

## CRYSTA-PLUS M

THE ALL-ROUND SYSTEM FOR MANUAL  
3-D COORDINATE MEASURING TASKS.

COORDINATE  
MEASURING MACHINES



## CRYSTA-PLUS M: The ultimate in manual precision.

Welcome to the world of 3-D coordinate measuring technology! CRYSTA-PLUS M is the intelligent alternative to complex, cost-intensive measuring equipment with conventional multi-point measuring devices. CRYSTA-PLUS M is a high performance, manual 3-D coordinate measuring machine that really demonstrates its strengths wherever the measuring tasks are constantly changing, different work pieces are involved, and random measurements are needed.



# Manual

# CRYSTA-PLUS M



## CRYSTA-PLUS M: all in all, the cheapest solution

Precision work is a highly individual matter – especially when measurements are not performed constantly at intervals of mere seconds: when conducting selective tests during the manufacturing process, or for special tasks, such as preliminary adjustment of tools for ED machining. CRYSTA-PLUS M is the ideal solution for performance-oriented and cost-conscious users performing both these and all other special measuring tasks. Because CRYSTA-PLUS M combines the capabilities of numerous individual pieces of test equipment in a single all-round system – thus allowing enormous savings, not only on procurement and operation, but also on test equipment monitoring.



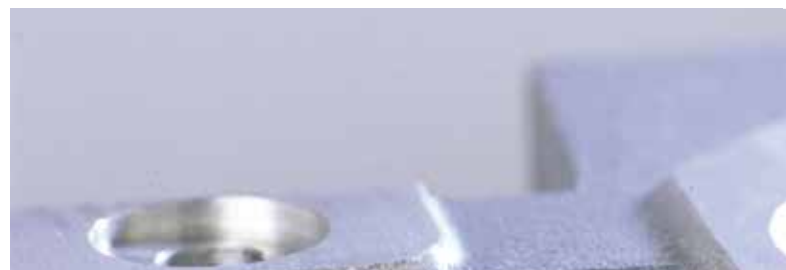
And CRYSTA-PLUS M is even geared to accept any new challenges.

A standard feature of CRYSTA-PLUS M is the premium MCOSMOS Manual software, the easy-to-operate center of command for professional management, measurement and analysis. As MCOSMOS Manual is optionally combinable with numerous application-oriented modules, it can easily cope with any task, no matter how specific.

Added to which, a widely diverse, user-oriented range of accessories is available – from specially designed sensor technology right up to flexible tensioning systems.

Example: Non contact measurement with centering microscope CF20 (fig. at the right)

CRYSTA-PLUS M allows you to enjoy the full benefits of high performance, manual 3-D coordinate measuring. At terms that quickly pay off; with added performance capabilities that bring immediate benefits.



# Cost efficient





CRYSTA-PLUS M:  
More quality, right down to the very last detail.



# Versatile

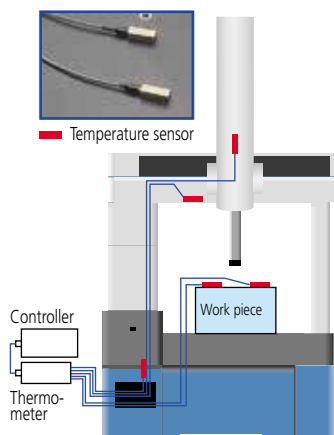
- Integrated thermal error compensation on measuring device and work piece at temperatures ranging from 15°C to 30°C (optional)
- Deviation of lengthwise measurement 3.5  $\mu\text{m}^*$ : impressive accuracy when measuring 3-D coordinates manually
- Highly accurate, dust-protected glass scales (resolution: 0.5  $\mu\text{m}$ ) on all axes
- White LED illumination of the work area for easier positioning of the probe on the work piece (optional)
- High performance MCOSMOS Manual software included as a standard feature
- User navigation with speech output
- Self-adjusting air bearings on all axes
- Vibration damping design in accordance with FEM analysis
- Three model series with five variants
- Space saving and lightweight thanks to its compact design and top quality material components
- Outstanding value for money

## Versatile



\* For models with 500 mm X axis:  
 $MPE_E = (3.5 + 0.4L/100) \mu\text{m}$  with TP20/MH20i at temperatures ranging from 19°C to 21°C resp. 15°C to 30°C when using optional thermal error compensation.

# CRYSTA-PLUS M: simply the better ideas

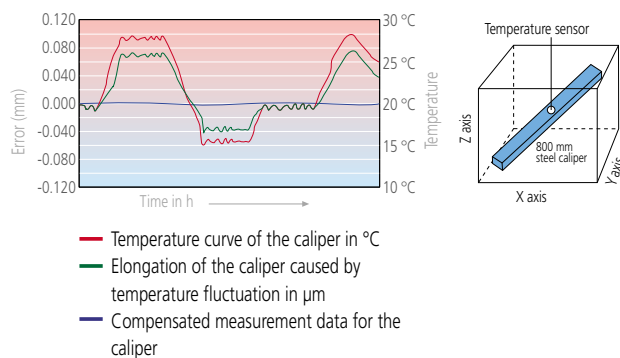


## Stable measuring results, even at fluctuating temperatures (optional)

CRYSTA-PLUS M performs just as well if temperatures in the surroundings of the measuring device or on the work piece fluctuate between 15°C and 30°C for all models as it does under thermally stable conditions. Sensors on the glass scales of the measuring device and on the work piece record these fluctuations, transmit the information to the automatic, temperature-dependent error corrector (optional) and adjust the system to the changed conditions in real time. Ensuring a level of precision when measuring in a manufacturing environment that is otherwise only achievable in a thermally stable measuring room.

## Visualization of the correction

Temperature-dependent correction using an 800 mm long steel caliper as an example – measured at differing ambient temperatures and diagonally positioned in the room.



Intelligent

Fixing the X, Y and Z axes and central fine adjustment of the X and Y axes.  
(Models X-400 and X-500)



## Uncomplicated

### User navigation with speech output

MCOSMOS measuring software provides users with speech guidance throughout the entire measuring program, which prevents misunderstandings and focuses concentration entirely on the management of the equipment. Allowing even less experienced employees to perform complex measuring tasks securely and without errors. A very important factor for universal use in a company.



# Uncomplicated

## Dust-protected glass scales

CRYSTA-PLUS M is equipped with highly accurate, dust-protected glass scales with a resolution of 0.5  $\mu\text{m}$ .

Temperature sensors on the glass scales of the measuring device ensure thermal error compensation. Making Crysta-Plus M particularly suited for use in rough manufacturing environments.

## Air bearings on all axes

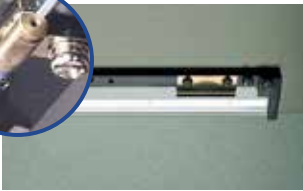
Self-adjusting air bearings on all axes enable CRYSTA-PLUS M to move particularly smoothly, quickly and precisely. They form the reassuring basis for utterly precise measuring results.



## Competent Compact

### Space saving and lightweight

No special static construction issues need to be observed when setting up CRYSTA-PLUS M. With its particularly high quality, lightweight materials and alloys and its space saving dimensions, it only requires a compact area on a normal base.



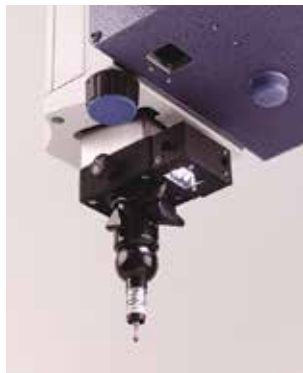
Precise

# Uncomplicated

## Spot on

### Illuminated work area (optional)

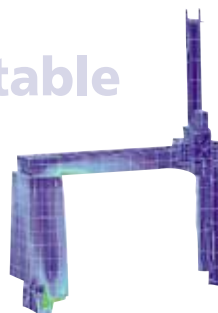
CRYSTA-PLUS M is fitted with white LED illumination on the sleeve to considerably simplify probe positioning. The beam is directed straight at the probe ball while at the same time illuminating the immediate work area. A highly convenient feature, especially when measuring bores.



### State of the art technologies for guide stability

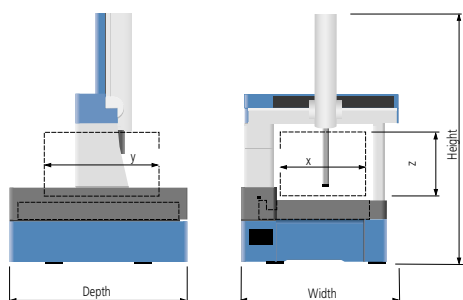
The portal structure is designed in accordance with the finite element method (FEM) and guarantees high levels of rigidity and straightness of the guide elements while at the same time damping vibration transference. In addition, the good thermal conduction capacity of the aluminum guide prevents deformations and distortions caused by thermal influences. And is joined by a direct measuring portal guide on the granite table.

Stable



A diverse range of quality products.

## M400 series M500 series



**M443**

**M544**

**M574**

|   |                                 |                                     |  |               |
|---|---------------------------------|-------------------------------------|--|---------------|
| <b>Measuring range</b>                  | <b>X axis</b>                   | 400 mm                              | 500 mm                                 | 500 mm        |
|   | <b>Y axis</b>                   | 400 mm                              | 400 mm                                 | 700 mm        |
|   | <b>Z axis</b>                   | 300 mm                              | 400 mm                                 | 400 mm        |
| <b>Work piece</b>                       | <b>Max. height</b>              | 480 mm                              | 510 mm                                 |               |
|   | <b>Max. weight</b>              | 180 kg                              | 180 kg                                 |               |
| <b>Work piece tensioning</b>            | <b>No. of M8 bores</b>          | 13                                  | 9                                      | 13            |
| <b>Length measurement deviation</b>     | <b>TP20</b>                     | ISO 10360-2 (20°C±1°C)              | MPE <sub>E</sub> = (3.0+0.4 L /100) μm |               |
|   | <b>TP8</b>                      |                                     | MPE <sub>E</sub> = (4.0+0.4 L /100) μm |               |
| <b>Contact deviation TP20/TP8</b>       | ISO 10360-2                     | MPE <sub>p</sub> = 4 μm / 5 μm      | MPE <sub>p</sub> = 4 μm / 5 μm         |               |
| <b>Permissible ambient temperature*</b> |                                 | 15°C to 30°C                        | 19°C to 21°C                           |               |
| <b>Temperature gradients</b>            |                                 | max. 2.0 K/h, 5.0 K/24h             | max. 2.0 K/h, 5.0 K/24h                |               |
|   | <b>vertical and horizontal</b>  | max. 1.0 K/m                        | max. 1.0 K/m                           |               |
| <b>Length measurement system</b>        | <b>Resolution</b>               | 0.5 μm                              | 0.5 μm                                 |               |
| <b>Guide</b>                            |                                 | Air bearings on all axes            | Air bearings on all axes               |               |
| <b>Axis fixing</b>                      |                                 | Rapid fixing on all axes, pneumatic | Rapid fixing on all axes, pneumatic    |               |
| <b>Measuring table</b>                  | <b>Material</b>                 | Granite                             | Granite                                |               |
|   | <b>Dimensions</b>               | 624 x 805 mm                        | 638 x 860 mm                           | 638 x 1160 mm |
| <b>Air supply</b>                       | <b>Consumption/Air pressure</b> | approx. 12.5 l / min at 0.35 MPa    | approx. 12.5 l / min at 0.4 MPa        |               |
|   | <b>Delivery rate</b>            | 25 l / min at 0.5 - 0.9 MPa         | 25 l / min at 0.5 - 0.9 MPa            |               |
| <b>Dimensions</b>                       | <b>Width</b>                    | 981 mm                              | 1082 mm                                |               |
|   | <b>Depth</b>                    | 1047 mm                             | 1078 mm                                | 1458 mm       |
|   | <b>Height</b>                   | 1967 mm                             | 2285 mm                                |               |
| <b>Device weight</b>                    | <b>With support table</b>       | 410 kg                              | 495 kg                                 | 615 kg        |

Precision figures are based on a TP20/TP8 measuring head with ø 3 x 10 mm probe ø 4 x 10 mm / ø 4 x 20 mm; \* when optional thermal error compensation is used

# CRYSTA-PLUS M

## M700 series



### M776

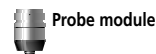
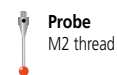
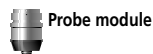
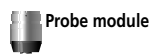
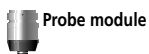
### M7106

|  |               |
|--|---------------|
| 700 mm                                     | 700 mm        |
| 700 mm                                     | 1000 mm       |
| 600 mm                                     | 600 mm        |
| 800 mm                                     |               |
| 500 kg                                     | 800 kg        |
| 13   |               |
| $MPE_E = (4.5+0.45L/100) \mu\text{m}$      |               |
| $MPE_E = (5.5+0.45 L/100) \mu\text{m}$     |               |
| $MPE_P = 5 \mu\text{m} / 6 \mu\text{m}$    |               |
| 15°C to 30°C                               |               |
| Max. 2.0 K/h, 5.0 K/24h                    |               |
| Max. 1.0 K/m                               |               |
| 0.5 $\mu\text{m}$                          |               |
| Air bearings on all axes                   |               |
| Rapid fixing on all axes,<br>on mobile box |               |
| Granite                                    |               |
| 900 x 1440 mm                              | 900 x 1740 mm |
| approx. 12.5 l/min<br>at 0.4 MPa           |               |
| 25 l/min at 0.5 - 0.9 MPa                  |               |
| 1460 mm                                    |               |
| 1717 mm                                    | 2017 mm       |
| 2840 mm                                    |               |
| 1560 kg                                    | 1800 kg       |

# Quality and diversity for all requirements: Mitutoyo measuring systems

Mitutoyo offers a wide range of measurement heads for your measuring tasks. Matched to the functions of the CRYSTA-PLUS M series.

| Contact measuring systems                              |  |  |  | Optical (without contact) measuring system |
|--|--|--|--|--|
| Infinitely adjustable manual swivel measuring systems  |  | Indexable manual swivel measuring systems                          |  | Centering microscope                       |
| Manual turn/swivel system with separate measuring head | Manual turn/swivel system with integrated measuring head | Manual turn/swivel system with separate measuring head (indexable) | Manual turn/swivel system with integrated measuring head (indexable) | Sleeve mounted                             |



A CCD camera can be connected via C-Mount Adapter (Pixel Fox) for representation on a PC screen

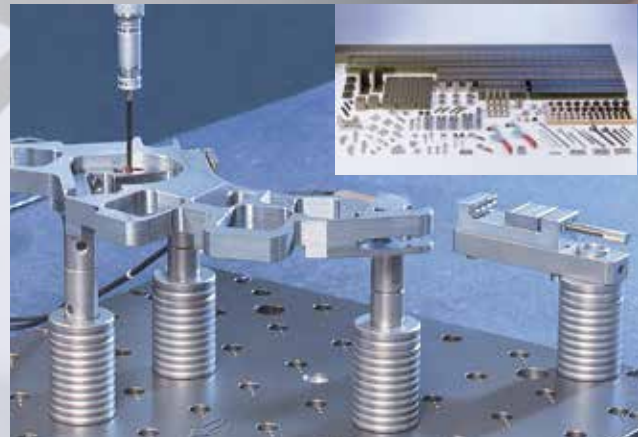


**Probe system changer**  
Manual storage point MSR1

# Versatile

The flexible Mitutoyo repro-fix tensioning system allows you to save even more time while further enhancing cost efficiency and precision in manufacturing-oriented measurement tasks. repro-fix is capable of handling any task, no matter how individualized – and is perfectly matched to the performance capabilities of CRYSTA-PLUS M.

The exclusive clamping technology allows repro-fix to be used as a complete system or easily broken down into modules. QUICK-RAIL is an add-on part that makes positioning the repro-fix elements even faster and easier.



The modular Mitutoyo eco-fix clamping system ensures a more relaxed approach in every respect. For the first time, it combines function and color into a practice-oriented concept for time-optimized, economical work that eliminates any possibility of mistakes.

Design with system, focusing on what is important: eco-fix concentrates on performing virtually any clamping task; its cost is as optimized as its performance capabilities. Logically assignable elements with an uncomplicated and user-friendly design build on the Mitutoyo eco-fix base plate, which is fitted entirely with threads.





MCOSMOS Manual is the software for professional management, measurement and analysis in coordinate measuring technology.

## MCOSMOS Manual



**Statistical analysis**  
Real time data collation, SPC analysis, network-enabled

**2-D contour analysis and 3-D digitalization**  
Combines automatic scanning of work piece contours with 3-D digitalization of surfaces

**3-D clearance area analysis**  
for target/actual comparisons of free form areas with the CAD model

**Analysis of bearing surface profiles**  
Measurement and analysis of selected characteristics of bearing surface profiles

**GEO\_EDM**  
Online correction program for EDM tools and workpieces.

# Professional

This top quality modular software system developed by Mitutoyo allows you to easily access the capabilities offered by various software modules, to comprehensively analyze, document and impressively present measuring results, and to store the data material in clear, practice-oriented structures.

MCOSMOS Manual is, of course, a standard component of all CRYSTA-PLUS M coordinate measuring machines.

### Performance features

**PartManager**

is the center of command for starting and managing the software package.

**Geometry module (GEOPAK)**

for recording, analyzing and documenting geometries.

**ProtokollDesigner**

for creating and adapting user-defined test reports

### Extension modules

**Statistical analysis module (MeasurLink)**

**2-D profile analysis module (SCANPAK)**

**3-D free form area analysis module (CAT 1000S)**

**Bearing surface analysis module (MAFIS)**

**... other modules available on request**

# Professional

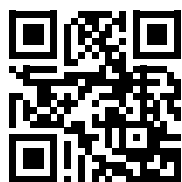




**Whatever your challenges are, Mitutoyo supports you from start to finish.**

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.



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**Mitutoyo Europe GmbH**

Borsigstraße 8-10  
41469 Neuss

Tel. +49 (0) 2137-102-0  
Fax +49 (0) 2137-102-351

info@mitutoyo.eu  
www.mitutoyo.eu