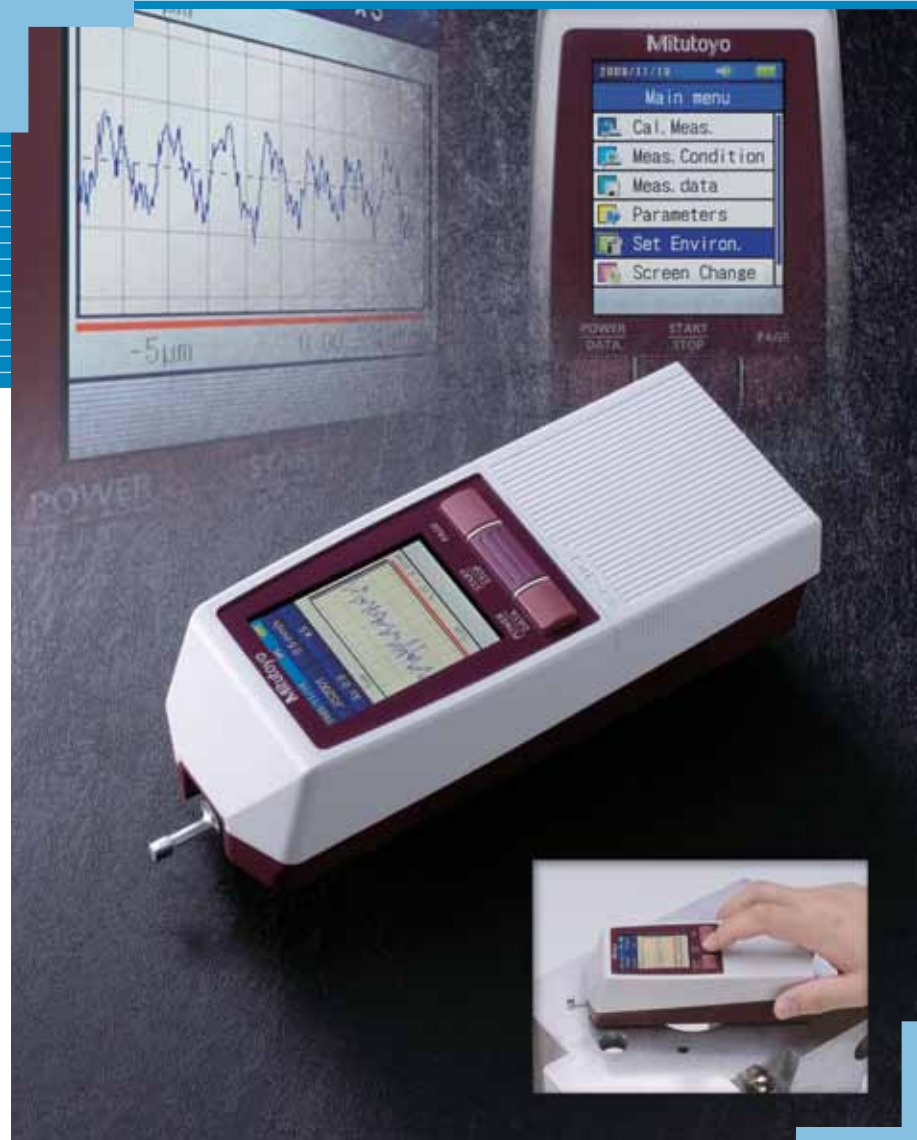


# SURFTEST SJ-210

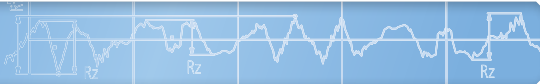


A small, lightweight, extremely easy-to-use surface roughness tester with colour LCD.

The Surftest SJ-210 is a user-friendly surface roughness tester designed as a handheld tool that can be easily carried and used on site.



## Easy to use



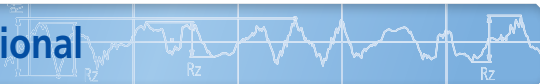
### Colour-graphic LCD with backlight

The 2.4" colour screen provides excellent readability and an intuitive display for easy use of the extensive functionality, with the added convenience of a backlight for excellent visibility in poor light.

### Simple key layout

The Surftest SJ-210 is easily operated using the keys on the front of the unit and those under the sliding cover.

## Highly functional



### Advanced data storage capabilities

Up to 10 setups and one measured profile can be stored in the internal memory.

### Optional memory card

An optional memory card can be used as an extended memory to store large numbers of measured profiles and setups.

### Password protection

Access to each feature can be password-protected, which prevents unintended operation and enables settings to be protected.

### Multilingual support

The display interface supports 16 languages, which can be freely switched.

### Stylus alarm

An alarm warns when the cumulative measurement distance exceeds a preset limit, so that the stylus can be changed in good time before wear begins to adversely affect measurement.

## Extensive analysis and display features



### Complies with relevant industry standards

The Surftest SJ-210 complies with the major VDA, ISO-1997, ANSI and Japanese standards applying to surface texture measurement.

### Displays assessed profiles and graphical data

In addition to calculation results, the Surftest SJ-210 can display sectional calculation results and assessed profiles, load curves, and amplitude distribution curves.



平均線

**Mitutoyo**

Surf

### Colour-graphics display

Intuitive display that's clear, sharp, and legible.

### Large, 2.4-inch LCD

The large screen provides excellent readability.

### Backlight

The backlight improves visibility in poor lighting conditions.

### Drive unit

The drive unit can be separated from the display unit by using the cable supplied, thus increasing flexibility in use. Separation and reattachment is simple.



There is a good choice of drive units and detectors available to suit almost any application.

### Operation keys

- The keys on the front of the unit and under the sliding cover are clearly labelled for ease of use.
- The user-friendly screen layout and arrow keys provide intuitive operation.
- Displayed settings can be changed easily by using the left and right arrow keys.
- Infrequently used keys are hidden under the sliding cover to discourage unintended operation.

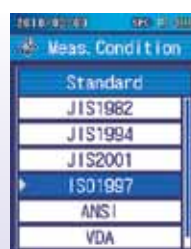
### Battery

The battery charges in one quarter the time of previous Mitutoyo products.



### Applicable standards

In addition to ISO, ANSI and VDA, the Surftest SJ-210 also complies with JIS standards.



### Multilingual support

The display interface supports 16 languages.



### High-speed USB communication

Data can be transferred to and from a computer via the high-speed USB interface.



### Memory card support

The memory-card slot enables large quantities of data to be conveniently stored.



test SJ-210



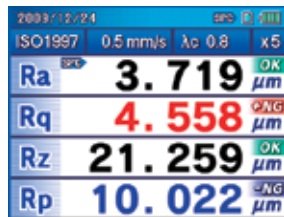
# Many features in a compact form

## Extensive display features that assist measurement

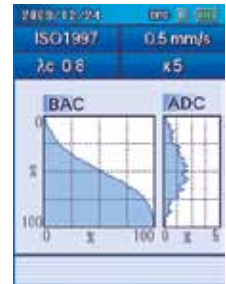
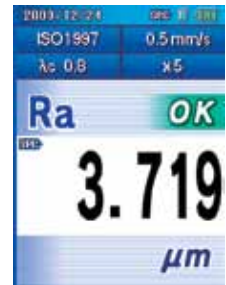
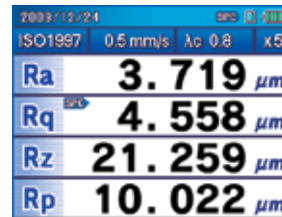
- The highly visible LCD with backlight ensures good screen visibility even in poor ambient lighting.



- Pass/fail results are displayed in colour for easy assimilation.

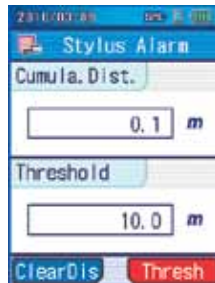


- The display mode can be freely switched between portrait and landscape.
- Calculation results are displayed in large characters.



## Stylus alarm function

- An alarm warns when the cumulative stylus travel exceeds a preset limit. This feature can be used to avoid problems caused by worn-out styli. Any value can be specified as the limiting distance.



## Easy setting

- Displayed settings can be easily changed by pressing the left and right arrow keys under the sliding cover. For example, these keys can be used to switch the cut-off value ( $\lambda_c$ ) and the number of sampling lengths (N) on the measurement screen.



## Advanced features

- The multilingual display interface supports 16 languages, which can be freely switched.
- Access to functions can be password-protected.
- The battery is a quick charge, long life type.

## Setting parameters and recalculating results

- The required parameters can be selected from the screen. The sub-menu also lets you specify detailed settings such as the tolerance. After completing measurement, the parameters can be changed and calculation can be executed again, using the new parameters\*.



\*May not be possible, depending on the setup.

## Advanced data storage capabilities

- Interface options: RS-232C output, Digimatic output, printer output, and footswitch input.
- Up to 10 setups can be stored in the internal memory, and these are quickly retrievable as they are each associated with a specific workpiece.
- The memory card\* slot enables practically unlimited expansion of the data memory capability.

\*See page 9 for details of compatible memory cards.

### Storage Capacity

Data type	Internal memory	Memory card (option)
Measured profiles	1	10,000
Calculation result	10	
Setups	10	500



# Detector/drive units

## Battery-powered portability scores when making surface roughness measurements on the shop floor.

Measurements in any orientation can be performed, even upside down. Optional accessories\*, such as a height gauge adapter, allow efficient measurement in almost any situation.

\*See pages 8 to 10 for details of the optional accessories available.



## The detector, drive unit and display combination means versatility.

### Highly capable detectors and drive units

The drive unit can be separated from the display unit and reattached via the cable supplied very easily.



Drive unit housed within display unit



Drive unit attached to display unit with cable

#### Standard detector



One of two types may be selected:

1. Measuring force: 0.75 mN  
Stylus profile: Tip radius 2  $\mu\text{m}$   
Tip angle 60°
2. Measuring force: 4 mN  
Stylus profile: Tip radius 5  $\mu\text{m}$   
Tip angle 90°

#### Drive units

##### Standard drive unit

Popular standard drive unit.



##### Transverse tracing drive unit

Best suited for measurement of narrow, shrouded workpiece features such as crankshaft bearings, EDM parts, etc.



##### Retractable drive unit

The detector is in the retracted position at rest so it is immune from damage when inserted into a feature whose profile cannot be easily seen, such as a blind hole, etc.



### Optional detectors

- A wide range of optional detectors\* is available, including detectors for small holes, extra small holes, gear tooth surfaces, and deep grooves.

\*See page 7 for details on the detectors.

### Carrying case

- A convenient carrying case is supplied as standard for protecting the instrument in the field.



# Specifications

Model (Type of detector)		Standard drive unit type		Retractable drive unit type		Transverse tracing drive unit type	
		SJ-210 0.75 mN type	SJ-210 4 mN type	SJ-210 0.75 mN type	SJ-210 4 mN type	SJ-210 0.75 mN type	SJ-210 4 mN type
Order No.	inch/mm	178-561-01	178-561-02	178-563-01	178-563-02	178-565-01	178-565-02
	X axis	17.5 mm				5.6 mm	
Measuring range	Z axis (detector)	360 μm (-200 μm to +160 μm)					
	Range/resolution	360 μm/0.02 μm, 100 μm/0.006 μm, 25 μm/0.002 μm					
Measuring speed		Measuring: 0.25 mm/s, 0.5 mm/s, 0.75 mm/s    Returning: 1 mm/s					
Measuring force/stylus tip		0.75 mN type: 0.75 mN/2 μm R 60°, 4 mN type: 4 mN/5 μm R 90°					
Skid force		Less than 400 mN					
Applicable standards		ISO '97/ANSI/VDA/JIS '82/JIS '94/JIS '01					
Assessed profiles		Primary profile/roughness profile/DF profile/roughness profile-Motif					
Evaluation parameters		Ra, Rc, Ry, Rz, Rq, Rt, Rmax, Rp, Rv, R3z, Rsk, Rku, Rc, R <sub>PC</sub> , Rsm, Rz1max, S, HSC, RzJIS, R <sub>ppi</sub> , RΔa, RΔq, Rlr, Rmr, Rmr(c), Rδc, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Rpm, tp, Htp, R, Rx, AR, custom					
Analysis graphs		Bearing area curve/amplitude distribution curve					
Filters		Gaussian, 2CR75, PC75					
Cut-off length	λ <sub>c</sub>	0.08, 0.25, 0.8, 2.5 mm					
	λ <sub>s</sub>	2.5, 8 μm					
Sampling length		0.08, 0.25, 0.8, 2.5 mm					
Number of sampling lengths (xn)		x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, arbitrary length (0.3 to 16.0 mm: 0.01 mm interval)				x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, arbitrary length (0.3 to 5.6 mm: 0.01 mm interval)	
LCD dimensions		36.7 x 48.9 mm					
Display languages		English, Chinese (simplified or traditional), Czech, Dutch, German, French, Hungarian, Italian, Japanese, Korean, Polish, Portuguese, Spanish, Swedish, Turkish					
Calculation result display	Vertical	1 parameter/3 parameter/trace to measurements					
	Horizontal	1 parameter/4 parameter/trace to measurements (horizontal display is invertable)					
Printing function *1 (A separate dedicated printer is required)		Setups/calculation results/calculation results for each sampling length/assessed profile/ bearing area curve/amplitude distribution curve/environment setting information					
External I/O		USB I/F, digimatic output, printer output, RS-232C I/F, foot SW I/F					
Functions	Customization	Desired parameters can be selected for calculation and display					
	GO/NG judgement*2	By maximum value/16%/standard deviation					
	Storage of setup	Save the conditions at power OFF					
		Internal memory	Setups (10 sets), measured profile (1 set)				
	Storage	Memory card (optional accessory)	500 setups, 10000 measured profiles, 500 display images, text file (setups/measured profile/assessed profile/bearing area curve/amplitude distribution curve)				
Calibration		Auto-calibration with the entry of numerical value/average calibration with multiple measurement (maximum 5)					
Power-saving		Auto-sleep function (10-600 sec)*3					
Power supply		Two-way power supply: battery (rechargeable Ni-MH battery) and AC adapter Note 1: charging time approximately 4 hours (may vary due to ambient temperature) Note 2: endurance approximately 1000 measurements (depends slightly on usage/environment)					
Size (W x D x H)	Display unit	52.1 x 65.8 x 160 mm					
	Drive unit	115 x 23 x 26 mm					
Mass		Approximately 500 g (display unit + drive unit + standard detector)					
Standard accessories		12BAA303 Connecting cable*4 12BAK699 Carrying case 12BAK700 Calibration stage 178-601 Roughness specimen Protective sheets for display, AC adapter, operation manual, quick reference manual, warranty				12BAA303 Connecting cable*4 12AAE643 Point-contact adapter 12AAE644 V-type adapter 12BAK699 Carrying case 12BAK700 Calibration stage 178-605 Roughness specimen Protective sheets for display, AC adapter, operation manual quick reference manual, warranty	

\*1: Order the SJ-210 printer (178-421, optional accessory) separately. See page 9 for details on printer.

\*2: Standard deviation only can be selected in ANSI. 16% rule cannot be selected in VDA.

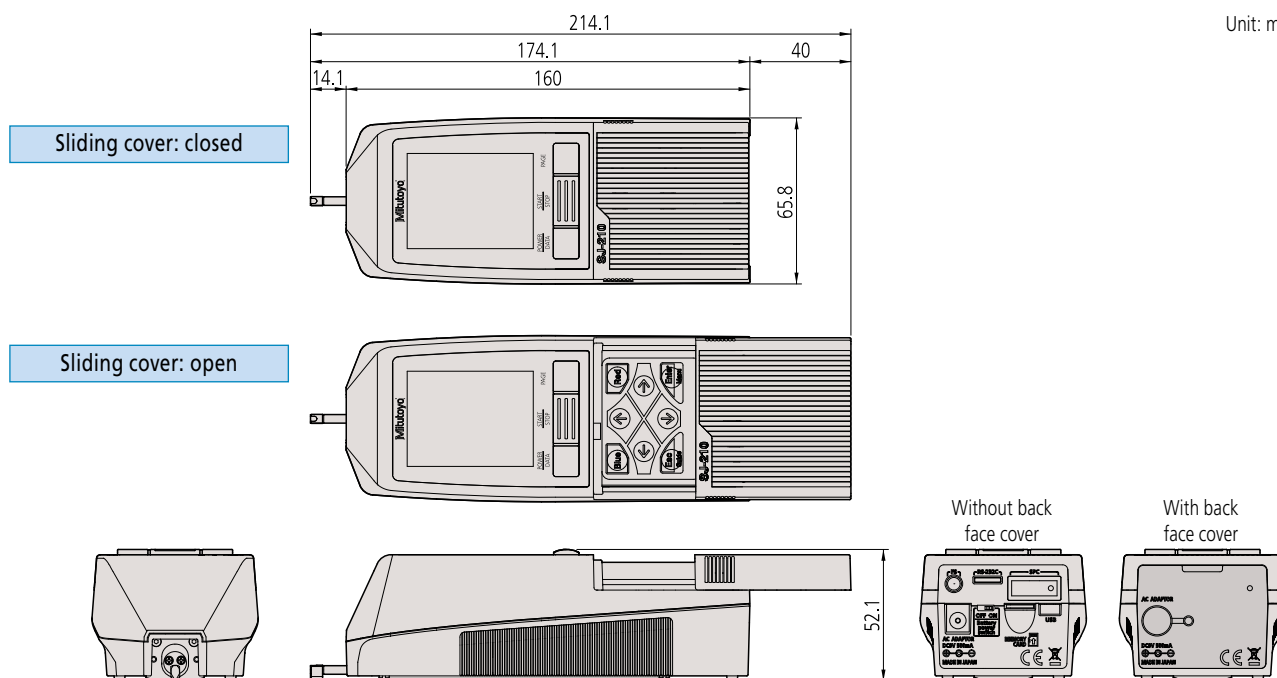
\*3: Auto-sleep function is inoperative when the AC adaptor is used.

\*4: For connecting the calculation display unit and drive unit.

# Dimensions: display unit and drive unit

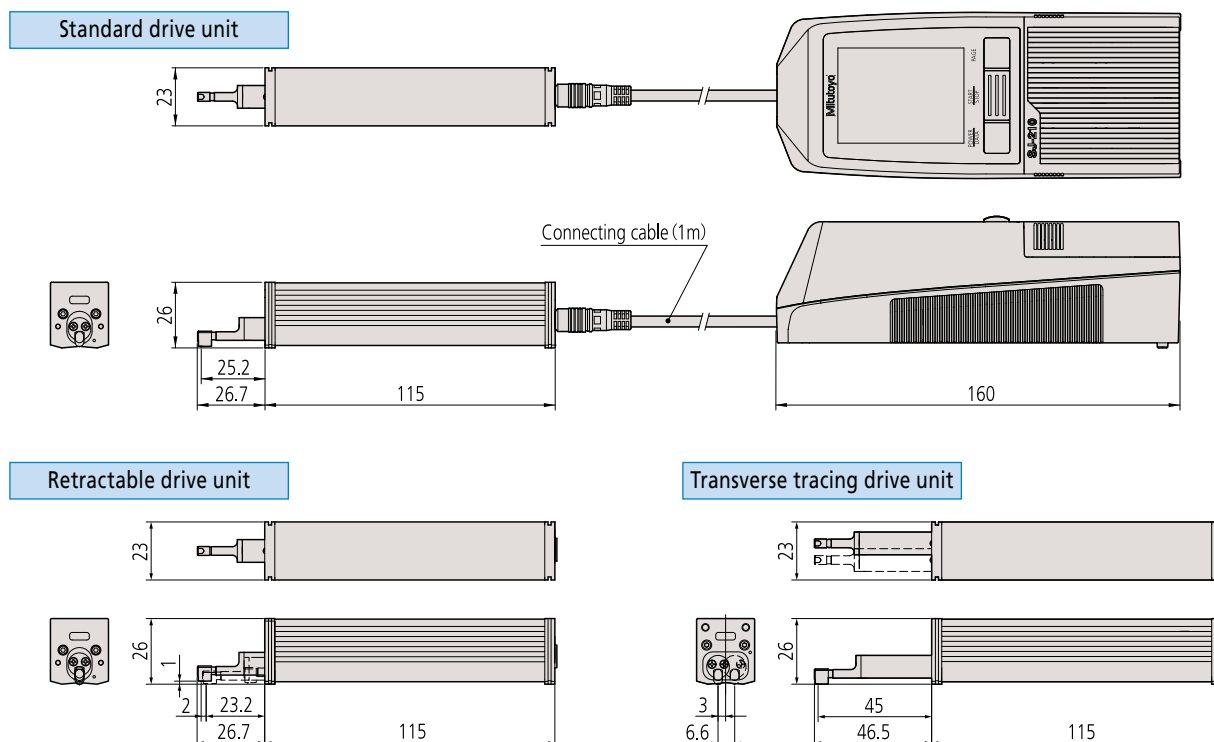
## Drive unit housed inside display unit (standard detector installed in drive unit)

Unit: mm



## Drive unit not housed inside display unit (standard detector installed in drive unit)

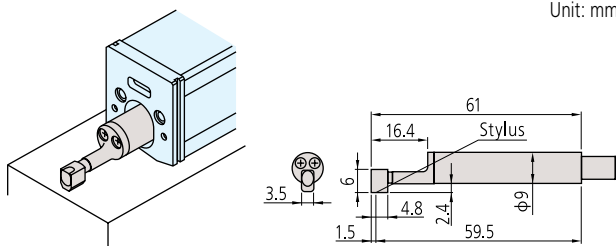
Unit: mm



# Dimensions: detectors

## Standard detectors

Unit: mm

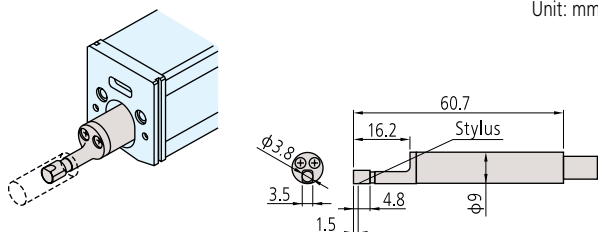


Order No.	Measuring force	Stylus profiles*	Remarks
178-296	0.75 mN	2 $\mu$ m R/60°	Dedicated to the standard/retractable drive units
178-390	4 mN	5 $\mu$ m R/90°	
178-387	0.75 mN	2 $\mu$ m R/60°	Dedicated to the transverse tracing drive unit
178-386	4 mN	5 $\mu$ m R/90°	
178-391	4 mN	10 $\mu$ m R/90°	Dedicated to the standard/retractable drive units

\*Tip radius/angle

## Small hole detectors

Unit: mm

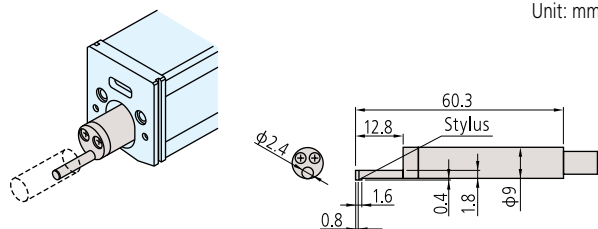


Order No.	Measuring force	Stylus profiles*	Remarks
178-383	0.75 mN	2 $\mu$ m R/60°	Minimum measurable hole: $\phi$ 4.5 mm
178-392	4 mN	5 $\mu$ m R/90°	

\*Tip radius/angle

## Extra small hole detectors

Unit: mm

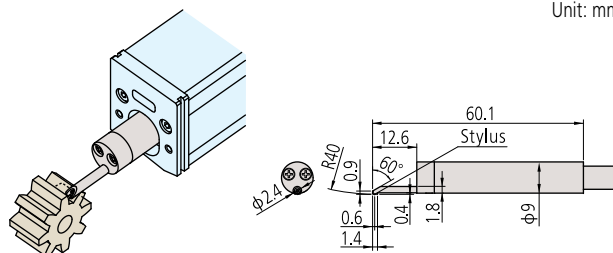


Order No.	Measuring force	Stylus profiles*	Remarks
178-384	0.75 mN	2 $\mu$ m R/60°	Minimum measurable hole: $\phi$ 2.8 mm
178-393	4 mN	5 $\mu$ m R/90°	

\*Tip radius/angle

## Gear-tooth surface detectors

Unit: mm

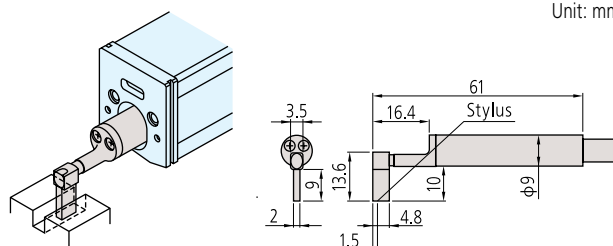


Order No.	Measuring force	Stylus profiles*
178-388	0.75 mN	2 $\mu$ m R/60°
178-398	4 mN	5 $\mu$ m R/90°

\*Tip radius/angle

## Deep groove detectors

Unit: mm



Order No.	Measuring force	Stylus profiles*	Remarks
178-385	0.75 mN	2 $\mu$ m R/60°	Not available for the transverse tracing drive unit
178-394	4 mN	5 $\mu$ m R/90°	

\*Tip radius/angle



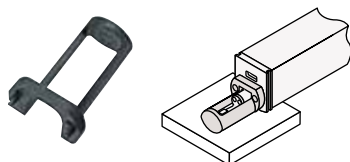


# Optional accessories: drive unit

## Nosepiece for flat surfaces

### 12AAA217

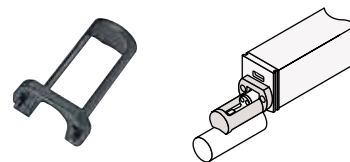
Not usable with the transverse tracing drive unit.



## Nosepiece for cylindrical surfaces

### 12AAA218

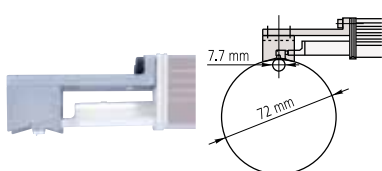
Not usable with the transverse tracing drive unit.



## V-type adapter

### 12AAE644

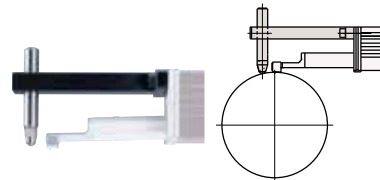
A transverse tracing drive unit standard accessory. Dedicated to the transverse tracing drive unit.



## Point-contact adapter

### 12AAE643

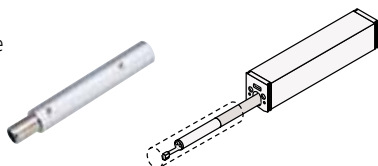
A transverse tracing drive unit standard accessory. Dedicated to the transverse tracing drive unit.



## Extension rod (50 mm)

### 12AAA210

Not usable with the transverse tracing drive unit. Only one rod may be used at any one time.



## Extension cable (1 m)

### 12BAA303

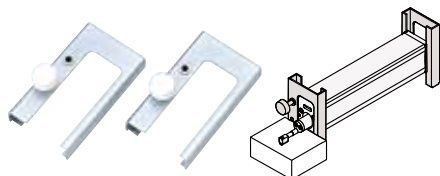
For connecting between calculation display unit and drive unit. Only one cable may be used at any one time.



## Support feet set

### 12AAA216

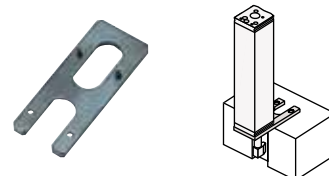
Not usable with the transverse tracing drive unit.



## Vertical positioning adapter

### 12AAA219

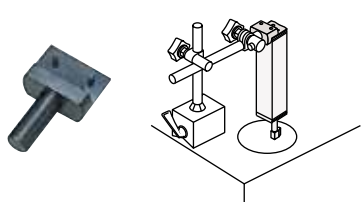
Not usable with the transverse tracing drive unit.



## Magnetic stand adapter

### 12AAA221 (ø8 mm)

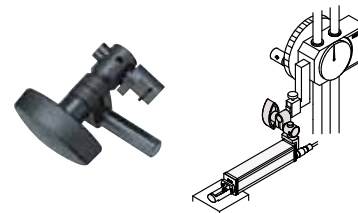
### 12AAA220 (ø9.5 mm)



## Nosepiece for cylindrical surfaces

### 12AAA222 (9 x 9 mm)

### 12AAA233 (1/4" x 1/2")



## Setting attachments

Enhances measurement efficiency by facilitating the measurement setup of multiple workpieces of the same type and of the hard-to-access sections of a workpiece. (Not available for the transverse tracing drive unit.)

### V type

#### 178-033

The V-width is adjustable to the cylinder diameter facilitating axial measurement of a wide range of cylinder diameters. Adjustable range: ø5-150 mm



### Magnetic slider type

#### 178-034

The magnetic frame allows taking hands-free measurement on an inclined surface of a magnetizable workpiece.



### Inside diameter type

#### 178-035

Greatly facilitates measurement of internal wall surfaces of, for example, a cylinder block. Applicable dia.: 75-95 mm Accessible depth: 30-135 mm



# Optional accessories: external equipment

## Digimatic mini processor DP-1VR

**264-504**

This processor can be used to print calculation results, perform a variety of statistical analyses, draw a histogram or D-chart, and also perform complicated operations for X-R control charts.



SJ-210 to DP-1VR connecting cables:

**936937** (1 m)

**965014** (2 m)

## Memory card

**12AAL069**

A memory card\* for saving up to 500 setups, 1000 measured profiles, 500 display images, text files (setups, measured profiles, assessed profiles, BAC, ADC).



Not all memory cards are recognized. Please use the memory card recommended by Mitutoyo.

## Printer

**178-421**

This palm-sized printer (WxDxH: 93 x 125 x 70 mm) can run on an internal battery to print assessed profiles, calculation results and curves.

- Powered by AC adapter or battery pack.
- Printable items: Setups, calculation results, assessed profiles, bearing area curves (BAC), amplitude distribution curves (ADC), and environment settings.

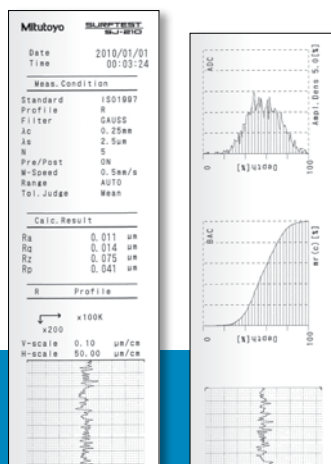


Unit configuration:

- Printer main unit
- Printer connecting cable
- Printing paper 6-pack
- Battery pack
- Exclusive use AC adapter



Examples of printer output



Printer paper (5-pack):  
**12AAA876**

# Optional accessories: external output

## Simplified communication program for SURFTEST SJ series

The SurfTest SJ-210 is equipped with a USB interface, enabling data to be transferred to spreadsheet or other software. A program that enables inspection record tables to be created using a Microsoft Excel\* macro is also provided.

### Required environment\*

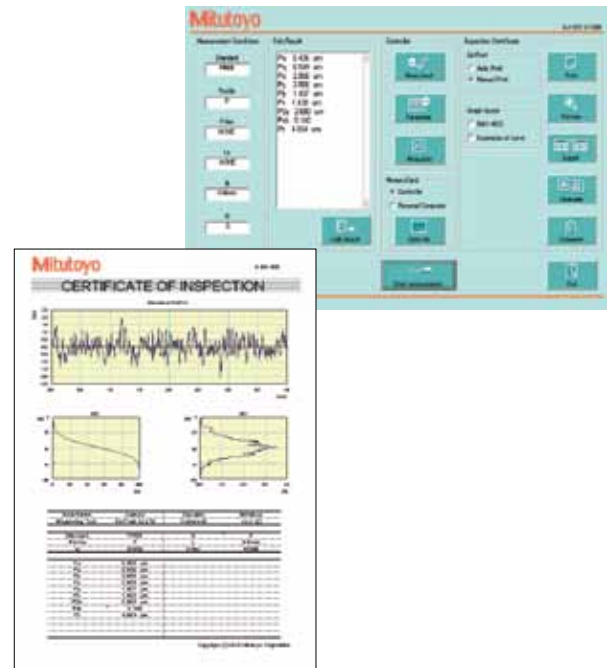
- OS:
  - Windows 2000 SP4
  - Windows XP
  - Windows Vista
  - Windows 7
- Spreadsheet software:
  - Microsoft Excel 2000
  - Microsoft Excel 2002
  - Microsoft Excel 2007

\* Windows OS and Microsoft Excel are products of Microsoft Corporation.

USB cable:

**12AAL068** (2 m)

This program can be downloaded FREE of charge from  
**[www.mitutoyo.co.uk](http://www.mitutoyo.co.uk)**



## Footswitch

**12AAJ088**

A footswitch can be used to trigger measurement. This tool is very useful in cases where the same type of workpiece is measured multiple times, often using a fixture for alignment.



## Protective sheet for the display

**12AAL066**

Protective sheet for the colour LCD (5-pack).

## Input tool

USB keyboard signal conversion model:

**IT-012U (264-012-10)**

PS/2 keyboard signal conversion model:

**IT-005D (264-005)**

Calculation results can be loaded directly into commercial spreadsheet software via this unit simply by connecting it from the SJ-210 to the USB connector on a computer or a PS/2 type keyboard connector.



Coordinate Measuring Machines	_____
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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