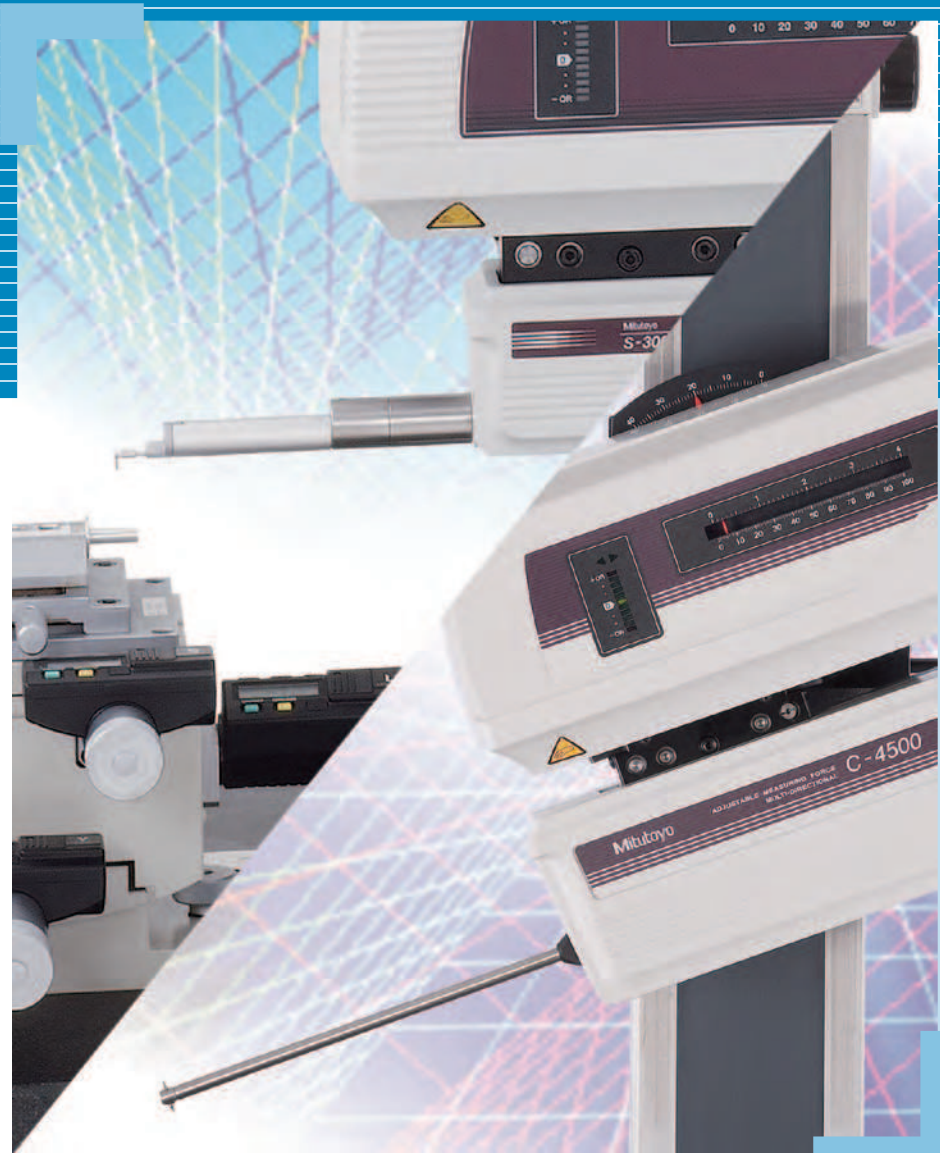# Surface Roughness/Contour Measuring System
Formtracer SV-C3200/4500 Series

Bulletin No. 2073

Dual-purpose measurement and powerful analysis of surface roughness and contour combined with high accuracy, high drive speed and simplified CNC measurement

Mitutoyo

Hybrid measuring instrument for surface roughness and contour measurement

Contour Measuring Functions

Detector with new arm design

Expands measurement range while reducing workpiece interference
Mitutoyo's newly designed detector arm lowers workpiece interference
while expanding the measurement range in the Z1 axis (detector).

• When using the SPH-71 one-sided cut stylus

• SV-C4100 (Conventional product)	• SV-C4500
50 mm / 10 mm	60 mm / 19 mm
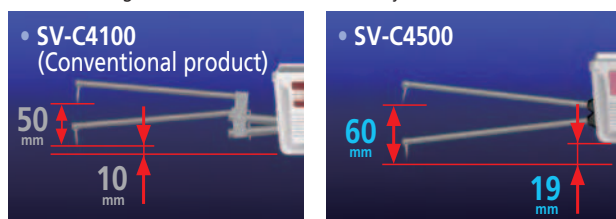
Detector measurement range expanded by 10 mm

One-touch arm attachment   (Patent pending in Japan)

The arm mount uses a magnetic joint for quick and easy arm
replacement. The mount also includes a safety mechanism.
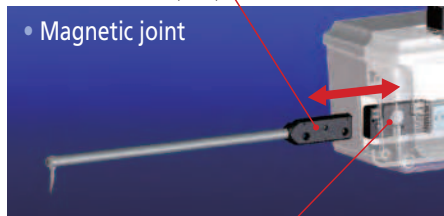
• **SV-C4100** (Conventional product)   • **SV-C4500**

Screw fixing

Removable unit (arm)

• Magnetic joint

Removable unit (detector)

New function specified for 4500 Series

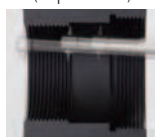#### Continuous top-bottom measurement function

Upper and lower surfaces can be measured continuously by using
Mitutoyo's double-sided conical stylus.
This continuous measurement data can be used to facilitate
analysis of features that were difficult to measure before, such as
the effective diameter of an internal screw-thread.

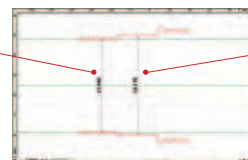Lower direction measurement (Bottom surface)   Upper direction measurement (Top surface)

Top and bottom measurement switched by software

Effective diameter

Plain-section diameter

Continuous top-bottom measurement allows hassle-free one-step calibration

(Patent pending in Japan)

The one-step calibration kit supplied with the SV-C4500 Series has
been upgraded to enable easy calibration of the double-ended
conical stylus featuring a contact on both the top and the bottom.
Precise work such as calibrating the Z1-axis gain, symmetry, and
stylus radius can now be carried out in a single operation.

• Calibration kit for SV-C4500 Series
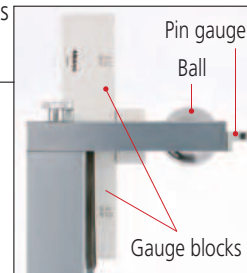
Pin gauge

Ball

Gauge blocks

Variable measuring force function

The measuring force can be varied in 5 steps by using the software
provided (**FORMTRACEPAK**), eliminating the need to adjust
the measuring force by switching
weights or through positional
adjustment.
The SV-C4500 Series can also
maintain the specified measuring
force even when tilted.

Measuring force

Mitutoyo

SV-C4500S4   SV-C3200S4

Surface Roughness Measuring Functions

Supporting International Standards

Compliant with JIS '82/'94/'01, ISO, ANSI, DIN, VDA, and other international surface roughness standards.

We offer a product lineup of surface roughness detectors with different measuring forces

Standard detectors can be selected (as listed below) to conform to the international standard required.
0.75mN (tip angle 60°; tip radius 2μm)
4mN (tip angle 90°; tip radius 5μm)

Reduction of measuring time and operator's fatigue

In addition to high speed movement of main unit, reduction of setting time and operator's fatigue can be achieved by using Auto-leveling Table (option), which allows automatic leveling for a measuring face.
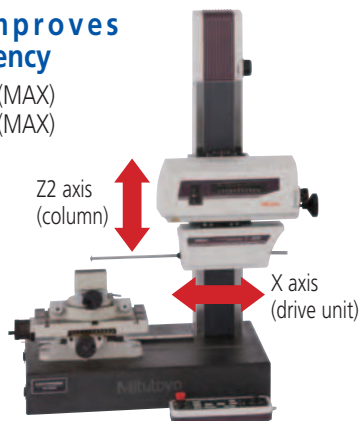
Common specifications

Fast traverse improves measurement efficiency

X axis (drive unit) : 80mm/s (MAX)
Z2 axis (column) : 30mm/s (MAX)

The total measurement time can be shortened by speeding up the traverse movements.

Z2 axis
(column)

X axis
(drive unit)

Remote-control unit enables safe, easy & fast measurement

The remote-control unit lets you move quickly from positioning to measurement. The unit also features an emergency stop switch and speed control knob for added safety while the machine is moving at high speeds.

Emergency stop switch

Drive speed control knob

New Remote Control Box

### Auto stop feature assures safety even during high-speed movement

The detector includes a safety mechanism (auto stop upon collision) to assure measurement safety even during high-speed movement. If the arm is removed or shifts during measurement, the safety mechanism is triggered and stops the machine.

Direction of collision that may cause the safety device to be triggered

• Detector for contour measuring

Removable unit
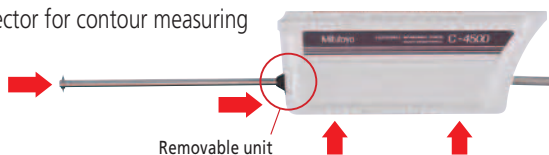
• Detector for surface roughness measuring
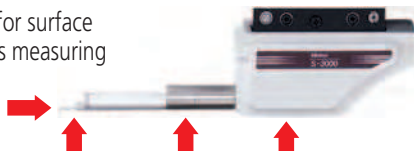
Incorporation of an ABS scale in the Z2 axis eliminates the need for wearisome origin point re-setting conventionally required for every step of repeated measurements over stepped or multiple sections.

ABSOLUTE®
Absolute System Patented by MITUTOYO
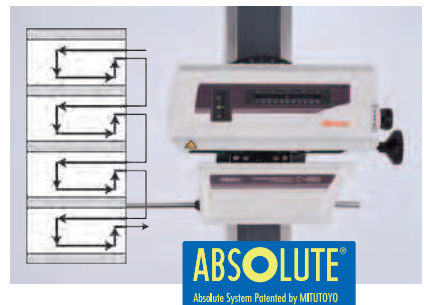
All detector and drive unit cables are housed inside the main unit to eliminate any risk of abrasion and guarantee trouble free, high-speed operation.

Contour Analysis Software: **FORMTRACEPAK**

Contour Measuring

• Contour analysis function

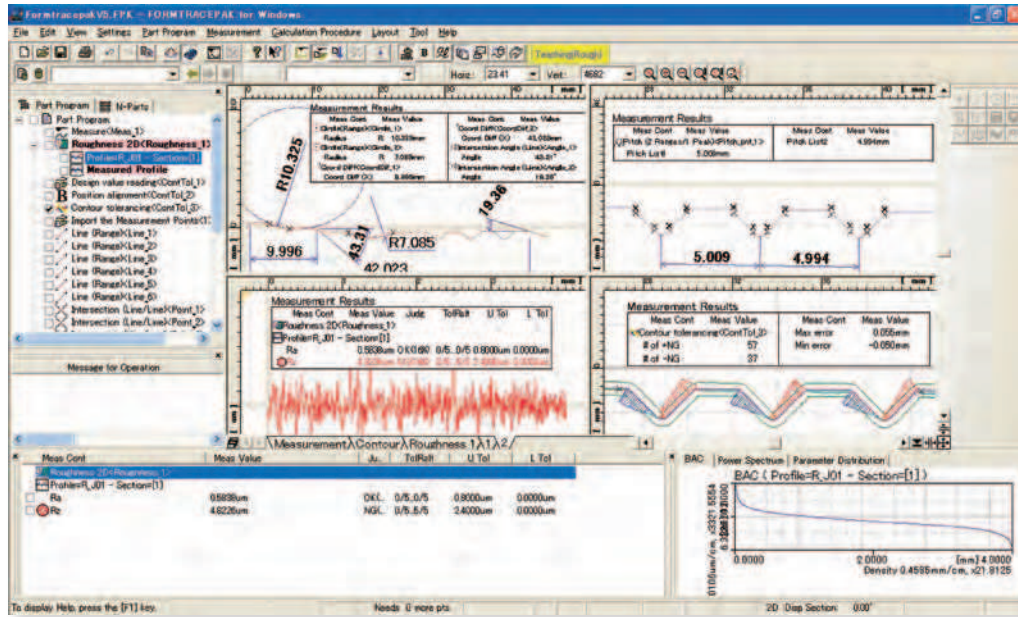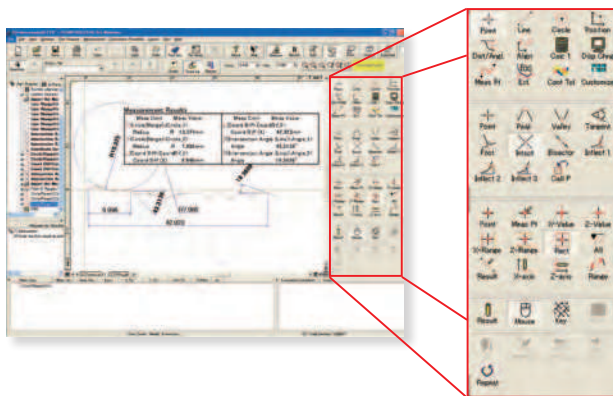Upper and lower surfaces can be measured continuously by using Mitutoyo's double-sided conical stylus.

This continuous measurement data can be used to facilitate analysis of features that were difficult to measure before, such as the effective diameter of an internal screw-thread.

• Contour-tolerancing function as a standard feature

• Design value generation function

• Data combination function

• Simple pitch calculation function

Surface Roughness Measuring

• Surface Roughness analysis function

FORMTRACEPAK can perform surface roughness analyses that conform to various standards such as ISO, JIS ANSI, and VDA. For comparing the measurement values with the tolerance limits, you can use the 16% rule or the maximum value rule. Furthermore, since FORMTRACEPAK comes with parameter calculation functions as well as a rich set of graphic analysis functions, it can be widely utilized for everything from routine quality control to R&D applications. It also includes many other functions, such as the function for eliminating (compensating) shapes, such as slopes and R-surface, and a data deletion function.

• Microscopic contour analysis function

• Simple input using drawing symbols

• Multiple-point measurement function

• Analysis function using multiple-point measurement

• Reference length dialog box

• Analysis condition modification with a preview function

• R-surface automatic measurement function

Note: Please refer to the FORMTRACEPAK catalog (E4386) for more details.

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Integrated layout

You can use simple operations to lay out graphics obtained from measurements as well as measurement results for surface roughness, contour, and roundness on a single page. Furthermore, since the program now allows you to specify a saved file and paste it, you can easily paste results from multiple files.

Note: the optional ROUNDPAK roundness/cylindricity analysis program is required.   (Ver. 7 or higher)
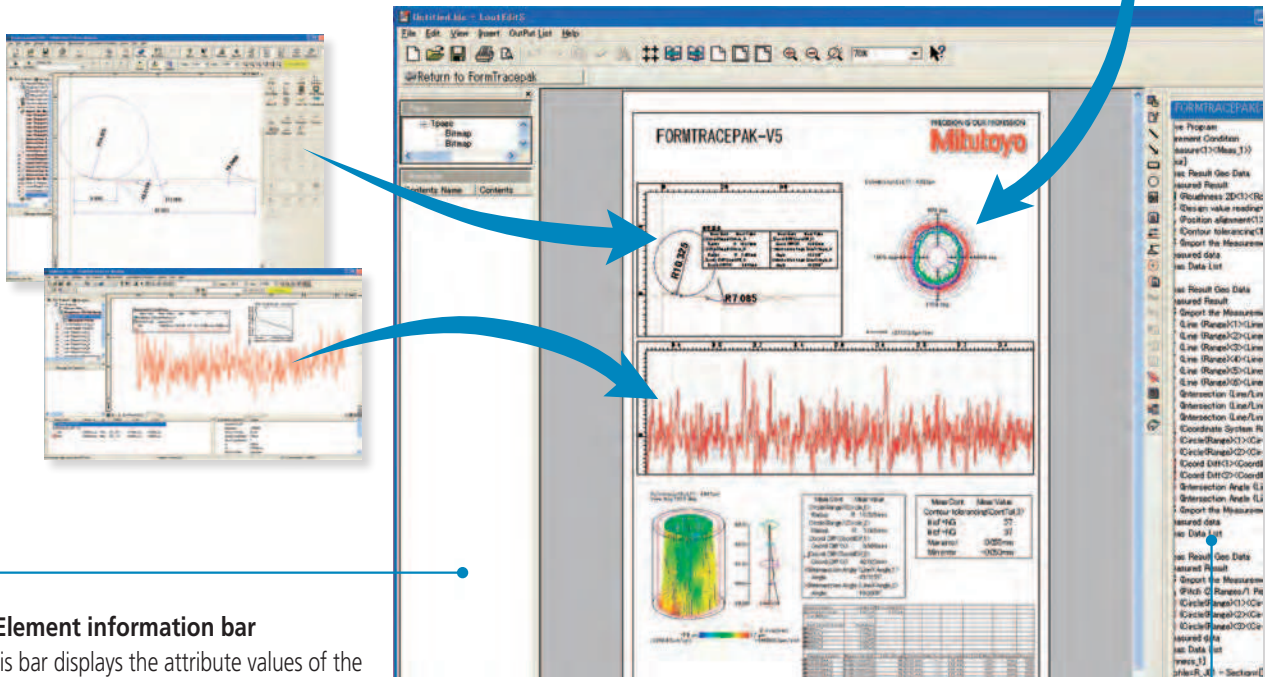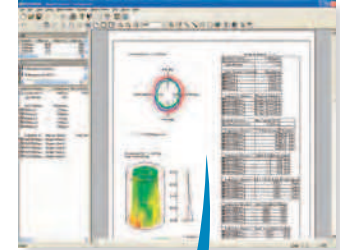
• Element information bar
This bar displays the attribute values of the pasted items, allowing you to easily check the contents of the pasted measurement data files.

• System layout printing
By simply selecting the items to be output, you can automatically lay out the page to be printed.
Use this feature when you wish to simplify the printing task.

• Element insertion bar
Using the mouse to drag and drop the analysis content displayed in the element insertion bar, you can paste it onto the layout. From the contour analysis result, you can also select the analysis result for a circle or line alone and paste it in position.

• Saving the result as a web page
Since you can save the result in html or mhtml format, which can be displayed using Internet Explorer or Microsoft Word, you can check the result even on a PC in which no layout-editing program is installed.

• Report creation function
You can freely assemble measurement results/conditions/graphics as well as comments/circles/lines/arrows, and print them out in a measurement result report. Furthermore, since you can paste bitmap files, you can also add a workpiece image or company logo to the layout.
You can also save the created layout and use it again later for similar measurements.

Optional Accessories for Automatic Measurement

Y-axis table: 178-097

Enables efficient, automatic measurement of multiple aligned workpieces and multiple points on a single measurement surface.
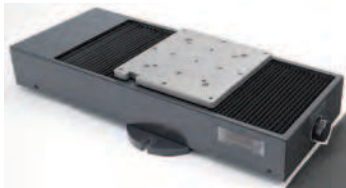
Travel range	200mm
Resolution	0.05µm
Positioning accuracy	±3µm
Drive speed	Max. 80mm/s
Maximum load	50kg
Mass	28kg

Rotary Table θ1-axis table: 12AAD975*

For efficient measurement in the axial/transverse directions. When measuring a cylindrical workpiece, automatic alignment can be performed in combination with the Y-axis table.
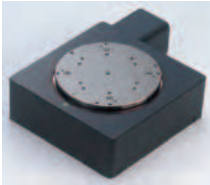*θ1-axis mounting plate (12AAE630) is required when directly installing on the base of the SV-C3200/4500.

|	
Displacement	360°
Resolution	0.004°
Maximum load	12kg
Rotational speed	Max. 10°/s
Mass	7kg

Rotary Table θ2-axis unit: 178-078*

You can measure multiple points on a cylindrical workiece and automate front/rear-side measurement.
*θ2 -axis mounting plate (12AAE718) is required when directly installing on the base of the SV-C3200/4500.

Displacement	360°
Resolution	0.0072°
Maximum load (loading moment)	4kg (343 N•cm or less)
Rotational speed	Max. 18°/s
Mass	5kg
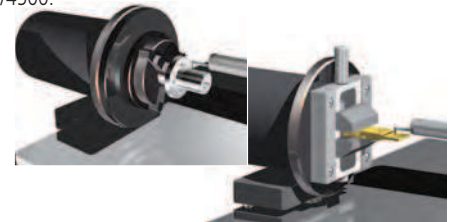
Centering chuck (ring operated): 211-032

This chuck is useful when measuring small workpieces. You can easily clamp them with its knurled ring.

Clamping range	Jaws normal	OD: ø1 - ø36mm
	Jaws normal	I D: ø16 - ø69mm
	Jaws reversed	OD: ø25 - ø79mm
Dimensions		ø118x41mm
Mass		1.2kg

Micro-chuck: 211-031

This chuck is suitable for clamping extra-small diameter workpieces (ø1 mm or less), which cannot be retained with the centering chuck.

Clamping range	OD: ø0.1 - ø1.5mm
Dimensions	ø118x48.5mm
Mass	0.6kg

Auto-leveling table: 178-087

This is a stage that performs fully automatic leveling as measurement starts, freeing the user from this troublesome operation. Fully automatic leveling can be done quickly by anyone. In addition, the operation is easy and reliable.

Inclination adjustment angle	±2°
Maximum load	7kg
Table dimensions	130x100mm
Mass	3.5kg
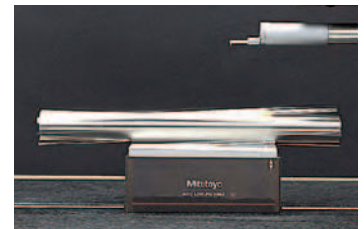
Options

3-axis Adjustment Table: 178-047

This table helps make 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.
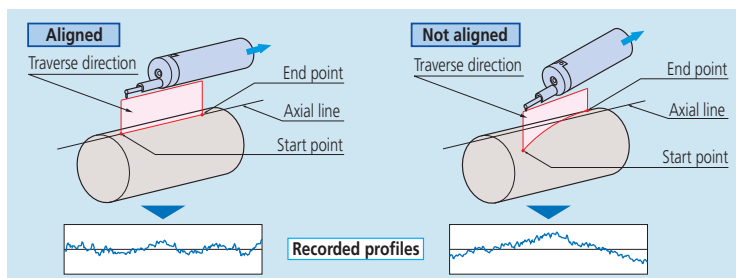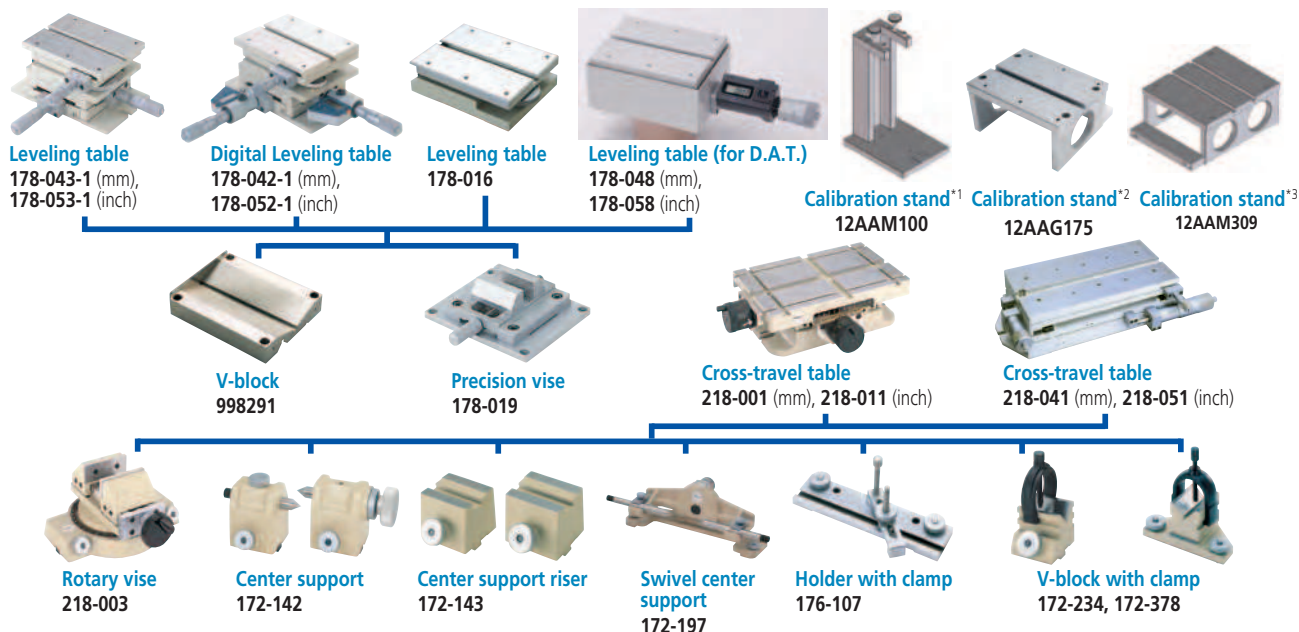
Aligned
Traverse direction
End point
Axial line
Start point

Not aligned
Traverse direction
End point
Axial line
Start point

Recorded profiles

Table and fixture systems

Leveling table
178-043-1 (mm),
178-053-1 (inch)

Digital Leveling table
178-042-1 (mm),
178-052-1 (inch)

Leveling table
178-016

Leveling table (for D.A.T.)
178-048 (mm),
178-058 (inch)

Calibration stand[1]
12AAM100

Calibration stand[2]
12AAG175

Calibration stand[3]
12AAM309

V-block
998291

Precision vise
178-019

Cross-travel table
218-001 (mm), **218-011** (inch)

Cross-travel table
218-041 (mm), **218-051** (inch)

Rotary vise
218-003

Center support
172-142

Center support riser
172-143

Swivel center support
172-197

Holder with clamp
176-107

V-block with clamp
172-234, 172-378

• Desk type vibration isolators
Manually charged pneumatic type[4]

Stand for Desktop type
External size (W×D×H):640×470×660mm
Mass: 25kg

Automatically charged pneumatic type[4]
No.178-025
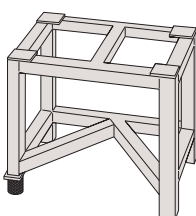
• Desk type vibration isolators
Desk type[4]
No.12AAK110

Monitor arm[5]
No.12AAK120

Side table[5]
No.12AAL019

Desk
Side table

Monitor arm
Desk

Example combination: with side table but no monitor arm (tester and PC not included)

Example combination: with monitor arm but no side table[6] (tester and PC not included)

*1 Required for calibrating upward measurement of **SV-C3200** series.
*2 Required for calibrating in bulk by mounting straight arm/small-hole stylus arm without using cross-travel table and Y-axis table.
*3 Required for calibrating in bulk by mounting straight arm/eccentric arm/small-hole stylus arm without using cross-travel table and Y-axis table.
*4 For models with a product code that ends in **S4, S8, H4**, or **H8**. Please contact us directly if you require units for models with a product code that ends in **W4** or **W8** (large base models).
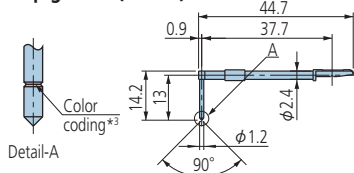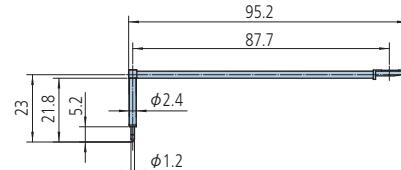*5 Used together with vibration isolator (**No.12AAK110**).
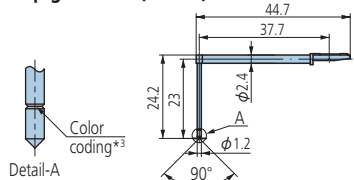*6 User to provide a printer rack.

Detectors / Styli (For Surface Roughness Measuring)

Detectors

Skidless nosepiece (**12AAB355**)

Detector

Order No.	Measuring force	
178-396-2	0.75mN	ISO-1997 and JIS-2001 compliant detectors
178-397-2	4mN	Detectors that comply with previous standards, for general use, etc.

Extension rods

• **12AAG202** Extension rod 50mm

• **12AAG203** Extension rod 100mm

* No more than one extension rod can be connected.

Styli

Standard stylus

Color coding*3

Detail-A

12AAE882 (1μm) *1
12AAE924 (1μm)
12AAC731 (2μm) *1
12AAB403 (5μm)
12AAB415 (10μm)
12AAE883 (250μm) *4
( ): Tip radius

Double-length for deep hole *2

12AAE898 (2μm) *1
12AAE914 (5μm)
( ): Tip radius

For small hole

Detail-A
(S=5/1)

Color coding*3

12AAC732 (2μm) *1
12AAB404 (5μm)
12AAB416 (10μm)
( ): Tip radius

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

Detail-A

12AAE892 (2μm) *1
12AAE908 (5μm)
( ): Tip radius

For extra-small hole

Detail-A
(S=5/1)

Color coding*3

12AAC733 (2μm) *1
12AAB405 (5μm)
12AAB417 (10μm)
( ): Tip radius

For small hole *2 *4

Ball φ1.6

12AAE884 (φ1.6mm)
( ): Tip radius

For extra-minute hole

Detail-A
(S=5/1)

Color coding*3

12AAC734 (2μm) *1
12AAB406 (5μm)
12AAB418 (10μm)
( ): Tip radius

For ultra-small hole *4

Ball φ0.5

Detail-A

12AAJ662 (φ0.5mm)
( ): Tip radius

For deep hole (double-length and triple-length) *2

Color coding*3

Detail-A

2X stylus
12AAC740 (2μm) *1
12AAB413 (5μm)
12AAB425 (10μm)
( ): Tip radius

Color coding*3

Detail-A

3X stylus
12AAC741 (2μm) *1
12AAB414 (5μm)
12AAB426 (10μm)
( ): Tip radius

For small slotted hole *2

Detail-A

12AAE938 (2μm) *1
12AAE940 (5μm)
( ): Tip radius

*1: Tip angle 60°
*2: For downward-facing measurement only.

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

*3:

*4: Used for calibration, a standard step gauge (**No.178-611 (mm)**, **No.178-612 (inch)**, option) is also required

Mitutoyo

Styli

For deep groove (10mm)

44.7
37.7
0.9
A
14.2
13
φ2.4
Color coding*³
Detail-A
φ1.2
90°

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

For deep groove *² (20mm)

95.2
87.7
23
21.8
5.2
φ2.4
φ1.2

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

For deep groove *² (20mm)

44.7
37.7
24.2
23
φ2.4
A
φ1.2
Color coding*³
Detail-A
90°

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

For deep groove *² (40mm)

45.2
37.7
43.8
42.6
φ2.4
5.2
φ2.4
φ1.2
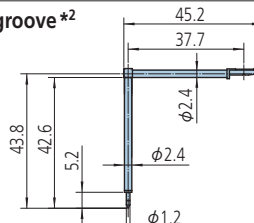
12AAE895 (2µm) *¹
12AAE911 (5µm)
( ): Tip radius

For deep groove *² (30mm)

37.7
45.2
33
31.8
φ2.4
φ2.4
5.2
A
φ1.2
Color coding*³
Detail-A
90°
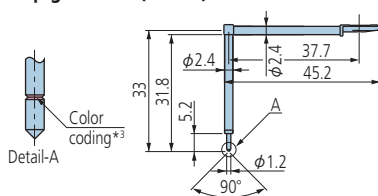
12AAC737 (2µm) *¹
12AAB407 (5µm)
12AAB419 (10µm)
( ): Tip radius

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

93.8
87.7
36.5
35
5.2
φ3
φ1.2
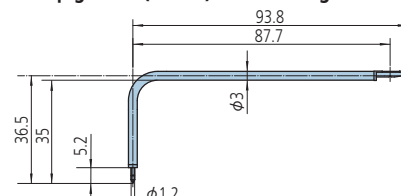
12AAE894 (2µm) *¹
12AAE910 (5µm)
( ): Tip radius

For gear tooth

43.8
37.7
6.4
7.6
60°
A
φ2.4
60°
φ1.2
Color coding*³
Detail-A
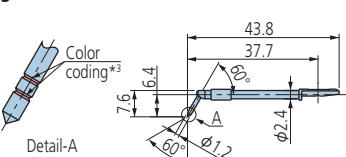
12AAB339 (2µm) *¹
12AAB410 (5µm)
12AAB422 (10µm)
( ): Tip radius

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

93.8
87.7
60°
36.5
35
6.77
φ3
φ1.2
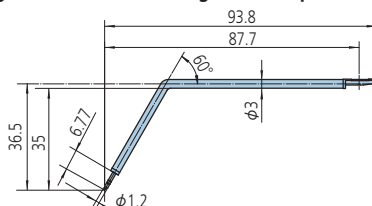
12AAE896 (2µm) *¹
12AAE912 (5µm) *¹
( ): Tip radius

For rolling circle waviness surface *⁴

44.7
37.7
0.9
7.6
5.2
φ1.2
Ball φ1.588
φ2.4
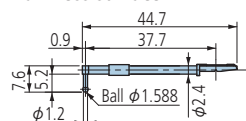
12AAB338 (φ1.588)
( ): Tip radius

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

94.7
87.7
0.9
7.6
6.4
5.2
φ1.2
φ2.4
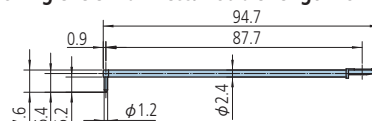
12AAE886 (250µm)
( ): Tip radius

For knife-edge *⁴

44.7
37.7
0.9
A
7.6
φ1.2
φ2.4
Color coding*³
Detail-A
90°
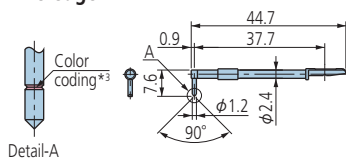
12AAC738 (2µm) *¹
12AAB411 (5µm)
12AAB423 (10µm)
( ): Tip radius

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

93.8
87.7
35
45°
5.8
5
φ0.8
φ1.6
φ2.4
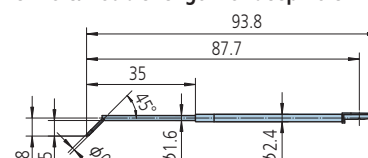
12AAE897 (2µm) *¹
12AAE913 (5µm) *²
( ): Tip radius

For eccentric arm *²

45.2
37.7
10
φ2.4
1.4
7.6
A
φ1.2
φ2.4
Color coding*³
Detail-A
90°
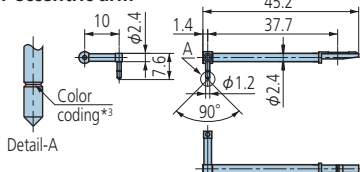
12AAC739 (2µm) *¹
12AAB412 (5µm)
12AAB424 (10µm)
( ): Tip radius

For bottom surface

44.3
37.7
0.5
7.4
6.2
1φ
5
φ2.4
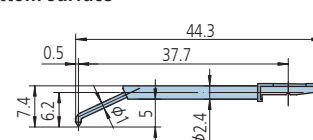
12AAE899 (2µm) *¹
12AAE915 (5µm)
( ): Tip radius

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*1: Tip angle 60°
*2: For downward-facing measurement only.
Customized special interchageable styli are available on request,
Please contact any Mitutoyo office for more information.

Arms / Styli (For Contour Measuring)

Arms

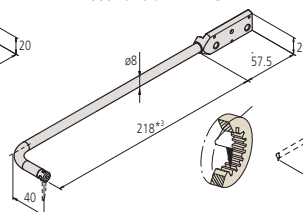| Description	Arm No.	Parts No.	Applicable stylus No.
Straight arm	AB-31*1	12AAM101	SPH-5*, 6*, 7*, 8*, 9*, SPHW*2-56,66,76
Eccentric arm	AB-32	12AAM102	SPH-5*, 6*, 7*, 8*, 9*, SPHW*2-56,66,76
Small-hole arm	AB-33	12AAM103	SPH-41, 42, 43

*1 Standard accessory
*2 Stylus for SV-C4500 series
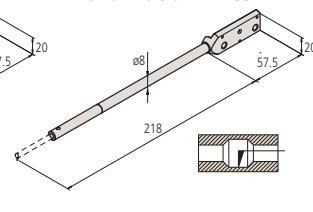*3 One-sided cut stylus SPH-71 (standard accessory) mounting

• Straight arm **AB-31**
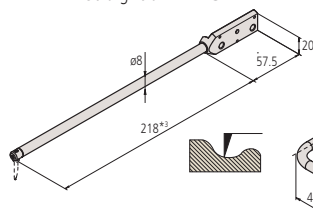
• Eccentric arm **AB-32**

• Small-hole arm **AB-33**

Styli

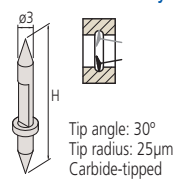| Stylus name	Stylus No.	Parts No.	Application arm No.	H (mm)
Double-sided conical stylus *1	SPHW-56	12AAM095*2	AB-31, AB-32	20
	SPHW-66	12AAM096	AB-31, AB-32	32
	SPHW-76	12AAM097	AB-31, AB-32	48
One-sided cut stylus	SPH-51	354882	AB-31, AB-32	6
	SPH-61	354883	AB-31, AB-32	12
	SPH-71	354884 *2*3	AB-31, AB-32	20
	SPH-81	354885	AB-31, AB-32	30
	SPH-91	354886	AB-31, AB-32	42
Intersecting cut stylus	SPH-52	354887	AB-31, AB-32	6
	SPH-62	354888	AB-31, AB-32	12
	SPH-72	354889	AB-31, AB-32	20
	SPH-82	354890	AB-31, AB-32	30
	SPH-92	354891	AB-31, AB-32	42
Cone stylus Tip angle 30° Sapphire tipped	SPH-53	354892	AB-31, AB-32	6
	SPH-63	354893	AB-31, AB-32	12
	SPH-73	354894	AB-31, AB-32	20
	SPH-83	354895	AB-31, AB-32	30
	SPH-93	354896	AB-31, AB-32	42
Cone stylus Tip angle 30° Carbide-tipped	SPH-56	12AAA566	AB-31, AB-32	6
	SPH-66	12AAA567	AB-31, AB-32	12
	SPH-76	12AAA568	AB-31, AB-32	20
	SPH-86	12AAA569	AB-31, AB-32	30
	SPH-96	12AAA570	AB-31, AB-32	42
Cone stylus Tip angle 20° Carbide-tipped	SPH-57	12AAE865	AB-31, AB-32	6
	SPH-67	12AAE866	AB-31, AB-32	12
	SPH-77	12AAE867	AB-31, AB-32	20
	SPH-87	12AAE868	AB-31, AB-32	30
	SPH-97	12AAE869	AB-31, AB-32	42
Cone stylus Tip angle 50° Diamond tipped	SPH-79	355129	AB-31, AB-32	20
Knife edge stylus	SPH-54	354897	AB-31, AB-32	6
	SPH-64	354898	AB-31, AB-32	12
	SPH-74	354899	AB-31, AB-32	20
	SPH-84	354900	AB-31, AB-32	30
	SPH-94	354901	AB-31, AB-32	42
Ball stylus	SPH-55	354902	AB-31, AB-32	6
	SPH-65	354903	AB-31, AB-32	12
	SPH-75	354904	AB-31, AB-32	20
	SPH-85	354905	AB-31, AB-32	30
	SPH-95	354906	AB-31, AB-32	42
Small hole stylus*4	SPH-41	12AAM104	AB-33	2
	SPH-42	12AAM105	AB-33	4
	SPH-43	12AAM106	AB-33	6.5

*1 Stylus for **SV-C4500 series**
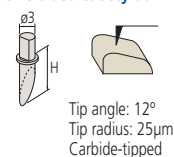*2 Standard accessory of **SV-C4500 series**
*3 Standard accessory of **SV-C3200 series**
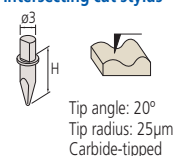*4 Styli SPH-21, 22, and 23 for **SV-C3100/4100 series** are not available.
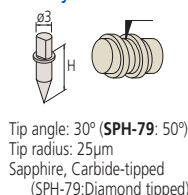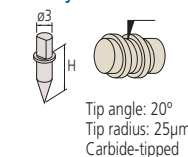
Double-sided conical stylus

Tip angle: 30°
Tip radius: 25µm
Carbide-tipped

Cone stylus

Tip angle: 30° (**SPH-79**: 50°)
Tip radius: 25µm
Sapphire, Carbide-tipped
(SPH-79:Diamond tipped)

Small hole stylus SPH-41

Tip shape: One-sided cut
Tip angle: 20°
Tip radius: 25µm
Carbide-tipped

One-sided cut stylus

Tip angle: 12°
Tip radius: 25µm
Carbide-tipped

Cone stylus

Tip angle: 20°
Tip radius: 25µm
Carbide-tipped

Small hole stylus SPH-42

Tip shape: One-sided cut
Tip angle: 20°
Tip radius: 25µm
Carbide-tipped

Intersecting cut stylus

Tip angle: 20°
Tip radius: 25µm
Carbide-tipped

Knife edge stylus

Tip angle: 20°
Edge width: 3mm
Tip radius: 25µm
Carbide-tipped

Small hole stylus SPH-43

Tip shape:One-sided cut
Tip angle: 20°
Tip radius: 25µm
Carbide-tipped

Ball stylus

Ball dia: 1mm
Carbide-tipped
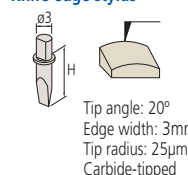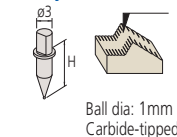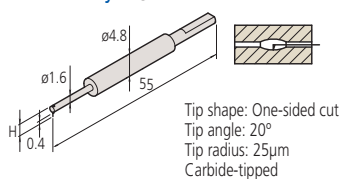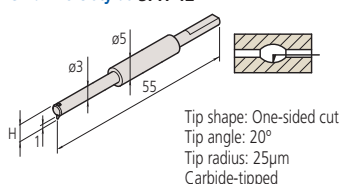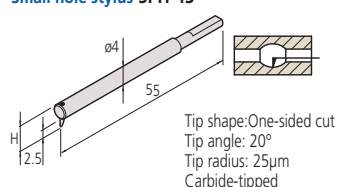
Arm stylus (comprising an arm and stylus)

Arm stylus name	Stylus No.	Parts No.	H (mm)
Double-sided small hole arm stylus	SPHW-31	12AAM108	2.4
	SPHW-32	12AAM109	5
	SPHW-33	12AAM110	9

*5 Arm Stylus for **SV-C4500 series**

Double-sided small hole arm stylus SPHW-31
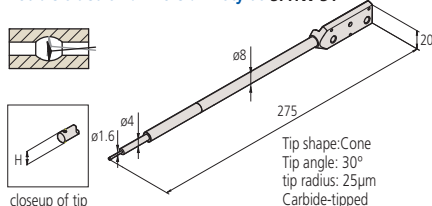
closeup of tip

Tip shape:Cone
Tip angle: 30°
tip radius: 25µm
Carbide-tipped

Double-sided small hole arm stylus SPHW-32

closeup of tip

Tip shape:Cone
Tip angle: 30°
tip radius: 25µm
Carbide-tipped

Double-sided small hole arm stylus SPHW-33

closeup of tip

Tip shape:Cone
Tip angle: 30°
tip radius: 25µm
Carbide-tipped
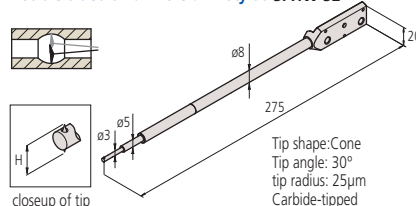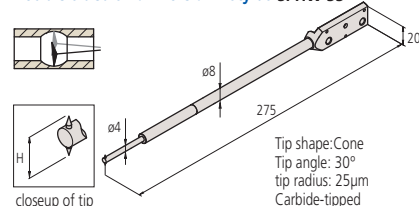
Mitutoyo

Dimensions

X-axis (drive unit) measuring range : 100mm TYPE (S4/H4/W4)

Unit: mm

T-groove size
(Common for all models)
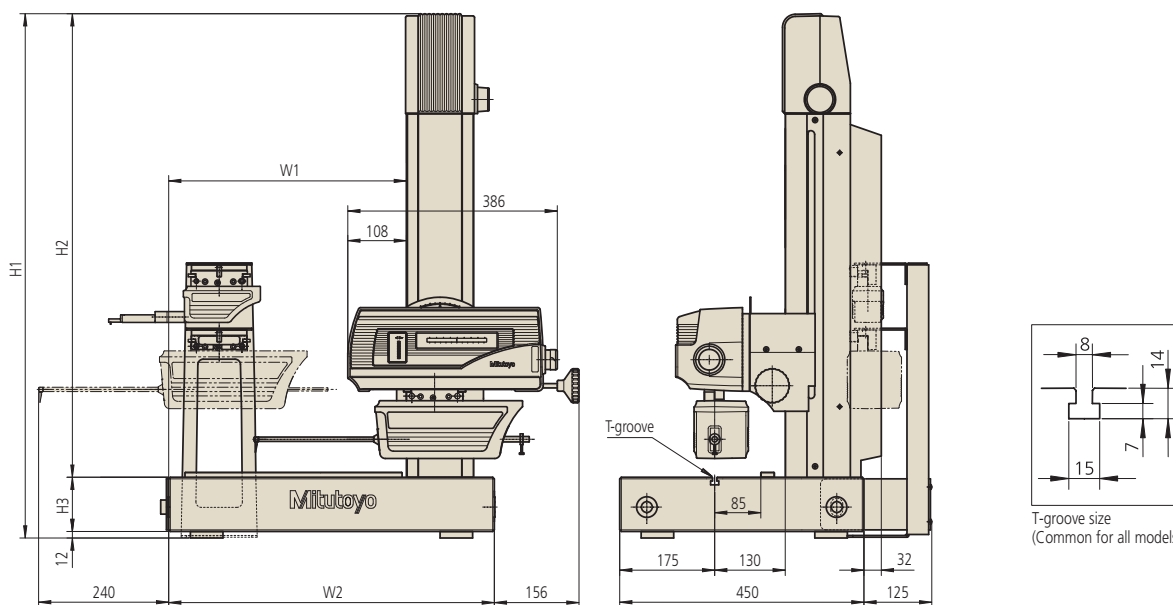
X-axis (drive unit) measuring range : 200mm TYPE (S8/H8/W8)
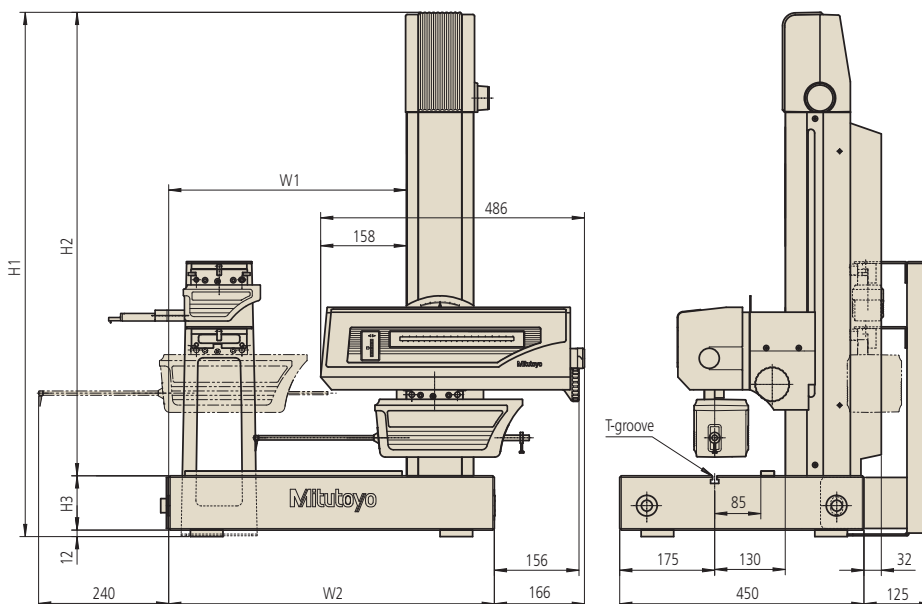
X-axis (drive unit) Measuring range	Models		H1 (mm)	H2 (mm)	H3 (mm)	W1 (mm)	W2 (mm)
	3200 Series	4500 Series					
100mm	SV-C3200S4	SV-C4500S4	966	854	100	438	600
	SV-C3200H4	SV-C4500H4	1166	1054	100	438	600
	SV-C3200W4	SV-C4500W4	1176	1054	110	838	1000
200mm	SV-C3200S8	SV-C4500S8	966	854	100	438	600
	SV-C3200H8	SV-C4500H8	1166	1054	100	438	600
	SV-C3200W8	SV-C4500W8	1176	1054	110	838	1000

Specifications

Model No. (Order No.)	SV-C3200S4 (525-491A-1)	SV-C3200H4 (525-492A-1)	SV-C3200W4 (525-493A-1)	SV-C3200S8 (525-496A-1)	SV-C3200H8 (525-497A-1)	SV-C3200W4 (525-498A-1)
	SV-C4500S4 (525-451A-1)	SV-C4500H4 (525-452A-1)	SV-C4500W4 (525-453A-1)	SV-C4500S8 (525-456A-1)	SV-C4500H8 (525-457A-1)	SV-C4500W8 (525-458A-1)

Specifications for Surface Roughness Measurement

Measuring range	X axis (drive unit)	100mm	200mm
	Z1 axis (detector unit)	800µm / 80µm / 8µm	
Straightness		(0.05+0.001L) µm L = Drive length (mm)	0.5µm / 200mm
Resolution	Z1 axis (detector unit)	0.01µm (800µm) , 0.001µm (80µm) , 0.0001µm (8µm)	
Measuring force		0.75mN or 4mN	
Stylus tip		60°, 2µmR (Measuring force: 0.75mN) or 90°, 5µmR (Measuring force: 4mN)	
Conformable standards		JIS1982/JIS1994/JIS2001/ISO1997/ANSI/VDA	
Parameters		Pa, Pq, Psk, Pku, Pp, Pv, Pz, Pt, Pc, PSm, PΔq, Pm (rC), Pmr, Pδc, Ra, Rq, Rsk, Rku, Rp, Rv, Rz, Rt, Rc, RSm, RΔq, Rm (rC), Rmr, R c, Wa, Wq, Wsk, Wku, Wp, Wv, Wz, Wt, Wc, WSm, WΔq, Wm (rC) Wmr, Wδc, Rk, Rpk, Rvk, Mr1, Mr2, A1, A2, Rx, AR, R, Wx, AW, W, Wte, Ry, RyDIN, RzDIN, R3y, R3z, S, HSC, Lo, Ir, Δa, λa, λq, Vo, Htp, NR, NCRX, CPM, SR, SAR, NW, SW, SAW	
Assessed profiles		Primary Profile, Roughness profile, Envelope residual curve, Filtered waviness curve, Band pass waviness curve, Waviness curve, Rolling circle waviness curve, Roughness motif, Waviness motif, DIN4776 curve	
Graphs		Amplitude distribution graphs, BAC1, BAC2, Power spectrum curve, Auto correlation curve Inclination angle distribution curve, Peak point height distribution curve, Parameter distribution curve	
Data compensation		Tilt compensation, R-surface compensation, Ellipse Compensation, Parabola compensation, Hyperbolic compensation, Polynomial compensation, Conic automatic compensation, Polynomial automatic compensation	
Filters		Gaussian filter, 2CRPC75, 2CRPC50, 2CR75, 2CR50, Robust spline filter	

Specifications for Contour Measurement

Measuring range	X axis (drive unit)	100mm	200mm
	Z1 axis (detector unit)	60mm (±30mm in horizontal situation)	
Straightness (when the X axis is horizontal)		0.8µm / 100mm	2µm / 200mm
Accuracy	X axis (drive unit)	± (0.8+0.01L) µm L = Drive length (mm)	± (0.8+0.02L) µm L = Drive length (mm)
	Z1 axis (detector unit)	SV-C3200 series: ± (1.6+|2H |/100) µm, SV-C4500 series: ± (0.8+|2H |/100) µm H = Measurement height from the horizontal position (mm)	
Resolution	X axis (drive unit)	0.05µm	
	Z1 axis (detector unit)	SV-C3200 series: 0.04µm, SV-C4500 series: 0.02µm	
	Z2 axis (column)	1µm	
Measuring force		SV-C3200 series: 30mN, SV-C4500 series:10, 20, 30, 40, 50mN (Setting measuring force FORMTRACEPAK)	
Measuring face direction		SV-C3200 series: Both upward and downward, SV-C4500 series: Both upward and downward (direction switch from FORMTRACEPAK)	

Common Specifications

Z2-axis (column) travel range		300mm	500mm	300mm	500mm
X-axis inclination angle		±45°			
Drive speed	X axis	0~80mm/s and manual operation			
	Z2 axis (column)	0~30mm/s and manual operation			
Measuring speed		0.02~5mm/s			

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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