Mitutoyo

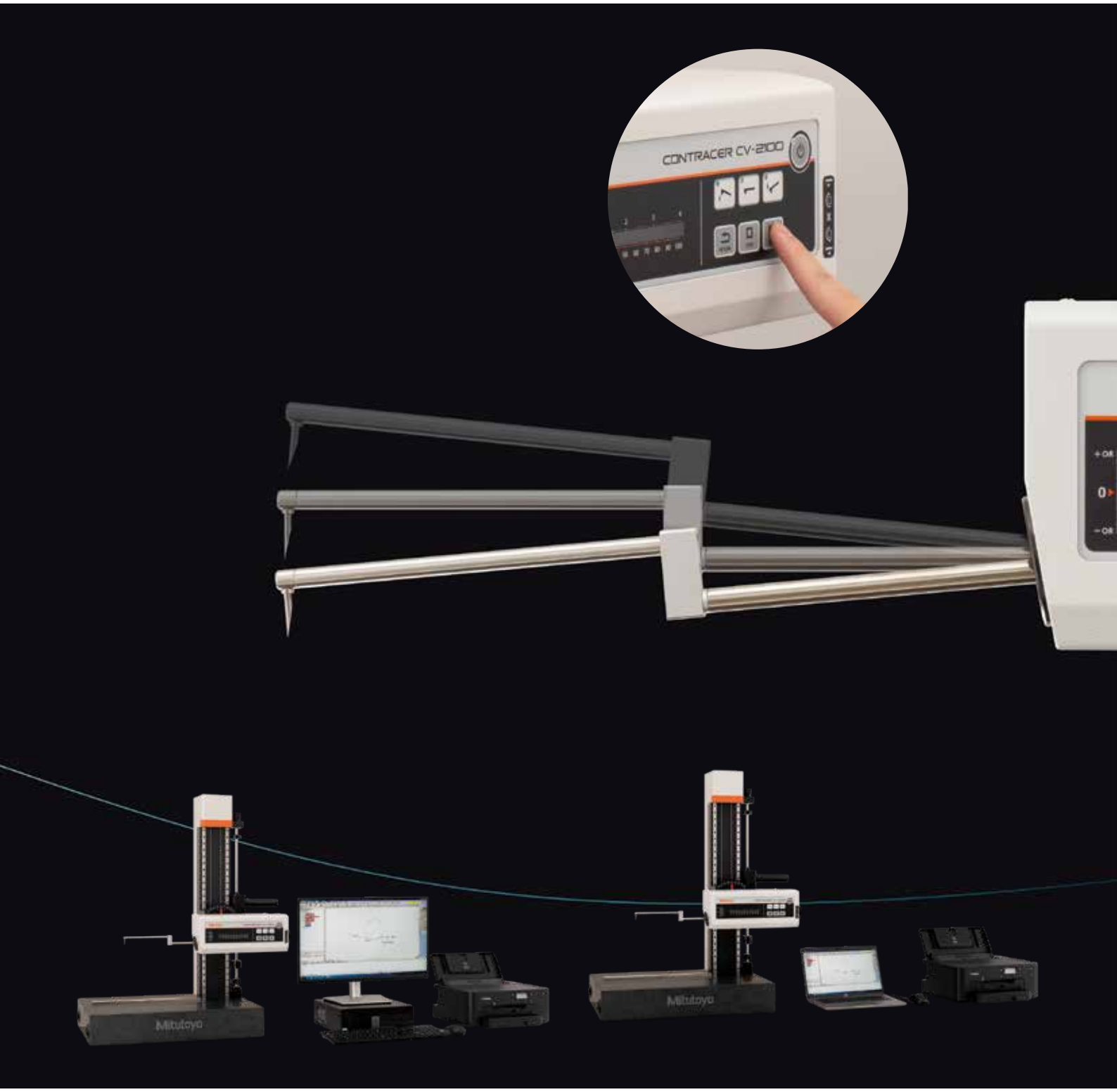
Form Measurement

Contour Measuring System
CONTRACER CV-2100 Series

PRE 1576

Mitutoyo

Redesigned functions for fast, accurate, and surprisingly easy contour measurements.

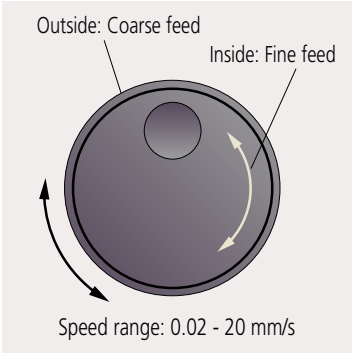



Mitutoyo
CONTRACER CV-2100
RETURN
STOP
START

Enhanced Functions for reduced operator workload and unprecedented speed performance.

Easy operation with X-axis jog shuttle

The standard equipped jog shuttle provides smooth and precise control over a wide speed range. The drive unit can be easily moved to the desired measurement position using the jog shuttle, allowing for convenient and efficient operation.



Streamlined front control panel

By strategically placing the switches for stylus position change, measurement start/stop, and return on the front of the drive unit, the operation flow is significantly shortened. These essential operations, performed in every cycle, are made more accessible, reducing the workload for operators and enhancing measurement efficiency.

Quick-vertical-motion stand for exceptional operability

The quick-vertical-motion stand enables operators to swiftly and effortlessly move the drive unit to and from the measurement height without the need for excessive pushing or pulling. Additionally, the stand is equipped with a convenient stop feature for quick repositioning to the measurement height, ensuring a seamless and highly efficient measurement process.

Fine-feed knob

Upside

Bottom

Highly efficient measurement capabilities

With faster X-axis movement and improved stylus up/down functions, the drive unit can efficiently return to the measurement start position after the auto-displacement of the stylus. This functionality proves particularly advantageous during multi-location (multiple-unit) measurements executed by a part program, streamlining the overall measurement process.

Achieving high accuracy and exceptional operability for versatile measurement needs.

"Pursuing high accuracy is our mission" Introducing a new highly accurate digital scale

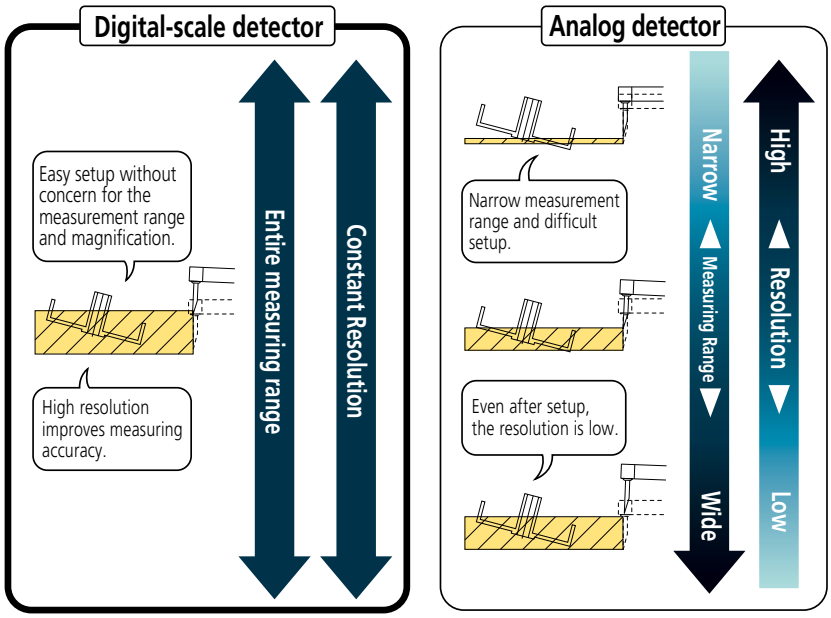
The detector unit (Z1 axis) is equipped with a state-of-the-art digital arc scale, ensuring exceptional accuracy. This scale precisely tracks the arc locus of the stylus tip, allowing for precise compensation and resulting in higher accuracy and resolution in measurements.

Measurement range of detector: 50 mm
Accuracy: ±(2.5+|0.1H|) µm*
Resolution: 0.1 µm (over entire measurement range)
* H = Measurement height from horizontal position within ±25 mm

Easy setup for highly accurate and efficient measurement

The highly accurate digital arc scale not only enhances measurement accuracy but also simplifies the setup process.

Operators are relieved from time-consuming tasks such as switching measurement magnifications and calibrating each magnification, which are required with analog instruments.



X-axis inclination mechanism as standard feature

The CV-2100 series* is equipped with a built-in drive unit inclination mechanism, enabling inclined-plane measurements without the need for additional settings.

* For **CV-2100N4**, a manual column stand **No.218-042** (refer to Page 13) is required (optionally available.)

*For **CV-2100M4**, inclination angle ±45 ° (max)

Range of options available for different applications

CV-2100N4

Manual column stand for **CV-2100N4***2

*1

Desktop PC

Laptop

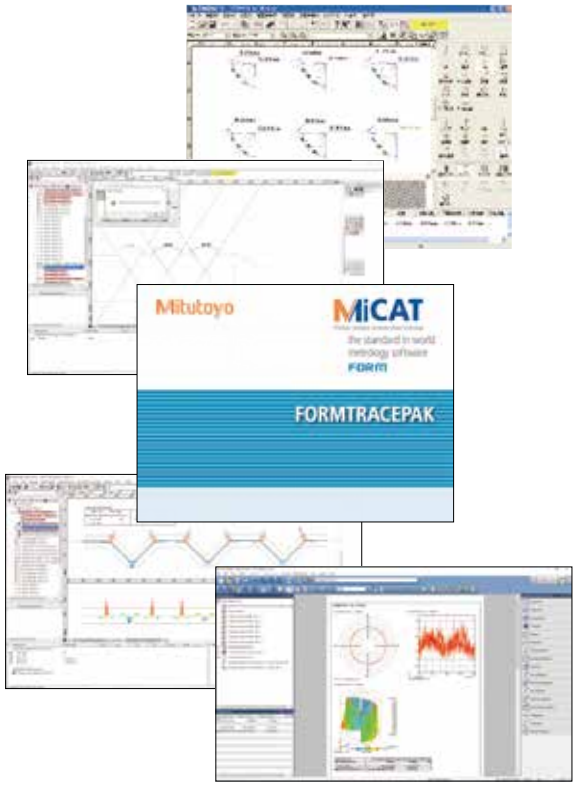
CV-2100M4

*1: If the **CV-2100N4** is operated without the dedicated manual stand, the measuring range of the Z axis might be reduced, depending on the installation conditions. If you are considering using the **CV-2100N4** without the stand, contact your local Mitutoyo sales office for advice.

*2: Optional accessory (refer to Page 13).

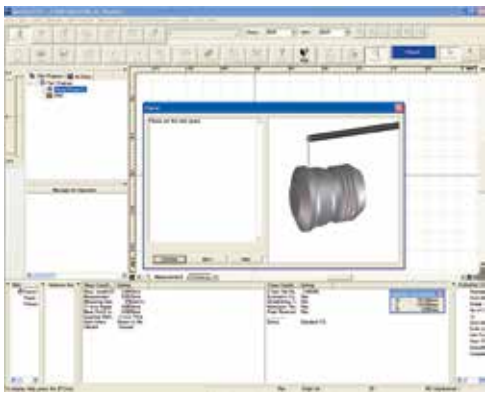
Contour Analysis Software: FORMTRACEPAK

The FORMTRACEPAK software offers comprehensive support for measurement system control, contour analysis, contour tolerancing, and inspection report creation.



Measurement control

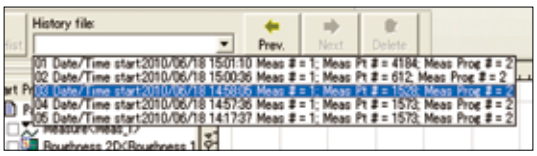
With the software's functions, you have full control over your measurement process. In the single mode, you can create a part program to make a single measurement. For measuring multiple workpieces with identical shapes, you can utilize the teaching mode. By embedding the entire workflow, from measurement to report printing, into a part program, you can efficiently conduct measurements, analyze data, and generate reports. The software also includes a feature that allows you to insert comments with accompanying photographs at desired points, facilitating the incorporation of important instructions from a measurement procedure document.



Multiple language support (18 languages)

FORMTRACEPAK provides support for multiple languages, allowing you to switch the language used in the measurement, analysis, and layout windows. Once the measurements have been taken, you can switch to another language and create a report in that language. This feature ensures worldwide usability and supports the following languages: Japanese, English, German, French, Italian, Spanish, Polish, Hungarian, Swedish, Czech, Simplified Chinese, Traditional Chinese, Korean, Turkish, Portuguese, Dutch, Russian, and Thai.

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



Online help function*

The software incorporates an online help function that can be accessed at any time. It includes index and keyword searches, as well as a helpful feature called the status-saving help button. This button allows you to view menus and Windows help with a simple click, providing immediate assistance and guidance.

* The online help function is available in Japanese and English languages only.

Button-editing function

The software offers a button-editing function, giving you the flexibility to customize the user interface. You can choose to hide buttons that are not frequently used, allowing you to optimize the displayed graphics window. By personalizing the window layout according to your specific needs, you can enhance your workflow and user experience.

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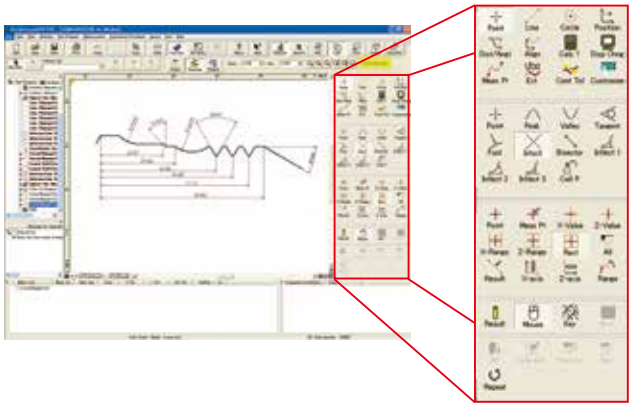
Contour Analysis

Contour analysis function

The contour analysis function provides a wide variety of commands that serve as the foundation for analysis. It includes commands for points (10 kinds), lines (6 kinds), and circles (6 kinds). Standard features include commands to calculate angles, pitches, and distances, as well as contour tolerancing and design value generation. The software also allows customization of calculation command buttons by hiding less frequently used commands, providing a tailored window according to the user's environment.



Circle and line automatic determination function

With the circle/line auto-fitting command, you can automatically calculate all circles and lines within the data without the need to click the command button each time. This streamlines the analysis process and improves efficiency.

Removal of abnormal points function

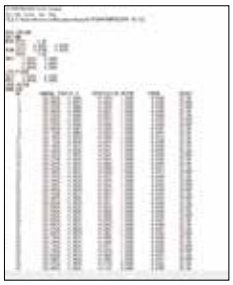
The software includes a function to filter out irregular defects in the data during calculation. This is particularly useful when determining the boundary between a circle and a line is difficult. It ensures accurate analysis by removing unwanted data points.

Text output of the calculation result and graphics data

The software offers the capability to output the calculation result as text in CSV or TXT format. It also allows the output of graphics data obtained from measurements as point-string data in DXF or IGES format, or the option to copy the data to the clipboard. These features facilitate data sharing with computers that may not have dedicated analysis software installed or enable integration with commercial document or statistical processing software.

Contour-tolerancing function as a standard feature

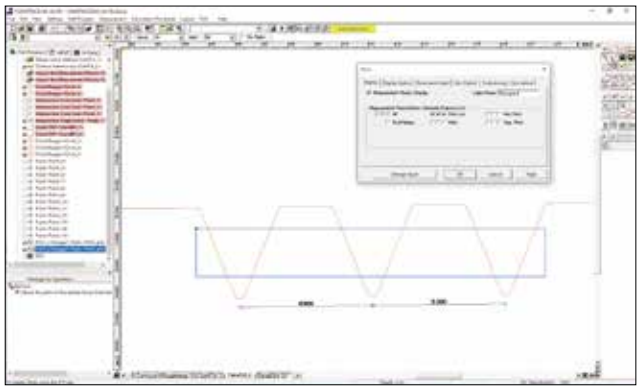
The software includes a contour-tolerancing function as a standard feature. It provides a best-fit processing function that optimizes the coordinate values of design data and measurement data. Measurement results can be displayed graphically, showing deviations of the measured contour from the nominal values with tolerance values expanded in each coordinate for easy comparison. The results can be output as a text file or used as feedback data for machining systems.



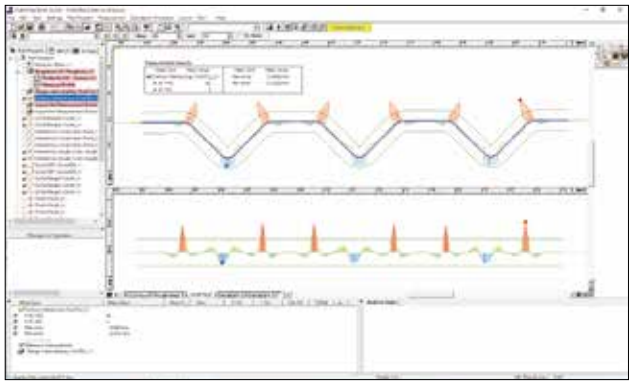
Example of contour-tolerancing result displayed with numeric values.

Simple pitch calculation function

Analyzing the pitch between identical shapes, such as screw pitch or distance between circles (center-to-center pitch), is made efficient by specifying the desired range using mouse operations. This simplifies the process and saves time.



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



Example of contour-tolerancing result displayed graphically.

Contour Analysis Software: FORMTRACEPAK

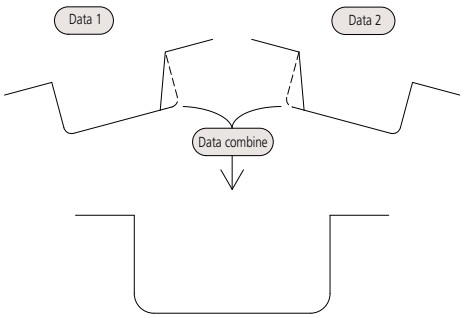
Contour Analysis

Design value generation function

The software allows you to generate design data from CAD data in DXF or IGES file formats or from text data. Additionally, you can convert measurement data into design data, enabling you to save parts data as design data prior to use (testing) and effectively utilize it for wear analysis after use (testing).

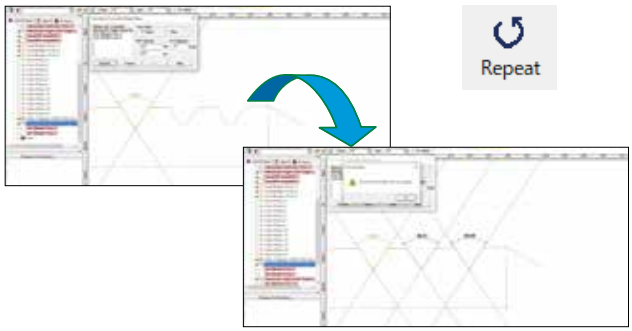
Data combination function

With the data combination function, you can merge partial data collected separately from a workpiece, which may be necessary due to shape characteristics, into a single graphic. This simplifies the analysis process by providing a consolidated view of the data.



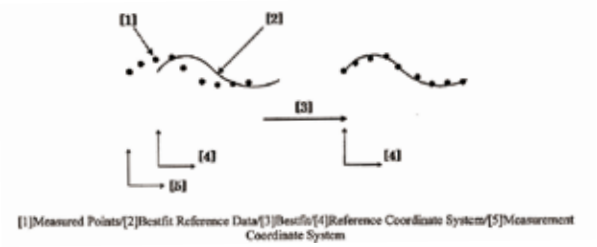
Calculation command repetition setting

When dealing with identical shapes with the same pitch, you can analyze all of the shapes in a batch by specifying a single analysis location and the pitch. This feature saves time and effort by automating the analysis process for multiple shapes with consistent pitch.



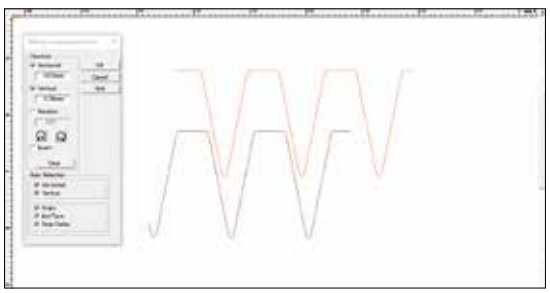
Best-fit processing function for measurement point strings

The best-fit processing function aligns the measurement points with the stored reference data on the same coordinate system. This helps eliminate any shifts that may occur when setting the workpiece during automatic analysis, ensuring accurate alignment and reliable results.



Data superimposition command

The software offers a data superimposition command that allows you to overlay two sets of data by detecting their characteristic points. Using the mouse, you can drag and move the measurement point strings to the desired positions for superimposition. This enables easy comparison and analysis of data for further insights.



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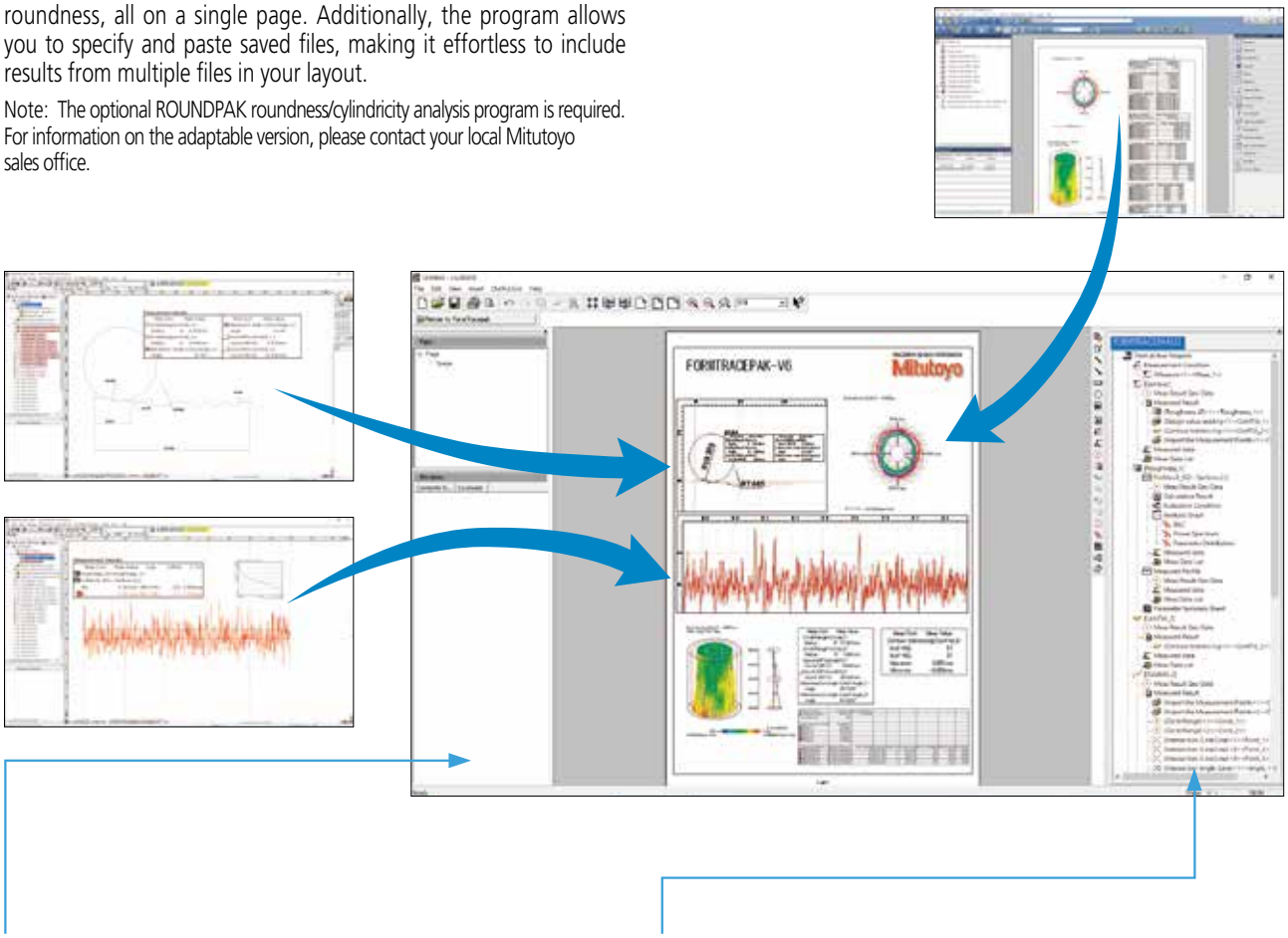
Integrated layout

The software provides a convenient integrated layout feature where you can easily arrange graphics obtained from measurements, as well as measurement results for surface roughness, contour, and roundness, all on a single page. Additionally, the program allows you to specify and paste saved files, making it effortless to include results from multiple files in your layout.

Note: The optional ROUNDPAK roundness/cylindricity analysis program is required. For information on the adaptable version, please contact your local Mitutoyo sales office.



Element information bar

The Element Information Bar displays the attribute values of the pasted items, allowing you to easily review the contents of the measurement data files that have been included in the layout.

Element insertion bar

The Element Insertion Bar allows you to easily insert analysis content into the layout by using the mouse to drag and drop. You can select the desired analysis result from the contour analysis and paste it into the layout. If you want to specifically include the analysis result for a circle or line, you can select it individually and paste it into the desired position. This feature provides flexibility in arranging and presenting analysis data within the layout.

System layout printing

By simply selecting the desired items for output, you can automatically arrange the page layout for printing. This feature streamlines the printing process and simplifies the task of generating printed reports.

Saving the result as a web page

You have the option to save the analysis results in HTML or MHTML format, which can be viewed using Internet Explorer® or Microsoft Word®. This allows you to access and review the results on any computer, even if it doesn't have a layout-editing program installed.

Optional Accessories

Digital 3-axis Adjustment Table 178-182

The digital three-axis adjustment table is a useful accessory for making precise adjustments when measuring cylindrical surfaces. It enables corrections for the pitch angle and swivel angle based on preliminary measurements, allowing for accurate positioning of the Digimatic micrometers. Additionally, this table can be used to level flat-surfaced workpieces. With the guidance provided by FORMTRACEPAK, aligning and leveling the workpiece becomes easy and straightforward, without the need for extensive experience or specialized expertise.

Guidance display when using 3-axis adjustment table

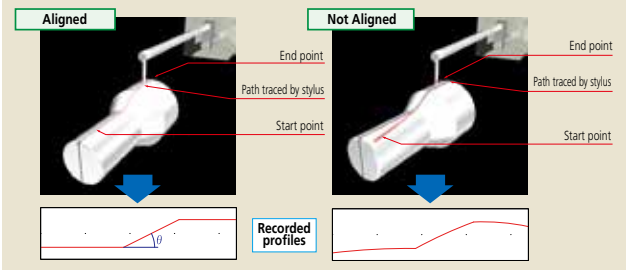
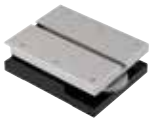


Table and fixture systems

XY travel + leveling table
178-183 (mm),
178-184 (inch)

Digimatic XY travel + leveling table
178-185 (mm)
178-186 (inch)



Leveling Table
178-195

Calibration stand[*1]
12AAG175

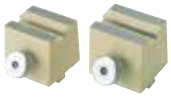
V-block
998291

Precision vise
178-019

Cross-travel table
218-001 (mm), **218-172** (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

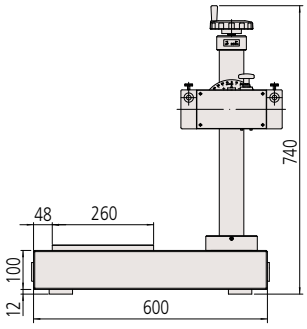
*1 This accessory is required for bulk calibration when using the straight arm or small-hole stylus arm without utilizing the cross-travel table and Y-axis table.

Optional Accessories

Manual column stand for CV-2100N4

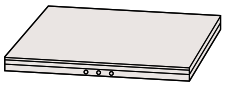
218-042
Vertical adjustment range: 320 mm
Inclination angle (MAX): ±45°
Dimensions (W×D×H) : 600×450×740 mm
Mass: 110 kg

Dimensions (Unit: mm)

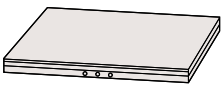


* The quick-vertical-motion function is not available with this column stand 218-042.

Vibration isolators (Desktop types), floor stand and tables



178-023-1
Vibration isolator
Manually charged pneumatic type



178-025
Vibration isolator
Automatically charged pneumatic type

Vibration isolators (Desk types)

Desk types

Example combination*2: with monitor arm but no side table

Example combination*2: with a side table but no monitor arm

*1 Used together with vibration isolator (**178-188**).
*2 Please note that the vibration isolators mentioned above do not include the measuring unit, controller, and analysis unit.

Arms and Stylus

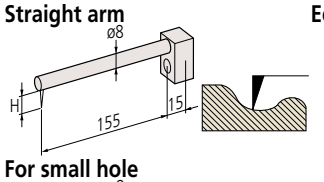
Arms (option)

Type of arm	Arm No.	Parts No.	Adaptation stylus No.	h (mm)
Straight arm	**AB-51**	**935111**	**SPH-51,52,53,54,55,56,57**	6
	AB-61	**935112**	**SPH-61,62,63,64,65,66,67**	12
	AB-71*	**935113**	**SPH-71,72,73,74,75,76,77,79**	20
	AB-81	**935114**	**SPH-81,82,83,84,85,86,87**	30
	AB-91	**935115**	**SPH-91,92,93,94,95,96,97**	42
Eccentric arm	**AB-52**	**935116**	**SPH-51,52,53,54,55,56,57**	6
	AB-62	**935117**	**SPH-61,62,63,64,65,66,67**	12
	AB-72	**935118**	**SPH-71,72,73,74,75,76,77,79**	20
	AB-82	**935119**	**SPH-81,82,83,84,85,86,87**	30
	AB-92	**935120**	**SPH-91,92,93,94,95,96,97**	42
Small-hole arm	**AB-11**	**935110**	**SP-11,31**	0.4
			SP-12,32	1
			SP-13,33	2.5

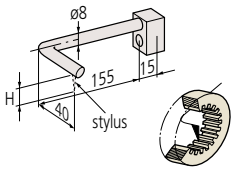
*Standard accessory

* Choose an arm and stylus that are suitable for your specific measurement needs.

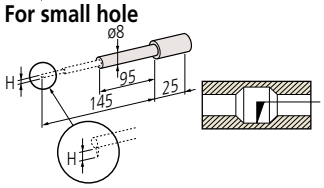
Straight arm



Eccentric arm



For small hole

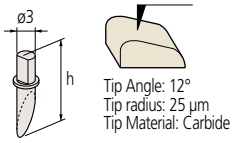


Styli (option)

Type of stylus	Stylus No.	Parts No.	Adaptation arm No.	h (mm)
One-sided cut stylus	**SPH-51**	**354882**	**AB-51·52**	6
	SPH-61	**354883**	**AB-61·62**	12
	SPH-71*	**354884**	**AB-71·72**	20
	SPH-81	**345885**	**AB-81·82**	30
	SPH-91	**354886**	**AB-91·92**	42
Intersecting cut stylus	**SPH-52**	**354887**	**AB-51·52**	6
	SPH-62	**354888**	**AB-61·62**	12
	SPH-72	**354889**	**AB-71·72**	20
	SPH-82	**354890**	**AB-81·82**	30
	SPH-92	**354891**	**AB-91·92**	42
Cone stylus Tip angle 20° (Carbide)	**SPH-57**	**12AAE865**	**AB-51·52**	6
	SPH-67	**12AAE866**	**AB-61·62**	12
	SPH-77	**12AAE867**	**AB-71·72**	20
	SPH-87	**12AAE868**	**AB-81·82**	30
	SPH-97	**12AAE869**	**AB-91·92**	42
Cone stylus Tip angle 30° (Sapphire)	**SPH-53**	**354892**	**AB-51·52**	6
	SPH-63	**354893**	**AB-61·62**	12
	SPH-73	**354894**	**AB-71·72**	20
	SPH-83	**354895**	**AB-81·82**	30
	SPH-93	**354896**	**AB-91·92**	42
Cone stylus Tip angle 50° (diamond)	**SPH-79**	**355129**	**AB-71·72**	20
Cone stylus Tip angle 30° (Carbide)	**SPH-56**	**12AAA566**	**AB-51·52**	6
	SPH-66	**12AAA567**	**AB-61·62**	12
	SPH-76	**12AAA568**	**AB-71·72**	20
	SPH-86	**12AAA569**	**AB-81·82**	30
	SPH-96	**12AAA570**	**AB-91·92**	42
Knife-edge stylus	**SPH-54**	**354897**	**AB-51·52**	6
	SPH-64	**354898**	**AB-61·62**	12
	SPH-74	**354899**	**AB-71·72**	20
	SPH-84	**354900**	**AB-81·82**	30
	SPH-94	**354901**	**AB-91·92**	42
Ball stylus	**SPH-55**	**354902**	**AB-51·52**	6
	SPH-65	**354903**	**AB-61·62**	12
	SPH-75	**354904**	**AB-71·72**	20
	SPH-85	**354905**	**AB-81·82**	30
	SPH-95	**354906**	**AB-91·92**	42
Small-hole stylus (One-sided cut)	**SP-11**	**932693**	**AB-11**	0.4
	SP-12	**932694**	**AB-11**	1
	SP-13	**932695**	**AB-11**	2.5
Small-hole stylus (Cone)	**SP-31**	**12AAE873**	**AB-11**	0.4
	SP-32	**12AAE874**	**AB-11**	1
	SP-33	**12AAE875**	**AB-11**	2.5

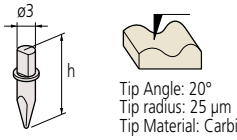
*Standard accessory

One-sided cut stylus



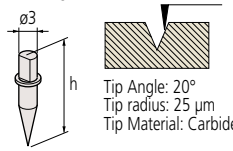
Tip Angle: 12°
Tip radius: 25 µm
Tip Material: Carbide

Intersecting cut stylus



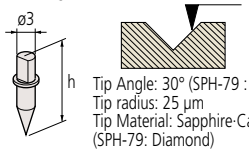
Tip Angle: 20°
Tip radius: 25 µm
Tip Material: Carbide

Cone stylus



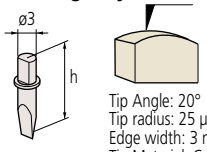
Tip Angle: 20°
Tip radius: 25 µm
Tip Material: Carbide

Cone stylus



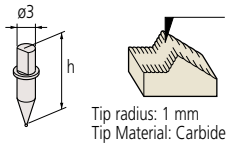
Tip Angle: 30° (SPH-79 : 50°)
Tip radius: 25 µm
Tip Material: Sapphire·Carbide
(SPH-79: Diamond)

Knife-edge stylus



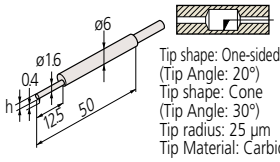
Tip Angle: 20°
Tip radius: 25 µm
Edge width: 3 mm
Tip Material: Carbide

Ball stylus



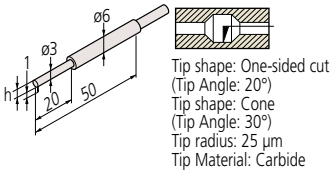
Tip radius: 1 mm
Tip Material: Carbide

For small-hole stylus SP-11/31



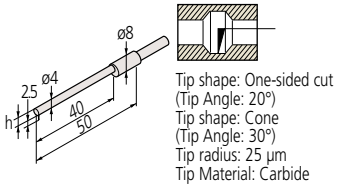
Tip shape: One-sided cut
(Tip Angle: 20°)
Tip shape: Cone
(Tip Angle: 30°)
Tip radius: 25 µm
Tip Material: Carbide

For small-hole stylus SP-12/32



Tip shape: One-sided cut
(Tip Angle: 20°)
Tip shape: Cone
(Tip Angle: 30°)
Tip radius: 25 µm
Tip Material: Carbide

For small-hole stylus SP-13/33



Tip shape: One-sided cut
(Tip Angle: 20°)
Tip shape: Cone
(Tip Angle: 30°)
Tip radius: 25 µm
Tip Material: Carbide

Specifications

Specifications

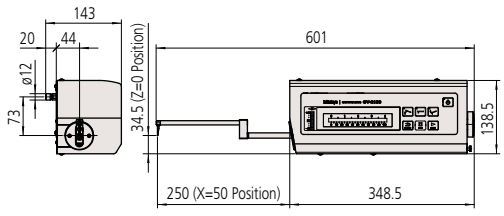
		CV-2100M4	CV-2100N4
Measurement range	X-axis	100 mm	
	Z1-axis (detector unit)	50 mm	
Z2-axis (column) travel range		350 mm	—
X-axis inclination angle		±45°	
Resolution	X-axis	0.1 µm	
	Z1-axis	0.1 µm	
Drive method	X-axis	Motorized drive (0 - 20 mm/s)	
	Z1-axis (column)	Manual (quick-up-and-down motion, fine feed)	—
Measuring speed		0.02, 0.05, 0.1, 0.2, 0.5, 1.0, 2.0, 5.0 mm/s	
Linearity accuracy (X-axis horizontal orientation)		2.5 µm/100 mm	
Accuracy (20 °C)	X-axis	±(2.5+0.02L) µm L = Measurement Length (mm)	
	Z1-axis	±(2.5+|0.1 H|) µm H = Measurementt height from horizontal position within ±25 mm	
Measurement direction		Push and pull	
Measurement surface direction		Downward	
Measuring force		30±10 mN (3 gf)	
Stylus traceable angle (Standard accessory stylus)		Ascent 77°, Descent 87° (Depends on the surface condition)	
External dimensions (W×D×H)		745×450×885 mm	651×143×138.5 mm
Mass		145.8 kg	5.8 kg

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.

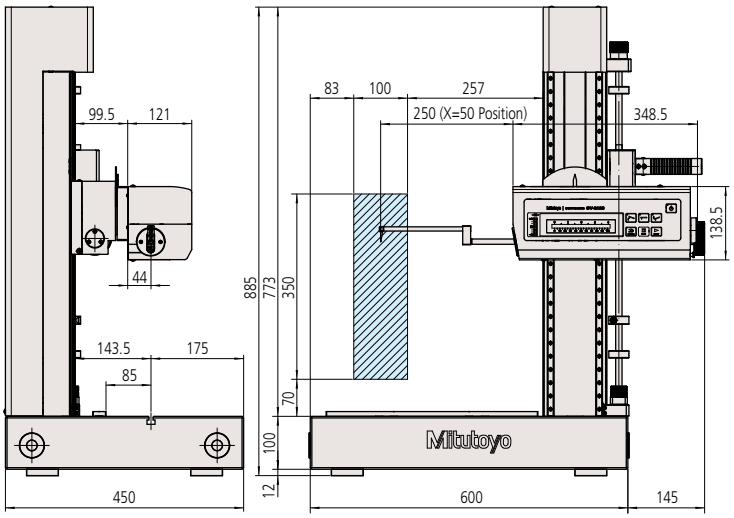
Dimensions

Unit: mm

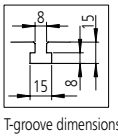
CV-2100N4



CV-2100M4



Measuring area



T-groove dimensions (**CV-2100M4**)

Coordinate Measuring Machines

Vision Measuring Systems

Form Measurement

Optical Measuring

Sensor Systems

Test Equipment

Digital Scale and DRO Systems

Small Tool Instruments and Data Management

Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

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