

# Roundtest

To realize efficient centering and leveling combined with high-precision measurement

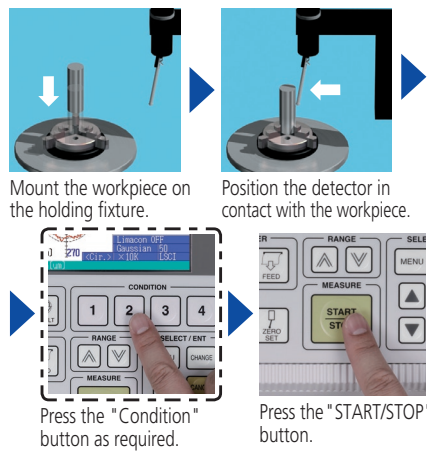
## Roundtest RA-10 SERIES 211 — Roundness Measuring Instrument

**MeasurLink<sup>®</sup> ENABLED**  
Data Management Software by Mitutoyo



RA-10

### Simple measurement procedure



### SPECIFICATIONS

| Model No.         | RA-10                                 |                  |  |
|-------------------|---------------------------------------|------------------|--|
| Turntable         | Rotational accuracy (JIS B 7451-1997) | Radial direction | (0.04+6H/10000)μm H: Probing height (mm)                       |
|                   |                                       | Axial direction  | (0.04+6X/10000)μm X: distance from the center of rotation (mm) |
|                   | Maximum probing diameter              |                  | ø100 mm  |
|                   | Maximum loading mass                  |                  | 10 kg  |
| Vertical movement | Vertical travel                       |                  | 117 mm   |
| X-axis            | Travel range                          |                  | 75 mm (–25 mm to 50 mm from the rotation center)               |
| Detector*         | Measuring range                       |                  | ±1000 μm   |

\* Only the standard length stylus is applicable to this detector. The long type cannot be used.

## Roundtest RA-120/120P SERIES 211 — Roundness Measuring Instruments

**MeasurLink<sup>®</sup> ENABLED**  
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RA-120



RA-120P

The analysis capabilities for the various models (RA-120/120P/10) vary. For details, refer to page L-41.

### SPECIFICATIONS

| Model No.         | RA-120                                |                  | RA-120P   |
|-------------------|---------------------------------------|------------------|---|
| Turntable         | Rotational accuracy (JIS B 7451-1997) | Radial direction | (0.04+6H/10000)μm H: Probing height (mm)  |
|                   |                                       | Axial direction  | (0.04+6X/10000)μm X: distance from the center of rotation (mm)  |
|                   | Maximum probing diameter*             |                  | ø280 mm (ø380 mm: for the vertical position when detector holder is installed reversely, the maximum probing height is up to 50 mm from the table top.) |
|                   | Maximum loading mass                  |                  | 25 kg   |
| Vertical movement | Vertical travel                       |                  | 280 mm  |
| X-axis            | Travel range                          |                  | 165 mm (–25 mm to 140 mm from the rotation center)  |
| Detector*2        | Measuring range                       |                  | ±1000 μm  |

\*1: Auxiliary stage for a low-height workpiece (optional) is required for the measurement 20 mm or less in the radial direction from the center point of the table and 20 mm or less from the table top.

\*2: Only the standard length stylus is applicable to this detector. The long type cannot be used.

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Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



An inspection certificate is supplied as standard. Refer to page X for details.

**It is a cost-effective compact machine that enables full-scale roundness evaluation.**

- Offers easy operation for anyone. A large, simple key arrangement is used.
- User-friendly operation. Measurement results and recorded profiles are easy to view with the large LCD, and can then be printed by the built-in thermal line printer. Furthermore, optional functions to improve usability can be offered.

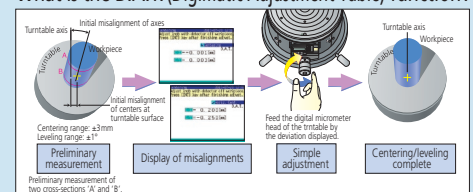


Refer to the Roundtest RA-10 Catalog (No. E15019) for more details.

**Easy operation, compact and outstanding cost/performance ratio, designed for use on the shop-floor right beside the production line.**

- D.A.T. (Digimatic Adjustment Table) function aids adjustments such as centering and leveling, and substantially reduces the time required for preliminary setup operations.

**What is the D.A.T. (Digimatic Adjustment Table) function?**

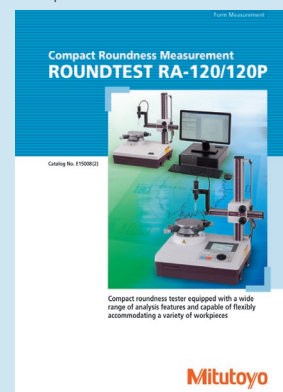


**Dedicated analysis unit type (RA-120)**

- Compact, lightweight design from incorporating electronic components inside the main unit.

**Data analysis by PC (RA-120P)**

- ROUNDPAK, a data analysis program employs Windows OS and archived higher level of analysis.

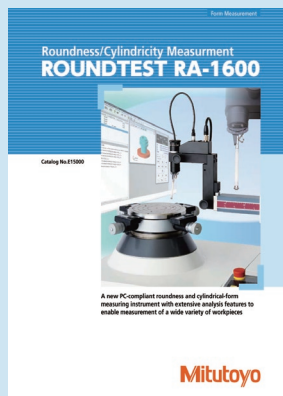


Refer to the Roundtest RA-120/120P Catalog (No. E15008) for more details.



An inspection certificate is supplied as standard. Refer to page X for details.

- Compact body and a wide measuring range assures precision that compares well with that of higher-grade models.
- D.A.T. (Digital Adjustment Table) function aids manual workpiece centering and leveling.
- Safety mechanism provided in the detection section as a standard feature.
- A sliding mechanism (optional sliding detector holder) can be installed in the detector holder. It enables one-touch measurement of a workpiece with a deep hole having a thick wall, which has been difficult with the standard detector.



Refer to the Roundtest RA-1600 Catalog (No. E15000) for more details.

**Pursued world's highest level accuracy. A high-performance automatic model equipped with a high-speed automatic centering/leveling function.**

- High-speed automatic centering/leveling function contributed to a significant reduction in the man-hours required for setups.
- It is a full-automatic model which performs all the processing automatically from part program calling, centering/leveling, measurement, calculation, to printing.
- Capable of continuous inside/outside diameter measurement without changing the detector orientation. (I.D. up to  $\phi 50$  mm)
- The automatic positioning function of the turntable enables automatic measurement in combination with table rotation and slider/column movement.
- Advanced graphical analysis such as power spectrum chart is available.
- A sliding mechanism is incorporated in the detector holder part.



Refer to the Roundtest RA-2200 series Catalog (No. E15001) for more details.

## Roundtest RA-1600 SERIES 211 — Roundness/Cylindricity Measuring System

MeasurLink<sup>®</sup> ENABLED  
Data Management Software by Mitutoyo



211-723 RA-1600



検出器の安全機構

### SPECIFICATIONS

| Model No.                              |                                       |                  | RA-1600   |
|--|---------------------------------------|------------------|---|
| Turntable                              | Rotational accuracy (JIS B 7451-1997) | Radial direction | $(0.02+6H/10000)\mu\text{m}$ H: Probing height (mm)                       |
|  |                                       | Axial direction  | $(0.02+6X/10000)\mu\text{m}$ X: Distance from the center of rotation (mm) |
|  | Maximum loading mass                  |                  | 25 kg   |
|  | Maximum probing diameter              |                  | $\phi 280$ mm   |
| Vertical movement (Z-axis column unit) | Vertical travel                       |                  | 300 mm  |
|  | X-axis                                | Travel range     | 165 mm (–25 mm to +140 mm from the rotation center)                       |
| Detector                               | Detection range                       | Standard         | $\pm 400 \mu\text{m}/\pm 40 \mu\text{m}/\pm 4 \mu\text{m}$                |
|  |                                       | Tracking         | $\pm 5$ mm  |

## Roundtest RA-2200 SERIES 211 — Roundness/Cylindricity Measuring System

MeasurLink<sup>®</sup> ENABLED  
Data Management Software by Mitutoyo



RA-2200 AS  
System vibration isolator (with side table)



RA-2200 AS  
System vibration isolator (monitor arm type)\*  
\* Printer table (provided by the customer) not shown.

### SPECIFICATIONS

| Model No.                                 |  |                  | RA-2200AS  | RA-2200DS | RA-2200AH | RA-2200DH |
|---|--|------------------|--|-----------|-----------|-----------|
| Turntable                                 | Rotational accuracy<br>(JIS B 7451-1997) | Radial direction | (0.02+3.5H/10000)μm H: Probing height (mm)                       |           |           |           |
|   |  | Axial direction  | (0.02+3.5X/10000)μm X: Distance from the center of rotation (mm) |           |           |           |
|   | Maximum loading mass                     |                  | 30 kg  |           |           |           |
|   | Maximum probing diameter                 |                  | ø 300 mm   |           |           |           |
| Vertical movement<br>(Z-axis column unit) | Maximum probing height                   |                  | 300 mm   |           | 500 mm    |           |
| X-axis                                    | Travel range                             |                  | 175 mm (−25 mm to +150 mm from the rotation center)              |           |           |           |
| Detector                                  | Detection range                          | Standard         | ±400 μm/±40 μm/±4 μm   |           |           |           |
|   |  | Tracking         | ±5 mm  |           |           |           |

\*1: Auxiliary stage for a low-height workpiece is required for the measurement 20 mm or less from the table top.

# Roundtest

To realize efficient centering and leveling combined with high-precision measurement

## Roundtest RA-H5200 SERIES 211 — Roundness/Cylindricity Measuring System



RA-H5200AH  
with side table

### SPECIFICATIONS

| Model No.                              | RA-H5200AS                            |                  | RA-H5200AH   |
|--|---------------------------------------|------------------|--|
| Turntable                              | Rotational accuracy (JIS B 7451-1997) | Radial direction | (0.02+3.5H/10000)μm H: Probing height (mm)                       |
|  |                                       | Axial direction  | (0.02+3.5X/10000)μm X: Distance from the center of rotation (mm) |
|  | Maximum loading mass                  |                  | 80 kg (On auto-centering: 65 kg)                                 |
|  | Maximum probing diameter              |                  | ø400 mm  |
| Vertical movement (Z-axis column unit) | Maximum probing height                |                  | 350 mm   |
| X-axis                                 | Travel range                          |                  | 225 mm (-25 mm to +200 mm from the rotation center)              |
| Detector                               | Detection range                       | Standard         | ±400 μm/±40 μm/±4 μm   |
|  |                                       | Tracking         | ±5 mm  |

## Roundtest Extreme RA-2200 CNC SERIES 211 — CNC Roundness/Cylindricity Measuring System



RA-2200 CNC  
System vibration isolator (with side table)

### SPECIFICATIONS

| Model No.                                 |  |                  | RA-2200 CNC  |  |
|---|--|------------------|--|--|
| Z-axis column unit                        |  |                  | Standard column specification<br>(Vertical travel: 300 mm)       | High column specification<br>(Vertical travel: 500 mm) |
| Turntable                                 | Rotational accuracy<br>(JIS B 7451-1997) | Radial direction | (0.02+3.5H/10000)μm H: Probing height (mm)                       |  |
|   |  | Axial direction  | (0.02+3.5X/10000)μm X: Distance from the center of rotation (mm) |  |
|   | Maximum loading mass                     |                  | 30 kg  |  |
|   | Maximum probing diameter                 |                  | ø256 mm  |  |
| Vertical movement<br>(Z-axis column unit) | Travel range                             |                  | 300 mm   | 500 mm   |
| X-axis                                    | Travel range                             |                  | 175 mm   |  |
| Detector                                  | Detection range                          | Standard         | ±400 μm/±40 μm/±4 μm   |  |
|   |  | Tracking         | ±5 mm  |  |

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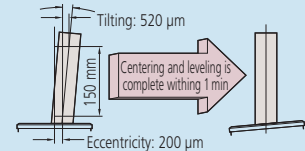
Products equipped with the measurement data output function can be connected to the measurement data network system MeasurLink (refer to page A-5 for details).



An inspection certificate is supplied as standard. Refer to page X for details.

**A high-performance automatic model equipped with a high-speed automatic centering/leveling function achieves the world's highest-level of accuracy.**

- High-speed automatic centering/leveling function contributes to a significant reduction in the man-hours required for setups.



- It is a full-automatic model which performs processing automatically from part program calling, centering/leveling, measurement, calculation, all the way through to printing.
- Capable of continuous inside/outside diameter measurement without changing the detector position. (up to ID ø50 mm)
- The automatic positioning function of the turntable enables automatic measurement in combination with table rotation and slider/column movement.
- Advanced graphical analysis such as a power spectrum chart is available.
- A sliding mechanism is incorporated in the detector holder.

- **Highly accurate and easy-to-use turntable.**  
The turntable with automatic centering and leveling function is equipped as standard, which frees operators from manual centering and leveling operations.
- **A function to change the detector posture enables CNC automatic measurement.**  
Automatic control of holder arm posture (vertical/horizontal) and the rotation feature of the detector (rotates in 1° increments in the range of 0 to 270°) enables continuous measurement of various feature combinations, such as OD/ID and/or top/bottom plane measurements.
- **A positioning sensor to achieve CNC high-accuracy automatic measurement.**  
A Mitutoyo linear scale is used in the X-axis drive unit to directly detect the position of the drive unit. It guarantees the highly precise positioning vital for automatic measurement.
- **A roughness detector is supported.**



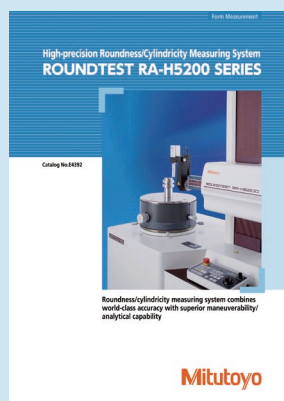
Refer to the Roundtest RA-2200 series Catalog (No. E15001) for more details.



An inspection certificate is supplied as standard. Refer to page X for details.

## Top productivity and performance from a CNC machine with highest-level accuracy.

- The turntable with automatic centering and leveling function is equipped as standard, which frees operators from manual centering and leveling operations.
- Automatic control of holder arm posture (vertical/horizontal) and the rotation feature of the detector (rotates in 1° increments in the range of 0 to 270°) enables continuous measurement of various feature combinations, such as OD/ID and/or top/bottom plane measurements.
- A Mitutoyo linear scale is used in the X-axis drive unit to directly detect the position of the drive unit. It guarantees the highly precise positioning vital for automatic measurement.
- A roughness detector is supported.



Refer to the Roundtest RA-H5200 Catalog (No. E4392) for more details.

## The best accuracy achieved in the class of large cylindricity measuring machine.

- Loading capacity is 350 kg, and the highest rotational accuracy in the class is achieved. Besides roundness and cylindricity, the flatness can be measured in high accuracy. The workpiece that requires high accuracy measurement such as large and heavy cylindrical parts can be measurement.
- For the ID measurement of a deep hole, such as a main shaft of machine tool, a deep hole measuring unit (specially made, without CNC functions) is available.
- Mitutoyo linear scale is used in the X-axis drive unit to directly detect the traveling amount of the drive unit. It guarantees high precision positioning vital for automatic measurement.

## Roundtest Extreme RA-H5200 CNC SERIES 211 — CNC Roundness/Cylindricity Measuring System



RA-H5200 CNC  
with side table

### SPECIFICATIONS

| Model No.                                 |  |                  | RA-H5200 CNC   |  |
|---|--|------------------|--|--|
| Z-axis column unit                        |  |                  | Standard column specification<br>(Vertical travel: 350 mm)       | High column specification<br>(Vertical travel: 550 mm) |
| Turntable                                 | Rotational accuracy<br>(JIS B 7451-1997) | Radial direction | (0.02+3.5H/10000)μm H: Probing height (mm)                       |  |
|   |  | Axial direction  | (0.02+3.5X/10000)μm X: Distance from the center of rotation (mm) |  |
|   | Maximum loading mass                     |                  | 80 kg (On auto-centering: 65 kg)                                 |  |
|   | Maximum probing diameter                 |                  | ø356 mm  |  |
| Vertical movement<br>(Z-axis column unit) | Travel range                             |                  | 350 mm   | 550 mm   |
| X-axis                                    | Travel range                             |                  | 225 mm   |  |
| Detector                                  | Detection range                          | Standard         | ±400 μm/±40 μm/±4 μm   |  |
|   |  | Tracking         | ±5 mm  |  |

## Roundtest Extreme RA-6000 CNC SERIES 211 — CNC Roundness/Cylindricity Measuring System



RA-6000 CNC  
with side table

### SPECIFICATIONS

| Model No.                                 |   |                  | RA-6000 CNC  |  |
|---|---|------------------|--|--|
| Turntable                                 | Rotational accuracy *1*2<br>(JIS B 7451-1997) | Radial direction | (0.05+6H/10000)μm H: Probing height (mm)                       |  |
|   |   | Axial direction  | (0.05+6X/10000)μm X: Distance from the center of rotation (mm) |  |
|   | Maximum loading mass                          |                  | 350 kg   |  |
|   | Maximum probing diameter                      |                  | ø880 mm  |  |
| Vertical movement<br>(Z-axis column unit) | Travel range                                  |                  | 1050 mm  |  |
| X-axis                                    | Travel range                                  |                  | 465 mm   |  |
| Detector                                  | Detection range                               | Standard         | ±400 μm/±40 μm/±4 μm   |  |
|   |   | Tracking         | ±5 mm  |  |

\*1: The temperature at which the accuracy can be guaranteed is 20 °C.

\*2: The rotational accuracy has been obtained when load is applied to the rotation center.

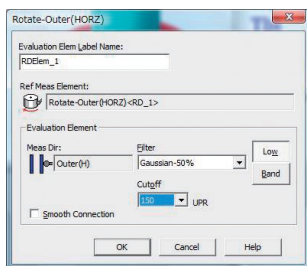
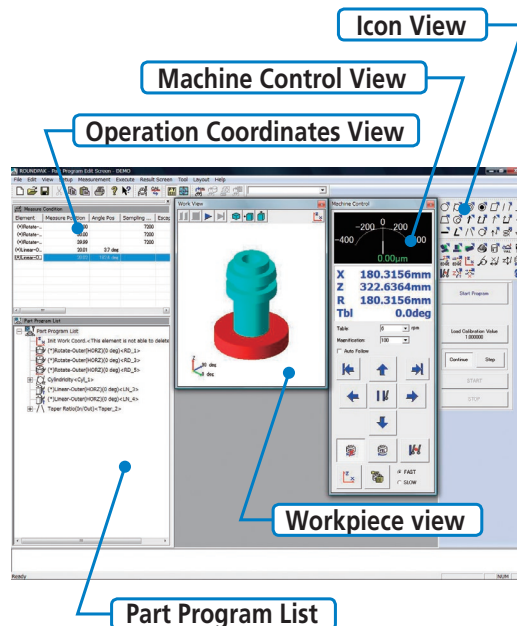
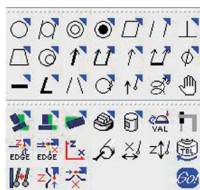
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To realize efficient centering and leveling combined with high-precision measurement

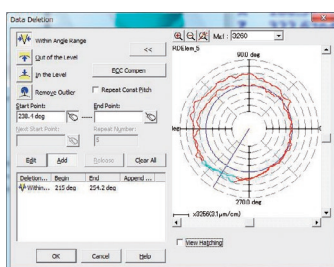
## ROUNDPAK

### Roundness/Cylindricity measurement/Analysis software

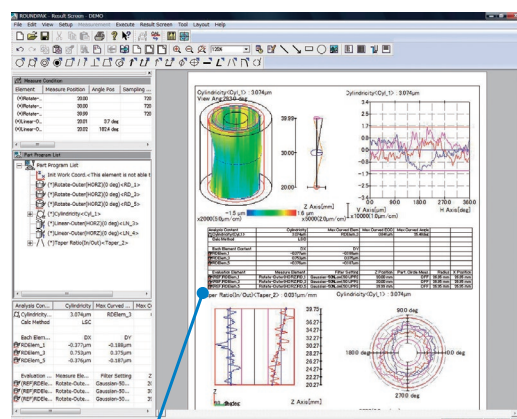
- A wide variety of parameters including those for roundness/cylindricity, as well as flatness and parallelism, are provided as standard features. You can visually select these parameters using icons. ROUNDPAK also comes with specialized functions, such as the design value best-fit analysis function, the harmonic analysis function, and a function for recording the peak or trough points on a circumference. Data that has already been collected can be easily used for re-calculation, or deleted.



Recalculation



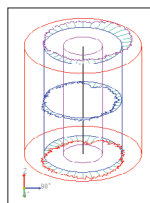
Data deletion



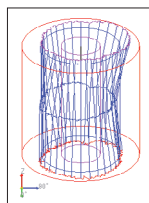
Result view

- The customer can create reports in custom formats by specifying how the analysis results will be displayed, as well as the sizes and positions of graphics. The analysis result window can be directly utilized as a layout window. Since the measurement procedure, including the layout information, is saved, the entire process, from measurement start, calculation, result saving, and finally to printing, can be automatically executed.

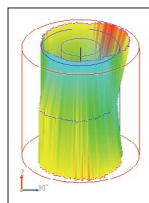
- Analysis results such as cylindricity and coaxiality can be visually expressed in 3D graphics.



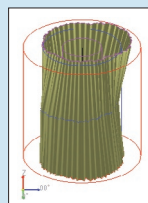
Normal display



Wire-frame display

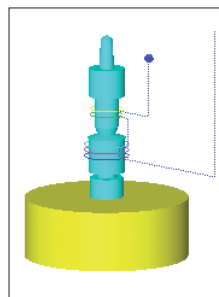


Surface-map display



Shading display

- An offline teaching function is provided to create a part program (measurement procedure) without an actual measurement target, enabling the user to virtually execute the measurement operation in a 3D simulation window.



| Analysis type                   |              | Model | RA-2200/H5200<br>RA-2200CNC/<br>H5200CNC/6000CNC | RA-1600 | RA-120P | RA-120 | RA-10 |
|---------------------------------|--------------|-------|--|---------|---------|--------|-------|
| Roundness                       |              | ○     | ✓  | ✓       | ✓       | ✓      | ✓     |
| Cylindricity                    |              | ⊘     | ✓  | ✓       |         |        |       |
| Concentricity                   |              | ◎     | ✓  | ✓       | ✓       | ✓      | ✓     |
| Coaxiality                      | Axis element | ⊙     | ✓  | ✓       | ✓       | ✓      | ✓     |
|                                 | Axis         |       | ✓  | ✓       | ✓       |        |       |
| Flatness                        |              | ▭     | ✓  | ✓       | ✓       | ✓      | ✓     |
| Parallelism                     |              | //    | ✓  | ✓       | ✓       | ✓      |       |
| Perpendicularity                |              | ⊥     | ✓  | ✓       | ✓       | ✓      |       |
| Radial deviation                |              | ▭     | ✓  | ✓       |         |        |       |
| Thickness deviation             |              | ⊙     | ✓  | ✓       | ✓       | ✓      |       |
| Radial runout                   |              | ↗     | ✓  | ✓       | ✓       | ✓      | ✓     |
| Total runout                    |              | ↗↗    | ✓  | ✓       |         |        |       |
| Diameter measurement            |              | ∅     | ✓  | ✓       |         |        |       |
| Straightness                    |              | —     | ✓  | ✓       |         |        |       |
| Inclination                     |              | ∠     | ✓  | ✓       |         |        |       |
| Taper                           |              | ∧     | ✓  | ✓       |         |        |       |
| Diameter contour tolerancing    |              | ⊕     | ✓  | ✓       |         |        |       |
| Rectilinear contour tolerancing |              | ⌒     | ✓  | ✓       |         |        |       |
| Width measurement (only CNC)    |              | ⊞     | ✓<br>(only CNC)                                  |         |         |        |       |
| Power spectrum                  |              | ▮     | ✓  | ✓       |         |        |       |
| Harmonic analysis               |              | ⊞     | ✓  | ✓       | ✓       |        |       |
| Profile operation               |              | ±     | ✓  | ✓       | ✓       |        |       |
| Tapered surface analysis        |              | ⌒     | ✓  | ✓       |         |        |       |