

Mitutoyo



Mitutoyo Corporation
80th Anniversary
Since 1934

MICROCORD CRYSTA-Apex EX Series

5-axis capability creates an amazing new standard
for measurement excellence

Coordinate Measuring Machines



Catalog No. E16015(2)

5-Axis CNC CMM

CRYSTA-Apex EX Series

Smooth action of a probe controlled in five axes realizes outstanding measurement efficiency

CRYSTA-Apex EX 500T/700T/900T Series

- Incorporates PH20 5-axis touch-trigger probe.
- Smooth 5-axis control drastically reduces measurement time for probe rotation.



5-axis control drastically reduces measurement time.



Efficient operation

5-axis design offers a choice of highly efficient measurement methods, including "head touch" for point measurement by moving the probe head only in two axes, and ultra high speed 5-axis scanning (500mm/sec)*.

* CRYSTA-Apex EX1200 R series only

CRYSTA-APEX EX

CRYSTA-Apex EX 1200R Series

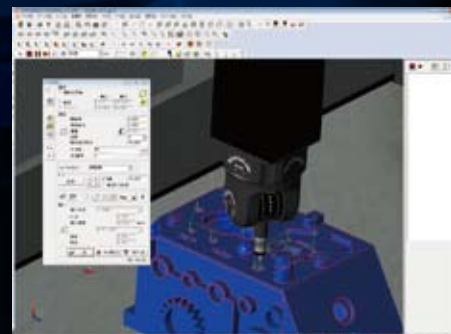
- Equipped with REVO 5-axis scanning probe head.
- Allows ultra high speed 5-axis scanning, far surpassing conventional 3-axis control.



Unique high-efficiency measurement



Allows efficient online or Off-line programming using 3D CAD modeling.



Programming with 3D CAD model

CRYSTA-Apex EX 500T/700T/900T Series

- The **CRYSTA-Apex EX 500T/700T/900T series** are CNC CMMs equipped with the **PH20** 5-axis control touch-trigger probe.
- 5-axis operation reduces the time required for probe rotational movements and allows more flexible positioning. This also ensures easy access to complex workpieces and saves time both during programming and measurement.

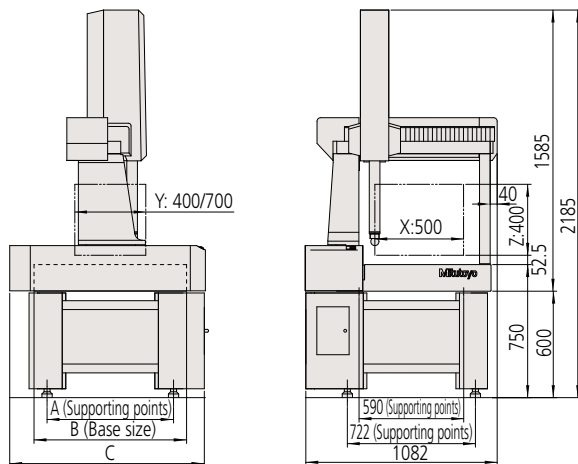
- In addition to 3-axis point measurement similar to conventional coordinate measuring machines, the **PH20** probe head also supports 'head touch' operation for quick point measurement using the two rotational axes of the probe only, with no movement required along the CMM axes.
- **PH20** incorporates a TP20 probe and allows use of modules designed for the TP20. Automatic probe changeover with a module changer is also supported.
- Even without the workpiece to be measured, a measurement program can be created on a PC using 3D CAD data. Compared to joystick operation, this makes for more efficient programming and also allows interference checking.



CRYSTA-Apex EX 544T

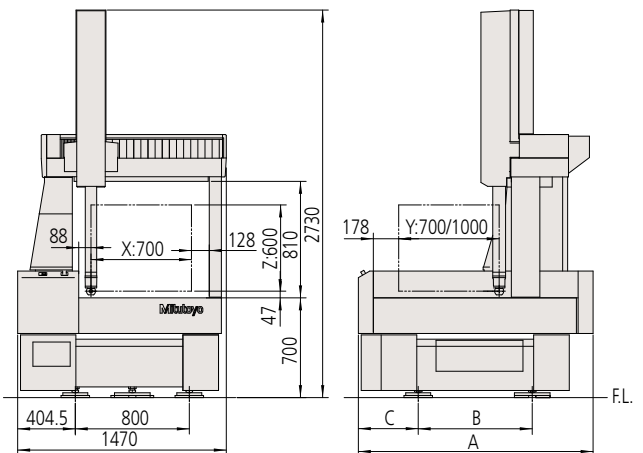


CRYSTA-Apex EX 500T Series DIMENSIONS (Unit: mm)



| Model No. | A | B | C |
|--------------------|------|------|------|
| CRYSTA-Apex EX544T | 713 | 860 | 1122 |
| CRYSTA-Apex EX574T | 1013 | 1160 | 1458 |

CRYSTA-Apex EX 700T Series DIMENSIONS (Unit: mm)



| Model No. | A | B | C |
|----------------------|------|------|-----|
| CRYSTA-Apex EX 776T | 1650 | 800 | 420 |
| CRYSTA-Apex EX 7106T | 1950 | 1000 | 470 |

SPECIFICATIONS

| Model No. | CRYSTA-Apex EX 544T | CRYSTA-Apex EX 574T | CRYSTA-Apex EX 776T | CRYSTA-Apex EX 7106T | CRYSTA-Apex EX 9106T | CRYSTA-Apex EX 9166T | CRYSTA-Apex EX 9206T |
|---|---------------------------|--|---------------------------|--|---------------------------|--|----------------------|
| Measuring range | X axis | 500mm | | 700mm | | 900mm | |
| | Y axis | 400mm | 700mm | 700mm | 1000mm | 1000mm | 2000mm |
| | Z axis | 400mm | | 600mm | | 600mm | |
| Drive speed | CNC MODE | Drive speed 8 - 300mm/s | | Drive speed 8 - 300mm/s | | Drive speed 8 - 300mm/s | |
| | J/S MODE | Measuring Speed 1 - 10mm/s | | Measuring Speed 1 - 10mm/s | | Measuring Speed 1 - 10mm/s | |
| | J/S MODE | 0 - 80mm/s | | 0 - 80mm/s | | 0 - 80mm/s | |
| Resolution | 0.0001mm | | 0.0001mm | | 0.0001mm | | |
| Guide method | Air bearings on each axis | | Air bearings on each axis | | Air bearings on each axis | | |
| Table loading | Maximum height | 545mm | | 800mm | | 800mm | |
| | Maximum mass | 180kg | 800kg | 1000kg | 1200kg | 1500kg | 1800kg |
| Mass (including the control device and installation platform) | 536kg | 646kg | 1696kg | 1972kg | 2252kg | 2889kg | 3933kg |
| Air supply | Pressure | 0.4MPa | | 0.4MPa | | 0.4MPa | |
| | Consumption | 50 L/min under normal conditions (air supply: 100 L/min) | | 60 L/min under normal conditions (air supply: 120 L/min) | | 60 L/min under normal conditions (air supply: 120 L/min) | |

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.

CRYSTA-Apex EX 500T/700T/900T Series Accuracy (Unit: μm)

| Probe used | Max. permissible length measurement error ISO 10360-2:2009 (JIS B 7440-2:2013) |
|------------|--|
| PH20+TP20 | $E_{0, MPE} = 2.2 + 3L/1000$ (Temperature environment 1) $E_{0, MPE} = 2.2 + 4L/1000$ (Temperature environment 2) |

* L=Measuring length (unit: mm)

* Table at right defines temperature environments 1 and 2

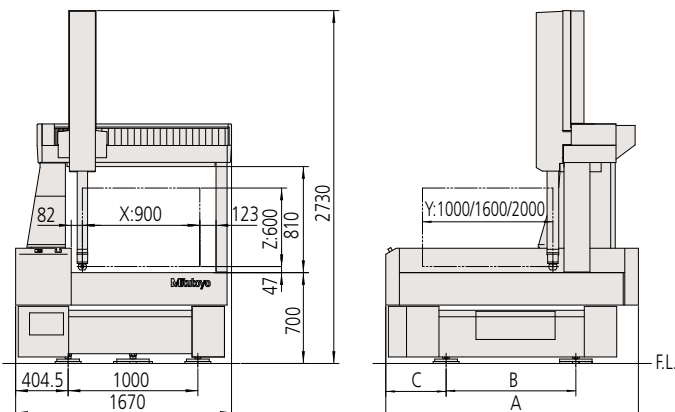
CRYSTA-Apex EX 500T/700T/900T Series Installation Temperature

| | | Temperature environment 1 | Temperature environment 2 |
|--|-------------------|---|---|
| Limits within which accuracy is guaranteed | Temperature Range | 18 - 22 °C | 16 - 26 °C |
| | Rate of change | 2 °C per hour or less 2 °C in 24 hours or less | 2 °C per hour or less 5 °C in 24 hours or less |
| | Gradient | 1 °C or less per meter | 1 °C or less per meter |

Specification of PH20

| | | |
|------------------------------|---------------------|--------------------------|
| Rotation angle (Pitch angle) | Vertical (A-axis) | -115° to +115° (0.08sec) |
| | Horizontal (B-axis) | ∞ (0.08sec) |
| Maximum stylus length | | 50mm |

CRYSTA-Apex EX 900T Series DIMENSIONS (Unit: mm)

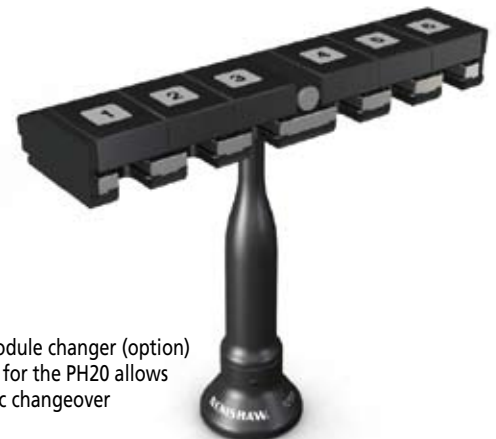


| Model No. | A | B | C |
|----------------------|------|------|-----|
| CRYSTA-Apex EX 9106T | 1950 | 1000 | 470 |
| CRYSTA-Apex EX 9166T | 2690 | 1320 | 700 |
| CRYSTA-Apex EX 9206T | 3090 | 1500 | 800 |



Various probe modules can be selected to suit the workpiece.

Note: Modules other than SF (standard force) module are options.



TCR20 module changer (option) designed for the PH20 allows automatic changeover

SPECIFICATIONS

| Model No. | | CRYSTA-Apex EX 121210R | CRYSTA-Apex EX 122010R | CRYSTA-Apex EX 123010R |
|---|----------------|---|------------------------|------------------------|
| Measuring range | X axis | 1200mm | | |
| | Y axis | 1200mm | 2000mm | 3000mm |
| | Z axis | 960mm | | |
| Drive speed | CNC MODE | Drive speed 8 - 300mm/s Measuring Speed 1 - 5mm/s | | |
| | J/S MODE | 0 - 80mm/s (J/S Mode: High Speed) 0 - 3mm/s (J/S Mode: Low Speed) 0 - 3mm/s (J/S Mode: Touch Speed) | | |
| Drive acceleration | | 375mm/s ² | | |
| Resolution | | 0.0001mm | | |
| Guide method | | Air bearings on each axis | | |
| Table loading | Maximum height | 1160mm | | |
| | Maximum mass | 2000kg | 2500kg | 3000kg |
| Mass (including the control device and installation platform) | | 4050kg | 6150kg | 9110kg |
| Air supply | Pressure | CMM: 0.4MPa REVO: 0.5MPa | | |
| | Consumption | 150 L/min under normal conditions (air source: 230 L/min or more), 0.6MPa or more | | |

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.

CRYSTA-Apex EX 121210R/122010R/123010R Series Accuracy (Unit: μm)

| Probe used | Max. permissible length measurement error ISO 10360-2:2009 (JIS B 7440-2:2013) |
|-------------------|--|
| REVO+RSP2+RSH250 | $E_{0, MPE}=2.9+4L/1000$ (Temperature environment1) $E_{250, MPE}=2.9+4L/1000$ (Temperature environment1) $E_{0, MPE}=2.9+5L/1000$ (Temperature environment2) $E_{250, MPE}=2.9+5L/1000$ (Temperature environment2) |
| REVO+RSP3-3+ RSH3 | $E_{0, MPE}=2.5+3L/1000$ (Temperature environment1) $E_{150, MPE}=2.5+3L/1000$ (Temperature environment1) $E_{0, MPE}=2.5+4L/1000$ (Temperature environment2) $E_{150, MPE}=2.5+4L/1000$ (Temperature environment2) |

* L=Measuring length (unit: mm)

* Table below defines temperature environments 1 and 2

CRYSTA-Apex EX 121210R/122010R/123010R Series Installation Temperature

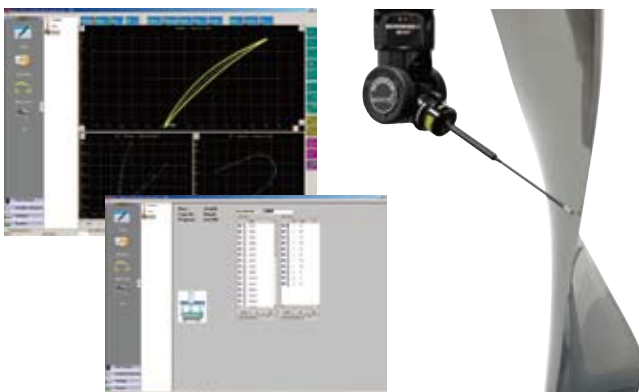
| | | Temperature environment 1 | Temperature environment 2 |
|--|-------------------|---------------------------|---------------------------|
| Limits within which accuracy is guaranteed | Temperature Range | 18 - 22 °C | 16 - 26 °C |
| | Rate of change | 2 °C in 24 hours or less | 5 °C in 24 hours or less |
| | Gradient | 1 °C or less per meter | 1 °C or less per meter |

Specification of REVO Scanning Probe

| | | |
|------------------------------|---|-------------------------|
| Rotation angle (Pitch angle) | Vertical (A-axis) | -5° to +120° (0.08 sec) |
| | Horizontal (B-axis) | ∞ (0.08 sec) |
| Maximum stylus length | 500mm (Distance from probe rotation center to stylus tip) | |

MAFIS Express [Blade measurement/Evaluation program]

This software program enables creation of measurement programs and measurement and analysis of blades and blisks. A part program for measurement can be automatically created just by selecting required contents and evaluation conditions. The measurement results are displayed in a report including 2D graphics.



REVO Probe Options

• RSP2

Optimal for 5-axis scanning and touch-trigger measurement
Stylus holder* supports 175 mm, 250 mm, 350 mm, 450 mm, 500 mm effective stylus length

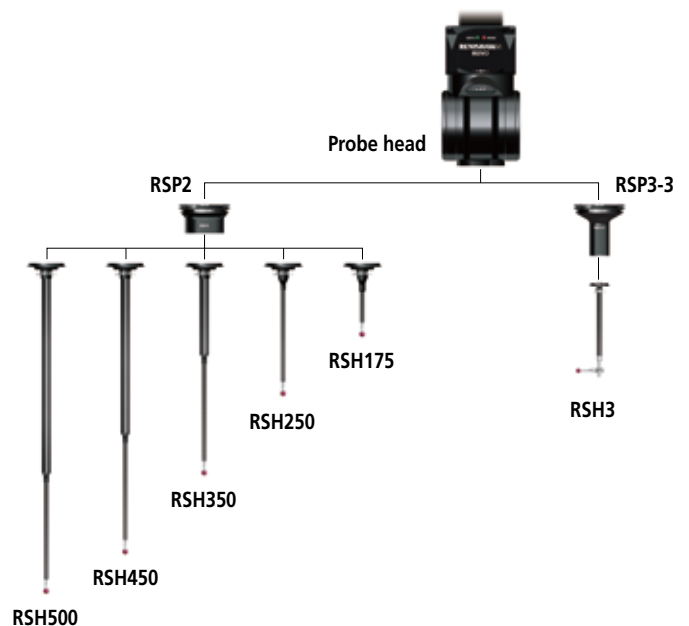
* Optional except for RSH250

• RSP3-3 (Options)

SP25 scanning probe
Supports use of cranked stylus

* Auto changer supported

Allows automatic changeover of probes (RSP2, RSP3) and stylus holders (RSH175, 250, 350, 450, 500).





**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 bespoke 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 product catalogue**

<http://www.mitutoyo.co.jp/global.html>

Note: Product illustrations are without obligation. Product descriptions, in particular any and 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 Corporation

20-1, Sakado 1-Chome,
Takatsu-ku, Kawasaki-shi,
Kanagawa 213-8533, Japan
T +81 (0) 44 813-8230
F +81 (0) 44 813-8231
<http://www.mitutoyo.co.jp>