Mitutoyo

CONTRACER CV-3200/4500 SERIES

HIGH-ACCURACY CONTOUR MEASURING MACHINE WITH EXCITING NEW FEATURES

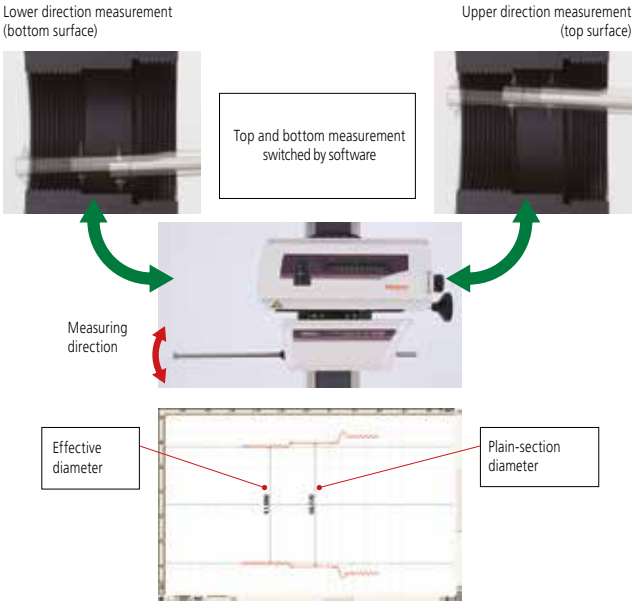
FORM MEASUREMENT

PRE1382(2)

CONTRACER
CV-4500 Series

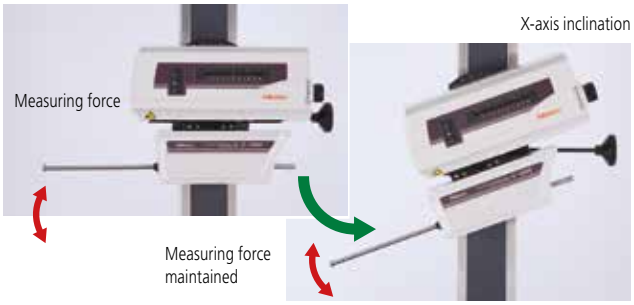
Continuous top-bottom measurement function for easy measurement of upper and lower surfaces

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.



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 CV-4500 Series can also maintain the specified measuring force even when tilted.



New Top-bottom Continuous Measurement and Variable Measuring Force.

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

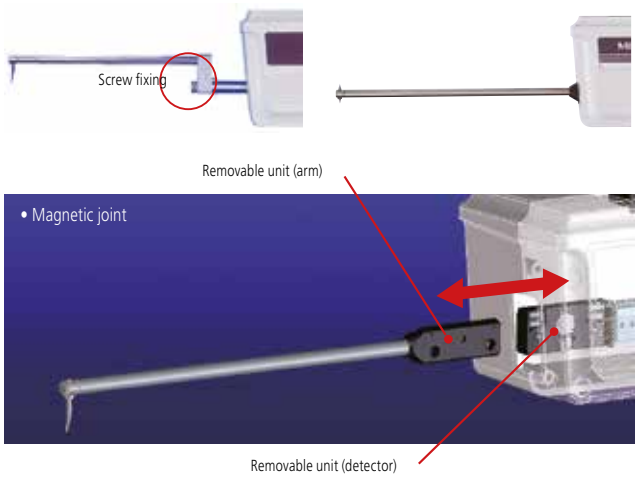
Detector measurement range expanded by 10 mm

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.

• **CV-4100** (Conventional product) • **CV-4500**



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.

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.

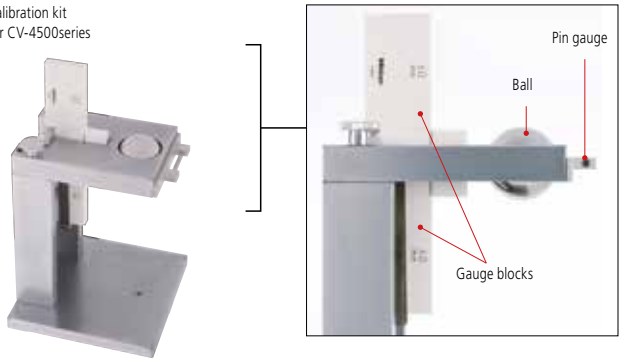
• Direction of collision that may cause the safety device to be triggered

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

(Patent pending in Japan)

The one-step calibration kit supplied with the CV-4500 Series has been upgraded to enable easy calibration of the double-sided conical stylus featuring a contact on both the top and the bottom. Fiddly work such as calibrating the Z1-axis gain, symmetry, and stylus radius can now be carried out in a single operation.

• Calibration kit for CV-4500series



Best-in-class-displacement accuracy

The CV-4500 Series features a built-in precision arc scale on the Z1-axis (detector) that allows the arc trajectory of the stylus tip to be read directly, minimizing the detector mechanism error and enabling precision, high-resolution measurement. On the X-axis (driver) is a linear scale, allowing high-accuracy full-stroke measurement.

Accuracy ————————————————————————————

Z1-axis (detector unit)	: ± (0.8 + 0.02H) µm H = Measurement height from the horizontal position (mm)
X-axis (drive unit)	: ± (0.8 + 0.01 L) µm*1 L = drive length (mm)

Resolution ————————————————————————————

Z1-axis (detector unit)	: 0.02 µm
X-axis (drive unit)	: 0.05 µm

*1 These specifications apply to the CV-4500S4/H4/W4. For specifications of other products in the series, see specifications on page 14.

CONTRACER
CV-3200 Series

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

Detector measurement range expanded by 10 mm

One-touch arm attachment

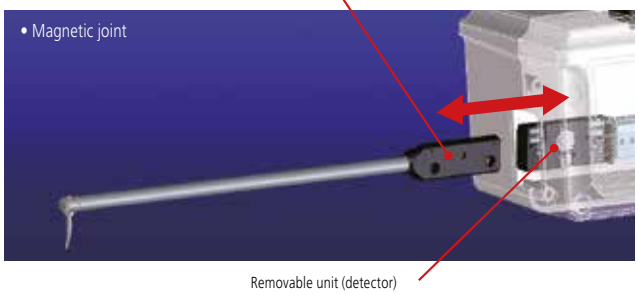
(Patent pending in Japan)

The arm mount uses a magnetic joint for quick and easy arm replacement. The mount also includes a safety mechanism.

• **CV-3100** (Conventional product)

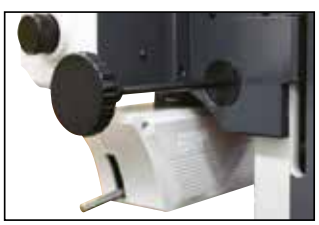
Removable unit (arm)

• **CV-3200**



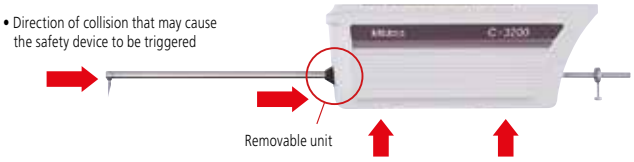
Removable unit (detector)

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.



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.



Hassle-free one-step calibration

The CV-3200 Series provides a dedicated calibration gage that lets you carry out fiddly work such as calibrating the Z1-axis gain, symmetry, and stylus radius in a single operation. Calibration of upward measurement is also possible by using Mitutoyo's optional calibration stage.

• **Calibration kit for CV-3200 series**

Best-in-class displacement accuracy

The CV-3200 Series features a built-in precision arc scale on the Z1-axis (detector) that allows the arc trajectory of the stylus tip to be read directly, minimizing the detector mechanism error and enabling precision, high-resolution measurement. On the X-axis (driver) is a linear scale, allowing high-accuracy full-stroke measurement.

Accuracy ————————————————————————————

Z1-axis (detector unit):	± (1.4 + 0.02H) µm H = Measurement height from the horizontal position (mm)
X-axis (drive unit):	± (0.8 + 0.01 L) µm*1 L = drive length (mm)

Resolution ————————————————————————————

Z1-axis (detector unit):	0.04 µm
X-axis (drive unit):	0.05 µm

*1 These specifications apply to the CV-3200S4/H4/W4. For specifications of other products in the series, see specifications on page 14.

Efficient Functions Featured by CV-4500 and CV-3200.

Excellent operability

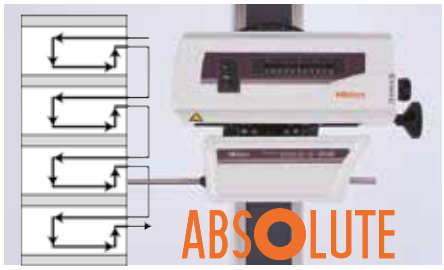
Remote-control unit enables safe, easy & fast measurement

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.

New remote control box

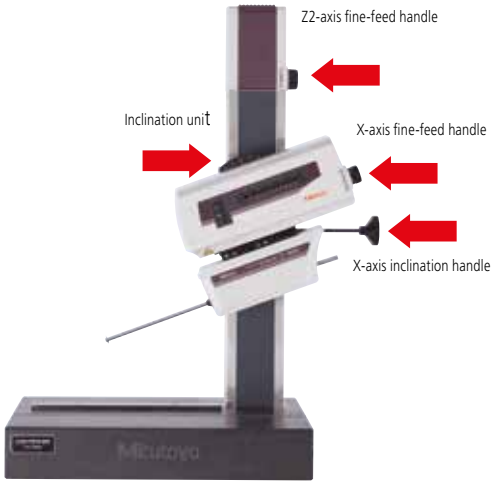
Remarkable Ease of Operation

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.



Simple positioning by fine feed mechanisms

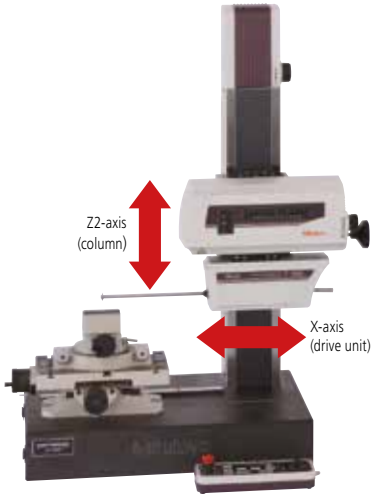
Small holes and inclined planes can be efficiently measured using the inclined X-axis drive unit and fine-feed handles on the X- and Z2-axes.



Fast traverse improves measurement efficiency

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

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

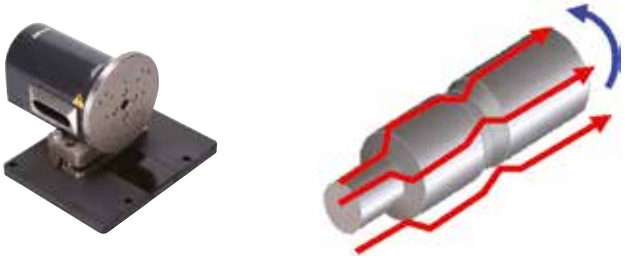


Simplified CNC Function

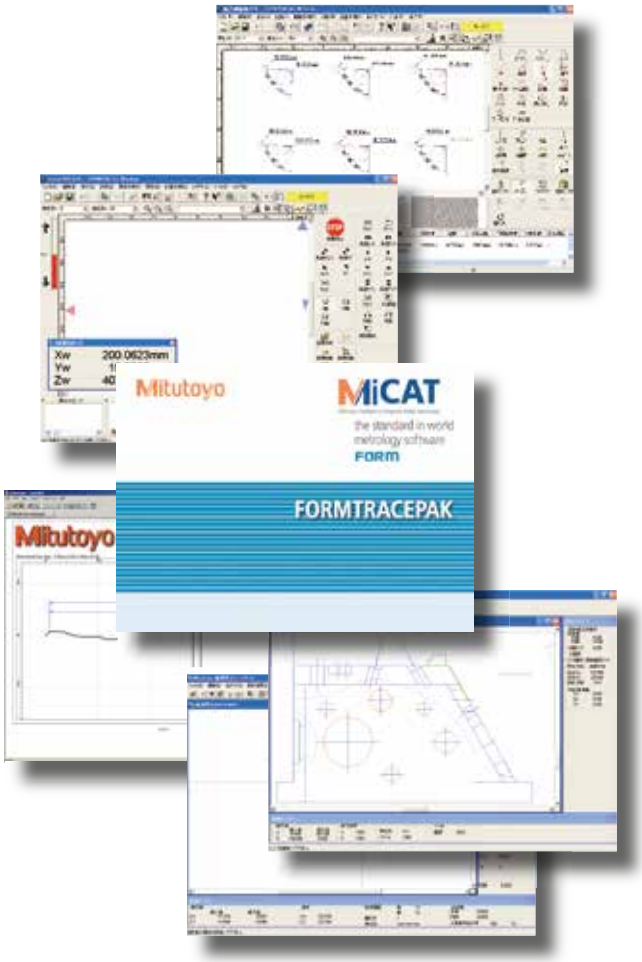
With the support for a wide range of optional peripherals designed for use with the CNC Form Measuring Unit enables simplified CNC measurement.

• θ1-axis rotary unit: Automatic circular-movement

• θ2-axis rotary unit: Automatic multiple-section continuous measurement



Contour Analysis Software: FORMTRACEPAK



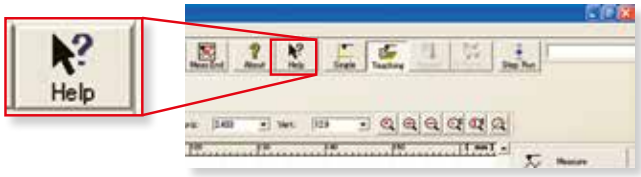
Multiple languages support (17 languages)

You can switch the language* to be used in the measurement, analysis, and layout windows. After measurements have been made, you can switch to another language and create a report in that language. This function can be used worldwide.

* Supported languages: Japanese, English, German, French, Italian, Spanish, Polish, Hungarian, Swedish, Czech, Simplified Chinese, Traditional Chinese, Korean, Turkish, Portuguese, Danish, Russian.

Online help function*

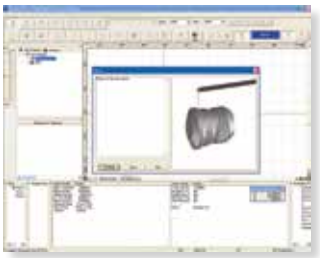
Online help that can be viewed any time is incorporated into the software. In addition to index and keyword searches, a status saving help button, which displays menus and Windows help with a click of the mouse, is provided.



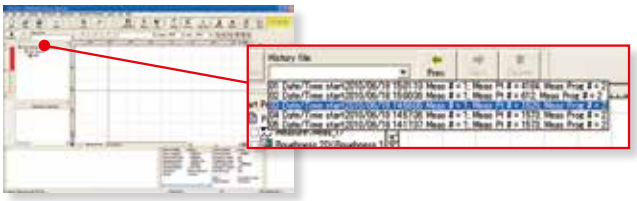
* Online help function supports only Japanese and English.

Measurement control

To make only a single measurement, you can create a part program in the single mode. To measure multiple workpieces of an identical shape, you can use the teaching mode.
FORMTRACEPAK supports the new top-bottom continuous measurement and variable measuring force functions of the CV-4500 Series (see page 2 for details), providing an even higher level of usability. Since you can embed the entire flow, from making measurement to printing a report, into a part program, you can efficiently make measurements, analyse data, and output a report. A function is also provided that enables you to insert comments accompanied with photographs at desired timings, enabling you to embed the roles described in a measurement procedure document that specifies important points such as work settings.

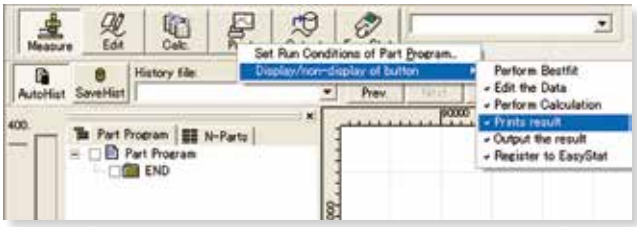


To make immediate measurements, you can use the pull-down menu to easily select and call up the desired operating procedure.



Button-editing function

You can hide buttons that are not used frequently. For example, you can choose to display only those buttons that are used frequently and increase the size of the displayed graphics window, thereby customizing the window to suit your needs.



Simple statistical commands

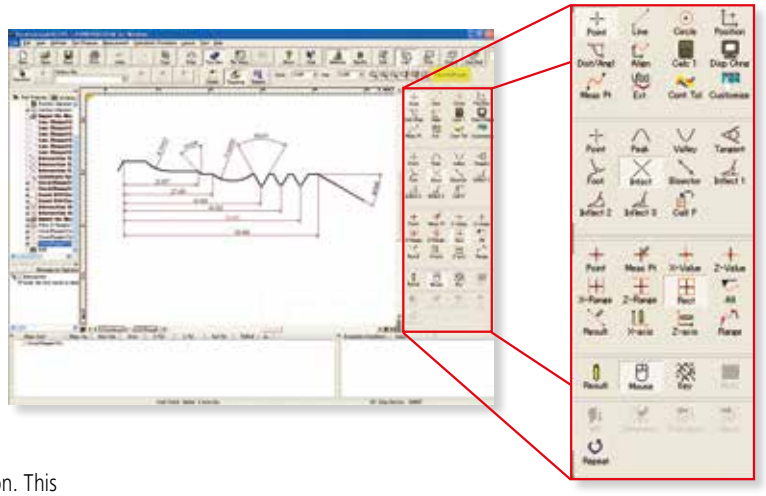
You can perform statistical calculations of roughness parameters and contour analysis results without using a separate program such as Excel®.

FORMTRACEPAK Functions Offer Total Support.

Contour analysis

Contour analysis function

A wide variety of commands, which form the basic elements for analysis, are provided, including those for points (10 kinds), lines (6 kinds), and circles (6 kinds). A rich set of commands that combine these elements to calculate angles, pitches, and distances, a contour tolerancing function, and a design value generation function are also provided as standard features. These functions, combined with the function that allows you to customize the calculation command buttons by hiding less frequently used commands, let you tailor the window according to the user environment.



Removal of abnormal points function

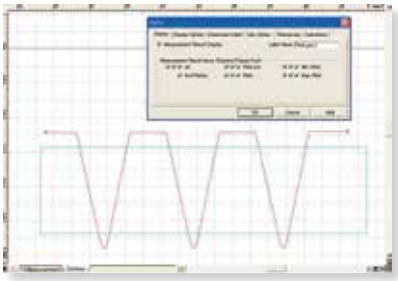
Irregular defects in the data are filtered out from the calculation. This function can effective when specifying the calculation range for locations at which the boundary between circle and line is difficult to determine.

Simple pitch calculation function

You can efficiently analyse the pitch between identical shapes, such as a screw pitch or the distance between circles (center-to-center pitch), by simply specifying the desired range using mouse operations.

Text output of the calculation result and graphics data

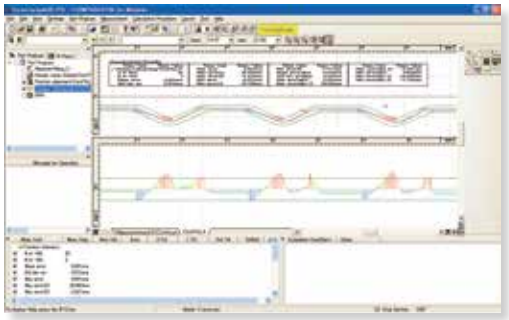
You can output the calculation result as text (in csv or txt format), output graphics data obtained from measurements as point-string data to a text file or CAD file (in the DXF or IGES format), or copy the data to the clipboard. Combined with commercial document or statistical processing software, this feature can be used to share data with computers that do not have dedicated analysis software installed or execute CAD-based reverse engineering.



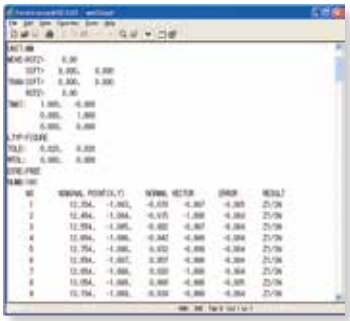
Example of range specification for screw thread pitch with rectangular tool.

Contour-tolerancing function as a standard feature

The best-fit processing function that moves the coordinate values of the design data and measurement data to the optimum positions is provided as a standard feature. Since the tolerancing results can be visually displayed as graphics, displayed as tolerance values and tolerance expansions in each coordinate, or output as a text file, they can be utilized as feedback data for machining systems.



Example of contour-tolerancing result



Example of contour tolerancing results output as numeric values

Contour Analysis Software: FORMTRACEPAK

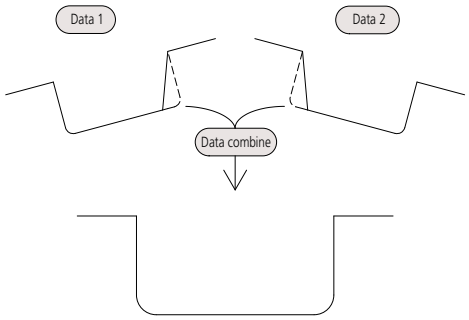
Contour analysis

Design value generation function

You can generate design data from CAD data (DXF or IGES file) or text data. Furthermore, since you can also convert measurement data into design data, you can save parts data prior to use (testing) as design data and effectively utilize it for checking the wear following use (testing).

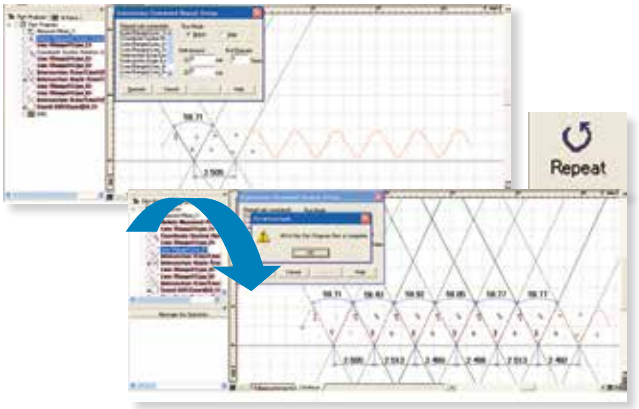
Data combination function

You can combine partial data collected separately from a workpiece (made necessary due to shape characteristics) into a single graphic for convenient analysis.



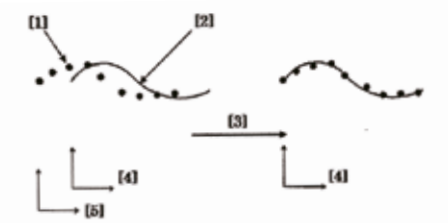
Calculation command repetition setting

When identical shapes have the same pitch, you can analyse all of the shapes in a batch by specifying a single analysis location and the pitch.



Best-fit processing function for measurement point strings

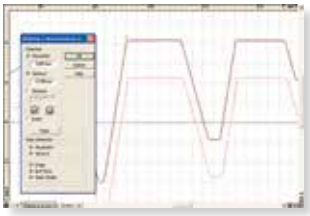
This function tries to fit the measurement points to the stored reference data on the same coordinate system. It can eliminate the effects of a shift that may occur when setting the workpiece during automatic analysis.



[1] Measured points/
[2] Bestfit reference data/
[3] Bestfit/
[4] Reference coordinate system/
[5] Measurement coordinate system

Data superimposition command

You can superimpose two sets of data by detecting their characteristic points. Use the mouse to drag and move the measurement point strings to the desired positions to be superimposed.



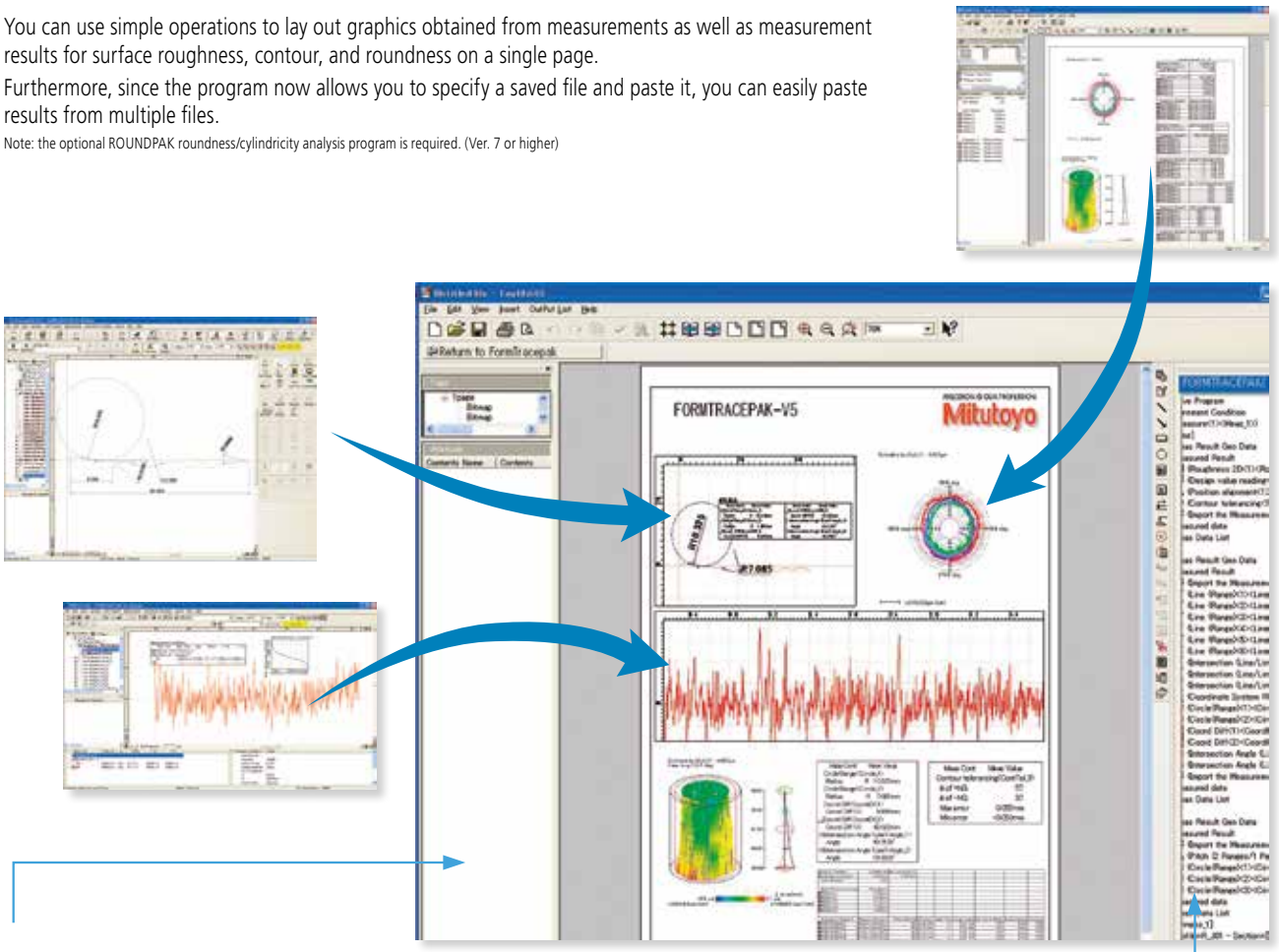
Measurement System Control, Contour Analysis, Contour Tolerancing, and Inspection Report Creation.

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)



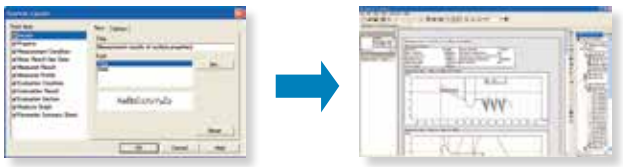
Element information bar

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 into 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 on 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

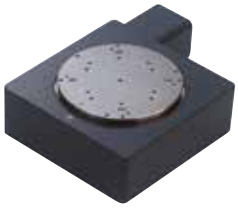
Y-axis table: 178-097

Enables efficient, automatic measurement of multiple aligned workpieces and multiple points on a single measurement surface.

Travel range	200 mm
Resolution	0.05 µm
Positioning accuracy	± 3 µm
Drive speed	Max 80 mm/s
Maximum load	50 kg
Mass	28 kg

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 CV-3200/4500 series.



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

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 CV-3200/4500 series.

Displacement	360°
Resolution	0.0072°
Maximum load (loading moment)	4 kg (343 N·cm or less)
Rotational speed	Max 18°/s
Mass	5 kg

Centering chuck (ring operated): 211-032

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

Retention range	Inner latch	OD: ø 1 - ø 36 mm
	Inner latch	I D: ø 16 - ø 69 mm
	Outer latch	OD: ø 25 - ø 79 mm
Dimensions		ø 118 x 41 mm
Mass		1.2 kg

Micro-chuck: 211-031

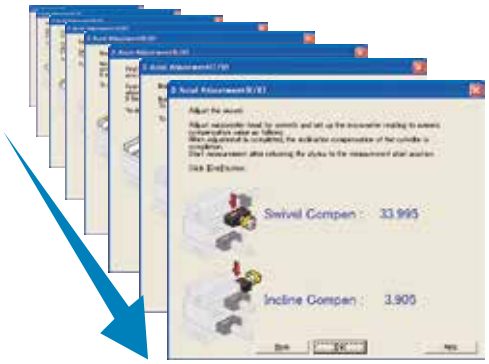
This chuck is suitable for clamping extra-small diameter workpieces (ø1 mm or less), which cannot be retained with the centering chuck.

Retention range	OD: ø 0.1 - ø 1.5 mm
Dimensions	ø 107 x 48.5 mm
Mass	0.6 kg

Optional Accessories

3-axis adjustment table: 178-047

This table helps make the 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.
By using Mitutoyo's 3-axis adjustment table, the workpiece can be aligned and leveled easily, simply by following the FORMTRACEPAK guidance. No experience or special expertise is required.



Guidance display when using 3-axis adjustment table

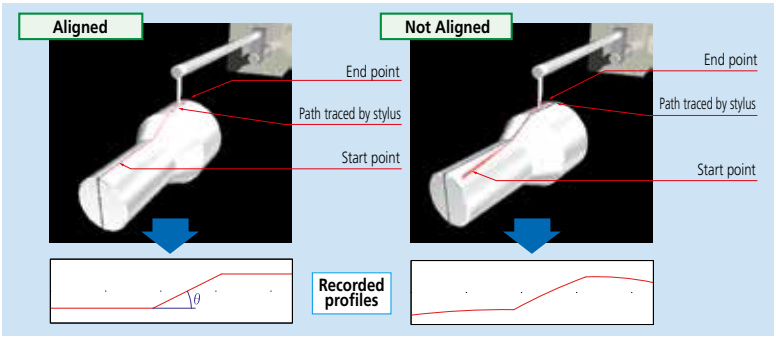
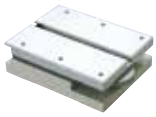


Table and fixture systems

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

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



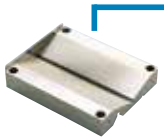
Leveling table
178-016

Leveling table (for D.A.T.)
178-048

Calibration stand*1
12AAM100

Calibration stand*2
12AAG175

Calibration stand*3
12AAM309

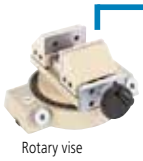


V-block
998291

Precision vise
178-019

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

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

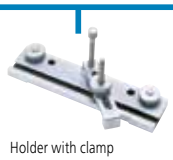


Rotary vise
218-003

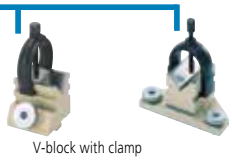
Center support
172-142

Center support riser
172-143

Swivel center support
172-197



Holder with clamp
176-107



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

*1 Required for calibrating upward measurement of **CV-3200** 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.

Optional Accessories

Vibration isolators

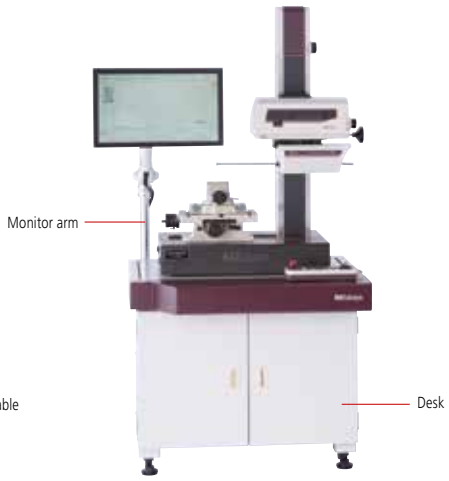
Desk types

Desk type*1
No.12AAK110

Monitor arm*2
No.12AAK120

Side table*3
No.12AAL019

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

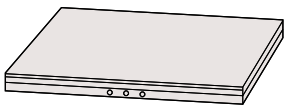


Example combination: with monitor arm but no side table*3 (tester and PC not included)

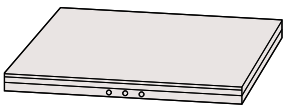
*1 For models with a product code that ends in **S4**, **S8**, **H4**, or **H8**. Please contact us directly if you require units for models with a product code that ends in **W4** or **W8** (large base models).
*2 Used together with vibration isolator (No.12AAK110).
*3 User to provide a printer rack.

Desktop types

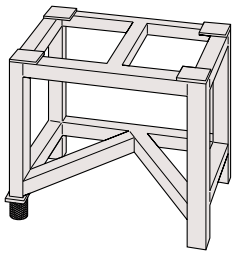
Manually charged pneumatic type*4
No.178-023



Automatically charged pneumatic type*4
No.178-025



Stand for Desktop type
External size (W×D×H): 640 × 470 × 660 mm, Mass: 25 kg
No.178-024



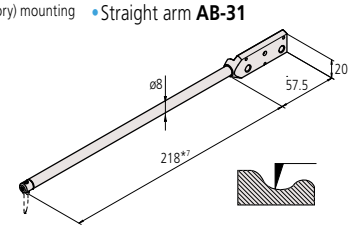
*4 For models with a product code that ends in **S4**, **S8**, **H4**, or **H8**. Please contact us directly if you require units for models with a product code that ends in **W4** or **W8** (large base models).

Arms

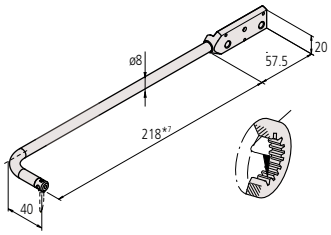
Description	Arm No.	Parts No.	Applicable stylus No.
Straight arm	AB-31*5	12AAM101	SPH-5x, 6x, 7x, 8x, 9x, SPHW*6-56,66,76
Eccentric arm	AB-37	12AAQ762	SPH-5x, 6x, 7x, 8x, 9x, SPHW*6-56,66,76
Small-hole arm	AB-33	12AAM103	SPH-41, 42, 43

*5 Standard accessory
*6 Stylus for CV-4500 series
*7 One-sided cut stylus SPH-71 (standard accessory) mounting

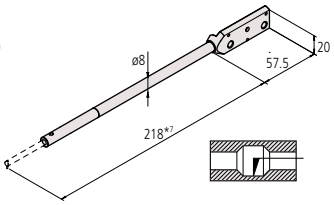
• Straight arm **AB-31**



• Eccentric arm **AB-37**



• Small-hole arm **AB-33**

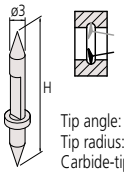


Styli

Stylus name	Stylus No.	Parts No.	Application arm No.	H mm
Double-sided conical stylus*1	**SPHW-56**	**12AAM095*2**	**AB-31, AB-37**	20
	SPHW-66	**12AAM096**	**AB-31, AB-37**	32
	SPHW-76	**12AAM097**	**AB-31, AB-37**	48
One-sided cut stylus	**SPH-51**	**354882**	**AB-31, AB-37**	6
	SPH-61	**354883**	**AB-31, AB-37**	12
	SPH-71	**354884 *2*3**	**AB-31, AB-37**	20
	SPH-81	**354885**	**AB-31, AB-37**	30
	SPH-91	**354886**	**AB-31, AB-37**	42
Intersecting cut stylus	**SPH-52**	**354887**	**AB-31, AB-37**	6
	SPH-62	**354888**	**AB-31, AB-37**	12
	SPH-72	**354889**	**AB-31, AB-37**	20
	SPH-82	**354890**	**AB-31, AB-37**	30
	SPH-92	**354891**	**AB-31, AB-37**	42
Cone stylus Tip angle 30° Sapphire tipped	**SPH-53**	**354892**	**AB-31, AB-37**	6
	SPH-63	**354893**	**AB-31, AB-37**	12
	SPH-73	**354894**	**AB-31, AB-37**	20
	SPH-83	**354895**	**AB-31, AB-37**	30
	SPH-93	**354896**	**AB-31, AB-37**	42
Cone stylus Tip angle 30° Carbide-tipped	**SPH-56**	**12AAA566**	**AB-31, AB-37**	6
	SPH-66	**12AAA567**	**AB-31, AB-37**	12
	SPH-76	**12AAA568**	**AB-31, AB-37**	20
	SPH-86	**12AAA569**	**AB-31, AB-37**	30
	SPH-96	**12AAA570**	**AB-31, AB-37**	42
Cone stylus Tip angle 20° Carbide-tipped	**SPH-57**	**12AAE865**	**AB-31, AB-37**	6
	SPH-67	**12AAE866**	**AB-31, AB-37**	12
	SPH-77	**12AAE867**	**AB-31, AB-37**	20
	SPH-87	**12AAE868**	**AB-31, AB-37**	30
	SPH-97	**12AAE869**	**AB-31, AB-37**	42
Cone stylus Tip angle 50° Diamond tipped	**SPH-79**	**355129**	**AB-31, AB-37**	20
Knife edge stylus	**SPH-54**	**354897**	**AB-31, AB-37**	6
	SPH-64	**354898**	**AB-31, AB-37**	12
	SPH-74	**354899**	**AB-31, AB-37**	20
	SPH-84	**354900**	**AB-31, AB-37**	30
	SPH-94	**354901**	**AB-31, AB-37**	42
Ball stylus	**SPH-55**	**354902**	**AB-31, AB-37**	6
	SPH-65	**354903**	**AB-31, AB-37**	12
	SPH-75	**354904**	**AB-31, AB-37**	20
	SPH-85	**354905**	**AB-31, AB-37**	30
	SPH-95	**354906**	**AB-31, AB-37**	42
Small hole stylus*4	**SPH-41**	**12AAM104**	**AB-33**	2
	SPH-42	**12AAM105**	**AB-33**	4
	SPH-43	**12AAM106**	**AB-33**	6.5

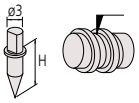
*1 Stylus for CV-4500 series
*2 Standard accessory of CV-4500 series
*3 Standard accessory of CV-3200 series
*4 Styli SPH-21, 22, and 23 for CV-3100/4100 series are not available.

Double-sided conical stylus



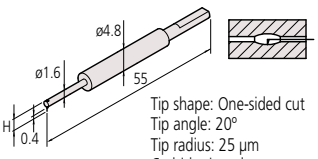
Tip angle: 30°
Tip radius: 25 µm
Carbide-tipped

Cone stylus



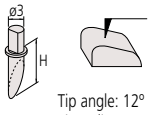
Tip angle: 30° (**SPH-79**: 50°)
Tip radius: 25 µm
Sapphire, Carbide-tipped
(SPH-79: Diamond tipped)

Small hole stylus SPH-41



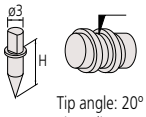
Tip shape: One-sided cut
Tip angle: 20°
Tip radius: 25 µm
Carbide-tipped

One-sided cut stylus



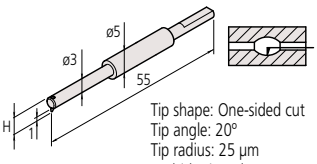
Tip angle: 12°
Tip radius: 25 µm
Carbide-tipped

Cone stylus



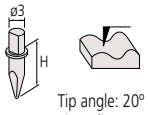
Tip angle: 20°
Tip radius: 25 µm
Carbide-tipped

Small hole stylus SPH-42



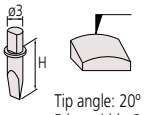
Tip shape: One-sided cut
Tip angle: 20°
Tip radius: 25 µm
Carbide-tipped

Intersecting cut stylus



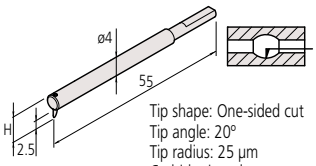
Tip angle: 20°
Tip radius: 25 µm
Carbide-tipped

Knife edge stylus



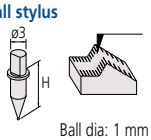
Tip angle: 20°
Edge width: 3 mm
Tip radius: 25 µm
Carbide-tipped

Small hole stylus SPH-43



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

Ball stylus



Ball dia: 1 mm
Carbide-tipped

Arm stylus (comprising an arm and stylus)

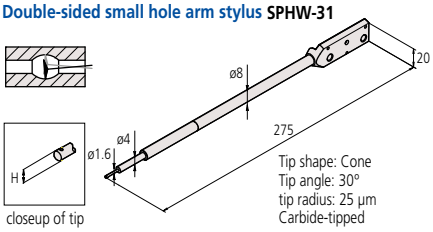
Arm stylus name	Stylus No.	Parts No.	H (mm)
Double-sided small hole arm stylus*5 (Cone 30°)	**SPHW-31**	**12AAM108**	2.4
	SPHW-32	**12AAM109**	5
	SPHW-33	**12AAM110**	9

*5 Arm Stylus for CV-4500 series

Arm stylus name	Stylus No.	Parts No.	H (mm)
Double-sided small hole arm stylus*5 (Cone 20°)	**SPHW-21**	**12AAT469**	2.4
	SPHW-22	**12AAT470**	5

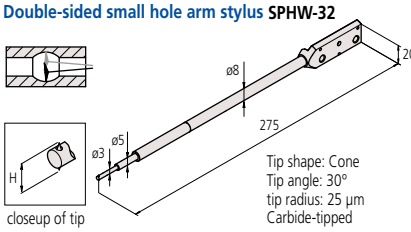
*5 Arm Stylus for CV-4500 series

Double-sided small hole arm stylus SPHW-31



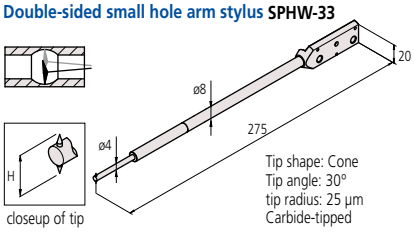
Tip shape: Cone
Tip angle: 30°
tip radius: 25 µm
Carbide-tipped

Double-sided small hole arm stylus SPHW-32



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

Double-sided small hole arm stylus SPHW-33



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

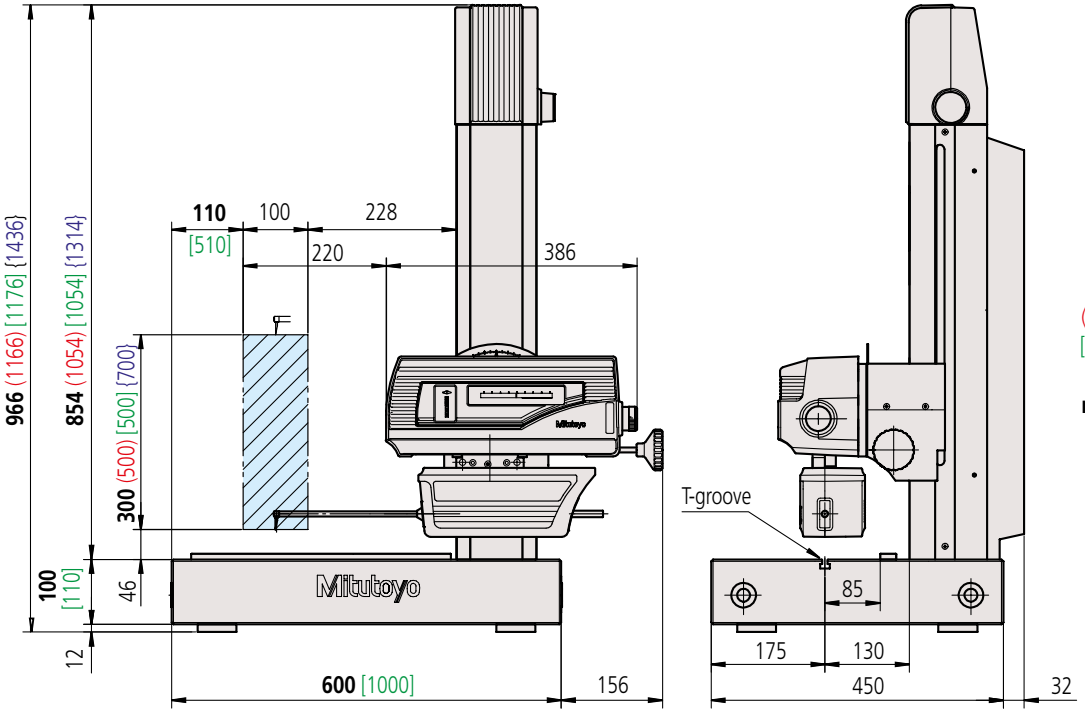
Specifications

Model			CV-3200S4 CV-4500S4	CV-3200H4 CV-4500H4	CV-3200W4 CV-4500W4	CV-3200L4 CV-3200L4	CV-3200S8 CV-4500S8	CV-3200H8 CV-4500H8	CV-3200W8 CV-4500W8	CV-3200L8 CV-4500L8
Measuring range	X-axis		100 mm				200 mm			
	Z1-axis (detector unit)		60 mm (± 30 mm in horizontal situation)							
Z2-axis (column) travel range			300 mm	500 mm		700 mm	300 mm	500 mm		700 mm
Detector (Z1-axis (detector unit))	Scale unit		Arc scale							
	Resolution		**CV-3200series**: 0.04 µm, **CV-4500series**: 0.02 µm							
	Stylus up/down motion		Arc movement							
	Measuring direction		Both pulling and pushing directions							
	Measuring face direction		**CV-3200 series**: Downward or upward **CV-4500 series**: Both upward and downward (direction switch from **FORMTRACEPAK**)							
	Measuring force		**CV-3200** series: 30 mN (by adjusting weight) **CV-4500 series**: 10, 20, 30, 40, 50 mN (Setting measuring force **FORMTRACEPAK**)							
	Stylus traceable range		Ascent 77°, Descent 83° (with one-sided cut stylus: standard accessory)							
Drive unit	Scale unit	X-axis	Separate type linear encoder							
		Z2-axis (column)	ABS encoder							
	Resolution	X-axis	0.05 µm							
		Z2-axis (column)	1 µm							
	Drive speed	X-axis	0 - 80 mm/s and manual operation							
		Z2-axis (column)	0 - 30 mm/s and manual operation							
	Measuring speed	X-axis	0.02 - 5 mm/s							
	Straightness (when the X- axis is horizontal)	X-axis	0.8 µm/ 100 mm				2 µm/ 200 mm			
	X-axis inclination angle	X-axis	± 45°							
Accuracy (20°C)	CV-3200 Series	X-axis	± (0.8 + 0.01 L) µm L = Drive length (mm) Wide range: 1.8 µm/100 mm Narrow range: 1.05 µm/ 25 mm				± (0.8 + 0.02 L) µm L = Drive length (mm) Wide range: 4.8 µm/ 200 mm Narrow range: 1.3 µm/ 25 mm			
		Z1-axis	± (1.4 + 0.02H) µm H = Measurement height from the horizontal position							
	CV-4500 Series	X-axis	± (0.8 + 0.01 L) µm L = Drive length (mm) Wide range: 1.8 µm/ 100 mm Narrow range: 1.05 µm/ 25 mm				± (0.8 + 0.02 L) µm L = Drive length (mm) Wide range: 4.8 µm/ 200 mm Narrow range: 1.3 µm/ 25 mm			
		Z1-axis	± (0.8 + 0.02H) µm H = Measurement height from the horizontal position							
External dimensions (W×D×H)	Main unit		756 × 482 × 966 mm	756 × 482 × 1166 mm	1156 × 482 × 1176 mm	1156 × 482 × 1436 mm	766 × 482 × 966 mm	766 × 482 × 1166 mm	1166 × 482 × 1176 mm	1166 × 482 × 1436 mm
	Controller		221 × 344 × 490 mm							
	Remote box		248 × 102 × 62.2 mm							
Mass	Main unit		140 kg	150 kg	220 kg	270 kg	140 kg	150 kg	220 kg	270 kg
	Controller		14 kg							
	Remote box		0.9 kg							
Operating temperature range			15 - 25°C (within ± 1K temperature fluctuation on calibration and measurement)							
Operating humidity range			20 - 80% RH (with no condensation)							
Storage temperature range			–10 to 50°C							
Storage humidity range			5 - 90% RH (with no condensation)							

Dimensions

CV-3200S4/H4/W4/L4, CV-4500S4/H4/W4/L4

Unit: mm

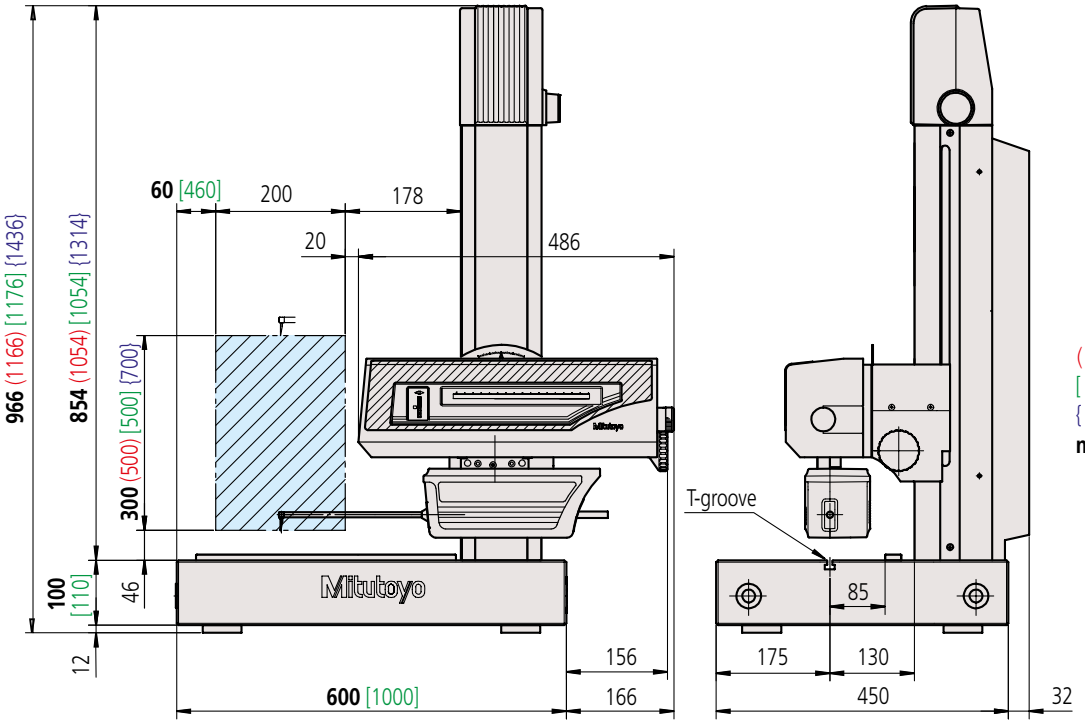


: CV-3200S4, CV-4500S4
( ): CV-3200H4, CV-4500H4
[ ]: CV-3200W4, CV-4500W4
{ }: CV-3200L4, CV-4500L8
mm

Measuring range

The CV-3200 series detector comes with weights for adjusting the measuring force.

CV-3200S8/H8/W8/L8, CV-4500S8/H8/W8/L8



: CV-3200S8, CV-4500S8
( ): CV-3200H8, CV-4500H8
[ ]: CV-3200W8, CV-4500W8
{ } : CV-3200L8, CV-4500W8
mm

Measuring range

The CV-3200 series detector comes with weights for adjusting the measuring force.

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Coordinate Measuring Machines

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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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Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver bespoke measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

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