Mitutoyo

Mitutoyo Quality

Portable Surface Roughness Tester
Surftest SJ-410 Series

Form Measurement

Bulletin No. 2306

Mitutoyo

Portable Surface Roughness Tester

Surftest SJ-410 Series

Analysis functions that surpass the rest

User benefit 1

Easy and safe measurements that anyone can perform efficiently

User benefit 2

Higher level of quality control

Touch screen for easier operations

The high-visibility color-graphic LCD touch screen clearly displays calculated results and assessed profiles. A backlight enables comfortable viewing even under poor lighting conditions.

User benefit **3**

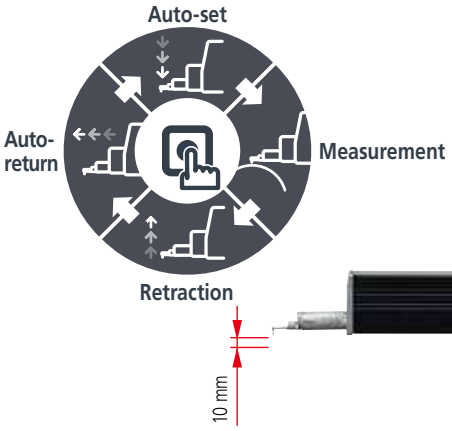
Doing double duty for space saving

SJ-412
Traverse range 50mm

SJ-411
Traverse range 25 mm

User benefit **1**

Easy and safe measurements that anyone can perform efficiently



Optional stand shown (**178-039**) is required to use the Auto-set unit.

The auto-set unit* allows measurements to be made with the push of a single button, saving you time and increasing work efficiency.

The auto-set function safely controls descent of the detector, eliminating the possibility of operator error causing damage to the stylus.

Auto-set unit*

178-010

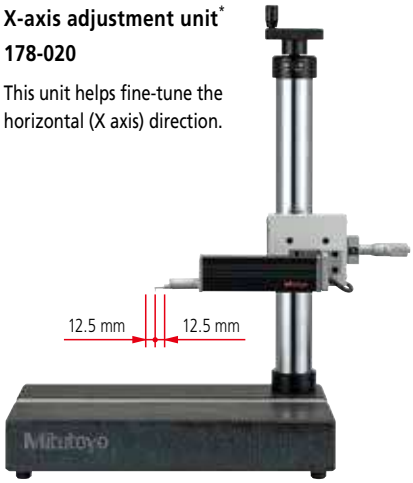
This unit automatically completes a full measurement cycle of stylus contact, measurement, stylus retraction and detector auto-return from the push of one button (stylus retraction and detector auto-return can be switched on and off by operating the drive unit).

Options for SJ-410 Series

X-axis adjustment unit*

178-020

This unit helps fine-tune the horizontal (X axis) direction.

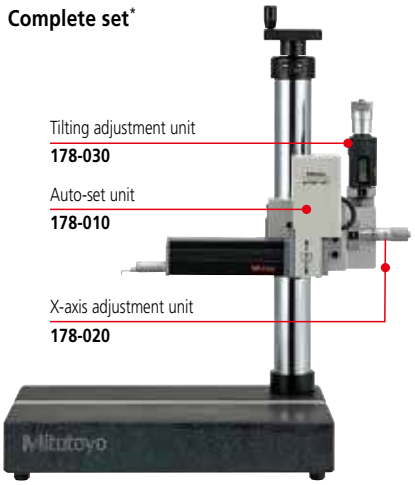


Tilting adjustment unit*

178-030

This unit is used for aligning the workpiece surface with the detector reference plane. It supports the DAT function to make the leveling of workpiece surfaces easier.

Complete set*



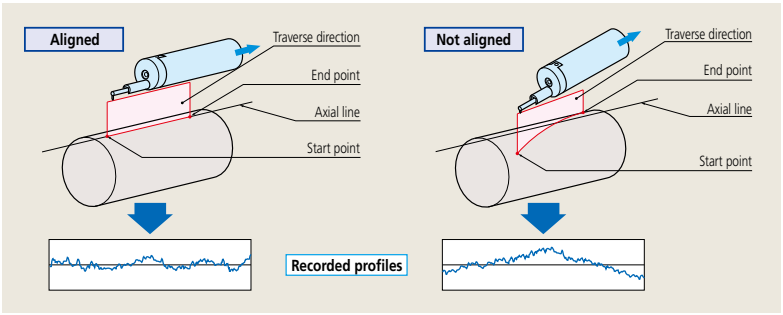
* This is an optional accessory for the **SJ-410** Series. It can only be used on the simple column stand (optional accessory, order No. **178-039**).
When the units are used in combination, straightness for **SJ-411 / 412** drive unit will be degraded about 0.2μm.
Cannot be used when the tester's main unit is an older model (**SJ-401 / 402**).

Assessing a single measurement result under two different evaluation conditions

A single measurement enables simultaneous analysis under two different evaluation conditions. A single measurement allows calculation of parameters and analysis of filtered profiles without the need for recalculation after saving data, which contributes to higher work efficiency.

3-axis Adjustment Table <Option> 178-047

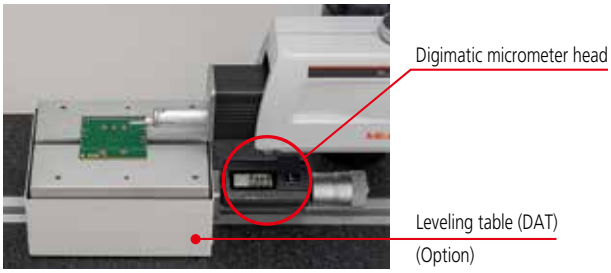
This table provides the alignment adjustments required when measuring cylindrical surfaces. The corrections for the pitch angle and the swivel angle are determined from a preliminary measurement and the Digimatic micrometers are adjusted accordingly. A flat-surfaced workpiece can also be leveled with this table.



DAT Function for the leveling table <Option>

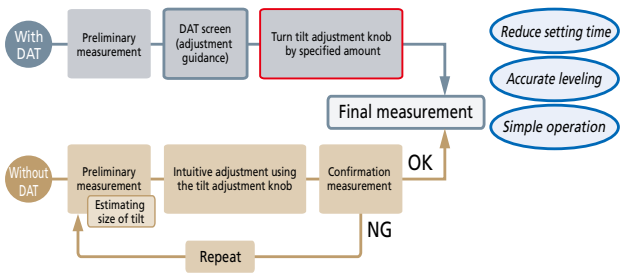
The leveling table can be used to align the surface to be tested with the detector reference plane. The operator is guided through the procedure by screen prompts.

178-048
Inclination adjustment angle: ±1.5°
Table dimensions: 130×100 mm
Maximum load: 15 kg



Powerful support for leveling

The height/tilt adjustment unit is included for leveling the drive unit prior to making skidless measurements and is supported by guidance from the unique DAT function making it easier to achieve highly accurate alignment.



Simple column stand for SJ-410 Series <Option>

178-039
Vertical adjustment range: 250mm
Dimensions: 400×250×578 mm
Mass: 20 kg

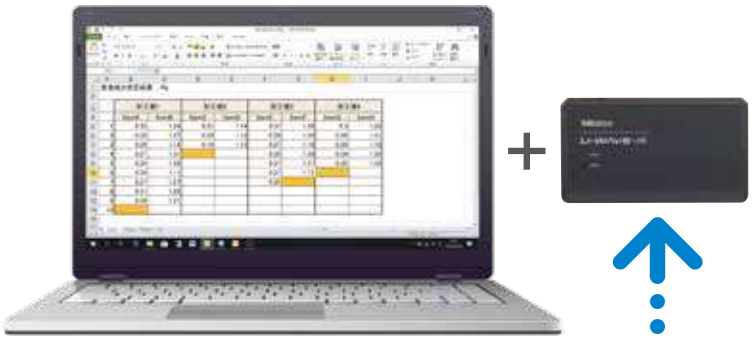
Combining (adjustment guidance)

User benefit 2

Higher level of quality control

Wireless communication and advanced analysis

Anyone can easily perform high-level data collection.



Wireless and quick capture of measurement results on a PC. No more handwriting, and also easy data input with a single touch <Option>

Wireless Input Tool

U-WAVE

This unit allows you to remotely load Surftest **SJ-410** calculation results (SPC output) into commercial spreadsheet software on a PC. You can essentially use a one-touch operation to enter the calculation results (values) into the cells in the spreadsheet software.

U-WAVE-R (Connects to the PC)
02AZD810D

U-WAVE-T* (Connects to the **SJ-410**)
02AZD880G

* Requires the optional Surftest **SJ-410** connection cable.
02AZD790D

One-touch Input

USB Input Tool

This unit allows you to load Surftest **SJ-410** calculation results (SPC output) into commercial spreadsheet software on a PC via a USB connector. You can essentially use a one-touch operation to enter the calculation results (values) into the cells in the spreadsheet software.

USB Input Tool Direct
USB-ITN-D
06AFM380D

USB keyboard signal conversion type*
IT-016U
264-016-10

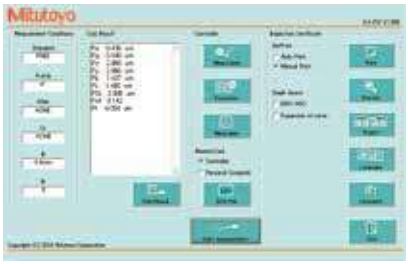
* Requires the optional Surftest **SJ-410** connection cable.
1 m: **936937**
2 m: **965014**

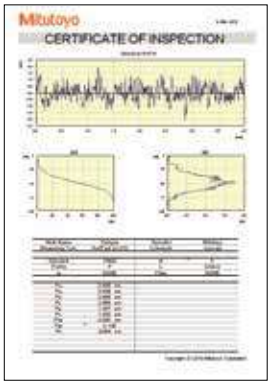
More advanced analysis with optional software and easy creation of inspection record tables by transferring data to Excel

For SURFTEST **SJ-410** Series

Simplified Communication Program (Free software)

The Surftest **SJ-410** Series has a USB interface, enabling setting up of measurement conditions and starting the measurement via PC. A program is also provided that lets you create inspection record tables using a Microsoft Excel* macro.





This program can be downloaded free of charge from the Mitutoyo website.
https://www2.mitutoyo.co.jp/eng/contact/products/sj/index.html

Required environment*

- OS: Windows 7, Windows 8, Windows 10
- Spreadsheet software: Microsoft Excel 2010, Microsoft Excel 2013, Microsoft Excel 2016

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

The optional USB cable is also required.

USB cable for **SJ-410** Series **12AAD510**

Contour / Roughness analysis software

FORMTRACEPAK-AP

More advanced analysis can be performed by loading **SJ-410** Series measurement data to software program **FORMTRACEPAK-AP** via a memory card (option) for processing back at base.

Higher accuracy measurements with selectable drive unit

A wide range, high-resolution detector

■ Detector

Measuring range / resolution:
800 µm / 0.01 µm
80 µm / 0.001 µm
8 µm / 0.0001 µm

High straightness drive unit

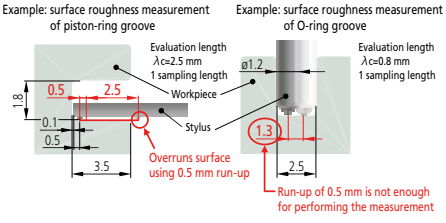
■ Drive unit

Straightness / traverse length:
0.3 µm / 25mm (**SJ-411**)
0.5 µm / 50mm (**SJ-412**)

Extending measurement to narrow features

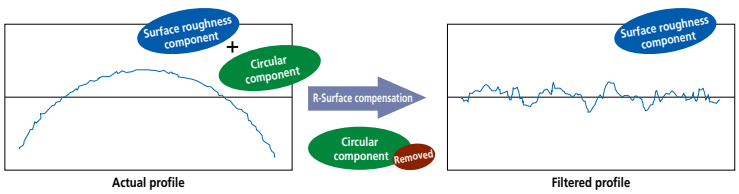
Surface roughness measurement requires a run-up distance before starting the measurement (or retrieving data). When the **SJ-410** Series measures, its run-up distance is normally set to 0.5 mm. However, this distance can be shortened to 0.15 mm using the narrow-part measurement function. This function extends the measurement of narrow locations to features such as piston-ring grooves and O-ring grooves.

Typical applications



Easily measures R-surface roughness (skidless measurement)

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.
Other curved surfaces can be processed such as parabolical and ellipsoidal.



User benefit 3

Doing double duty for space saving

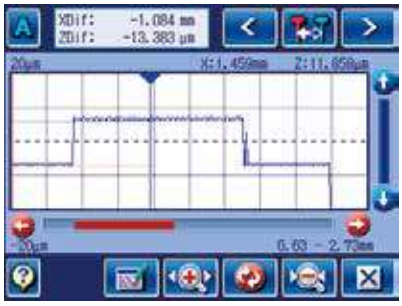
Surface Roughness / Fine Contour

Supporting not only surface roughness measurement but also contour (fine contour) measurement

Simple contour analysis function

Point group data collected for surface roughness evaluation is used to perform simplified contour analysis (step, step height, area and coordinate difference). It assesses minute forms that cannot be assessed by a regular contour measuring machine.

Step



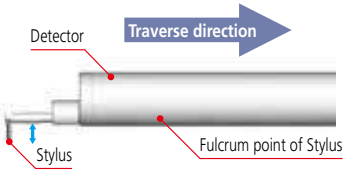
Coordinate difference

Area

Your choice of skidless or skidded measurement

Skidless measurement

Skidless measurement is where surface features are measured relative to the drive unit reference surface. This measures waviness and finely stepped features accurately, in addition to surface roughness, where range is limited to the stylus travel available.

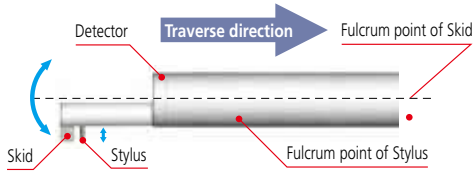


Measuring example of stepped features: Skidless

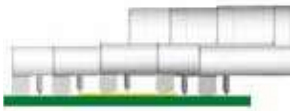
Measured profile

Skidded measurement

In skidded measurements, surface features are measured with reference to a skid following close behind the stylus. This cannot measure waviness and stepped features exactly, but the range of movement within the measurement made is greater because the skid tracks the workpiece surface contour.



Measuring example of stepped features: Skidded

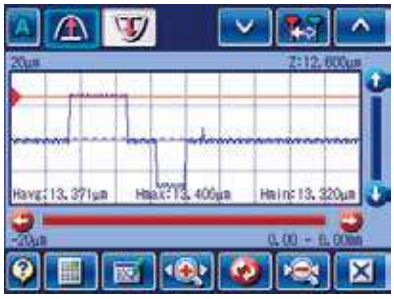


Measured profile

Easy to use and highly functional

This portable surface roughness tester is equipped with analysis functionality rivaling that of benchtop surface roughness testers.

Data compensation



Simple contour analysis function

Equipped with externally controllable interfaces as standard

A variety of interfaces supplied as standard

The external device interfaces that come as standard include USB, RS-232C, SPC output and foot switch I/F.

Data storage

Memory card (optional) is supported

The measurement conditions and data can be stored in a memory card (optional) and recalled as required. This enables batch analysis and printout of data after on-site measurement.

■ **Measurement condition**

Internal memory: 10 sets

Memory card: 500 sets

■ **Measurement result**

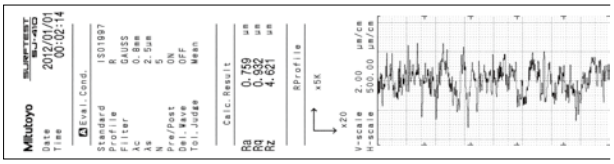
Memory card: 10000 sets

High-speed thermal printer built in

High-speed printer prints out measurement results on site

A high-quality, high-speed thermal printer prints out measurement results.

It can also print a BAC curve or an ADC curve, as well as, calculated results and assessed profiles. These results and profiles are printed out in landscape format, just as they appear on the color-graphic LCD.



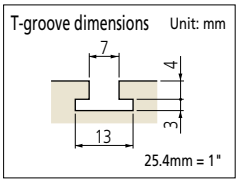
Equipped with convenient carrying case as standard

The unit is easily transported in a dedicated carrying case which includes the tester and holders for the accessories. (Standard accessory)

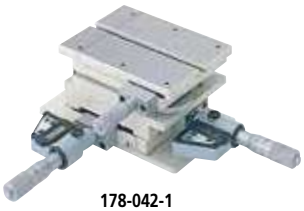
Other Optional Accessories

XY leveling tables

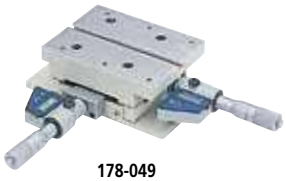
The tester includes X- and Y-axes micrometer heads. This makes axis alignment much easier because the tilt adjustment center is the same as the rotation center of the table.
(Order No.**178-042-1** / **178-043-1**)



Movement is in X and Y axes only.



178-042-1

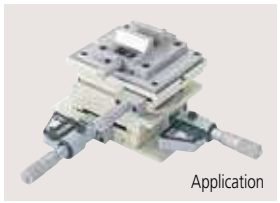


178-049

Order No. / Items	**178-042-1** (mm) **178-052-1** (inch) with digital heads	**178-043-1** (mm) **178-053-1** (inch) with analog heads	**178-049** (mm) **178-058** (inch/mm) with digital heads
Table dimensions	130×100 mm		
Maximum load	15 kg		
Inclination adjustment angle	±1.5°		—
Swiveling angle	±3°		—
X/Y-axis travel range	±12.5 mm	±12.5 mm	±12.5 mm
Resolution	0.001 mm	0.01 mm	0.001 mm
Dimensions (W×D×H)	262×233×83 mm	220×189×83 mm	262×233×55 mm
Mass	6.3 kg	6 kg	5 kg

Precision vise

Fits on the stand.



Order No.	**178-019**
Clamping method	Sliding jaws
Jaw opening	36 mm
Jaw width	44 mm
Jaw depth	16 mm
Height	38 mm

Roughness specimen W

Display: Ra = Approx. 3 µm,
Approx. 0.4 µm

178-604

Note: Ra = Approx. 0.4 µm can only be used for stylus tip checking.

Cylinder attachment

This block can be positioned on top of cylindrical objects to perform measurements.

12AAB358

Diameter: ø15 to 60 mm

Configuration

- Cylindrical measurement block
- Auxiliary block
- Clamp

Reference step specimen

Used to calibrate detector sensitivity.

178-611

Step nominal values: 2µm /10 µm

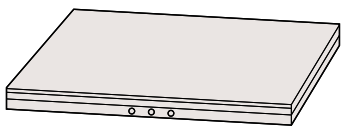
Optional accessories, consumables, and others for SJ-410

Printer paper (5 rolls)	**270732**
Durable printer paper (5 rolls)	**12AAA876**
Touch-screen protector sheet (10 sheets)	**12AAN040**
Memory card * (2 GB / 8 GB)	**12AAW452 / 64PMI244**
Connecting cable (for RS-232C)	**12AAA882**
Foot switch	**12AAJ088**

* micro SD card (with a conversion adapter to SD card)

Vibration Isolator (Air cushion type)

Vibration isolator for simple column stand for **SJ-410** Series (**178-039**).



178-093-1

Note: No pump is supplied. An American-valve-compatible hand pump is required.

Enhanced standard functions

Sheet buttons

Single button measurements

A sturdy sheet-button panel with superior durability in any environment is provided. For repeat measurement of the same work, a simple press of the start switch can complete measurement, analysis and printout.

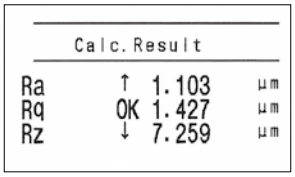
Recalculating

Previously measured data can be recalculated for use in other evaluations by changing the current standard, assessed profile and roughness parameters.

Note: Some conditions are limited.

GO / NG judgement function

An "GO/NG" judgment symbol is displayed when limits are set for the roughness parameter. In case of "NG," the calculated result is highlighted. The calculated result can also be printed out.



The "OK" symbol means the measurement is within the limits set; "NG" means it is not, in which case an arrow points to either the upper or lower limit in the printout.

Multilingual support

The display interface supports 16 languages.

(Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Chinese (simplified/traditional), Czech, Polish, Hungarian, Turkish, Swedish, Dutch)

Password protection

Access to functions can be restricted by a password

A pre-registered password can limit use of measurement conditions and other settings to the tester's administrator.

Arbitrary sampling length setting

This function allows a sampling length to be arbitrarily set in 0.01 mm increments (**SJ-411**: 0.1 mm to 25 mm, **SJ-412**: 0.1 mm to 50mm).
It also allows the **SJ-410** Series to make both narrow and wide range measurements.

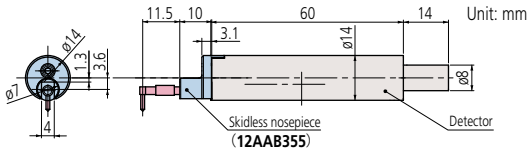
Applicable standards

Complies with many industry standards

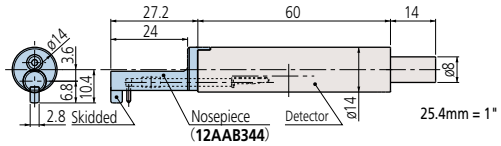
The Surftest **SJ-410** complies with the following standards:
JIS (JIS-B0601-2001, JIS-B0601-1994, JIS B0601-1982), VDA, ISO-1997, and ANSI.

Detectors

Skidless



Skidded



Order No.	Measuring force	
178-396-2*1*3	0.75 mN	'97ISO and '01JIS compliant detectors
178-397-2*1*4	4 mN	Detectors that comply with previous standards, for general use, etc.
178-396*2*3	0.75 mN	'97ISO and '01JIS compliant detectors
178-397*2*4	4 mN	Detectors that comply with previous standards, for general use, etc.

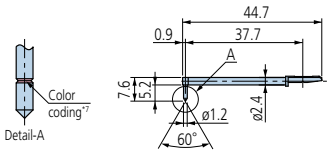
*1 The skidless nosepiece (**12AAB355**) is a standard accessory.
*2 The skidless nosepiece (**12AAB355**) and the nosepiece (**12AAB344**) are standard accessories.
*3 The standard stylus (**12AAC731**) is a standard accessory.
*4 The standard stylus (**12AAB403**) is a standard accessory.

Styli

Unit: mm
25.4mm = 1"

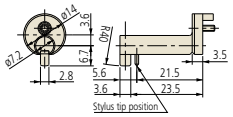
Standard stylus

12AAE882 (1 µm)
12AAE924 (1 µm)*5
12AAC731 (2 µm)
12AAB403 (5µm)*5
12AAB415 (10 µm)*5
12AAE883 (250 µm)*8
( ): Tip radius

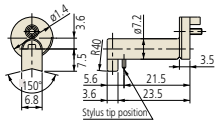


Nosepiece

For standard
12AAB344
Remarks ø2 to 20

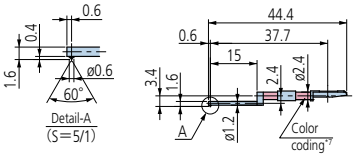


For round bar
12AAB345



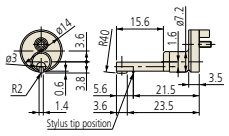
For small hole

12AAC732 (2 µm)
12AAB404 (5 µm)*5
12AAB416 (10 µm)*5
( ): Tip radius



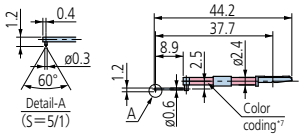
Nosepiece

For small hole
12AAB346
Remarks
Hole diameter: ø4 or more
Hole depth: 15 or less



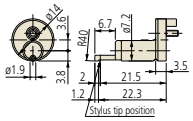
For extra-small hole

12AAC733 (2 µm)
12AAB405 (5 µm)*5
12AAB417 (10 µm)*5
( ): Tip radius



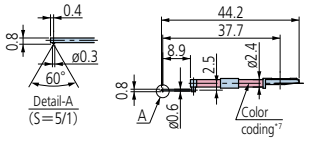
Nosepiece

For ultra-small hole
12AAB347
Remarks
Hole diameter: ø2.3 or more
Hole depth: 6.5 or less



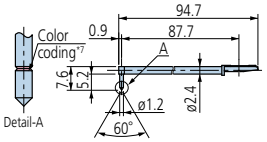
For ultra-small hole

12AAC734 (2 µm)
12AAB406 (5 µm)*5
12AAB418 (10 µm)*5
( ): Tip radius

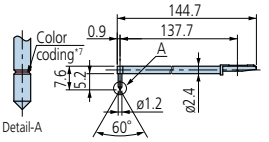


For deep hole*6

2X stylus
12AAC740 (2 µm)
12AAB413 (5 µm)*5
12AAB425 (10 µm)*5
( ): Tip radius

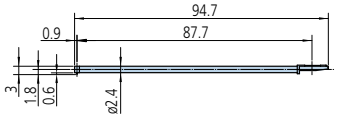


3X stylus
12AAC741 (2 µm)
12AAB414 (5 µm)*5
12AAB426 (10 µm)*5
( ): Tip radius



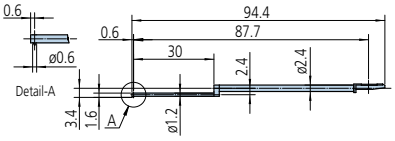
Double-length for deep hole*6

12AAE898 (2 µm)
12AAE914 (5 µm)*5
( ): Tip radius



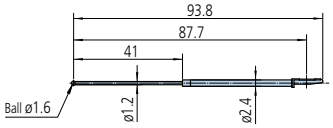
For small hole / Double-length for deep hole*6

12AAE892 (2 µm)
12AAE908 (5 µm)*5
( ): Tip radius



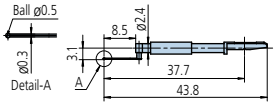
For small hole*6*8

12AAE884
(ø1.6 mm)



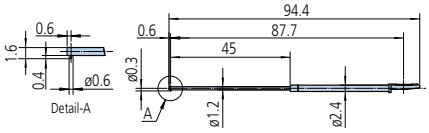
For ultra-small hole*8

12AAJ662
(ø0.5 mm)



For small slotted hole*6

12AAE938 (2 µm)
12AAE940 (5 µm)*5



*5 Tip angle 90°
*6 For downward-facing measurement only.

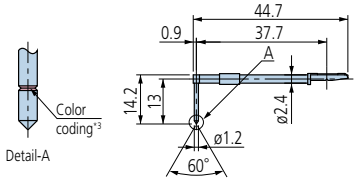
*7

Tip radius	1 µm	2µm	5µm	10 µm	250 µm
Color coding	White	Black	No Color	Yellow	No notch or color

*8 Used for calibration, a standard step gauge (**178-611**, option) is also required

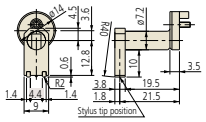
For deep groove (10 mm)

12AAC735 (2 µm)
12AAB409 (5 µm) *1
12AAB421 (10 µm)*1
( ): Tip radius



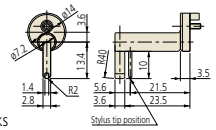
Nosepiece

For deep groove 10
12AAB349



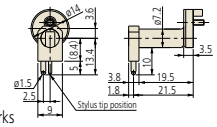
Remarks
Depth: 10 or less, Width: 9.5 or more

For narrow groove
12AAB350



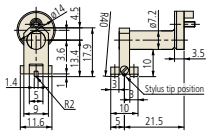
Remarks
Depth: 10 or less, Width: 3 or more

For R-Surface
12AAB351



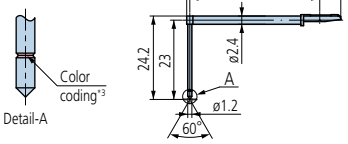
Remarks
Convex: R1.5 or more
Concave: R3 or more

For vibration
12AAB352



For deep groove*2 (20 mm)

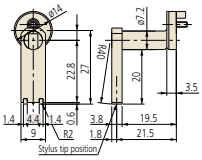
12AAC736 (2 µm)
12AAB408 (5 µm)*1
12AAB420 (10 µm)*1
( ): Tip radius



Nosepiece

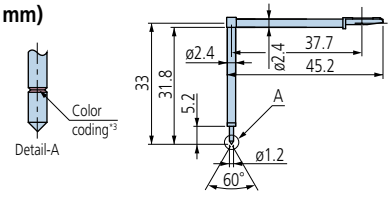
For deep groove 20
12AAB348

Remarks
Groove depth: 20 or less
Groove pitches: 9.5 or more



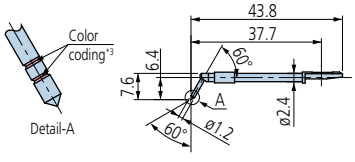
For deep groove*2 (30 mm)

12AAC737 (2 µm)
12AAB407 (5 µm)*1
12AAB419 (10 µm)*1
( ): Tip radius



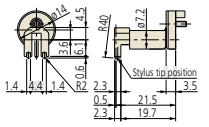
For gear tooth

12AAB339 (2 µm)
12AAB410 (5 µm)
12AAB422 (10 µm)
( ): Tip radius



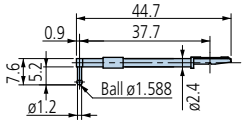
Nosepiece

For corner
12AAB353



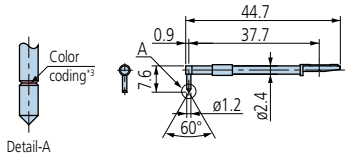
For rolling circle waviness surface*4

12AAB338 (ø1.588)
( ): Tip radius



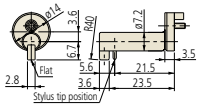
For knife-edge*4

12AAC738 (2 µm)
12AAB411 (5 µm)*1
12AAB423 (10 µm)*1
( ): Tip radius



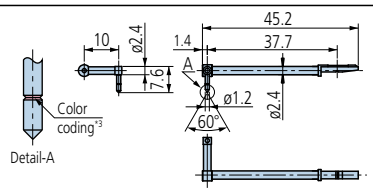
Nosepiece

For knife-edge
12AAB354



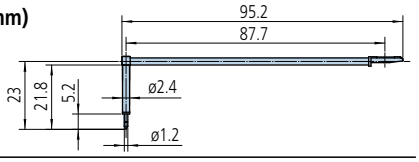
For eccentric arm*2

12AAC739 (2 µm)
12AAB412 (5 µm)*1
12AAB424 (10 µm)*1
( ): Tip radius



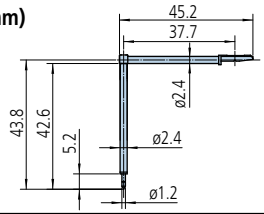
For deep groove*2 (20 mm)

12AAE893 (2 µm)*1
12AAE909 (5 µm)
( ): Tip radius



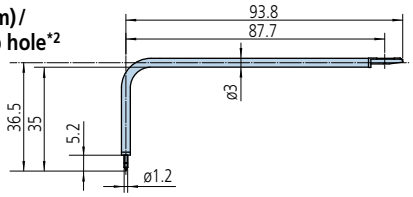
For deep groove*2 (40 mm)

12AAE895 (2 µm)*1
12AAE911 (5 µm)
( ): Tip radius



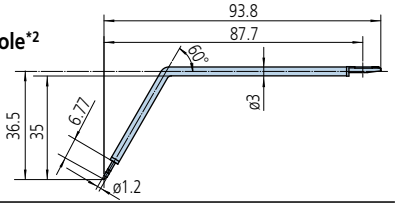
For deep groove (30 mm) / Double-length for deep hole*2

12AAE894 (2 µm)*1
12AAE910 (5 µm)
( ): Tip radius



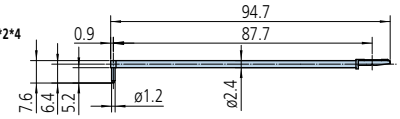
For gear tooth / Double-length for deep hole*2

12AAE896 (2 µm)*1
12AAE912 (5 µm)*1
( ): Tip radius



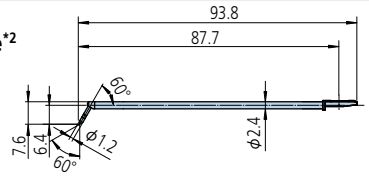
For rolling circle waviness / Double-length for deep hole*2*4

12AAE886 (250 µm)
( ): Tip radius



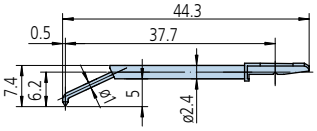
For corner hole / Double-length for deep hole*2

12AAM601 (2 µm)
12AAM603 (5 µm)
( ): Tip radius



Hole-bottom cone stylus

12AAE899 (2 µm)
12AAE915 (5 µm)*1
( ): Tip radius



*1 Tip angle 90°
*2 For downward-facing measurement only.

*3

Tip radius	2 µm	5 µm	10 µm
Color coding	Black	No color	Yellow

*4 Used for calibration, a standard step gauge (**178-611**, option) is also required

Note: Customized special interchangeable styli are available on request. Please contact any Mitutoyo sales office for more information.

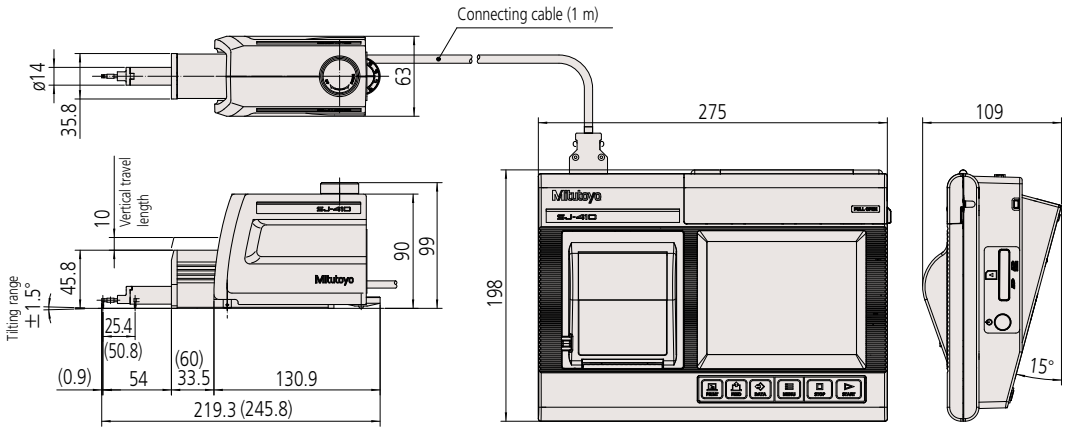
Specifications

Model No.		SJ-411		SJ-412	
	inch/mm	178-581-11A	178-581-12A	178-583-11A	178-583-12A
Measuring range	X axis	25mm (1")		50mm (2")	
	Z axis (detector)	800µm, 80µm, 8µm (32000µin, 3200µin, 320µin) Up to 2,400µm (96,000µin) when using an optional stylus.			
Detector	Detection method	Differential inductance			
	Resolution (Range)	0.01µm (800µm) / 0.001µm (80µm) / 0.0001µm (8µm) 0.4µin (32000µin) / 0.04µin (3200µin) / 0.004µin (320µin)			
	Stylus tip shape (Angle/Radius)	60°/2µm (80µin)	90°/5µm (200µin)	60°/2µm (80µin)	90°/5µm (200µin)
	Measuring force	0.75 mN	4 mN	0.75 mN	4 mN
	Radius of skid curvature	40mm (1.57")			
	Measuring methods	Skidless/Skidded (switchable)			
Drive unit (X axis)	Measuring speed	0.05, 0.1, 0.2, 0.5, 1.0mm/s (0.002, 0.004, 0.02, 0.04 inch/s)			
	Drive speed	0.5, 1, 2, 5mm/s (0.02, 0.04, 0.08, 0.2 inch/s)			
	Straightness	0.3µm / 25mm (12µin / 1")		0.5µm / 50mm (20µin / 2")	
Up/down inclination unit	Vertical travel	10mm (0.39")			
	Inclination adjustment angle	±1.5°			
Applicable standards		JIS 1982/JIS 1994/JIS 2001/ISO 1997/ANSI/VDA			
Parameter		Ra, Rq, Rz, Ry, Rp, Rv, Rt, R3z, Rsk, Rku, Rc, RPc, RSm, Rmax[*1], Rz1max[*2], S, HSC, RzJIS[*3], Rppi, RΔa, RΔq, Rlr, Rmr, Rmr (c), RσC, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Vo, λa, λq, Lo, Rpm, tp[*4], Htp[*4], R, Rx, AR, W, AW, Wx, Wte Customizable			
Filtered profile		Primary profile, Roughness profile, DF profile, Waviness profile, Roughness motif profile, Waviness motif profile			
Analysis graph		Material ratio curve, Profile height amplitude distribution curve			
Data compensation functions		Parabola, Hyperbola, Ellipse, Circle, Tilt, No compensation			
Filter		2CR, PC75, Gaussian			
Cutoff value	λc	0.08, 0.25, 0.8, 2.5, 8 mm (.003, .01, .03, .1, .3")			
	λs[*5]	2.5, 8, 25µm (100, 320, 1000µin)			
Sampling length		0.08, 0.25, 0.8, 2.5, 8, 25 mm (.003, .01, .03, .1, .3, 1")			
Number of intervals		×1, ×2, ×3, ×4, ×5, ×6, ×7, ×8, ×9, ×10, ×11, ×12, ×13, ×14, ×15, ×16, ×17, ×18, ×19, ×20			
Arbitrary length		0.1 to 25 mm (.0039 to 1")		0.1 to 50 mm (.0039 to 2")	
Calculation display unit	Customization	Selection of display/evaluation roughness parameter			
	Simplified contour analysis function	Step, Step quantity, Area, Coordinate difference			
	DAT (Digimatic Adjustment Table) function	Helps to level workpiece prior to skidless measurement			
	Real sampling function	Inputs the displacement of the detector while stopping the drive unit			
	statistical processing	Calculates the maximum value, minimum value, average value, standard deviation, pass rate and histogram for each parameter.			
	Judgment[*6]	Maximum value rule, 16 % rule, mean value rule, standard deviation (1σ, 2σ, 3σ)			
	Storing measurement condition	Max. 10 (calculation display unit)			
	Print function (Built-in thermal printer)	Measurement condition/Calculation result/Judgment result/Calculation result per segment/Tolerance value/Evaluation curve/Graphic curve/Material ratio curve/Profile height amplitude distribution curve/Environmental setting items/Statistical result (Histogram)			
	Display language	16 languages (Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Chinese (simplified/traditional), Czech, Polish, Hungarian,Turkish, Swedish, Dutch)			
	Storage function	Built-in memory: Measurement condition (Up to 10) Memory card (optional): 500 measurement conditions, 10000 measured profiles, 500 display images, 10000 text files, 500 statistical data, 1 backup file of device setting data, 10 data of Trace 10			
	External I/O functions	USB I/F, Digimatic output, RS-232C I/F, Foot switch I/F			
Power supply	Battery Charging time/Endurance	Built-in battery (rechargeable Ni-MH battery) /AC adapter Charging time of the built-in battery: about 4 hours (may vary due to ambient temperature) Endurance: about 1000 measurements (differs slightly due to use conditions/environment)			
	Max. power consumption	50 W			
External dimensions (W×D×H)	Calculation display unit	275x198x109 mm (10.83x7.80x4.29")			
	Up/down inclination unit	131x63x99 mm (5.16x2.48x3.9")			
	Drive unit	128x35.8x46.6 mm (5.04x1.41x1.83")		154.Sx3S.8x46.6 mm (6.08x1.41x1.83")	
Mass	Calculation display unit	1.7 kg			
	Up/down inclination unit	0.4 kg			
	Drive unit	0.6 kg		0.64 kg	
Standard Accessories		Detector[*7]/Standard stylus[*8] **178-601** Roughness specimen (Ra3 µm) **270732** Receipt paper (Standard type: 5-roll set) **12BAL402** Protective sheet for the LCD (×1 sheet) **12BAG834** Touch pen **12AAN041** Carrying case		AC adapter, Power cable, Flat-blade screwdriver, Phillips screwdriver, Hex wrench, Strap for the touch pen, Operation manual, One-sheet manual, Warranty card	

*1 Calculation is available only when selecting the VDA, ANSI, or JIS 1982 standards.
*2 Calculation is available only when selecting the ISO 1997 standard.
*3 Calculation is available only when selecting the JIS 2001 standard.
*4 Calculation is available only when selecting the ANSI standard.
*5 Not available when selecting the JIS 1982 standard.
*6 Only the mean value rule is available for the ANSI standard. 16 % rule is not available when selecting the VDA standard.
*7 Depending on the Order No. of the **SJ-410** Series main unit, **178-396** or **178-397** is provided as standard.
*8 Standard stylus (**12AAC731** or **12AAB403**) supporting the provided detector is provided as standard.
Note 1: Refer to pages 12 to 13 for details of Detector, Stylus and Nosepiece.
Note 2: To denote your AC line voltage add the following suffixes (e.g. **178-580-11A**). 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)

Dimensions

Unit: mm
25.4mm = 1"

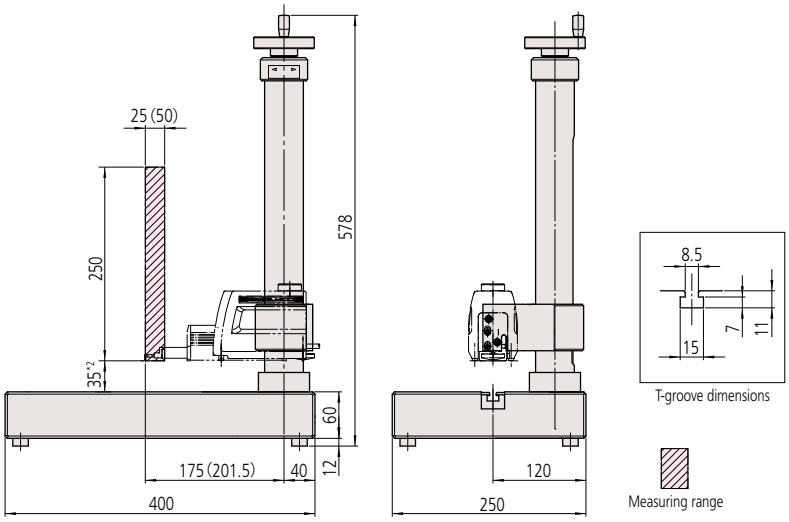


Note: Dimensions in parentheses indicate those of **SJ-412** [equipped with a 50mm drive unit].

Example of mounting on simple column stand. (178-039)*1

*1 For details see page 5.

Unit: mm
25.4mm = 1"

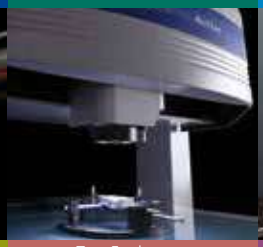


*2 This is the lowest position of the standard stylus mounted on the simple column stand. Since it is 35 mm from the base top, a block of suitable height is required for calibration with a roughness specimen. Use the stand in combination with optional accessories such as a leveling table (**178-016**) or an XY leveling table (**178-024**).

Note: The dimensions in parentheses indicate those for **SJ-412**

Coordinate Measuring Machines

Vision Measuring Systems



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