

# Surftest SJ-301

Bulletin No. 1711



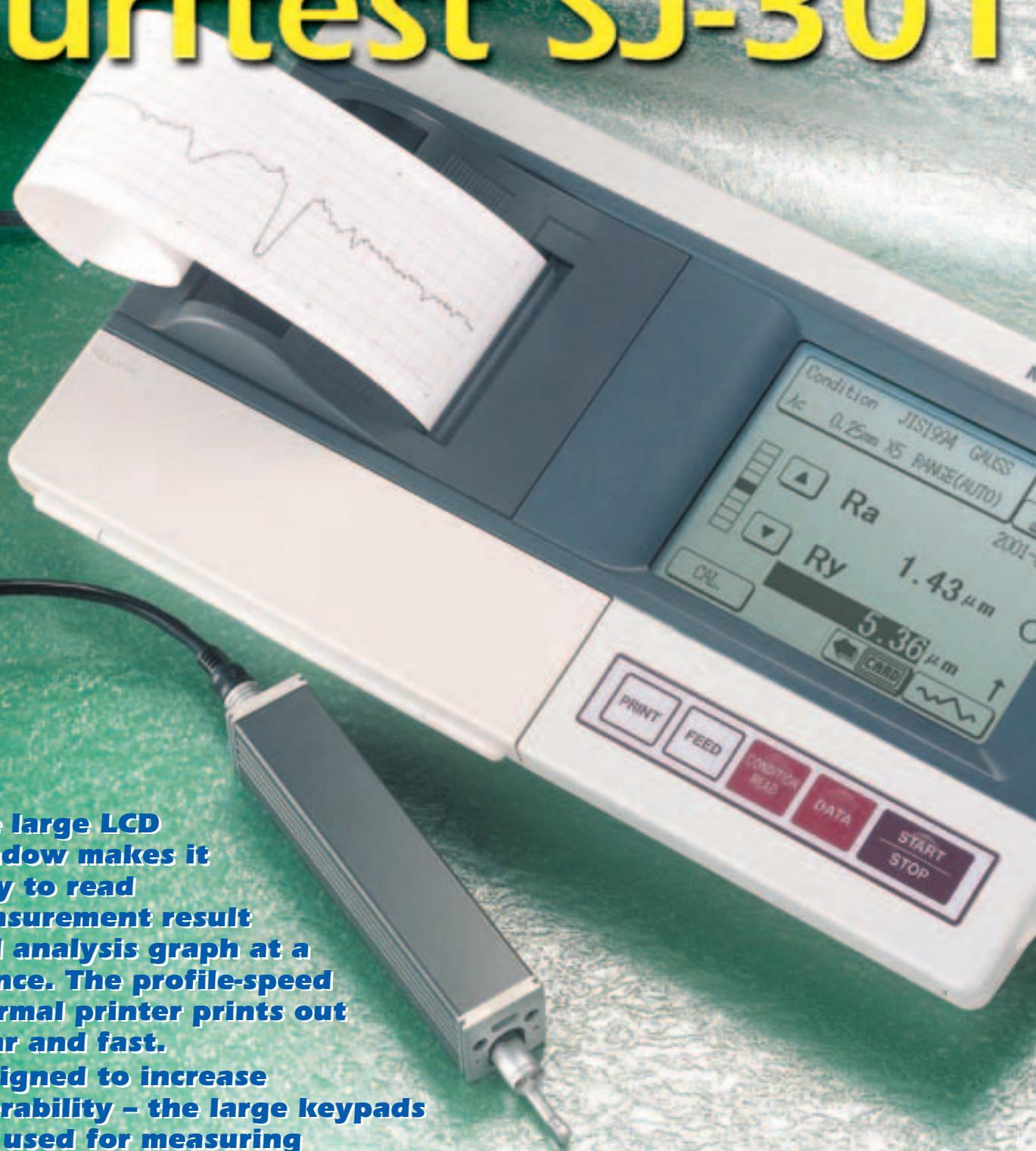
PORTABLE SURFACE ROUGHNESS TESTER

**Mitutoyo**



**A portable surface roughness tester with a touch-panel LCD and a built-in printer.**

# Surftest SJ-301



- **The large LCD window makes it easy to read measurement result and analysis graph at a glance. The profile-speed thermal printer prints out clear and fast.**
- **Designed to increase operability – the large keypads are used for measuring operations, while the touch panel LCD is used for setting various measurement conditions.**
- **Measured data can be downloaded to a PC. Various analyses can be made by using Surfpak-SJ, dedicated software for surface texture analysis.**





## Conforming to various standards

- Conforming to the JIS (1994/1982), ISO, DIN, and ANSI standards.
- Additionally, the horizontal roughness parameters  $S$ ,  $S_m$ ,  $t_p$  ( $mr$ ) can be reported. The SJ-301 also performs such special parameters as plateau rate and RK-related parameters.

## Storing measurement conditions and data

- The SJ-301 main unit can store a maximum of 5 sets of measuring conditions. Individual measuring conditions can be selected for each workpiece.
- The measuring conditions stored in the SJ-301 can be recalled and switched by direct key operations.
- Measured data can be saved at the measurement site and be printed out or recalculated later.
- By using an optional memory card, a maximum of 20 sets of measuring conditions, measured data, and statistical results can be stored.

## High-speed thermal printer

- Equipped with a highly sophisticated, high-speed thermal printer.
- Selectable orientation for printout – Choose the portrait for conventional printout or the landscape for printing out the image as it is displayed.
- BAC (Bearing Area Curve) and ADC (Amplitude Distribution Curve) can be printed out.

## Key-masking function

- This function limits touch panel operation to prevent the detector calibration data and measuring conditions from being altered or deleted.
- Measuring conditions can be easily controlled among multiple users.

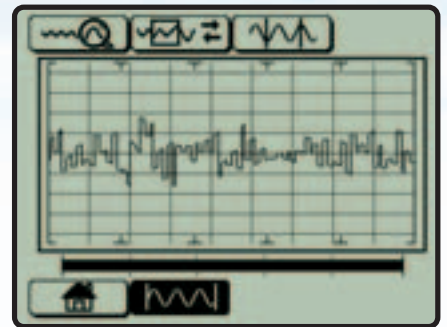


## Resistance to environment

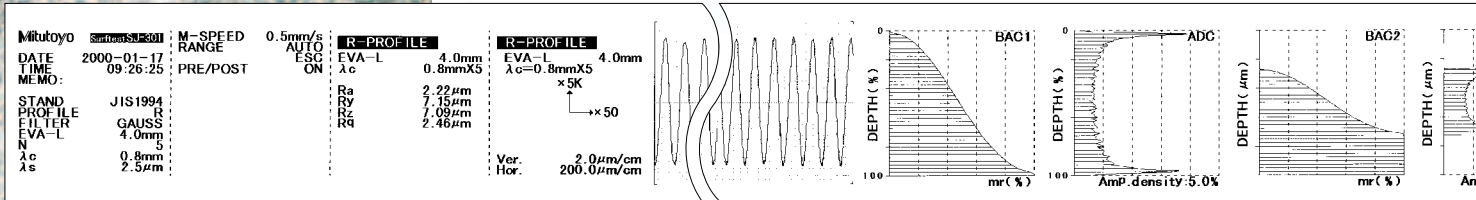
- The SJ-301 keypads have excellent durability – No need to worry about oil stains from the user's hand.

## Reading profiles in the LCD window

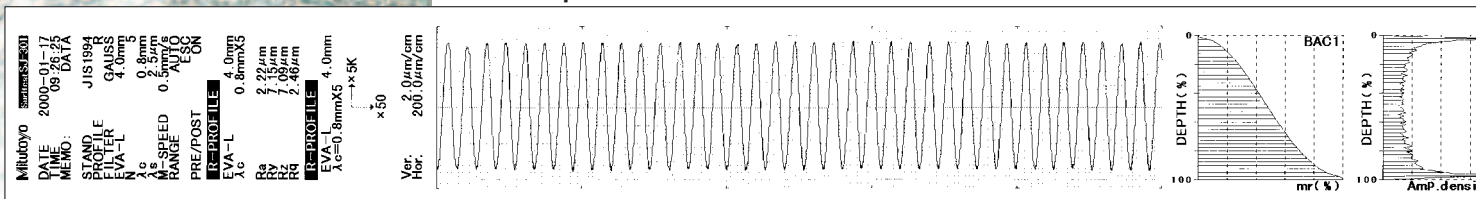
- Measurement results and analysis profiles can be read in the LCD window.
- Signal waves can be scrolled smaller or larger, enabling the operator to read fine details.



### Landscape printout

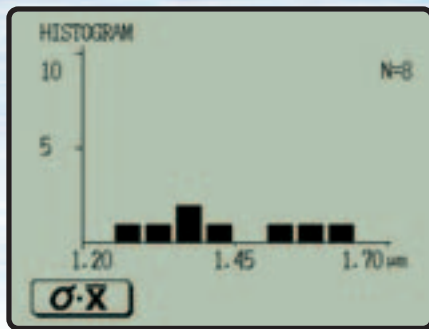
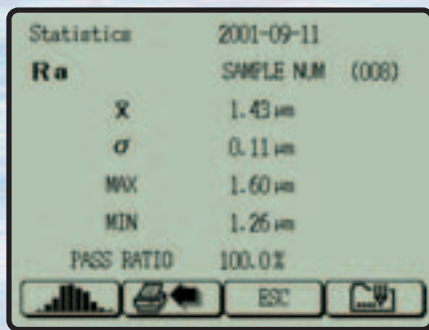


### Portrait printout



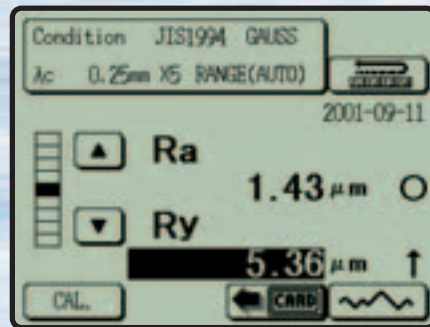
### Statistical analysis functions

- Statistical analysis of one parameter is possible.
- Displays and prints frequency histograms as well as statistical calculation results (average, standard deviation, maximum value, minimum value, pass ratio).



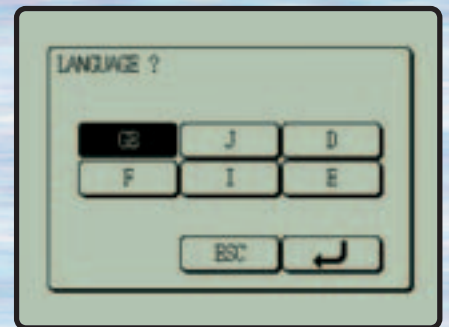
### GO/NG judgement function

- Tolerance values in three-steps can be set for the surface roughness parameters.
- Judgment symbol is displayed in the result display for a quick judgment of GO/NG.



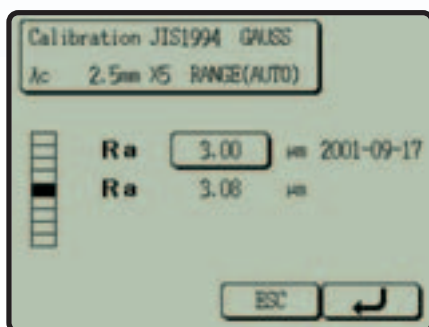
### Selectable language for display/printout

Display/printout language is selectable from among English, German, French, Italy, Spanish and Japanese.



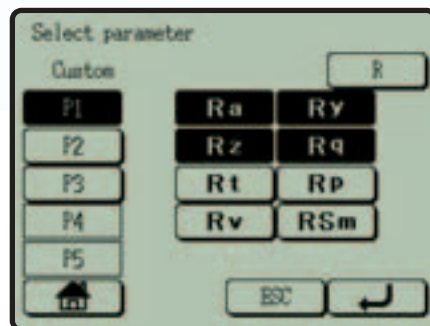
### Auto calibration

- Calibration can be easily performed by simply inputting and measuring the Ra value inscribed on the roughness reference specimen.
- No adjustment with a tool, such as a volume adjustment, etc. is required.



### Customization function

- The user can select only the parameters needed from a variety of surface roughness parameters provided.



### Mobility

- A built-in battery in the SJ-301 makes it possible to inspect surface roughness even at a site where there is no electrical outlet available.
- Portable and convenient – the drive unit and the detector can be stored in the display unit. (Carrying case is a standard accessory.)
- Measurement can be performed while the display unit is in the carrying case. The carrying case can be used to protect the display unit.



### Arbitrary evaluation length

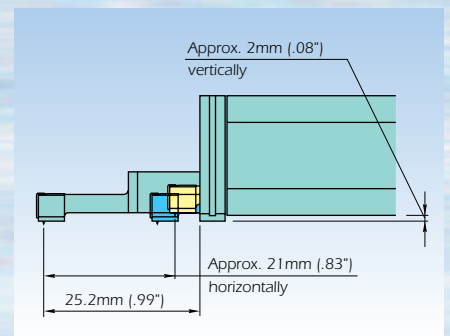
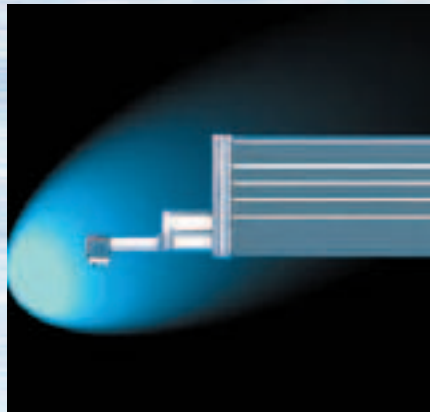
- An arbitrary evaluation length within the range of 0.3 mm - 12.5 mm (Unit: 0.1 mm) can be set.
- Measurement in a limited space, where measurement is difficult under the measuring conditions in accordance with JIS standards, is made possible by using the start-up OFF function.

### One-step detector replacement

- Special detectors are available for measurements that cannot be performed with a standard detector - such as measurement of small-diameters and deep-grooves.
- No tool is required for replacing the detector. Simply pull out and insert a detector.
- Just one SJ-301 can perform measurement on a variety of workpieces, since various types of detectors, depending on the workpiece, can be used.

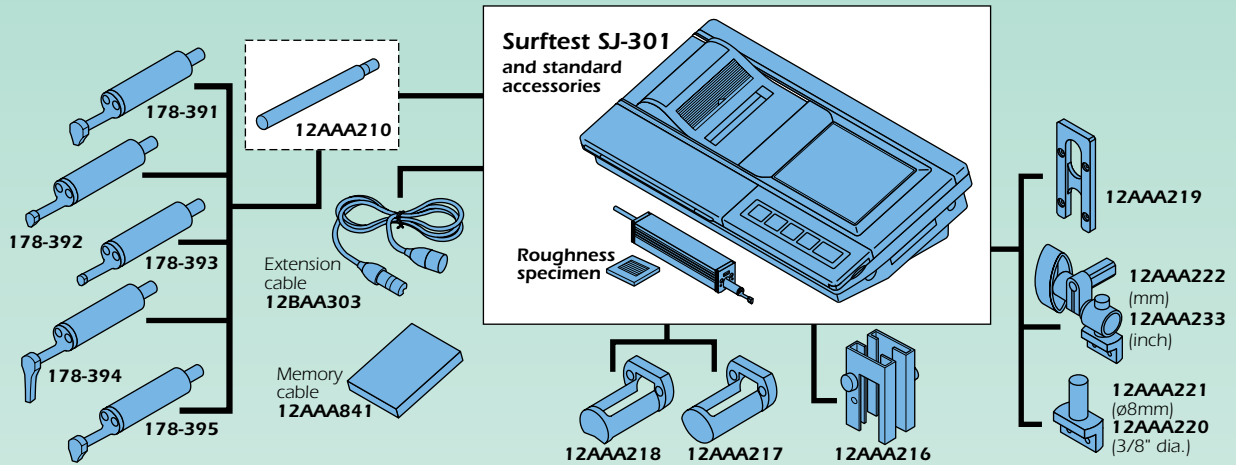
### High-accuracy detector

- SJ-301 employs a differential inductance method, which is used in high-end models.
- Measurement with a high-accuracy and a wide measuring range of 350µm.
- Parameters that require high-accuracy feed such as Sm and S can be measured with the SJ-301.
- The detector can be retracted into the drive unit when the SJ-301 is not performing a measurement.



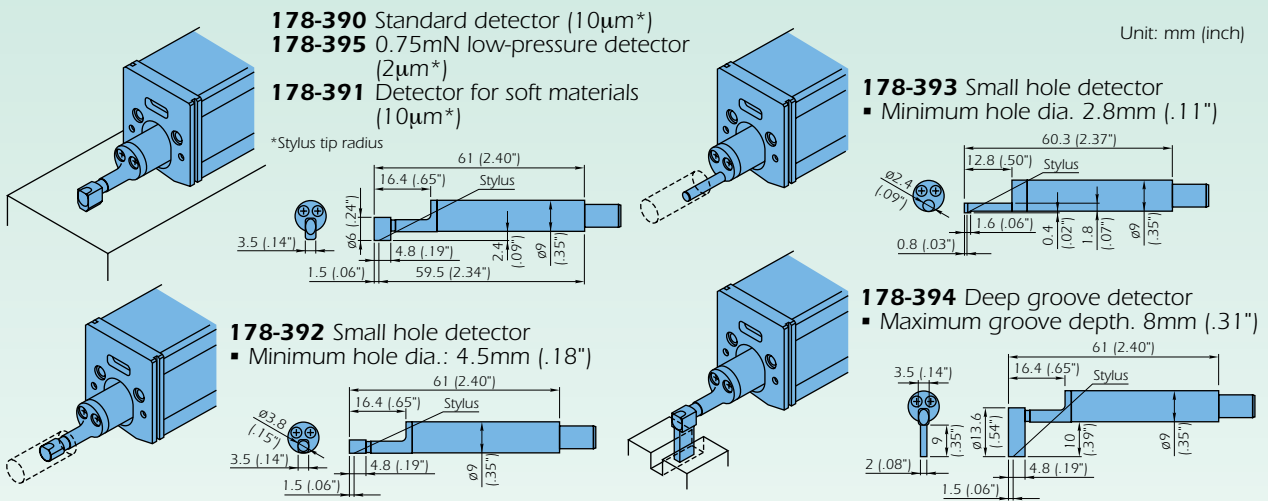
# ACCESSORIES

Various optional accessories widen the application range of measurements.

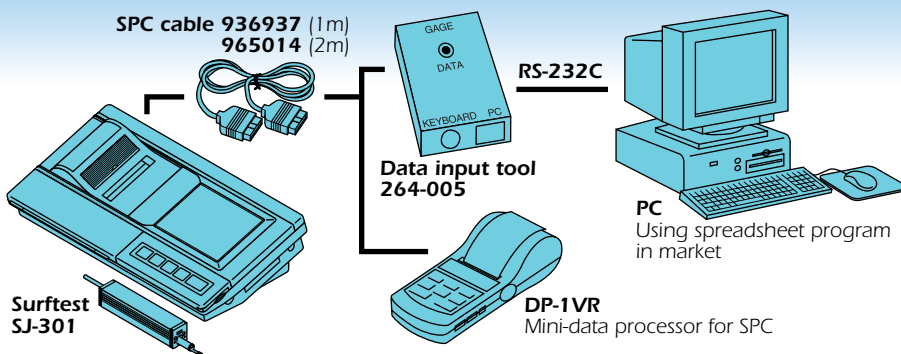


## DETECTORS

Select a detector appropriate for the material and shape of the workpiece to be measured.

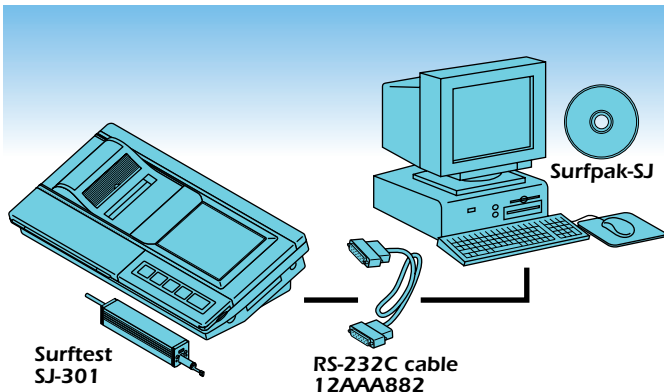
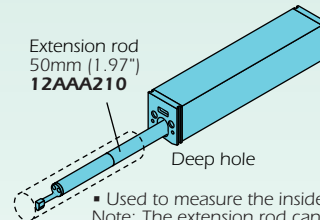
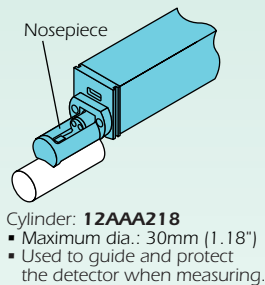
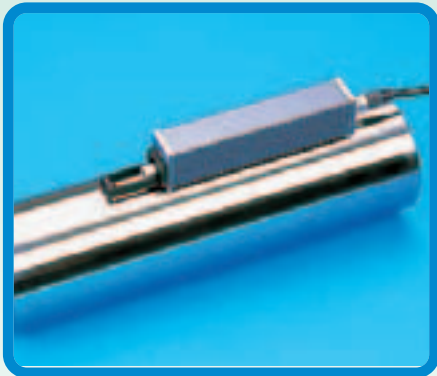
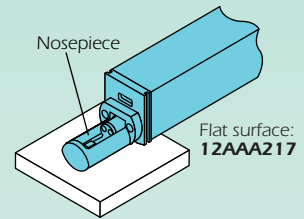
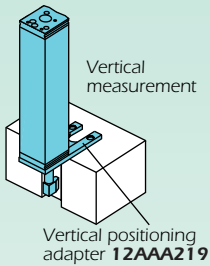
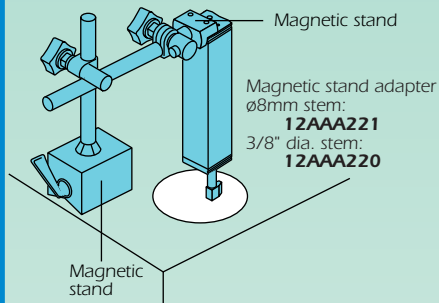


## SYSTEM EXTENSION



### Connection to DP-1VR and spreadsheet program

- Measurement results from the SJ-301 can be output to an external device for data processing and printout.
- When connected to the spreadsheet-input tool (optional), measured data can be input to a commercial spreadsheet program simply by pressing a key.



### Connection to surface-texture analysis software

The SJ-301 can be connected to Surfpak-SJ, the dedicated software for surface-texture analysis. When connected to Surfpak-SJ, the SJ-301's operability and analysis capability are expanded to the level of a high-end surface roughness tester. By using the SJ-301 with Surfpak-SJ, not only the numbers of roughness parameters and analysis graphs are increased but also evaluations of surface characteristics not limited to roughness are made possible; for example, deletion of unneeded data and contour evaluations such as step and pitch evaluations. The compact design allows room to build a highly expandable desktop evaluation system.

## Specifications

Order No.*		178-953-2	178-954-2	178-952-2	178-955-2
Type		mm	inch/mm	mm	inch/mm
Measuring range		Z-axis: 350 $\mu$ m (12000 $\mu$ in) X-axis: 12.5mm (.5")			
Drive Unit	Drive speed	Measuring: 0.25mm/s (.01"/s), 0.5mm/s (.02"/s) Returning: 1mm/s (.04"/s)			
	Connecting cable length	1m (39")			
	Mass	190g (.42 lbs.)			
Detector provided		178-390		178-395	
	Detecting method	Differential inductance			
	Measuring range	350 $\mu$ m (-200 $\mu$ m to +150 $\mu$ m)/13780 $\mu$ in (-7880 $\mu$ in to +5900 $\mu$ in)			
	Material of stylus	Diamond			
	Stylus tip radius	5 $\mu$ m (200 $\mu$ in)		8 $\mu$ m (80 $\mu$ in)	
	Radius of skid curvature	40mm (1.57")			
	Measuring force	4mN (0.4gf)		0.75mN (0.075gf)	
	Mass	18g (.04 lbs.)			
Display Unit	Assessed profile	Primary profile (R), Roughness profile (R), DIN4776, MOTIF.R, MOTIF.W			
	Evaluation parameter	Ra, Ry, Rz, Rt, Rp, Rq, Rv, Sm, S, Pc, R3z, mr, Rpk, Rvk, sc, Rk, Mr1, Mr2, Lo, Ppi, R, AR, Rx, A1, A2, Vo, HSC, mrd, sk, Ku, $\Delta$ a, $\Delta$ q, Wte, Wt, W, AW			
	Analysis graph	BAC1, BAC2, ADC			
	Roughness standard	JIS, DIN, ISO, ANSI			
	Sampling length (L)	0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm (0.003", .01", .03", .1", .3")			
	Cut-off length	lc: 0.08mm, 0.25mm, 0.8mm, 2.5mm, 8mm (0.003", .01", .03", .1", .3")			
		ls: 2.5 $\mu$ m, 8 $\mu$ m, 25 $\mu$ m (.100 $\mu$ in, .320 $\mu$ in, 1000 $\mu$ in)			
	Number of sampling spans	x1, x3, x5, xL**			
	Digital filter	2CR, PC75 (phase corrected), Gauss			
	Resolution/range	0.4 $\mu$ m/350 $\mu$ m (16.4 $\mu$ in/13780 $\mu$ in), 0.1 $\mu$ m/100 $\mu$ m (4.1 $\mu$ in/4000 $\mu$ in), 0.05 $\mu$ m/50 $\mu$ m (2.0 $\mu$ in/2000 $\mu$ in), 0.01 $\mu$ m/10 $\mu$ m (0.5 $\mu$ in/400 $\mu$ in),			
	Displaying range	Ra, Rq: 0.01 $\mu$ m - 100 $\mu$ m (.4 $\mu$ in - 4000 $\mu$ in)			
		Ry, Rz, Rt, Rp, Rv, R3z, Rk, Rpk, Rvk, R, Rx, W, Wx, Wte: 0.02 $\mu$ m - 350 $\mu$ m (.8 $\mu$ in - 14000 $\mu$ in) Aw, AR: 2.0 - 350m (80 - 1400 $\mu$ in)			
		S, Sm: 2 $\mu$ m - 4000 $\mu$ m (79 $\mu$ in - 160000 $\mu$ in)			
		PC: 2.5/cm - 5000/cm (6.35/inch - 12700/inch)			
		$\sigma$ c: -350 $\mu$ m - 350 $\mu$ m (-14000 -14000Min)			
		Lo: 0.1mm - 99.999mm (.004inch - 9.999inch)			
		mr, Mr1, Mr2, mrd: 0 - 100%			
		A1, A2: 0 - 15000 $\Delta$ a, $\Delta$ q, Ku: 0.01 Vo: 0.0000 - 999.99			
	Recording magnification	Vertical: 10x, 20x, 50x, 100x, 200x, 500x, 1000x, 2000x, 5000x, 10000x, 20000x, 50000x, 100000x, AUTO Horizontal: 1x, 2x, 5x, 10x, 20x, 50x, 100x, 200x, 500x, 1000x, AUTO			
	Printer	Thermal printer [printing width: 48mm (1.89")]			
Statistical processing	Maximum value, Minimum value, Mean vale, (for each parameter) Standard deviation (s), Pass ratio, Frequency distribution table				
Tolerance judgment	Upper and lower limit values for three parameters can be specified.				
Measuring condition	5 sets of measuring conditions storage				
Auto-sleep (turning off)	After five minutes without operation				
Calibration	Automatic calibration entering the value of roughness specimen.				
Power supply	Via AC adapter (DC7.5V, 1.5W) / built-in rechargeable battery				
Rechargeable battery	Charging time: 15hours (for 1000 measurements without printing)				
Data output	RS-232C input/output, SPC output				
Mass	Approximately 1200g (2.64 lbs.)				

\* To denote your AC line voltage add the following suffixes (e.g. **178-953-2A**). **A** for 120V, **C** for 110V, **D** for 220V, **E** for 240V, **No suffix** is required for 100V.

\*\* Evaluation length can be specified arbitrary in the range from 0.3mm (.01") to 12.5mm (.49").



## Standard Accessories

- Display unit
- Drive unit
- Standard detector (**178-390**)
- Nosepiece for flat surface (**12AAA217**)
- Nosepiece for cylinder (**12AAA218**)
- Supporting feet (**12AAA216**, pair)
- Roughness specimen (mm: **178-601**, inch/mm: **178-602**)



Roughness specimen

- AC adapter (**357651**)
- Printer paper (**270732**, 5 rolls set)
- Battery (**12BAA688**)
- Screwdriver (**541106**)
- Carrying case (**12BAA781**)
- Set screw for carrying case (**355556**)
- User's manual (**99MBB092A**)
- One sheet manual (**99MBB093A**)

## Optional Accessories

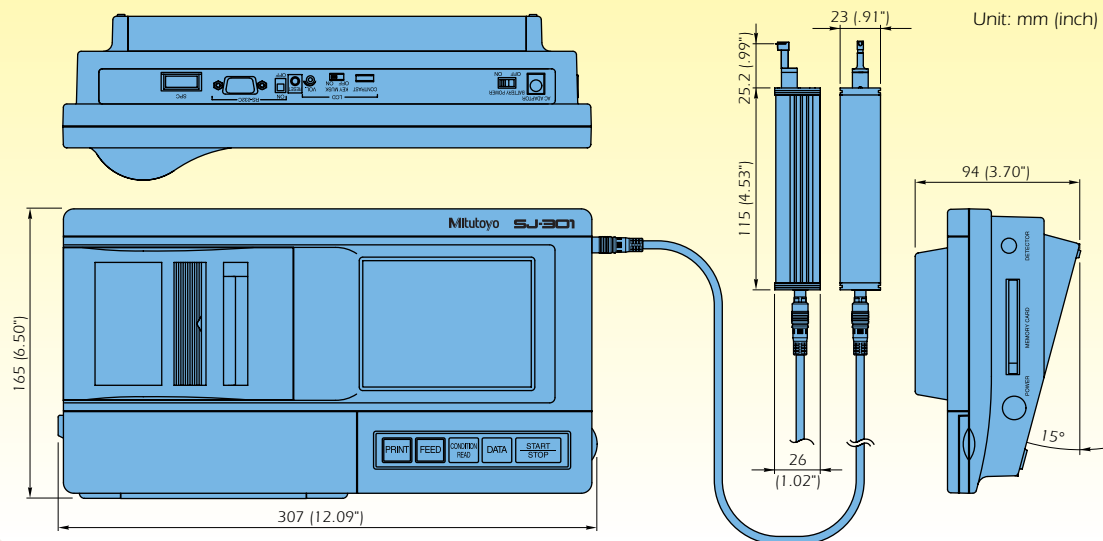
- 178-391** Detector for soft materials (stylus tip radius: 10mm)
- 178-392** Small hole detector (ø4.5mm)
- 178-393** Small hole detector (ø2.8mm)
- 178-394** Deep groove detector
- 12AAA219** Vertical positioning adapter

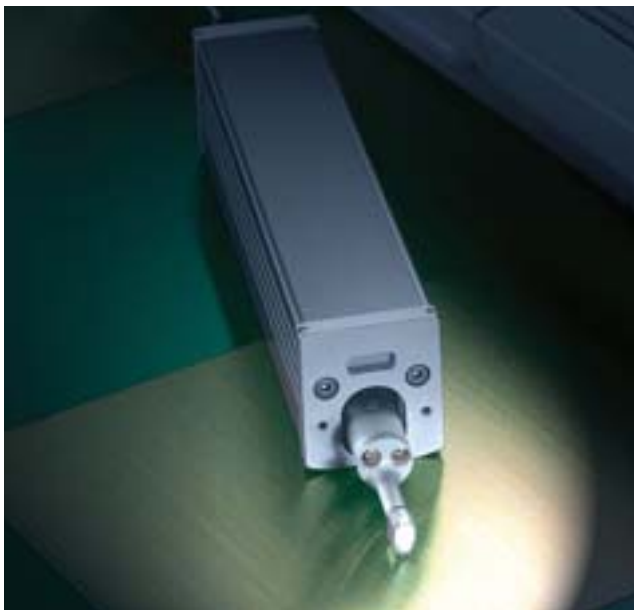
- 12AAA220** Magnetic stand adapter (3/8" dia. stem)
- 12AAA221** Magnetic stand adapter (ø8mm stem)
- 12AAA222** Height gage adapter (mm type)
- 12AAA233** Height gage adapter (inch type)
- 12AAA210** Extension rod (50mm)
- 936937** SPC cable (1m/40")
- 965014** SPC cable (2m/80")
- 12BAA303** Extension cable
- 12AAA882** RS-232C connecting cable
- 12AAA841** Memory card
- 12AAA896** LCD protective sheet (10 sheets set)
- 12AAA876** Printer paper (durable type, 5 rolls set)

- Connecting cable (**12BAA686**, 1m/40")
- Touch pen (**12BAA689**)
- Touch panel protection sheet (**12BAA690**)



## Dimensions





Coordinate Measuring Machines	=====
Vision Measuring Systems	=====
Surface-, Form- and Contour Measurement	=====
Digital Scale and DRO Systems	=====
Optical Measuring	=====
Sensor Systems	=====
Hardness Measuring	=====
Small Tool Instruments and Data Management	=====

**Mitutoyo America Corporation**  
[www.mitutoyo.com](http://www.mitutoyo.com)

<b>M<sup>3</sup> Solution Center</b>	
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Job No. 11B-7



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