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Surftest SJ-210
SERIES 178 — On-site Surface Roughness Tester

Compact type all-in-one surface roughness tester has evolved by meeting customer demands

- The color LCD can display not only calculation results and measurement conditions, but also surface roughness waveforms. In addition, bigger character size contributes to visibility.
- Built-in rechargeable battery allows measurement without a mains power supply connection.

Refer to the Surftest **SJ-210/310** Series Brochure (**E15028**) for more details.

SPECIFICATIONS

Model No.			Standard drive unit		Retractable drive unit		Transverse tracing drive unit	
			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.		mm	**178-560-11**	**178-560-12**	**178-562-11**	**178-562-12**	**178-564-11**	**178-564-12**
		inch/mm	**178-561-11**	**178-561-12**	**178-563-11**	**178-563-12**	**178-565-11**	**178-565-12**
Measuring range	X axis		16.0 mm				5.6 mm	
	Detector	Range	360 μm (-200 μm to +160 μm)					
		Range/Resolution	360 μm/0.0256 μm, 100 μm/0.0064 μm, 25 μm/0.0016 μm					
Measuring force/Stylus tip shape			Depends on the Order No.: 0.75 mN/2 μmR 60° (when the Order No. ends with "**-11**") 4 mN/5 μmR 90° (when the Order No. ends with "**-12**")					
Applicable standards			JIS B 0601:2001, JIS B 0601:1994, JIS B 0601:1982, VDA, ISO:1997, ANSI					
Assessed profile			Primary profile, Roughness profile, DF profile, Roughness motif profile					

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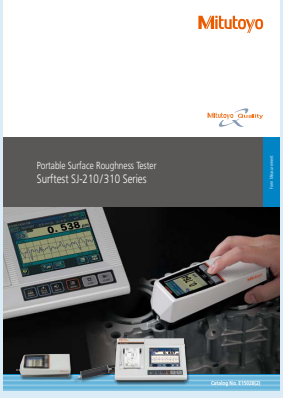
Surftest SJ-310
SERIES 178 — On-site Surface Roughness Tester

Advanced handheld tester that is easy to operate and meets a variety of needs

- Equipped with a large, touch-screen color graphic LCD for intuitive operation and excellent ease of use.
- Equipped with a high-speed thermal printer (approx. 1.5 times faster than conventional models) as standard, allows for printing of BAC and ADC curves in addition to calculation results (including pass/fail judgments) and assessment profiles. The printer can also print horizontally to match the content displayed on the LCD, and has an easy-to-understand layout.



Refer to the Surftest **SJ-210/310** Series Brochure (**E15028**) for more details.

SPECIFICATIONS

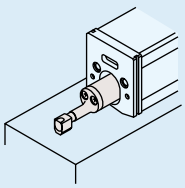
Model No.			Standard drive unit		Retractable drive unit		Transverse tracing drive unit	
			SJ-310 (0.75 mN type)	**SJ-310** (4 mN type)	**SJ-310** (0.75 mN type)	**SJ-310** (4 mN type)	**SJ-310** (0.75 mN type)	**SJ-310** (4 mN type)
Order No.		mm	**178-570-11**	**178-570-12**	**178-572-11**	**178-572-12**	**178-574-11**	**178-574-12**
		inch/mm	**178-571-11**	**178-571-12**	**178-573-11**	**178-573-12**	**178-575-11**	**178-575-12**
Measuring range	X axis		16.0 mm				5.6 mm	
	Detector	Range	360 μm (-200 μm to +160 μm)					
		Range/Resolution	360 μm/0.0256 μm, 100 μm/0.0064 μm, 25 μm/0.0016 μm					
Measuring force/Stylus tip shape			Depends on the Order No.: 0.75 mN/2 μmR 60° (when the Order No. ends with "**-11**") 4 mN/5 μmR 90° (when the Order No. ends with "**-12**")					
Applicable standards			JIS B 0601:2001, JIS B 0601:1994, JIS B 0601:1982, VDA, ISO:1997, ANSI					
Assessed profile			Primary profile, Roughness profile, DF profile, Roughness motif profile, Waviness motif profile					

Optional Accessories for Surftest SJ-210/310

Detector

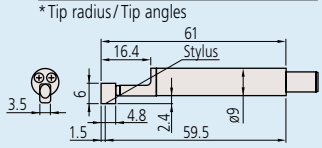
Unit: mm

• Standard detectors

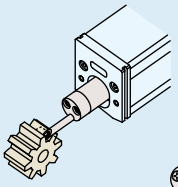


Order No.	Measuring force	Stylus profiles*	Remarks
178-296	0.75 mN	2 μmR/60°	Dedicated to the standard/retractable drive unit
178-390	4 mN	5 μmR/90°	
178-387	0.75 mN	2 μmR/60°	Dedicated to the transverse tracing drive unit
178-386	4 mN	5 μmR/90°	
178-391	4 mN	10 μmR/90°	Dedicated to the standard/retractable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

*Tip radius/Tip angles

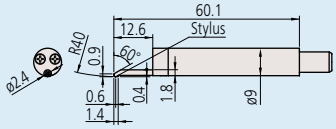


• Gear-tooth surface detectors

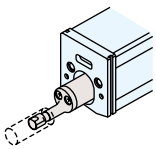


Order No.	Measuring force	Stylus profiles*
178-388	0.75 mN	2 μmR/60°
178-398	4 mN	5 μmR/60°

*Tip radius/Tip angles

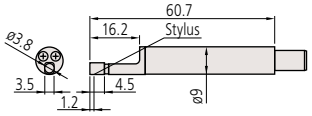


• Small hole detectors

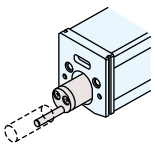


Order No.	Measuring force	Stylus profiles*	Remarks
178-383	0.75 mN	2 μmR/60°	Minimum measurable hole diameter: ø4.5 mm
178-392	4 mN	5 μmR/90°	

*Tip radius/Tip angles

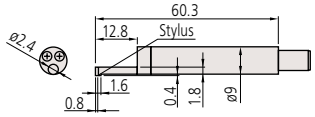


• Extra small hole detectors

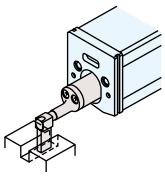


Order No.	Measuring force	Stylus profiles*	Remarks
178-384	0.75 mN	2 μmR/60°	Minimum measurable hole diameter: ø2.8 mm
178-393	4 mN	5 μmR/90°	

*Tip radius/Tip angles

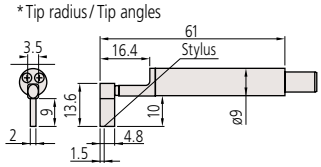


• Deep groove detectors



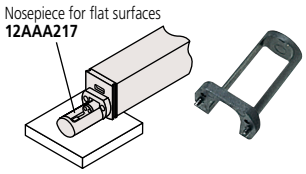
Order No.	Measuring force	Stylus profiles*	Remarks
178-385	0.75 mN	2 μmR/60°	Not available for the transverse tracing drive unit
178-394	4 mN	5 μmR/90°	

*Tip radius/Tip angles



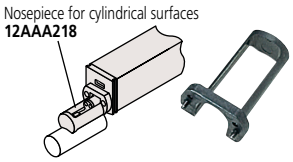
Optional Accessories for Drive Units

•Nosepiece for flat surfaces



12AAA217
- Standard accessory for the standard/retractable drive unit of the **SJ-310** Series
- Not available for the transverse tracing drive unit

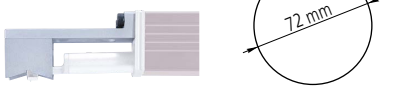
•Nosepiece for cylindrical surfaces

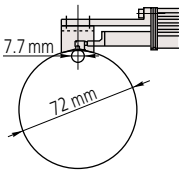


12AAA218
- Standard accessory for the standard/retractable drive unit of the **SJ-310** Series
- Not available for the transverse tracing drive unit

•V-type adapter

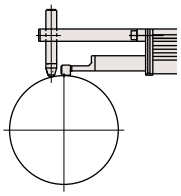
12AAE644
- Transverse tracing type standard accessory.
- Dedicated to the transverse tracing drive unit.





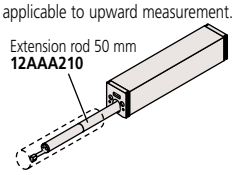
•Point-contact adapter

12AAE643
- Transverse tracing type standard accessory.
- Dedicated to the transverse tracing drive unit.



•Extension rod (50 mm) (Note: Only one rod can be used.)

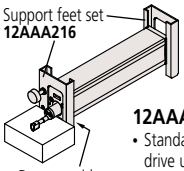
12AAA210
- Not available for the transverse tracing drive unit
- Not applicable to upward measurement.

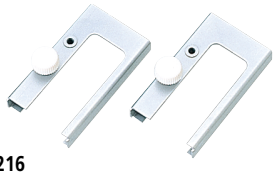


•Extension cable (1 m) (Note: Only one rod can be used.)

12BAA303
- For the connection between the calculation display unit and drive unit

•Support feet set

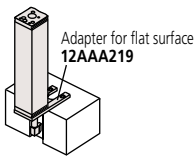




12AAA216
- Standard accessory for the standard/retractable drive unit of the **SJ-310** Series
- Not available for the transverse tracing drive unit
- Adjustment range is 28 mm from bottom face.

•Adapter for flat surface

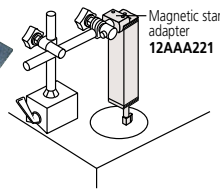
12AAA219
- Not available for the transverse tracing drive unit



•Magnetic stand adapter

12AAA221
Mounting spigot diameter is 8 mm.

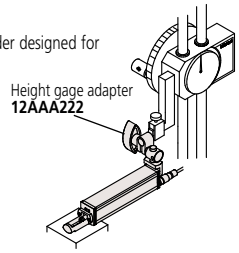
12AAA220
Mounting spigot diameter is 9.5 mm.



•Height gage adapter

Note: Suiable for a height gage holder designed for 9×9 mm section scribers.

12AAA222



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PROPRIETARY INSPECTION CERTIFICATE

Surftest SJ-410
SERIES 178 — Compact Surface Roughness Tester

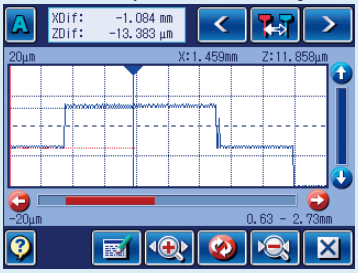
SPECIFICATIONS

Model No.			SJ-411		SJ-412	
Order No.		mm	178-580-11	178-580-12	178-582-11	178-582-12
		inch/mm	178-581-11	178-581-12	178-583-11	178-583-12
Measuring range	X axis		25 mm		50 mm	
	Z axis (detector)		800 µm, 80 µm, 8 µm Up to 2,400 µm when using an optional stylus.			
Detector	Detection method		Differential inductance			
	Resolution		0.0125 µm (800 µm range), 0.00125 µm (80 µm range), 0.000125 µm (8 µm range)			
	Stylus tip shape (Angle/Radius)		60°/2 µm	90°/5 µm	60°/2 µm	90°/5 µm
	Measuring force		0.75 mN	4 mN	0.75 mN	4 mN
	Radius of skid curvature		40 mm			
	Measuring methods		Skidless/Skidded (switchable)			
Drive unit (X axis)	Measuring speed		0.05, 0.1, 0.2, 0.5, 1.0 mm/s			
	Drive speed		0.5, 1, 2, 5 mm/s			
	Straightness		0.3 µm/25 mm		0.5 µm/50 mm	
Up/down inclination unit	Vertical travel		10 mm			
	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			
	λs *5		2.5, 8, 25 µm			
Sampling length			0.08, 0.25, 0.8, 2.5, 8, 25 mm			
Number of intervals			x1, x2, x3, x4, x5, x6, x7, x8, x9, x10, x11, x12, x13, x14, x15, x16, x17, x18, x19, x20			
Arbitrary length			0.1 to 25 mm		0.1 to 50 mm	
Calculation display unit	Customization		Selection of display/evaluation roughness parameter			
	Simplified contour analysis function		Step, Step quantity, Area, Coordinate difference			
	D.A.T. (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		275×198×109 mm			
	Up/down inclination unit		130.9×63×99 mm			
	Drive unit		128×35.8×46.6 mm		154.5×35.8×46.6 mm	
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 (x1 sheet) **12BAR507** 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** (0.75 mN) or **178-397** (4 mN) is provided as standard.
*8 Standard stylus (**12AAC731** or **12AAB403**) supporting the provided detector is provided as standard.

Dramatic improvement on compact type surface roughness testers

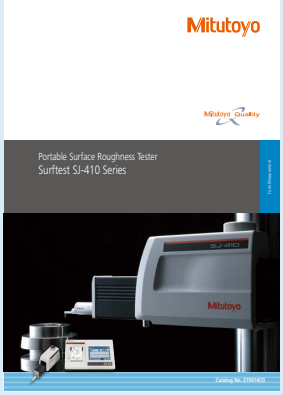
- Equipped with a large, touch-screen color graphic LCD to achieve both intuitive operation and high operability.
- Skidded and skidless measurement are switchable to perform optimum evaluation according to the measurement setup.
- A wide-range, high-resolution detector and a very accurate drive unit provide superior high-accuracy measurement in its class.
- **Detector**
  Measuring range: 800 µm
  Resolution: 0.0001 µm (when the measuring range is 8 µm)
- **Drive unit**
  Straightness/Drive length: 0.3 µm/25 mm (**SJ-411**)
  Straightness/Drive length: 0.5 µm/50 mm (**SJ-412**)
- Simplified contour analysis (Step, Step quantity, Area, Coordinate difference) is available using the point cloud data collected to evaluate the surface roughness.
  Allows the evaluation of detailed shapes that cannot be achieved by contour measuring instruments.



- Allows the evaluation of surface roughness in a circumferential direction using the skidless measurement and R-surface compensation functions.
- Conforms to the latest ISO standard and ANSI/VDA standard in addition to the JIS standard (2001/1994/1982).
- Achieves the performance of a desktop type surface roughness tester in combination with the simplified stand and associated optional accessories.

Optional Accessories for SJ-410 Consumables

• Receipt paper Standard type (5-roll set)	**270732**
• Receipt paper High-durability paper (5-roll set)	**12AAA876**
• Protective sheet for the touch panel (x10 sheets)	**12AAN040**
• Memory card (2 GB)	**12AAW452**



Refer to the Surftest **SJ-410** Series Brochure (**E15014**) for more details.

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PROPRIETARY INSPECTION CERTIFICATE

Surftest SJ-500/SV-2100
SERIES 178 — Dedicated Control Unit Type Surface Roughness Tester

High precision and high performance type surface roughness tester with a dedicated control unit, offering a user-friendly display and simple operation.

- Equipped with a 7.5-inch, color TFT LCD, color icons and touch panel controls, the display unit is easy to read and simple to operate.
- A built-in joystick on the control unit allows quick and easy positioning. The manual adjustment knob allows fine positioning of a small stylus for measuring small holes.
- In addition to the roughness parameters compliant with ISO/JIS/ANSI/VDA surface roughness standards, contour analysis is also available.

SV-2100M4

SV-2100S4

SPECIFICATIONS

Model No.		SJ-500	SV-2100M4*1	SV-2100S4*1	SV-2100H4*1	SV-2100W4*1
Stand type		—*2	Manual stand	Motorized stand		
Measuring range	Z1 axis (detector)	800 µm, 80 µm, 8 µm				
	X axis	50 mm	100 mm			
Resolution	X axis	0.05 µm				
	Z1 axis (detector)	0.01 µm (800 µm), 0.001 µm (80 µm), 0.0001 µm (8 µm)				
	Z2 axis (column)	—	—	1 µm		
Assessed profile		Primary profile, Roughness profile, Waviness profile, DF profile, Roughness motif profile, Waviness motif profile				

*1 While the appearance of the natural stone measuring table varies according to the source, the high stability for which this material is known can always be relied upon.
*2 Stand for **SJ-500** is optional.

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Surftest SJ-500P/SV-2100M4
SERIES 178 — Data Processing Unit (PC) Surface Roughness Testers

A superior data processing tester with PC data analysis for higher efficiency.

Note: If a power column type (**SV-2100S4**/**H4**/**W4**) with PC data-processing is required, consider the **FORMTRACER Avant S3000** Series (Refer to page L-9 for specifications).

SJ-500P

SV-2100M4 (PC type)

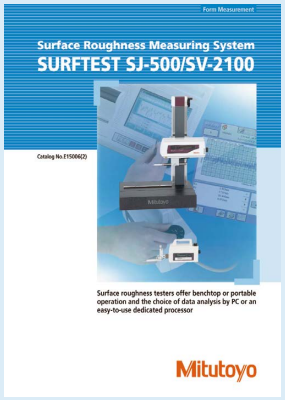
FORMTRACEPAK: Best-selling Surface Roughness Analysis Program

Best-selling dedicated software for surface roughness measurement and analysis.
Features a flexible printer format and creation of an original inspection certificate.

SPECIFICATIONS

Type of data processing unit		PC type	
Model No.		SJ-500P	SV-2100M4*1
Elevating shaft mechanism of stand		—*2	Manual operation only
Measuring range	X axis	50 mm	100 mm
	Z1 axis (detector)	800 µm, 80 µm, 8 µm	
Z2-axis (column) travel range		—	350 mm
Resolution	X axis	0.05 µm	
	Z1 axis (detector)	0.01 µm (800 µm), 0.001 µm (80 µm), 0.0001 µm (8 µm)	
	Z2 axis (column)	—	—
Applicable standards		JIS 1982/JIS 1994/JIS 2001/ISO 1997/ANSI/VDA	
Assessed profile		Primary profile, Roughness profile, Waviness profile, Filtered waviness profile, Rolling circle waviness profile, Rolling circle center line waviness profile, Envelope residual profile, DIN4776 profile, Roughness motif profile, Waviness motif profile	

*1 While the appearance of the natural stone measuring table varies according to the source, the high stability for which this material is known can always be relied upon.
*2 The simplified stand or manual column stand is available as an optional accessory.



Refer to the Surftest **SJ-500**/**SV-2100** Brochure (**E15006**) for more details.

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PROPRIETARY INSPECTION CERTIFICATE

Surftest Extreme SV-3000CNC/SV-M3000CNC SERIES 178 — CNC Surface Roughness Testers

SV-3000CNC
(Inclinable drive unit + Y-axis table)

SV-M3000CNC
(Surface Roughness Tester with built-in Y axis.)
(The photo represents a special specification model.)

- The X1, Y and Z2 axes have a maximum drive speed of 200 mm/s.
  This permits high-speed positioning that can potentially result in a large increase in the throughput of multiple-profile/multiple-workpiece measurement tasks.
- Capable of inclined plane measurement through 2 axis simultaneous control in X and Y.
- Models equipped with the α axis allow continuous measurement on horizontal and inclined surfaces by power-tilting the X1 axis.
- It is possible to expand the measuring range for multiple workpieces through positioning in Y.
- All connecting cables are contained within the measuring instrument to eliminate any inconvenience during measurement.
- Since the Z1-axis detector incorporates an anti-collision safety device, the detector unit will automatically stop if it touches a workpiece or fixture.
- Surftest Extreme **SV-M3000CNC** (CNC Surface Roughness Tester with a movable Y-axis table) that handles measurement of large/heavy workpieces, such as engine blocks or crankshafts, is also available.
- Optional external control function (Ext I/O) through bidirectional communication (RS-232C) with the PLC (programmable logic controller) is available.

SV-3000CNC SPECIFICATIONS

Model No.			SV-3000CNC
X1 axis (drive unit)	Measuring range		200 mm
	Resolution		0.05 µm
	Scale type		Reflective-type linear encoder
	Drive speed	CNC mode	Max. 200 mm/s
		Joystick mode	0 to 50 mm/s
	Measuring speed		0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0 mm/s
	Measuring direction		Backward
	Straightness		0.5 µm/200 mm
Y axis (table)	Measuring range		200 mm
	Resolution		0.05 µm
	Drive speed	CNC mode	Max. 200 mm/s
		Joystick mode	0 to 50 mm/s
	Maximum table loading		20 kg
Z2 axis (column)	Travel range	Z2 axis (column, type **S**)	300 mm
		Z2 axis (column, type **H**)	500 mm
	Resolution		0.05 µm
	Scale type		Reflective-type linear encoder
	Drive speed	CNC mode	Max. 200 mm/s
		Joystick mode	0 to 50 mm/s
Base unit	Base size (width×depth)		750×600 mm
	Base material		Granite

Note: While the appearance of the natural stone measuring table varies according to the source, the high stability for which this material is known can always be relied upon.

SV-M3000CNC SPECIFICATIONS

Model No.			SV-M3000CNC
X1 axis (drive unit)	Measuring range		200 mm
	Resolution		0.05 µm
	Scale type		Reflective-type linear encoder
	Drive speed	CNC mode	Max. 200 mm/s
		Joystick mode	0 to 50 mm/s
	Measuring speed		0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0 mm/s
	Straightness	When using a standard detector	0.5 µm/200 mm
Z2 axis (column)	Measuring range		500 mm
	Resolution		0.05 µm
	Scale type		Reflective-type linear encoder
	Drive speed	CNC mode	Max. 200 mm/s
		Joystick mode	0 to 50 mm/s
Y axis	Measuring range		800 mm
	Resolution		0.05 µm
	Scale type		Reflective-type linear encoder
	Drive speed	CNC mode	Max. 200 mm/s
		Joystick mode	0 to 50 mm/s
	Measuring speed		0.02 to 2 mm/s
	Straightness	When using a standard detector holder	Narrow range 0.5 µm/50 mm
			Wide range 2 µm/800 mm
Base unit	Base size (width×depth)		600×1500 mm
	Base material		Steel
	Maximum table loading		300 kg

Refer to the CNC Form Measuring Instrument Series Brochure (**E15021**) for more details.