# Mitutoyo

# *Surftest SJ-210* *Series*

## Color graphic LCD

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

## Battery

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

## Large, 2.4-inch LCD

The large LCD provides excellent readability.

## Backlight

The backlight improves visibility in dark environments.

## Operation keys

- The keys on the front of the unit and under the sliding cover are well-labeled and easy to use.
- The user-friendly screen layout and arrow keys provide intuitive operability.
- Displayed settings can be changed easily by using the left and right arrow keys.
- Infrequently used keys are hidden under the sliding cover to prevent unintended operations.

## Drive unit

The drive unit can be separated from the display unit by using a cable, allowing more flexible measurement.
The driver can be separated and reattached in one simple step.

There are many different kinds of drivers and detectors available.
(Refer to page 6, 13, 14 for details.)

## Applicable standards

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

## High-speed USB communication

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

## Memory card support
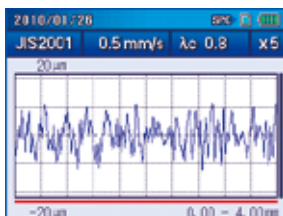
The memory card slot lets you store large amounts of data onto a memory card.

## Multilingual support

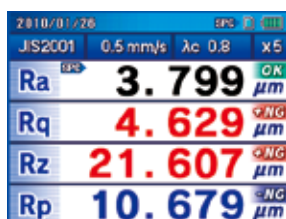The display interface supports 16 languages.

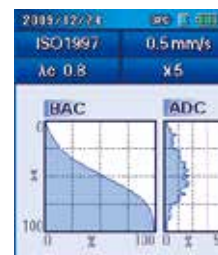## Extensive display features that assist measurement

- The highly visible 2.4-inch color graphic LCD with backlight lets you view the screen easily even in dark environments.
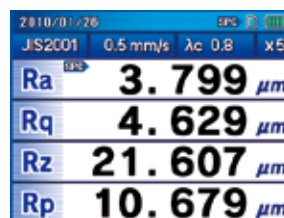
- Pass/fail results are displayed in color.

- Assessed profiles, load curves, and amplitude distribution curves can be displayed in addition to calculation results.
  Assessed profiles can also be zoomed up and down.

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

## Advanced data storage capabilities

- Up to 10 measurement conditions can be stored in the internal memory. Conditions can be quickly read according to the workpiece.
- An optional memory card can be used as an extended memory to store large quantities of measured profiles and conditions.

**Storage capacity of memory card (optional)**

| Data type | Storage capacity of memory card |
|---|---|
| Measured profiles | 10000 |
| Calculation result | |
| Measurement condition | 500 |
| Display images | 500 |

- Many interface options:
  - A USB interface is equipped as standard.
  - The Surftest **SJ-210** also provides an RS-232C output, Digimatic output, printer output, and foot switch input.

## Stylus alarm function

- An alarm warns you when the cumulative measurement distance exceeds a preset limit. This feature can be used to prevent problems that would be caused by worn out styli. Any value can be specified as the limit.

## 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.
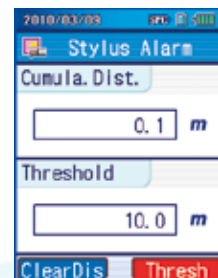
(Example of the measurement screen)

## Advanced features

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

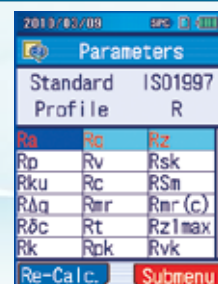## Setting parameters and recalculating results

- 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.
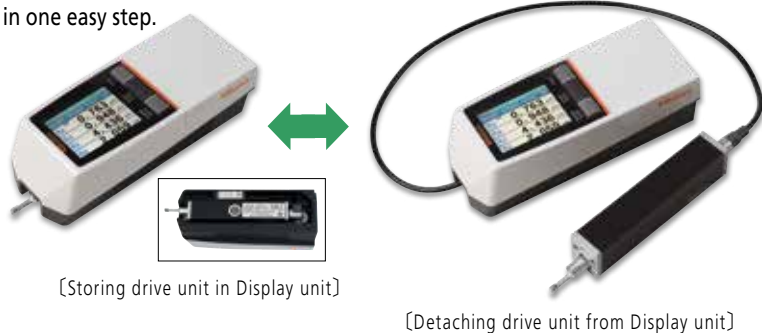  * May not be possible, depending on the measurement conditions.
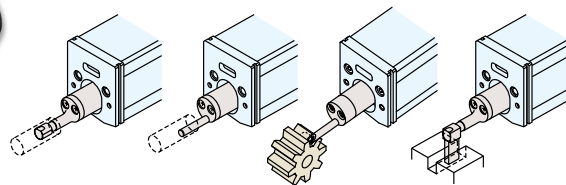
# Mitutoyo

# SJ-210 Series

**A wide variation in system setup is possible with the detector + drive unit + display unit combination**

## Highly functional detectors and drive units

The driver can be separated from the display unit and reattached in one easy step.

〔Storing drive unit in Display unit〕

〔Detaching drive unit from Display unit〕

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

Refer to page 14 for details of detector.

### Detector supplied as standard

**Selectable from the following two items.**
- Measuring force: 0.75 mN
  Stylus tip: Tip radius 2 µm
  Tip angle 60°
- Measuring force: 4 mN
  Stylus tip: Tip radius 5 µm
  Tip angle 90°

### Drive units (selectable)

| Standard drive unit | Transverse tracing drive unit | Retractable drive unit |
|---|---|---|
| ● Popular standard drive unit | ● Best suited for measurement of narrow, shrouded workpiece features such as crankshaft, EDM parts, etc. (Patent Registered in Japan) | ● 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. |

### Positive stylus contact indication

Stylus contact with the workpiece is indicated by color coding in the display. This is helpful when visibility of the surface to be measured is restricted (e.g. when measuring within a shrouded feature or groove).

No contact

JIS2001  0.5mm/s  λs 0.8  x5
**Ra**
0. 684
*µm*

Contact

JIS2001  0.5mm/s  λs 0.8  x5
**Ra**
0. 684
*µm*

### Carrying case

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

# SJ-210 Series Specifications

## Specifications

| Type of detector | | | Standard drive unit type | | Retractable drive unit type | | Transverse tracing drive unit type | |
|---|---|---|---|---|---|---|---|---|
| Model No. | | | 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) |
| | | inch/mm | 178-561-11A | 178-561-12A | 178-563-11A | 178-563-12A | 178-565-11A | 178-565-12A |
| Measuring range | X axis | | .63" (16.0mm) | | | | .22" (5.6mm) | |
| | Z axis (Detector) | Range | 14400 µin (-7900 µin to +6300 µin) [360 µm (-200 µm to +160 µm)] | | | | | |
| | | Range/ Resolution | 14400 µin / .8 µin (360 µm / 0.02 µm) 4000 µin / .2 µin (100 µm / 0.006 µm) 1000 µin / .08 µin (25 µm / 0.002 µm) | | | | | |
| Measuring speed | | | When measuring: 0.01, 0.02, 0.03 in/s (0.25mm/s, 0.5mm/s, 0.75mm/s)  When returning: 04 in/s (1mm/s) | | | | | |
| Measuring force/Stylus tip | | | 0.75 mN / 2 µmR 60°,  4 mN / 5 µmR 90° | | | | | |
| Skid force | | | Less than 400 mN | | | | | |
| Applicable standards | | | JIS '82/JIS '94/JIS '01/ISO '97/ANSI/VDA | | | | | |
| Assessed profiles | | | Primary profile, Roughness profile, DF profile, Roughness profile-Motif | | | | | |
| Parameters | | | Ra, Rc, Ry, Rz, Rq, Rt, Rmax[*1], Rp, Rv, R3z, Rsk, Rku, Rc, RPc, Rsm, Rz1max[*2], S, HSC, RzJIS[*3], Rppi, R$\Delta$a, R$\Delta$q, Rlr, Rmr, Rmr(c), R$\delta$c, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, Rpm, tp[*4], Htp[*4], R, Rx, AR, Possible Customize | | | | | |
| Graph analysis | | | Bearing area curve/Amplitude distribution curve | | | | | |
| Filters | | | Gaussian, 2CR75, PC75 | | | | | |
| Cut off length | $\lambda$c | | 0.003, 0.01, 0.03, 0.1" (0.08 , 0.25 , 0.8 , 2.5mm) | | | | | |
| | $\lambda$s[*5] | | 100, 300µin (2.5 , 8µm) | | | | | |
| Sampling length | | | 0.003, 0.01, 0.03, .1" (0.08 , 0.25 , 0.8 , 2.5mm) | | | | | |
| Number of sampling lengths (×n) | | | ×1, ×2, ×3, ×4, ×5, ×6, ×7, ×8, ×9, ×10, Arbitrary 0.01~.63" (.0001"interval) [(0.3~16.0mm: 0.01mm interval)] | | | | ×1, ×2, ×3, ×4, ×5, ×6, ×7, ×8, ×9, ×10, Arbitrary .0118 ~ .22"(.0001" Interval) [(0.3 ~ 5.6mm: 0.01mm Interval)] | |
| LCD dimensions | | | 1.45 x 1.93" (36.7×48.9 mm) | | | | | |
| Display languages | | | Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Traditional Chinese, Simplified Chinese, Czech, Polish, Hungarian, Turkish, Swedish, Dutch | | | | | |
| Measurement result display | | | Vertical display: 1-parameter display/3-parameter display/Trace display Horizontal display: 1-parameter display/4-parameter display/Trace display (Horizontal display is invertable) | | | | | |
| Printing function[*6] (Dedicated printer is required separately.) | | | Measurement conditions/Calculation results/GO/NG judgement result/Calculation results for each sampling length/ Assessed profile/Bearing area curve/Amplitude distribution curve/Environment setting infomation | | | | | |
| 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 judgment[*7] | | By max value/16 %/Standard deviation | | | | | |
| | Storage of measurement condition | | Save the conditions at power OFF | | | | | |
| | Storage | | Internal memory: Measurement condition (10 sets) Memory card (Option): 500 measurement conditions, 10000 measured profiles, 500 display images Text file (Measurement conditions/Measured profile/Assessed profile/ Bearing area curve/Amplitude distribution curve) | | | | | |
| | Calibration | | Auto-calibration with the entry of numerical value/ Average calibration with multiple measurement (Max.5 times) is available | | | | | |
| Power-saving function | | | Auto-sleep off function (10-600 sec)[*8] | | | | | |
| Power supply | | | Two-way power supply: battery (rechargeable Ni-MH battery) and AC adapter Note 1: Charging time: about 4 hours (may vary due to ambient temperature) Note 2: Endurance: about 1000 measurements (differs slightly due to use conditions/environment) | | | | | |
| Size (W×D×H) | Display unit | | 2.05 x 2.6" x 6.3" (52.1×65.8×160mm) (sliding cover closed, detector not mounted) | | | | | |
| | Drive unit | | 4.5 x .9 x 1.02" (115×23×26mm) (detector not mounted) | | | | | |
| Mass | | | About 1.1lbs (500g) (Display unit + Drive unit + Standard detector) | | | | | |
| Standard accessories | | | 12BAA303  Connecting cable[*9] 178-601  Roughness specimen Ra (3 µm) 12BAR344  Carrying case 12BAK700  Calibration stage Protective sheets for display, AC Adapter, Operation manual, Quick reference manual, Warranty | | | | 12BAA303  Connecting cable[*9] 178-605  Roughness specimen Ra (1 µm) 12AAE643  Point-contact adapter 12AAE644  V-type adapter 12BAR344  Carrying case 12BAK700  Calibration stage Protective sheets for display AC Adapter, Operation manual Quick reference manual, Warranty | |

*1 Calculation is available only when selecting the VDA, ANSI, or JIS '82 standard.
*2 Calculation is available only when selecting the ISO '97 standard.
*3 Calculation is available only when selecting the JIS '01 standard.
*4 Calculation is available only when selecting the ANSI standard.
*5 Not available when selecting the JIS '82 standard.
*6 Order the SJ-210 printer (178-421, optional accessory) separately. See page 19 for details about the SJ-210 printer.
*7 Standard deviation only can be selected in ANSI. 16 % rule cannot be selected in VDA.
*8 Auto-sleep function is invalid when AC adaptor is used.
*9 For connecting the calculation display unit and drive unit.
Note: To denote your AC line voltage add the following suffixes (e.g. 178-560-11A).
       A for 120 V, C for 100 V, D for 230 V, E for 230 V (for UK), DC for 220 V (for China), K for 220 V (for Korea)