

Compact Roundness Measurement ROUNDTTEST RA-120/120P



Roundtest RA-120

This compact roundness measuring machine offers various user-friendly features prioritizing usability. It includes an extended detector range, an intuitive operation panel with a large LCD, and a powerful D.A.T. (Digital Adjustment Table) function for centering and leveling adjustments.

- Outstanding rotational accuracy for a compact roundness measuring instrument
- Fine adjustment on both X- and Z-axes
- Multiple analysis capabilities with easy operation
- D.A.T. function*1 for enhanced adjustment precision
- Scaled Z-axis*1 for accurate positioning
- Continuous measurement of ID and OD*1
- High-precision air bearing for reliable performance
- Wide-range detector² for versatile measurement applications
- Convenient registration and retrieval of measurement results and conditions
- Built-in printer for quick and easy printing
- Supports 16 languages for global usability



*1: Refer to P.6

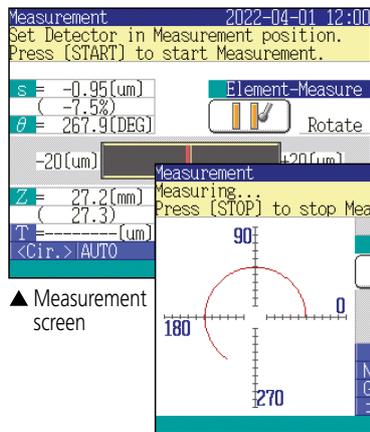
*2: Refer to P.7

Interactive and user-friendly display screen

The large LCD screen with backlight provides a clear and easy-to-understand presentation of measurement results and graphs. Users can easily check forms and set notch processing while observing the displayed graphs.

Measurement screen

- Adjust the detector position and measurement conditions here.
- Real-time display of measurement graphs.

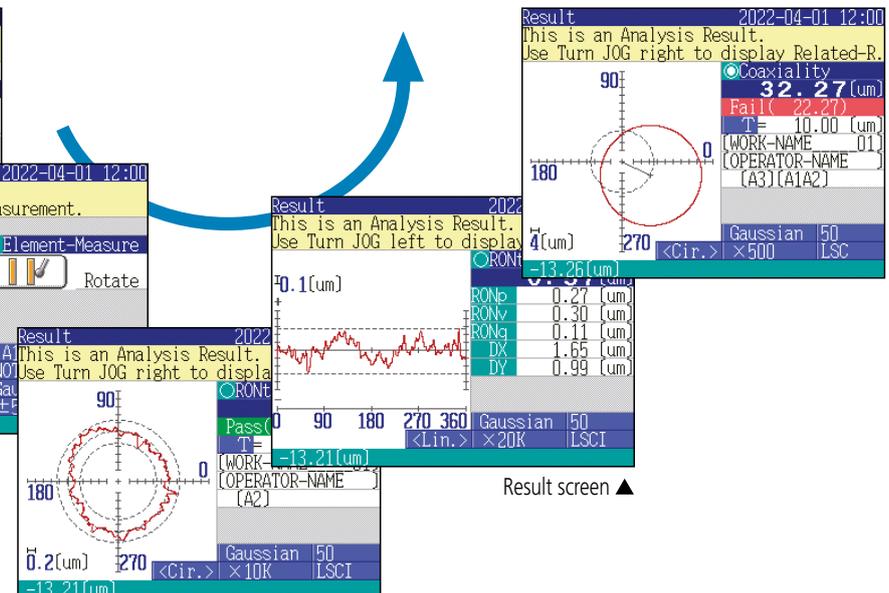


▲ Measurement screen

▲ Measurement in progress screen

Measurement results

- Modify filters, display magnification, and more.
- View development views in addition to circles.



▲ Result screen

Operating panel that is read at a glance

Supports 16 languages

Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Traditional Chinese, Simplified Chinese, Czech, Polish, Hungarian, Turkish, Swedish, Dutch.

Analysis type

Easily access a wide variety of analysis types using the selection buttons.

Screen mode switching:

Switch the display at the touch of a button, providing access to the Calibration, Centering and Leveling, Measurement, and Result screens.

Zero-setting button

Set the measurement position accurately without the need for fine adjustments.



Simple setup

Easily apply the current measurement setup with a single action reducing the risk of operational errors.

Jog dial

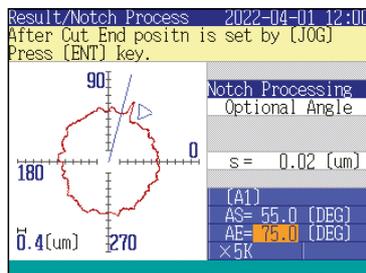
Effortlessly make precise adjustments to the setup and perform other operations with the convenient jog dial.

Simplified communication program for ROUNDTEST RA-120

The Roundtest RA-120 has a USB interface, enabling data to be transferred to a spreadsheet or other software.

Notch processing

Exclude unwanted data, such as those caused by notches or scratches, from the analysis as needed. Choose between [Automatic Setting] and [Arbitrary Setting] to customize the exclusion criteria.



File save

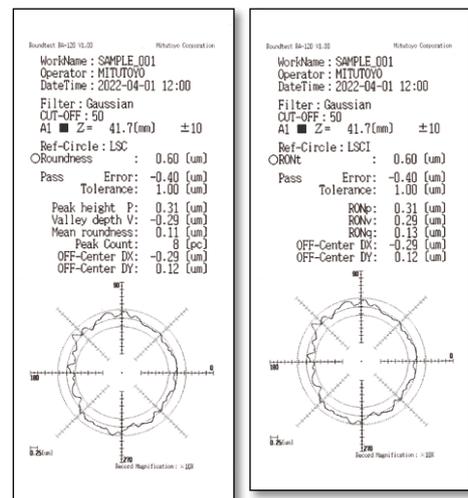
Effortlessly save and retrieve your measurement files and result files using a USB memory device. This feature allows you to conveniently store and transfer your data for further analysis or documentation. Additionally, the data output function enables you to compile and analyze your data using compatible tabulation software.

[Measurement file] [Measurement data (Data output)]
[Result file] [Result data (Data output)]

High-grade thermal printer

Easily print measurement conditions, computation results, result graphs, comments, and more with the thermal printer. Customize the output by changing development graphs and selecting specific items to be printed.

Sample prints



Recording paper set (optional set of 10 rolls)

Roundtest RA-120P

This entry-level desktop tester equipped with the ROUNDPAK multi-analysis evaluation program empowers the RA-120P with comprehensive analytical capabilities similar to more advanced models. With its high functionality, this multi-analysis roundness measuring machine is suitable for various applications, including measurement rooms and research and development sections.

- Outstanding rotational accuracy in Compact Type Roundness Measuring Instruments
- Fine adjustment capability on both X- and Z-axes
- Multiple analysis options with simple operation
- Powerful D.A.T. function*1 for centering and leveling adjustments
- Scaled Z-axis*1 for precise positioning
- Continuous ID and OD measurement*1 for comprehensive analysis
- Display function for various graphs to visualize data
- High-precision air bearing for stability and accuracy
- Wide-range detector*2 for versatile measurements
- Supports 18 languages for global usability

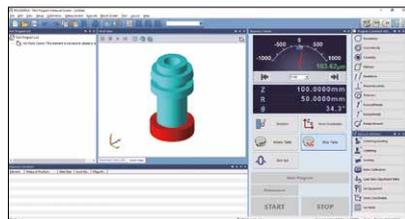


*1: Refer to P.6

*2: Refer to P.7

Windows graphical interface

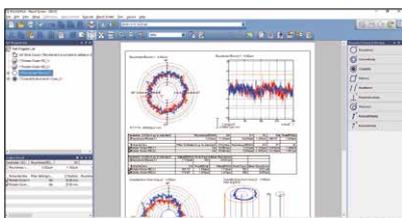
With its Windows graphical interface, the Roundtest RA-120P offers excellent usability. The machine can be controlled using a mouse and buttons with corresponding icons, making it intuitive to navigate. Recalculation and graph reading functions are performed swiftly with simple and clear operations.



▲ Main screen



▲ Measurement setup screen



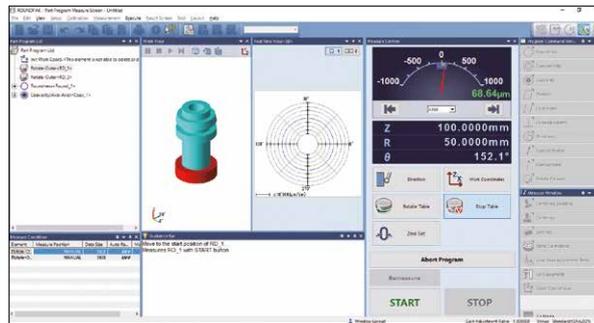
▲ Result screen



▲ Measurement in progress screen

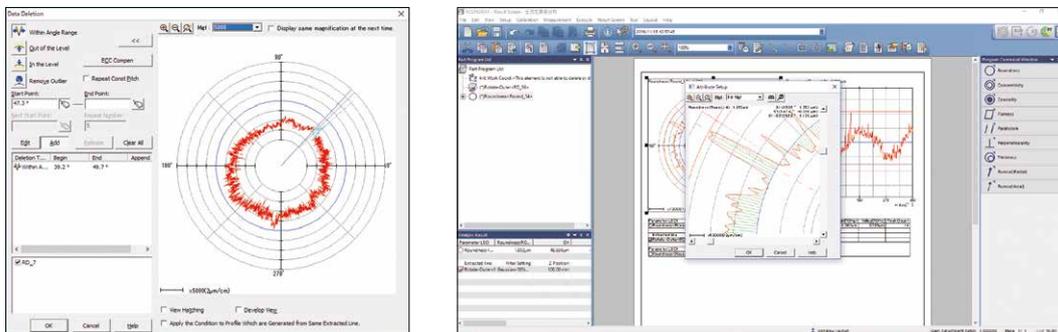
The Roundtest RA-120P is an entry-level desktop tester that features the ROUNDPAK multi-analysis evaluation program, giving it analytical capabilities comparable to more advanced models. This makes it a highly functional roundness measuring machine suitable for use not only in measurement rooms but also in research and development sections.

Graphical-rich measurement screen



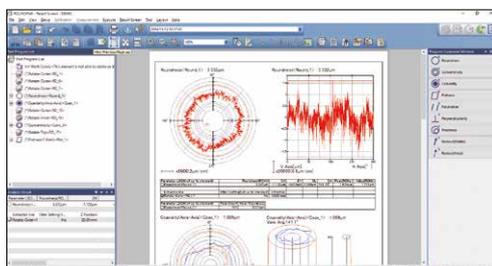
Multi-analysis functionality

The Roundtest RA-120P boasts a comprehensive set of features, including partial enlargement, auxiliary line setup, color change, displacement/angular difference of data between two points, and more. With notch processing and graph reading capabilities, this machine proves valuable in research departments. Additionally, recalculation can be easily performed with the ability to adjust the filter and evaluation method as needed.

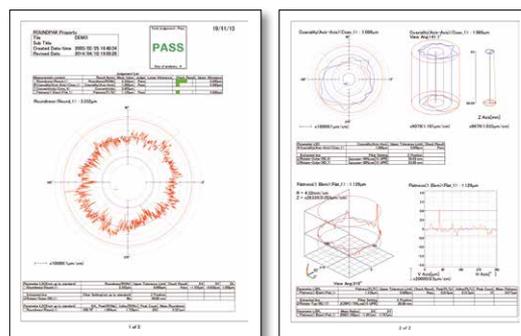


Effortless layout function

With the simplified layout function, you can conveniently arrange computation results for multiple items in various formats on a single sheet, ready for printing.



■ Layout setting screen



■ Sample print outputs

Functions Enhancing Measurement Efficiency and Analysis Range

D.A.T. Function (*Excluding Centering/Leveling Device with Analog Micrometer Heads)

The D.A.T. (Digital Adjustment Table) function, available on more sophisticated models, offers exceptional support for centering and leveling operations. With this function, users can easily adjust the digital micrometer heads on the rotary table based on the precise measurements displayed. This feature simplifies the process and ensures accurate centering and leveling. Additionally, the D.A.T. function is capable of measuring notched workpieces, further enhancing its versatility.



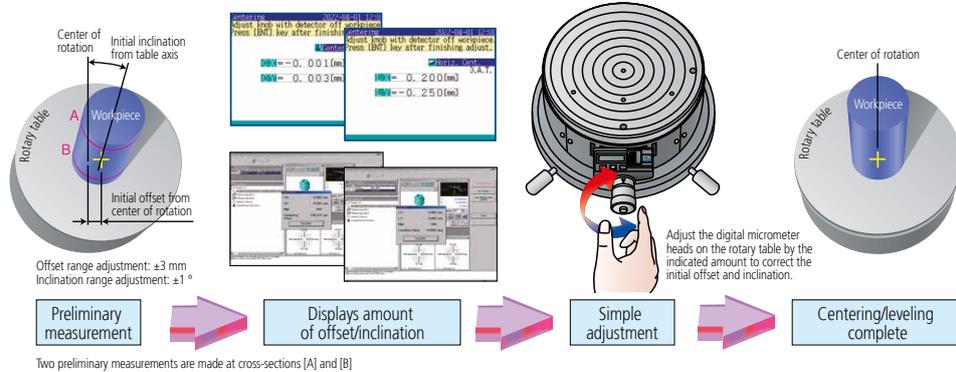
Mode selection

Preliminary setup

Centering

Leveling

RA-120P



Continuous ID and OD measuring function

This function is highly practical for repetitive measurements of outer and inner surfaces. It is particularly useful in evaluating parameters such as concentricity and wall thickness deviations. With this function, the inner surface can be measured and analyzed using the detector while maintaining a consistent measuring position for the outer diameter, eliminating the need for reorientation. This feature ensures efficient and precise measurements, even for small inside diameters as small as 50 mm.



Continuous inside and outside diameter function (inner diameter surface)

Continuous inside and outside diameter function (outer diameter surface)

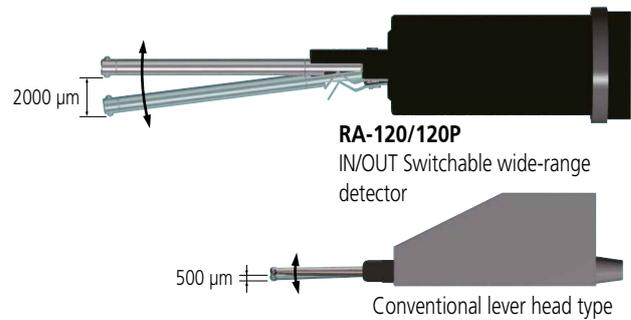
Z-axis scale

The Z-axis scale proves to be valuable when precise measuring height positions need to be input, particularly in scenarios such as measuring concentricity. The machine incorporates an ABS Digimatic scale unit, offering an efficient solution for repetitive measurements and position setting. With the Z-axis scale, users can easily and accurately establish the desired measuring height, enhancing the overall measurement process.



IN/OUT switchable wide-range detector

The range of this detector has been significantly expanded, offering up to four times the range of a conventional lever head. With this enhancement, the detector now provides a wider measurement range than ever before. It offers ample flexibility for centering and leveling tasks, as well as for measuring substantial variations in size. Furthermore, the measuring direction can be effortlessly switched between inside and outside diameters with a simple button press, ensuring convenience and efficiency during the measurement process.



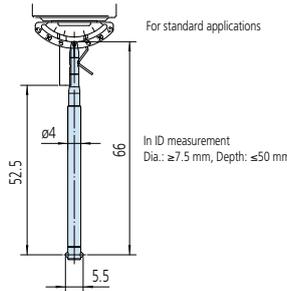
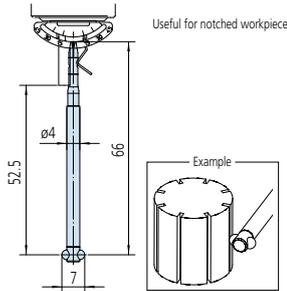
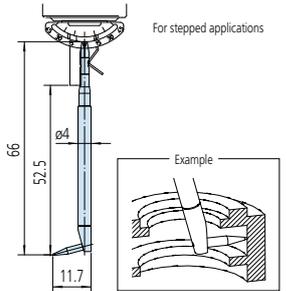
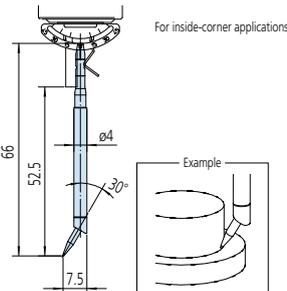
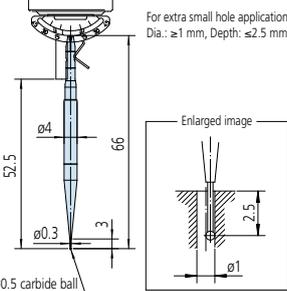
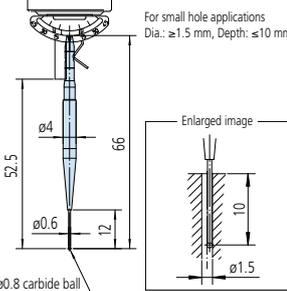
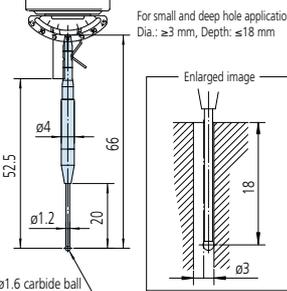
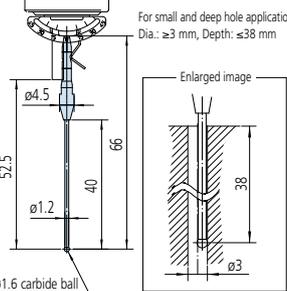
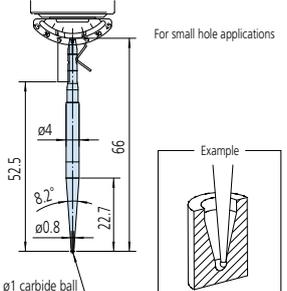
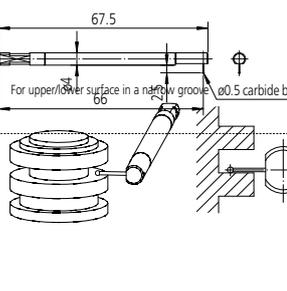
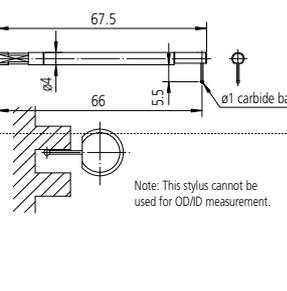
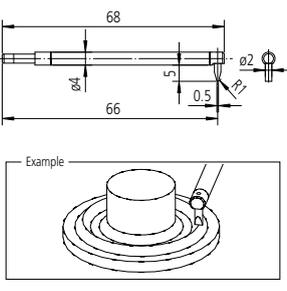
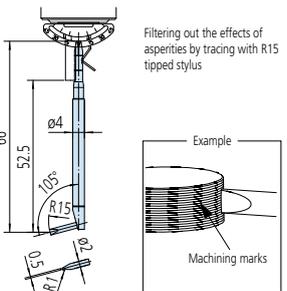
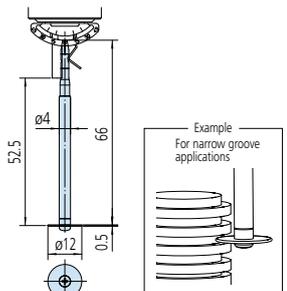
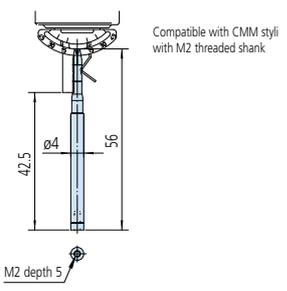
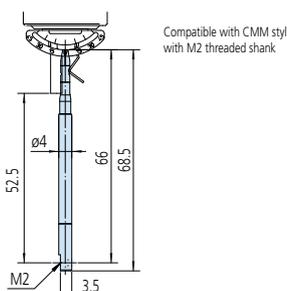
Types of analysis

| Type of analysis | Measurement mode | Evaluation diagram | RA-120 | RA-120P | Type of analysis | Measurement mode | Evaluation diagram | RA-120 | RA-120P | |
|------------------|-------------------|--------------------|--------|---------|---------------------|------------------|--------------------|--------|---------|---|
| Roundness | | | ✓ | ✓ | Parallelism | | | ✓ | ✓ | |
| Flatness | | | ✓ | ✓ | Thickness variation | Radial | | | ✓ | ✓ |
| Perpendicularity | Relative to axis | | ✓ | ✓ | | Axial | | | ✓ | ✓ |
| | Relative to plane | | ✓ | ✓ | Circular run-out | Radial | | | ✓ | ✓ |
| Concentricity | | | ✓ | ✓ | | Axial | | | ✓ | ✓ |
| Coaxiality | of section | | ✓ | ✓ | Power spectrum | | | — | ✓ | |
| | of axis | | — | ✓ | Profile operation | | | — | ✓ | |

Optional Accessories

Interchangeable Styli*

Unit: mm

| | | | |
|---|--|--|---|
| <p>12AAL021 Standard accessory Standard stylus (stylus tip: $\phi 1.6$ carbide ball)</p> | <p>12AAL022 Stylus for notched workpieces (stylus tip: $\phi 3$ carbide ball)</p> | <p>12AAL023 Stylus for grooves (stylus tip: R0.25 sapphire)</p> | <p>12AAL024 Stylus for corners (stylus tip: R0.25 sapphire)</p> |
| <p>For standard applications</p>  <p>In ID measurement Dia.: ≥ 7.5 mm, Depth: ≤ 50 mm</p> | <p>Useful for notched workpieces</p>  <p>Example</p> | <p>For stepped applications</p>  <p>Example</p> | <p>For inside-corner applications</p>  <p>Example</p> |
| <p>12AAL029 Stylus for extra small holes (stylus tip: $\phi 0.5$ carbide ball)</p> | <p>12AAL026 Stylus for small holes (stylus tip: $\phi 0.8$ carbide ball)</p> | <p>12AAL030 Stylus for small and deep holes (stylus tip: $\phi 1.6$ carbide ball)</p> | <p>12AAL028 Stylus for small and deep holes (stylus tip: $\phi 1.6$ carbide ball, L=40)</p> |
| <p>For extra small hole applications Dia.: ≥ 1 mm, Depth: ≤ 2.5 mm</p>  <p>$\phi 0.5$ carbide ball</p> <p>Enlarged image</p> | <p>For small hole applications Dia.: ≥ 1.5 mm, Depth: ≤ 10 mm</p>  <p>$\phi 0.8$ carbide ball</p> <p>Enlarged image</p> | <p>For small and deep hole applications Dia.: ≥ 3 mm, Depth: ≤ 18 mm</p>  <p>$\phi 1.6$ carbide ball</p> <p>Enlarged image</p> | <p>For small and deep hole applications Dia.: ≥ 3 mm, Depth: ≤ 38 mm</p>  <p>$\phi 1.6$ carbide ball</p> <p>Enlarged image</p> |
| <p>12AAL027 Stylus for small holes (stylus tip: $\phi 1$ carbide ball)</p> | <p>12AAL032 Cranked stylus (stylus tip: $\phi 0.5$ carbide ball)</p> | <p>12AAL033 Cranked stylus (stylus tip: $\phi 1$ carbide ball)</p> | <p>12AAL034 Stylus for flat surface</p> |
| <p>For small hole applications</p>  <p>$\phi 1$ carbide ball</p> <p>Example</p> | <p>For upper/lower surface in a narrow groove</p>  <p>$\phi 0.5$ carbide ball</p> | <p>For upper/lower surface in a narrow groove</p>  <p>$\phi 1$ carbide ball</p> <p>Note: This stylus cannot be used for OD/ID measurement.</p> |  <p>Example</p> |
| <p>12AAL025 Cutter mark stylus - R15 mm</p> | <p>12AAL031 Disc stylus D12 mm</p> | <p>12AAL043 Stylus shank for mounting M2-CMM</p> | <p>12AAL044 Groove stylus shank for mounting M2-CMM</p> |
| <p>Filtering out the effects of asperities by tracing with R15 tipped stylus</p>  <p>Example</p> <p>Machining marks</p> | <p>Example For narrow groove applications</p>  | <p>Compatible with CMM styli with M2 threaded shank</p>  <p>M2 depth 5</p> | <p>Compatible with CMM styli with M2 threaded shank</p>  <p>M2</p> |

* Customized special interchangeable styli are available upon request. For more information, please contact your local Mitutoyo office.

Quick chuck (knurled ring operated)

Provides excellent operability when measuring a small-diameter workpiece. The knurled ring allows for easy clamping of the workpiece.



| | |
|-----------------------|--|
| Order No. | 211-032 |
| Holding range | OD with inner jaw: $\phi 1 - 36$ mm ID with inner jaw $\phi 16 - 69$ mm OD with outer jaw: $\phi 25 - 79$ mm |
| External size (D x H) | $\phi 118 \times 41$ mm |
| Mass | 1.2 kg |

Collet chuck holder

Ensures high clamping repeatability by utilizing optional precision collets. Please refer to the table on the right for available options.



| | |
|--------------------|----------------------------|
| Order No. | 211-061 |
| Part holding range | OD $\phi 0.5 - 10$ mm*2 |
| Centering error | Within $50 \mu\text{m}$ *3 |
| Mass | 1.4 kg |

*2: Collets to match the workpiece size range are required for use with this chuck.

*3: When measured with $\phi 5$ mm pin gauge at measuring height of 30 mm.

X-axis stop

Enables rapid and easy return of the detector to a fixed position along the X-axis.



| | |
|------------------|-----------------|
| Order No. | 12AAH320 |
| Mass | 65 g |

Three-jaw chuck (key operated)

Useful in situations where a higher clamping force needs to be applied to the workpiece, surpassing what can be achieved with the centering chuck.



| | |
|-----------------------|---|
| Order No. | 211-014 |
| Holding range | OD with outer jaw: $\phi 2 - 35$ mm ID with inner jaw: $\phi 25 - 68$ mm OD with outer jaw: $\phi 35 - 78$ mm |
| External size (D x H) | $\phi 157 \times 70.6$ mm |
| Mass | 3.8 kg |

Individual collets*4

These collets are designed to be used with the collet chuck depicted on the left. They are obtained according to the required workpiece diameter range.

| Order No. | Part Holding Range |
|-----------------|----------------------|
| 12AAH402 | $\phi 0.5 - 1.0$ mm |
| 12AAH403 | $\phi 1.0 - 1.5$ mm |
| 12AAH404 | $\phi 1.5 - 2.0$ mm |
| 12AAH405 | $\phi 2.0 - 2.5$ mm |
| 12AAH406 | $\phi 2.5 - 3.0$ mm |
| 12AAH407 | $\phi 3.0 - 3.5$ mm |
| 12AAH408 | $\phi 3.5 - 4.0$ mm |
| 12AAH409 | $\phi 4.0 - 5.0$ mm |
| 12AAH410 | $\phi 5.0 - 6.0$ mm |
| 12AAH411 | $\phi 6.0 - 7.0$ mm |
| 12AAH412 | $\phi 7.0 - 8.0$ mm |
| 12AAH413 | $\phi 8.0 - 9.0$ mm |
| 12AAH414 | $\phi 9.0 - 10.0$ mm |

*4: A collet cannot be mounted on the rotary table without a collet chuck.
*4: YCC10-** Class AA, made by Yukiwa Seiko Inc. or its equivalent.

Vibration-damping stand



| | |
|--------------------------|---------------------------|
| Order No. | 211-013 |
| Vibration damping system | Diaphragm type air spring |
| External size | 615 x 515 x 51 mm |
| Max. loading mass | 150 kg |

Micro chuck

Designed for clamping small workpieces with a diameter of 1 mm or less that cannot be held in the centering chuck.



| | |
|-----------------------|------------------------------|
| Order No. | 211-031 |
| Holding range | OD: $\phi 0.2 - \phi 1.5$ mm |
| External size (D x H) | $\phi 107 \times 48.5$ mm |
| Mass | 0.6 kg |

Auxiliary stage for low height workpiece

356038



Reference hemisphere

211-016



Magnification checking gauge

211-045



Gauge block set for calibration

997090



Printer paper set (10 rolls)

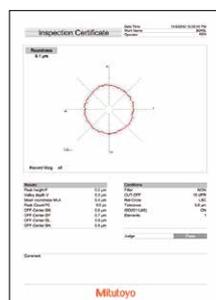
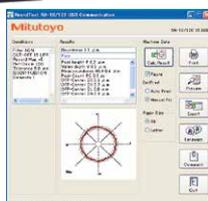
12AAH181

Replacement elements for the air filter

358592 (for filter)
358593 (filter regulator)

USB Communication Program for ROUNDTTEST RA-120

The Roundtest RA-120 is equipped with a USB interface, allowing for seamless data transfer to a spreadsheet or other compatible software. To further enhance usability, we offer a dedicated program that enables the creation of inspection record tables using a Microsoft® Excel® macro.



Required environment:

- OS: Windows® XP-SP3 Spreadsheet software: Microsoft® Excel® 2010
Windows® VISTA Microsoft® Excel® 2016
Windows® 7 (32bit/64bit)
Windows® 10

- Spreadsheet software: Microsoft® Excel® 2010, Microsoft Excel® 2016

Note: Windows® OS and Microsoft® Excel® are products of Microsoft® Corporation.

- The optional USB cable (Order No. **12AAH490**) is required.

Commercial item: Equivalent to USB Type A to B cable.

This program is available for FREE download from the Mitutoyo website at: https://mitutoyo.eu/en_us/downloads/software-and-updates

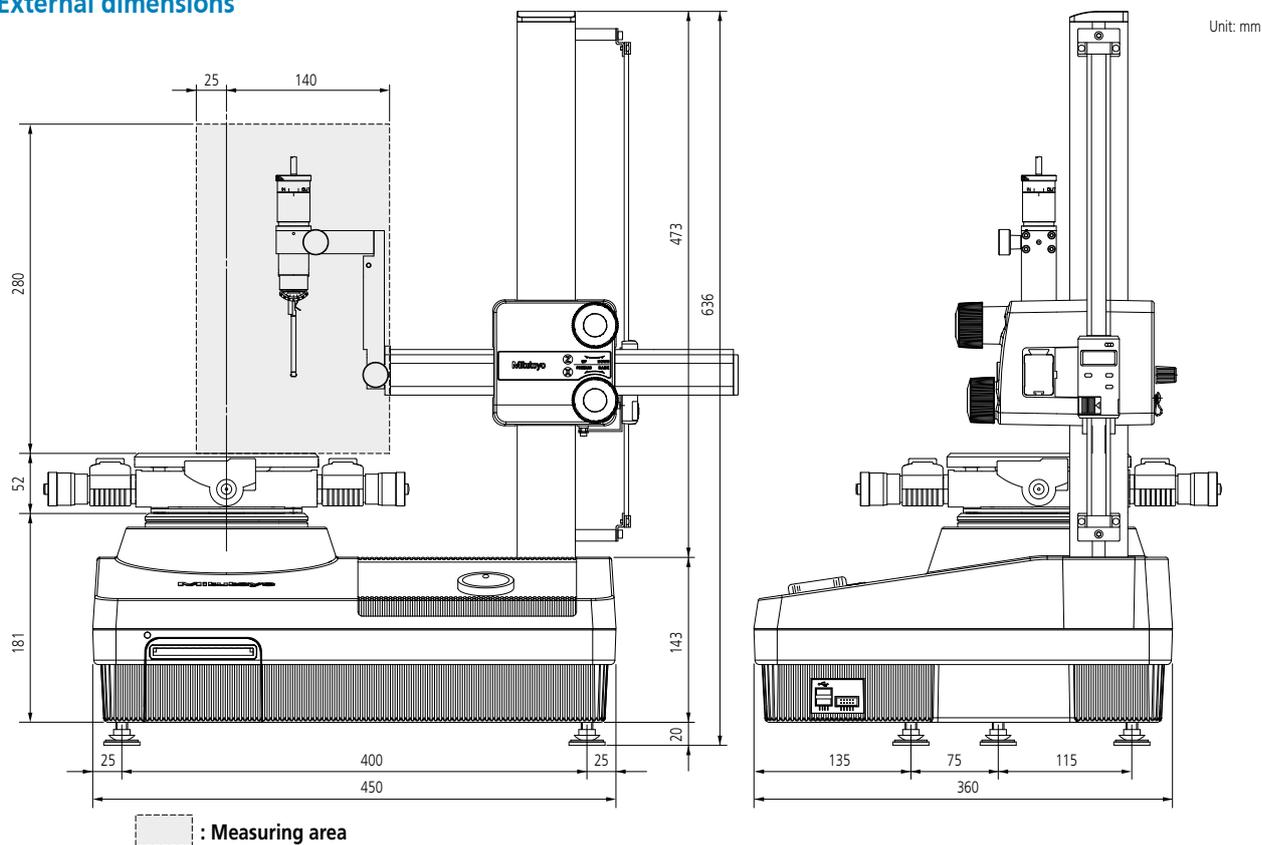
Specifications

■ Main unit

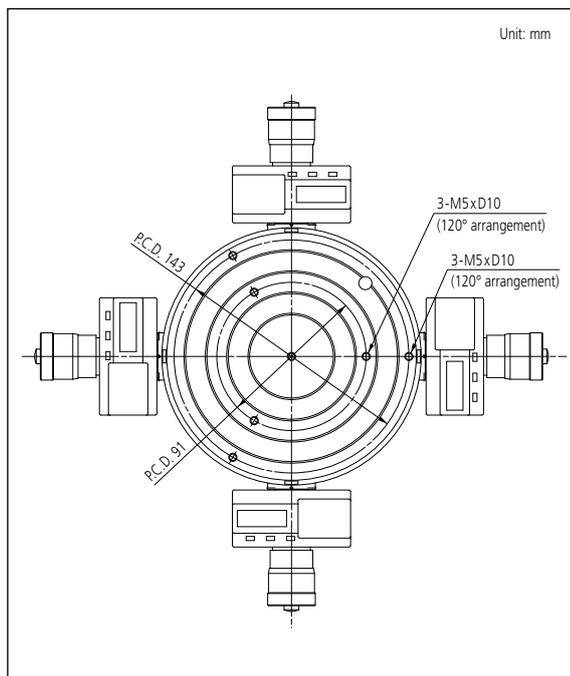
| Model | | RA-120 | | | RA-120P | | | |
|--------------------------|---|---|---|------------------------|--|-------------------|------------------------|--|
| | | Dedicated electronic analysis type | | | Data analysis by PC | | | |
| Turntable | Rotational accuracy | Radial | (0.04+6H/10000) μm H: Probing height (mm) JISB7451-1997 | | | | | |
| | | Axial | (0.04+6X/10000) μm X: Distance from the center of rotation (mm) | | | | | |
| | Rotational speed | 6 rpm | | | | | | |
| | Table diameter | 150 mm | | | | | | |
| | Centering range adjustment | ±3 mm | | | | | | |
| | Leveling range adjustment | ±1 ° | | | | | | |
| | Centering/leveling device (micrometer head) | Analog head | Digital head (mm) | Digital head (inch/mm) | Analog head | Digital head (mm) | Digital head (inch/mm) | |
| | Maximum probing diameter | 280 mm (380 mm in a reverse and vertical detector position) | | | | | | |
| | Maximum workpiece diameter | 440 mm | | | | | | |
| | Maximum turntable loading | 25 kg | | | | | | |
| Vertical column (Z axis) | Vertical travel | 280 mm from the turntable top | | | | | | |
| | Maximum probing height | 280 mm from the turntable top (480 mm in the reverse and vertical detector configuration) | | | | | | |
| | Maximum probing depth | 100 mm (minimum ID: 30 mm) | | | | | | |
| Horizontal arm (X axis) | Horizontal travel | 165 mm (Including a protrusion of 25 mm from the turntable rotation center) | | | | | | |
| Detector | Measuring direction | Two directional (IN/OUT switchable) | | | | | | |
| | Measuring range | ±1000 μm | | | | | | |
| | Measuring force | 70 to 100 mN (±30 %) | | | | | | |
| | Standard stylus (12AAL021) | Carbide ball, ø1.6 mm (.06 ") | | | | | | |
| Electronic unit | Measuring range | 8 steps: ±(1000, 500, 200, 100, 50, 20, 10, 5) μm | | | | | | |
| | Magnification | X5 to X200,000 | | | X1 to X500,000 | | | |
| | Filter type | Phase corrected: Gaussian, 2CRPC75, 2CRPC50 | | | Not phase corrected: 2CR75, 2CR50 Filter OFF | | | |
| | Cutoff value | 15 upr, 50 upr, 150 upr, 500 upr 15-150 upr, 15-500 upr, 50-500 upr | | | 15 upr, 50 upr, 150 upr, 500 upr 15-150 upr, 15-500 upr, 50-500 upr | | | |
| | Number of measuring sections | Maximum 5 | | | Maximum 100 | | | |
| | Evaluation type | Roundness, coaxiality, concentricity, flatness, circular run-out (radial/axial), Perpendicularity (relative to axis/plane), thickness deviation, parallelism | | | | | | |
| | Reference circle for evaluation | LSC, MZC, MIC, MCC | | | | | | |
| | Adjusting centering/leveling | DAT function (circular/multi-point switchable) | | | | | | |
| | Functions | Notched measurement, re-calculation, limaçon error correction, continuous ID and OD measurement | | | Notched measurement, re-calculation, limaçon error correction, remarkable point analysis (gear), harmonic analysis, continuous ID and OD measurement | | | |
| | Printer | Built-in thermal line printer | | | Windows compatible ink-jet printer | | | |
| | Display languages | Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Traditional Chinese, Simplified Chinese, Czech, Polish, Hungarian, Turkish, Swedish, Dutch | | | Japanese, English, German, French, Italian, Spanish, Portuguese, Korean, Traditional Chinese, Simplified Chinese, Czech, Polish, Hungarian, Turkish, Swedish, Russian, Dutch, Thai | | | |
| | Data output | USB | Calculation result, measurement data | | | | | |
| | | RS-232C | Calculation result, measurement data | | | | | |
| | | SPC | Calculation result | | | | | |
| Others | Power supply | AC 100 – 240 V | | | | | | |
| | Power consumption | 32 – 36 W | | | 21 – 24 W (excluding PC system) | | | |
| | Air pressure | 0.39 MPa | | | | | | |
| | Air consumption | 30 L/min (minimum) | | | | | | |
| | Mass | Main unit: 32 kg Air filter: 2 kg | | | | | | |

Dimensions

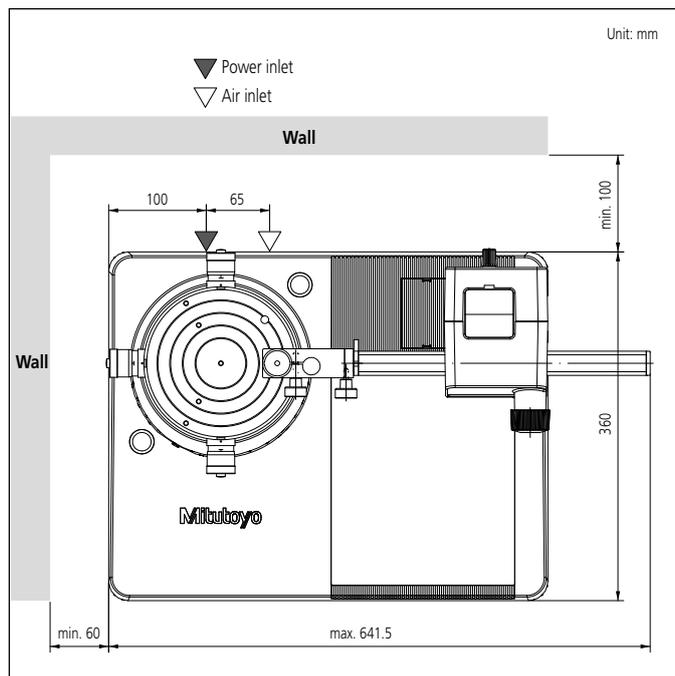
External dimensions

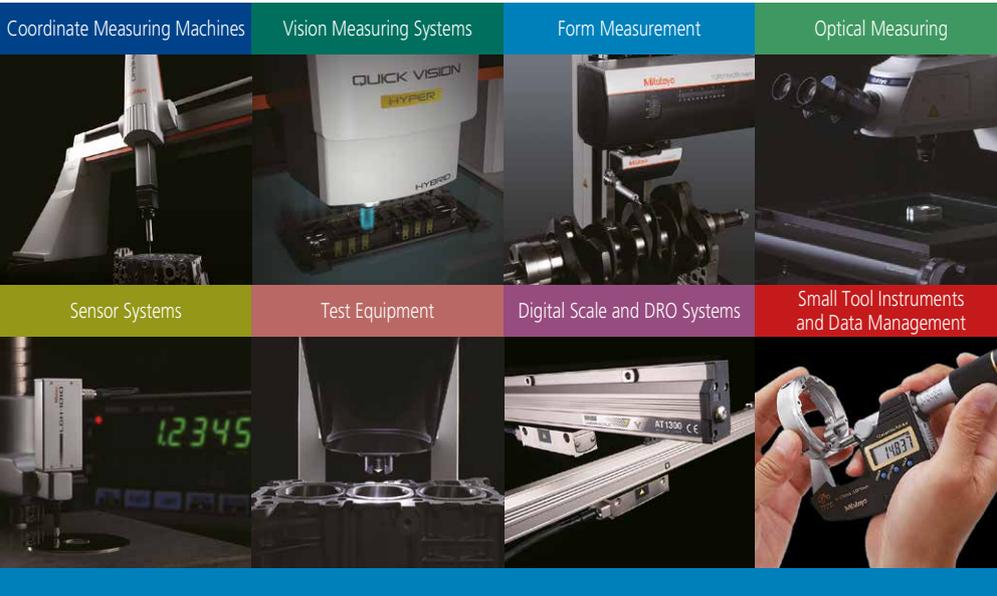


Turntable top view



Installation floor plan





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.

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 measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.



Find additional product literature and our complete catalog here.

www.mitutoyo.eu

Note: Product illustrations are without obligation. Product descriptions, in particular all technical specifications, are only binding when explicitly agreed upon. MITUTOYO and MICAT are either registered trademarks or trademarks of Mitutoyo Corp. in Japan and/or other countries/regions. Other product, company, and brand names mentioned herein are for identification purposes only and may be the trademarks of their respective holders.

Mitutoyo

Mitutoyo Europe GmbH

Borsigstraße 8-10
41469 Neuss

Tel. +49 (0) 2137-102-0

info@mitutoyo.eu

www.mitutoyo.eu