
Drive unit:	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:	P (primary profile), R (roughness profile), W (filtered waviness profile), DIN4776, roughness motif, waviness motif
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, Da, Dq, Ku, HSC, mrd, Sk, W, AW, Wte, Wx, Vo
Evaluation graphs:	Bearing Area Curve (BAC1 / 2), Amplitude Distribution Curve (ADC)
Digital filter	2CR, PC75, Gaussian
Cutoff length	0.08, 0.25, 0.8, 2.5, 8mm
Number of sampling length:	X1, X3, X5, XL
Arbitrary length (XL):	0.1 to 25mm (0.1 to 50mm: SJ-402), 0.1mm increments
Sampling length (L):	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 (σ), 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)



Evaluation Capability: SURFPAC-SJ

Industrial standards met: ISO 4287:1997, ANSI / ASME B46.1-1995, JIS B0601 1994, etc.
 Assessed profiles: P (primary profile), R (roughness profile), WC, WCA, WE WEA DIN4776 profile, E (envelope residual profile), roughness motif, waviness motif
 Evaluation parameters: Ra, Rq, Rz, Rz (JIS), Ry, Ry (DIN), Rc, Rqi, Rp, Rpmax, Rvi, Rvmax, Rti, Rt, R3zi, R3z, R3y, S, Pci, (Ppi), Sm, HSC, m_c, plateau ratio, mrd, Rk, Rpk, Rvk, Mr1, Mr2, Δa, Δq, λ_a, λ_q, Sk, Ku, Lo, Lr, A1, A2, Rx, R AR, SR, SAR, NR, NCRX, CPM
 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% (phase corrected)

Cutoff length:

λc: 0.025, 0.08, 0.25, 0.8, 2.5, 8, 25mm or arbitrary value
 fl: 0.25, 0.8, 2.5, 8mm or arbitrary value
 fh: 0.25, 0.8, 2.5, 8mm or arbitrary value

Sampling length (L):

0.025, 0.08, 0.25, 0.8, 2.5, 8, 25mm or arbitrary value

Data compensation: Tilt compensation, R-plane (curved surface) compensation, ellipse compensation, parabola compensation, hyperbola compensation, Conic automatic compensation, polynomial compensation, polynomial automatic compensation

Data deletion function

- Data deletion to avoid an over-range error
- Data deletion in a specific range to perform recalculation
- Automatic data deletion

Recording magnifications

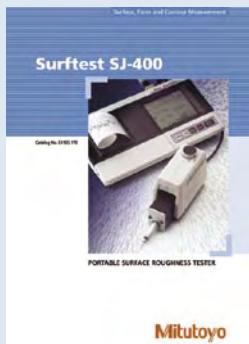
Vertical: 100X - 500,000X, Horizontal: 1X - 10,000X

Special functions for report generation

- Bit-map image paste-up function
- Multiple data layout function

An RS-232C cable is required.

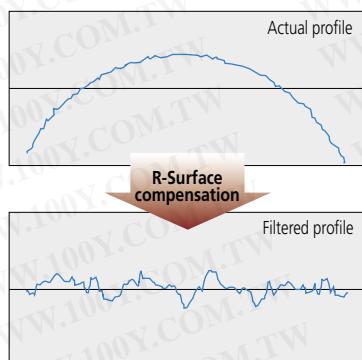
12AAA882: RS-232C connecting cable



Refer to the Surftest SJ-400 leaflet (E4185) for more details.

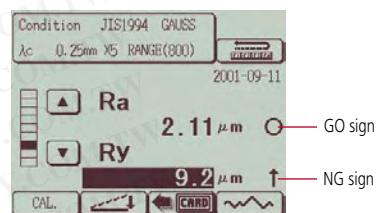
Measuring curved-surface roughness

Usually, a spherical or cylindrical surface (R-surface) cannot be evaluated, but, by removing the radius with a filter, R-surface data is processed as if taken from a flat surface.



GO/NG indication

A GO/NG indication is displayed after a measurement. The calculation result is highlighted if NG.



Statistics

Statistical processing (mean, standard deviation, max/min value and acceptance ratio and histograms) can be performed on multiple measurements for one roughness parameter.

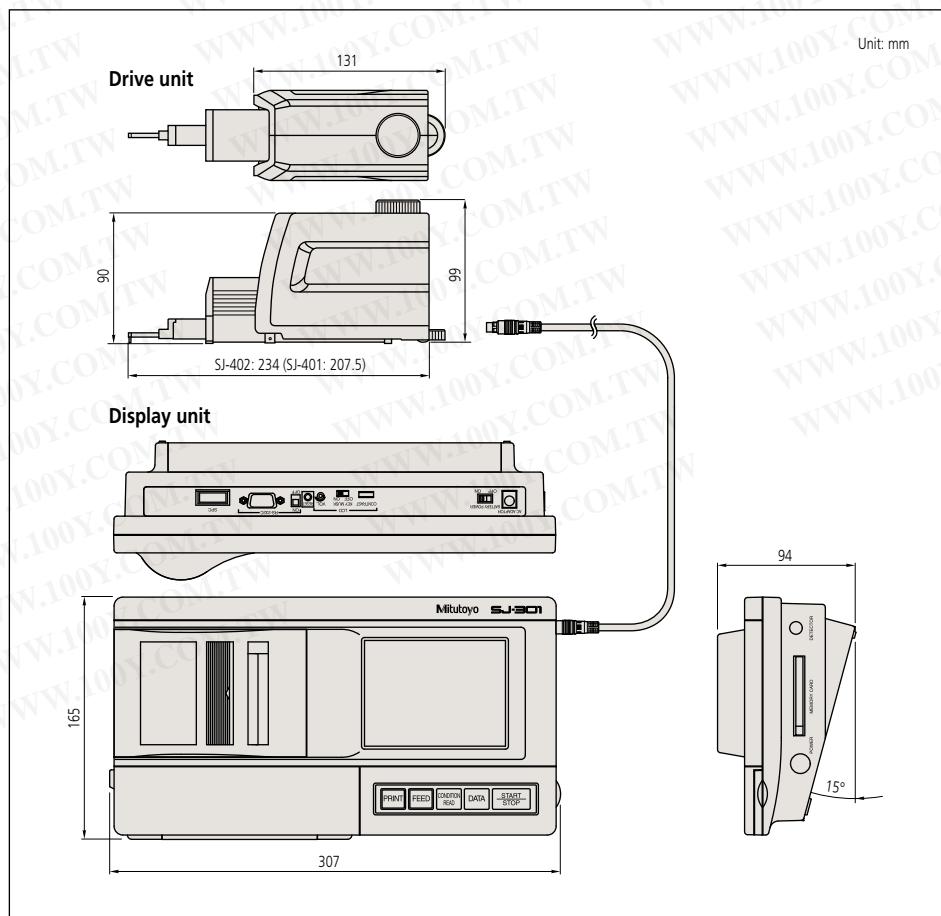


SPECIFICATIONS

Model No.	SJ-401	SJ-401	SJ-402	SJ-402
Order No. (mm)	178-956-3*	178-946-3*	178-958-3*	178-940-3*
Order No. (inch)	178-957-3*	178-947-3*	178-959-3*	178-945-3*
Measuring force	0.75mN	4mN	0.75mN	4mN
Evaluation range	25mm	25mm	50mm	50mm

*To denote your AC line voltage add the following suffixes to the order No. (e.g.: **178-956-3A**):
 A for UL/CSA, D for CEE, E for BS, DC for China, K for EK, **No suffix** is required for JIS/100V

DIMENSION



Optional Accessory

- 178-611: Reference step specimen (mm)
- 178-612: Reference step specimen (inch)
- 178-610: Step gage (step: 1µm, 2µm, 5µm, 10µm)
- 178-009: Manual column stand (vertical travel: 200mm)
- 178-039: Manual column stand (granite base) (vertical travel: 250mm)
- 12AAB358: Cylinder attachment (workpiece dia.: 15 - 60mm)
- 178-016: Leveling table (tilting: $\pm 1.5^\circ$, max. loading: 15kg)
- 178-048: Leveling table with D.A.T function (mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg)
- 178-058: Leveling table with D.A.T function (inch) (tilting: $\pm 1.5^\circ$, max. loading: 15kg)
- 178-043-1: XY leveling table (25 x 25mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$)
- 178-053-1: XY leveling table (1" x 1") (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$)
- 178-042-1: Digital XY leveling table (25 x 25mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$)
- 178-052-1: Digital XY leveling table (1" x 1") (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$)
- 178-049: Digital XY leveling table (25 x 25mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg)
- 178-059: Digimatic XY leveling table (1" x 1") (tilting: $\pm 1.5^\circ$, 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)

Consumable Parts

- 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: DP-1VR (Refer to the page 15.)
—: Detectors, Stylus, and nosepieces (Refer to the page 400.)

SYSTEM DIAGRAM

The system diagram illustrates the connectivity of the following components:

- SJ-400 Control Unit:** The central unit connected to the probe via a cable.
- SURFPAK-SJ Probe:** Connected to the SJ-400 via a cable labeled 12AAA882.
- Accessories:**
 - 178-611: Reference step specimen (mm).
 - 12AAA841: Memory card (8MB).
 - 178-009: Manual column stand (vertical travel: 200mm).
 - 178-039: Manual column stand (granite base) (vertical travel: 250mm).
 - 12AAB358: Cylinder attachment (workpiece dia.: 15 - 60mm).
 - 178-016: Leveling table (tilting: $\pm 1.5^\circ$, max. loading: 15kg).
 - 178-048: Leveling table with D.A.T function (mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg).
 - 178-058: Leveling table with D.A.T function (inch) (tilting: $\pm 1.5^\circ$, max. loading: 15kg).
 - 178-043-1: XY leveling table (25 x 25mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$).
 - 178-053-1: XY leveling table (1" x 1") (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$).
 - 178-042-1: Digital XY leveling table (25 x 25mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$).
 - 178-052-1: Digital XY leveling table (1" x 1") (tilting: $\pm 1.5^\circ$, max. loading: 15kg, swiveling: $\pm 3^\circ$).
 - 178-049: Digital XY leveling table (25 x 25mm) (tilting: $\pm 1.5^\circ$, max. loading: 15kg).
 - 178-059: Digimatic XY leveling table (1" x 1") (tilting: $\pm 1.5^\circ$, 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).

MEASUREMENT APPLICATIONS

R-surface measurement: A stylus is used to measure the surface of a large cylindrical workpiece.

Fine contour measurement with an auto leveling table: A stylus is used to measure the fine contours of a printed circuit board (PCB) mounted on a leveling table.

Upside down measurement: A stylus is used to measure the bottom surface of a stack of metal plates.

Deep groove measurement: A stylus is used to measure the depth of a deep groove in a metal part.

Cylinder measurement with a support foot: A stylus is used to measure the diameter of a large cylindrical workpiece, supported by a dedicated foot.

Surftest (表面粗糙度测量仪) SJ-400

178 系列 — 便携式表面粗糙度测量仪

特点

- 配备有符合最新 ISO, DIN, ANSI, 和 JIS 标准的 36 种粗糙度评价参数。
- 一个宽范围、高分辨率的检测器和一个直接驱动元件，提供了在同类产品中更优越的高精度测量。
 - < 范围 / 分辨率 >
800μm / 0.000125μm (8μm 测量范围)
 - < 直线度 / 移动长度 >
SJ-401 驱动部 : 0.3μm / 25mm
SJ-402 驱动部 : 0.5μm / 50mm

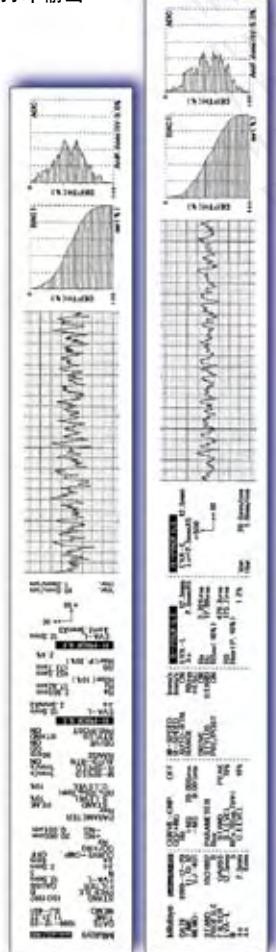


- 无轨检测器和弧形表面补偿功能使它能有效地评价圆柱体表面粗糙度。
- 特细的阶差，直线度、波度均可用无轨测量功能测出。
- 测量数据可通过 RS-232C 接口电缆 (选件) 由外部 PC 输出。
- 带有粗糙度标准板。
- 由数字滤波功能可得到全真的表面粗糙度轮廓图。
- GO/NG 判断功能。
- 自动校正功能。

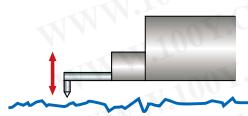
技术参数

X 轴 (驱动部)	25mm (SJ-401), 50mm (SJ-402)
测量范围 :	0.05, 0.1, 0.5, 1.0mm/s
返回速度 :	0.5, 1.0, 2.0mm/s
移动方向 :	向后
直线度 :	0.3μm / 25mm (SJ-401), 0.5μm / 50mm (SJ-402)
定位 :	±1.5° (倾角), 10mm (向上 / 向下)
检测器	
范围 / 分辨率 :	800μm / 0.01μm, 80μm / 0.001μm, 8μm / 0.0001μm (使用测头选件时, 最大可达 2400μm)
检测方法:	无轨 / 有轨测量
测力:	4mN 或 0.75mN (低测力型)
测针针尖:	金刚石、90° / 5μmR (60° / 2μmR: 低测力型)
导头曲率半径:	40mm
检测方法:	差动电感式
电源:	通过 AC 适配器 / 可充电镍氢电池
电池寿命:	最多可测量 600 次 (不带打印)
充电时间:	15 个小时
数据输出:	通过 RS-232C 端口 / SPC 输出
尺寸 (WxDxH)	
控制器:	307 x 165 x 94mm
高度 - 倾角调整装置:	131 x 63 x 99mm
驱动部:	128 x 36 x 47mm (SJ-401), 155 x 36 x 47mm (SJ-402)
重量	
控制器:	大约 1.2kg
高度 - 倾角调整装置:	大约 0.4kg
驱动部:	0.6kg (SJ-401), 0.7kg (SJ-402)

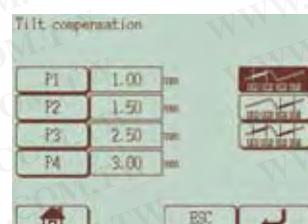
打印输出



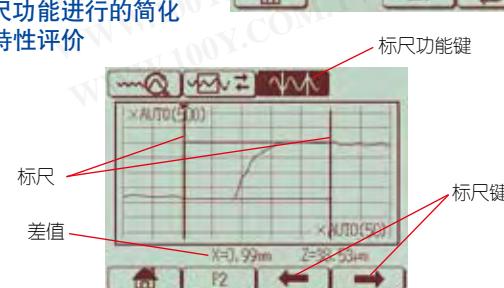
无轨测量



倾斜补偿



利用标尺功能进行的简化的表面特性评价



评估能力

评估轮廓:
P (主轮廓), R (表面粗糙度轮廓), W (滤波波度轮廓),
DIN4776、粗糙度 motif、波形 motif
评估参数:

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, Da, Dq, Ku, HSC, mrd, Sk, W, AW,
Wte, Wx, Vo

分析图表:

支撑曲线 (BAC1 / 2)、振幅分布曲线 (ADC)

滤波波长 2CR, PC75, 高斯

截止波长 0.08, 0.25, 0.8, 2.5, 8mm

取样数: X1, X3, X5, XL

任意长度 (XL): 0.1 - 25mm (0.1 - 50mm: SJ-402),
0.1mm 增量

取样长度 (L): 0.08, 0.25, 0.8, 2.5, 8mm

打印机 热敏打印机

打印宽度 48mm (纸宽: 58mm)

纪录速率

垂直: 20X - 100,000X、自动

水平: 1X - 1,000X、自动

功能

客户化: 显示 / 评价参数的选择

数据补偿: R 表面、倾斜补偿

标尺功能:

显示任意两点间的坐标差

数字调整工作台功能:

无轨测量时、协助调水平

移动检测模式

驱动部停止时输入测头移动

统计过程: 最大值、最小值、均值、标准差、合格率、直方图

公差判断: 可确定三个参数的上、下极值。

测量条件储存: 5 组测量条件 (控制单元)



评估能力 : SURFPAK-SJ

达到业界标准: ISO 4287:1997, ANSI / ASME B46.1-1995, JIS B0601 1994 等

评估轮廓: P(主轮廓)、R(表面粗糙度轮廓), WC, WCA, WE WEA DIN4776 轮廓、E(包络残余线)、粗糙度 motif、波形 motif

评估参数: Ra, Rq, Rz, Rz (JIS), Ry, Ry (DIN), Rc, Rpi, Rp, Rpm, Rvi, Rv, Rvmax, Rti, Rt, R3z1, R3z2, R3y, S, P_c (P_{pj}), Sm, HSC, mr, δ_c, plateau ratio, mrd, Rk, Rpk, Rvk, Mr1, Mr2, Δa, Δq, λ_a, λ_q, Sk, Ku, Lo, Lr, A1, A2

Rx, R AR, SR, SAR, NR, NCRX, CPM
Wte, Wx, W, AW, SW, SAW, NW

分析图表: ADC, BAC1, BAC2、功率谱图、自相关图、Walsh 功率谱图、Walsh 自相关图、倾斜分布图、局部峰值分布图、参数分布图

滤波类型: 2CR-75%, 2CR-50%, 2CR-75% (相位校正), 2CR-50% (相位校正), 高斯-50% (相位校正)

截止波长:

λc: 0.025, 0.08, 0.25, 0.8, 2.5, 8, 25mm 或任意值

f_l: 0.25, 0.8, 2.5, 8mm 或任意值

f_h: 0.25, 0.8, 2.5, 8mm 或任意值

取样长度 (L):

0.025, 0.08, 0.25, 0.8, 2.5, 8, 25mm 或任意值

数据补偿: 倾斜补偿、R平面(曲面)补偿、椭圆补偿、抛物线补偿、双曲线补偿、自动锥面补偿、多项式补偿、多项式自动补偿

数据的删除:

- 删除超出测量范围所得数据, 以避免越界误差。
- 删除指定范围的数据, 以进行重新计算。
- 自动删除数据。

纪录倍率

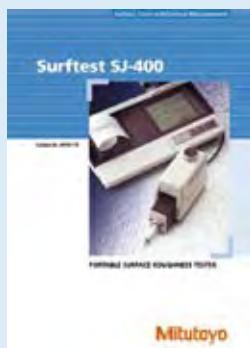
垂直: 100X - 500,000X、水平: 1X - 10,000X

生成报告的特殊功能

- 位图图像粘贴功能
- 数据图表的多种排布

必备 RS-232C 电缆

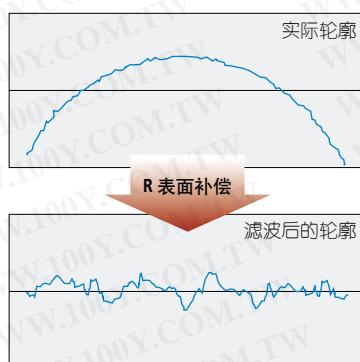
12AAA882: RS-232C 连接电缆



详见 Surftest SJ-400 (E4185) 产品样本

测量凹凸面的粗糙度

球面或圆柱面 (R 表面) 的粗糙度通常无法评价, 但以滤波器去除半径之后, R 表面数据就可像平面测量那样加以处理。



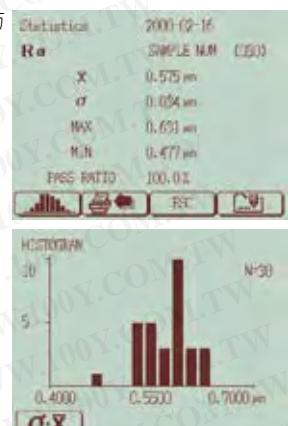
GO/NG 指示

测量后, 显示 GO/NG。判断结果为 NG 时会突出显示。



统计数据

对一个粗糙度参数进行多重测量, 在此基础上, 可进行统计(平均值, 标准偏差, 最大 / 最小值、合格率以及直方图)。



性能参数

型号	SJ-401	SJ-401	SJ-402	SJ-402
货号 (mm)	178-956-3*	178-946-3*	178-958-3*	178-940-3*
货号 (inch)	178-957-3*	178-947-3*	178-959-3*	178-945-3*
测力	0.75mN	4mN	0.75mN	4mN
评价范围	25mm	25mm	50mm	50mm

* 为区分交流电源电压, 在货号后加上以下后缀(如: 178-956-3A):

A 适于 UL/CSA, D 适于 CEE, E 适于 BS, DC 适于中国、K 适于 EK, 无后缀适于 JIS/100V

尺寸

