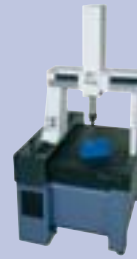


Coordinate Measuring Machines  
QM-M 333  
Crysta-Plus M



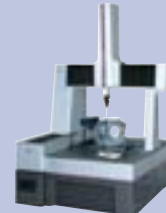
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CNC-Coordinate Measuring Machines  
Crysta-Apex C



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CARBapex  
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Software System MCOSMOS  
Software System MeasurLink®  
Indexible Fixture System REPRO-FIX



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## FLEXIBLE GAUGE QM-M 333

FLEXIBLE GAUGE is a measuring machine for the manual measurement of workpieces – fast, precise and flexible. FLEXIBLE GAUGE has been specially designed for aggressive conditions in the workshop and production environments.

- Rapid, simple execution of measuring processes with data processor QM-Data.
- High-precision measurement with rapid, direct processing of measured data.
- Robust, stable construction, particularly user-friendly design.
- An integrated Temperature Compensation System guarantees the accuracy of the CMM main unit under temperature conditions of 15 °C to 30 °C as option possible.
- Can be supplied with PC and MCOSMOS software as an option.



QM-M 333



Data processor QM-Data

Model	Measuring range X : Y : Z mm	Accuracy*
QM-M 333	300 : 300 : 300	$E = (3,0 + 0,4L/100) \mu\text{m}$
QM-M 353	300 : 500 : 300	$E = (3,0 + 0,4L/100) \mu\text{m}$

\* According to ISO 10360-2 in the temperature range  $20\text{ °C} \pm 1\text{ °C}$  with TP2, TP20

## Coordinate Measuring Machines Crysta-Plus M

Manually-operated compact devices for a very economical entry into the world of 3D coordinate measurement. For uncomplicated, rapid and powerful workshop testing, as part of the production process.

- Compact unit with excellent price-performance ratio.
- The Crysta-Plus M can be upgraded to a CNC Machine.
- An optional temperature compensation system can be installed on the Crysta-Plus M. It guarantees the accuracy of the CMM main unit under temperature conditions of 16 to 26 °C.
- Supplied as standard with PC and MCOSMOS software.



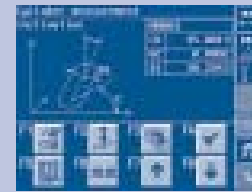
Crysta-Plus M with PC

Model	Measuring range X : Y : Z mm	Accuracy*
Crysta-Plus M544	500 : 400 : 400	$E = (3,5 + 0,45L/100) \mu\text{m}$
Crysta-Plus M574	500 : 700 : 400	$E = (3,5 + 0,45L/100) \mu\text{m}$
Crysta-Plus M776	700 : 700 : 600	$E = (4,5 + 0,45L/100) \mu\text{m}$
Crysta-Plus M7106	700 : 1000 : 600	$E = (4,5 + 0,45L/100) \mu\text{m}$

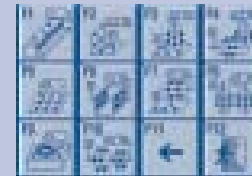
\* According to ISO 10360-2 in the temperature range  $20\text{ °C} \pm 1\text{ K}$  with TP2, TP20

### Specification

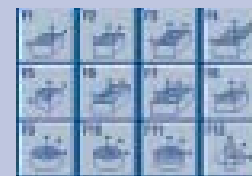
Accuracy:  $3,0\ \mu\text{m}$



QM-Data screenshot



QM-Data sample menu



QM-Data sample menu

### Specification

Accuracy:  $3,5\ \mu\text{m}$  and  $4,5\ \mu\text{m}$



Request our detailed brochure or make an inquiry on the Internet at [www.mitutoyo.de](http://www.mitutoyo.de) – product lounge!

**Specification**

Accuracy: 1,7 µm

# CNC-Coordinate Measuring Machines Crysta-Apex C

CNC machines for the trickiest tasks in the laboratory or production line. A great variety of versions for a large selection of measuring ranges.

- An integrated Temperature Compensation System guarantees the accuracy of the CMM main unit under temperature conditions of 16 to 26 °C.
- High drive speed up to 520 mm/s.
- Compatible with a wide range of measuring systems.
- Supplied as standard with PC and MCOSMOS software.



Crysta-Apex C700 with PC



Crysta-Apex C500



Crysta-Apex C900



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Model	Measuring range X : Y : Z mm	Accuracy* L in mm
Crysta-Apex C544	505 : 405 : 405	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C574	505 : 705 : 405	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C776	705 : 705 : 605	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C7106	705 : 1005 : 605	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C9106	905 : 1005 : 605	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C9108	905 : 1005 : 805	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C9166	905 : 1605 : 605	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C9168	905 : 1605 : 805	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C9206	905 : 2005 : 605	$MPE_E = (1,7 + 0,4L/100) \mu m$
Crysta-Apex C9208	905 : 2005 : 805	$MPE_E = (1,7 + 0,4L/100) \mu m$

\* According to ISO 10360-2 in the temperature range 16 °C to 26 °C with SP 25M

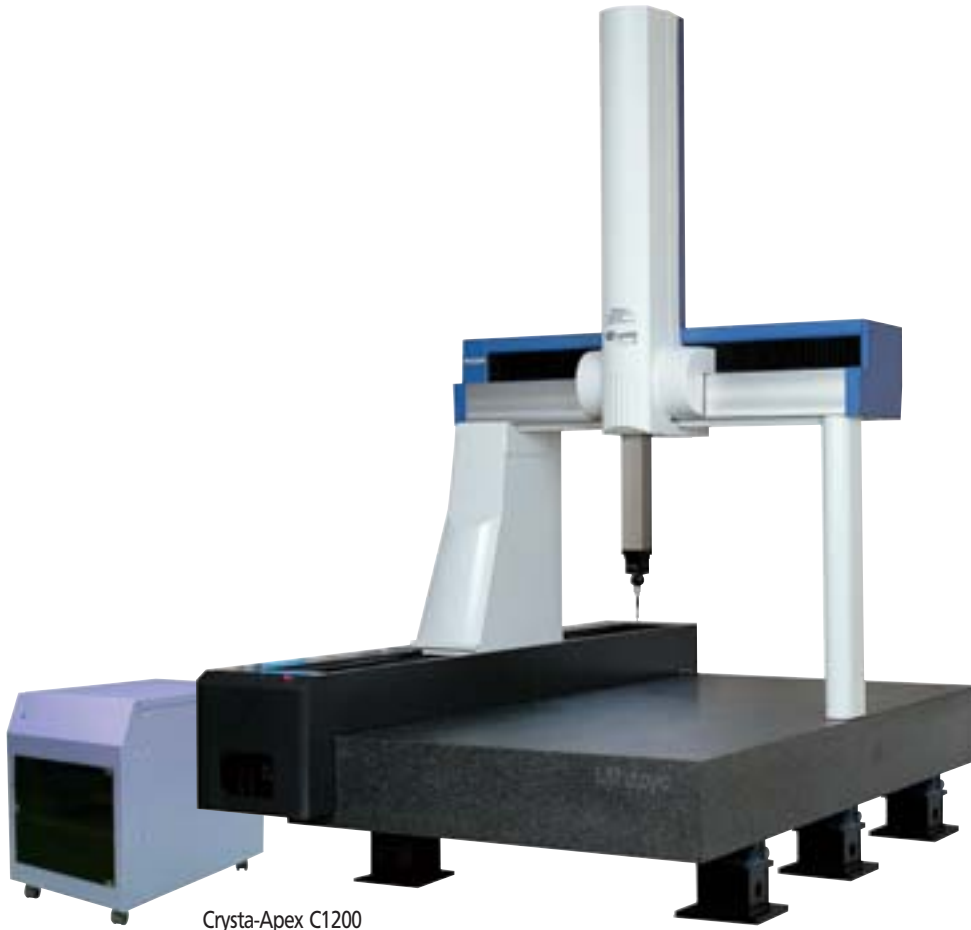
# CNC-Coordinate Measuring Machines Crysta-Apex C

CNC machines for the trickiest tasks in the laboratory or production line. A great variety of versions for a large selection of measuring ranges.

- An integrated Temperature Compensation System guarantees the accuracy of the CMM main unit under temperature conditions of 18 °C to 22 °C.
- High drive speed up to 520 mm/s.
- Compatible with a wide range of measuring systems.
- Supplied as standard with PC and MCOSMOS software.

## Specification

Accuracy: 2,3 µm to 6,0 µm



Crysta-Apex C1200

Model	Measuring range X : Y : Z mm	Accuracy* L in mm
Crysta-Apex C121210	1205 : 1205 : 1005	$MPE_E = (2,3 + 0,3L/100) \mu\text{m}$
Crysta-Apex C122010	1205 : 2005 : 1005	$MPE_E = (2,3 + 0,3L/100) \mu\text{m}$
Crysta-Apex C123010	1205 : 3005 : 1005	$MPE_E = (2,3 + 0,3L/100) \mu\text{m}$
Crysta-Apex C163012	1600 : 3000 : 1200	$MPE_E = (3,3 + 0,45L/100) \mu\text{m}$
Crysta-Apex C163016	1600 : 3000 : 1600	$MPE_E = (4,5 + 0,55L/100) \mu\text{m}$
Crysta-Apex C164012	1600 : 4000 : 1200	$MPE_E = (3,3 + 0,45L/100) \mu\text{m}$
Crysta-Apex C164016	1600 : 4000 : 1600	$MPE_E = (4,5 + 0,55L/100) \mu\text{m}$
Crysta-Apex C165012	1600 : 5000 : 1200	$MPE_E = (3,3 + 0,45L/100) \mu\text{m}$
Crysta-Apex C165016	1600 : 5000 : 1600	$MPE_E = (4,5 + 0,55L/100) \mu\text{m}$
Crysta-Apex C203016	2000 : 3000 : 1600	$MPE_E = (4,5 + 0,8L/100) \mu\text{m}$
Crysta-Apex C203020	2000 : 3000 : 2000	$MPE_E = (6,0 + 0,9L/100) \mu\text{m}$
Crysta-Apex C204016	2000 : 4000 : 1600	$MPE_E = (4,5 + 0,8L/100) \mu\text{m}$
Crysta-Apex C204020	2000 : 4000 : 2000	$MPE_E = (6,0 + 0,9L/100) \mu\text{m}$
Crysta-Apex C205016	2000 : 5000 : 1600	$MPE_E = (4,5 + 0,8L/100) \mu\text{m}$
Crysta-Apex C205020	2000 : 5000 : 2000	$MPE_E = (6,0 + 0,9L/100) \mu\text{m}$

\* According to ISO 10360-2 in the temperature range 18 °C to 22 °C with SP25M



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# CNC-Coordinate Measuring Machines Crysta-Apex C Measuring Systems

## Contact measuring systems

Overview of probe change systems:



ACR1



SCRMPMP



MRS-FCR25



MRS-SCP80



SCR200



MRS-ACR3



Sample application

Measuring heads	Probe change system	Description	With probe
<b>Touch-trigger probe heads</b> for single point or multi-point measurement			
	SCR200	Stepless manual-swivel measuring head with separate measuring probe.	
	ACR1 / MRS-ACR3	Rigid measuring system. Measuring head with separate measuring probe.	+
	ACR1 / MRS-ACR3	Motorised turning and swivelling measuring system. Measuring head with separate measuring probe.	+
	SCR 200	Motorised turning and swivelling measuring system. Measuring head with separate measuring probe.	

<b>Dynamic measuring probe heads</b> for single point or multi point measurement			
	MRS-SCRMPMP / MRS-SCP80	Compact measuring systems. Measuring heads with integrated measuring probes.	
	ACR1 / FCR25 / MRS-ACR3	Motorised turning and swivelling measuring system. Measuring heads with separate measuring probes.	

\* Only applies from 700 series

## Optical (non-contact) measuring systems

Measuring heads	Probe change system	Description	With measuring system
<b>Video measuring head</b> for single point or multi-point measurement			
	ACR1 / MRS-ACR3	Video measuring head also in combination with other measuring systems.	
<b>Laser measuring systems</b> for single point measurement, contour measurement and digitalisation			
	ACR1 / MRS-ACR3	Laser-scan measuring heads also in combination with other measuring systems.	

\* Only applies from 700 series



Request our detailed brochure!

# CNC-Coordinate Measuring Machines Euro-C STRATO

High-precision CNC system for high-efficiency use in the measuring laboratory and directly in the production environment. With integrated vibration suppression.

- An integrated Temperature Compensation System guarantees the accuracy of the CMM main unit under temperature conditions of 18 °C to 22 °C.
- High drive speed up to 430 mm/s.
- Compatible with a wide variety of measurement systems.
- Supplied as standard with PC and MCOSMOS software.



Euro-C STRATO

## Specification

Accuracy: 1,2 and 1,3  $\mu\text{m}$   
3,8 and 4,8  $\mu\text{m}$

Model	Measuring range X : Y : Z mm	Accuracy* L in mm
Euro-C STRATO 776	705 : 705 : 605	$MPE_E = (1,2 + 0,3L/100) \mu\text{m}$
Euro-C STRATO 7106	705 : 1005 : 605	$MPE_E = (1,2 + 0,3L/100) \mu\text{m}$
Euro-C STRATO 9106	905 : 1005 : 605	$MPE_E = (1,3 + 0,3L/100) \mu\text{m}$
Euro-C STRATO 9166	905 : 1605 : 605	$MPE_E = (1,3 + 0,3L/100) \mu\text{m}$
Euro-C STRATO 162012	1605 : 2005 : 1205	$MPE_E = (3,8 + 0,4L/100) \mu\text{m}$
Euro-C STRATO 162015	1605 : 2005 : 1505	$MPE_E = (4,8 + 0,5L/100) \mu\text{m}$
Euro-C STRATO 163012	1605 : 3005 : 1205	$MPE_E = (3,8 + 0,4L/100) \mu\text{m}$
Euro-C STRATO 163015	1605 : 3005 : 1505	$MPE_E = (4,8 + 0,5L/100) \mu\text{m}$
Euro-C STRATO 164012	1605 : 4005 : 1205	$MPE_E = (3,8 + 0,4L/100) \mu\text{m}$
Euro-C STRATO 164015	1605 : 4005 : 1505	$MPE_E = (4,8 + 0,5L/100) \mu\text{m}$

\* According to ISO 10360-2 in the temperature range 18 °C to 22 °C; with SP 25 M (for 700 series and 900 series) with TP 200 (for 1600 series)



Request our detailed brochure!

### Specification

Accuracy: 0,35  $\mu\text{m}$  and 0,8  $\mu\text{m}$

## CNC-Coordinate Measuring Machines LEGEX

CNC machine with impressive accuracy to 0.35  $\mu\text{m}$ . Absolute top-of-the-range technology for the most stringent precision requirements in the test laboratory.

- An integrated Temperature Compensation System guarantees the accuracy of the CMM main unit under temperature conditions of 18 °C to 22 °C.
- High drive speed up to 200 mm/s.
- Integrated vibration suppression (from 500 series models).
- Highly rigid.
- Supplied as standard with PC and MCOSMOS software.



LEGEX 322 with PC



LEGEX 322



Request our detailed brochure!



LEGEX 774

Model	Measuring range X : Y : Z mm	Accuracy* L in mm
LEGEX 322	300 : 200 : 200	$MPE_E = (0,8 + 0,2L/100) \mu\text{m}$
LEGEX 574	510 : 710 : 455	$MPE_E = (0,35 + 0,1L/100) \mu\text{m}$
LEGEX 774	705 : 705 : 455	$MPE_E = (0,35 + 0,1L/100) \mu\text{m}$
LEGEX 776	705 : 705 : 605	$MPE_E = (0,35 + 0,1L/100) \mu\text{m}$

\* According to ISO 10360-2 in the temperature range 20 °C  $\pm$  2 K; LEGEX 322 with TP 7 M; from 500 series with MPP 300 Q

# CNC-Coordinate Measuring Machines LEGEX

CNC machine with impressive accuracy to 0.35 µm. Absolute top-of-the-range technology for the most stringent precision requirements in the test laboratory.

- An integrated Temperature Compensation System guarantees the accuracy of the CMM main unit under temperature conditions of 18 °C to 22 °C.
- High drive speed up to 200 mm/s.
- Integrated vibration suppression.
- Highly rigid.
- Supplied as standard with PC and MCOSMOS software.



LEGEX 9106



LEGEX 12128 with PC

Model	Measuring range X : Y : Z mm	Accuracy* L in mm
LEGEX 9106	905 : 1005 : 605	$MPE_E = (0,35 + 0,1 L/100) \mu\text{m}$
LEGEX 12128	1210 : 1210 : 805	$MPE_E = (0,6 + 0,15 L/100) \mu\text{m}$

\* According to ISO 10360-2 in the temperature range 20 °C ± 2 K; with MPP300Q

## Specification

Accuracy: 0,35 µm and 0,6 µm



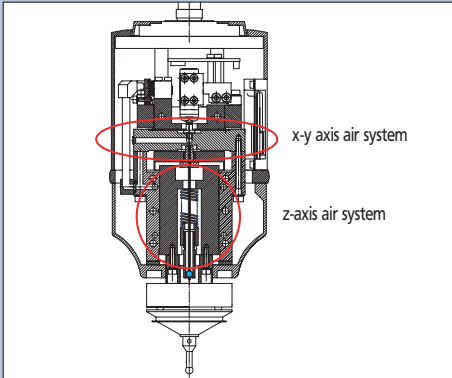
Request our detailed brochure!

# CNC-Coordinate Measuring Machines LEGEX

## Measuring probe and accessories

### Specification MPP-300Q

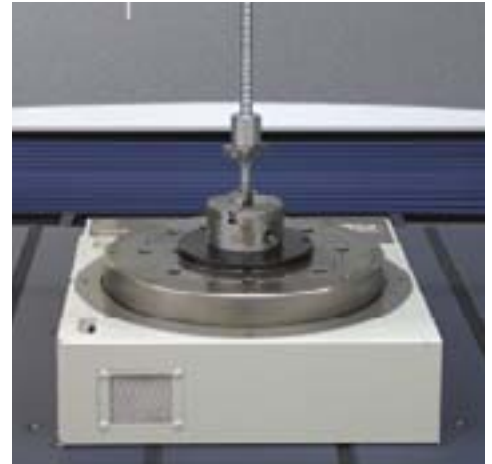
Measuring system resolution: 0,01  $\mu\text{m}$   
 Repeatability ( $\sigma$ ): 0,1  $\mu\text{m}$   
 Scanning force: 0,03 to 0,2 N  
 Measuring range:  $\pm 1$  mm (all axes)  
 Clamping function: all axes  
 Probe lengths: max. 200 mm horizontal/vertical  
 Location: secured in spindle sleeve



### Probe system MPP-300Q



### Turntable MRT-320



Can be used with all CMMs from X axis 500 mm

### Specification MRT-320

Table top size:  $\varnothing 320$  mm  
 Resolution: 1/100000°  
 Max. workpiece weight: 100 kg  
 Concentricity:  $\leq 1$   $\mu\text{m}$   
 Axial run-out:  $\leq 2$   $\mu\text{m}$



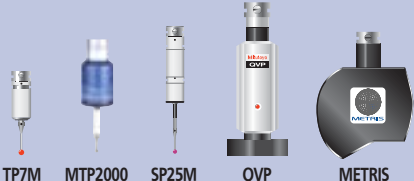

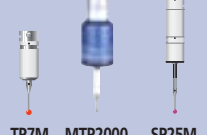
### Specification MTP-2000

Repeatability ( $\sigma$ ):  $\leq 0,075$   $\mu\text{m}$   
 Probe system error: 0,5  $\mu\text{m}$   
 Probe lengths: max. 50 mm horizontal,  
 max. 100 mm vertical  
 Fixing: Autojoint location

### Probe system MTP-2000



### Measuring Systems

Measuring head	With measuring probe	Measuring probe
<b>For LEGEX 500 / 700 / 900 / 1200</b>  SP80	Ultra high accuracy scanning probe SP80.	
 PH10MQ	High accuracy touch-trigger probe TP7M, MTP2000 High accuracy scanning probe SP25M Vision probe QVP METRIS XC / LC Line laser probe	 TP7M MTP2000 SP25M QVP METRIS
<b>For LEGEX 322</b>  PH6M	High accuracy touch-trigger probe TP7M, MTP2000 High accuracy scanning probe SP25M	 TP7M MTP2000 SP25M



Request our detailed brochure!

# CNC-Coordinate Measuring Machines MACH

CNC-Hi-speed, in-line coordinate measuring. Drive speed up to 1800 mm/s.

With its enormous stability and strength, ideal and uncomplicated for direct integration into the production process.

- Extremely high travel speed with maximum precision.
- Integrated thermal error compensation for measuring device and workpiece for use directly in the production environment.
- High probing speed up to 30 mm/s.
- Enormous stability and strength.
- Supplied as standard with PC and MCOSMOS software.



MACH V



MACH 806

## Specification

Accuracy: 2,5, 3,5 and 5,0 µm



MACH 403

Workpiece table optional

Model	Measuring range X : Y : Z mm	Accuracy* (L in mm) µm	Range of temperature	Probing speed	Drive speed
MACH-V 565	500 : 600 : 500	$E = (2,9 + 0,43L/100) \mu\text{m}$	15 to 35 °C	1–20 mm/s	max. 866 mm/s
MACH-V 796	700 : 900 : 600	$E = (2,9 + 0,43L/100) \mu\text{m}$	15 to 35 °C	1–20 mm/s	max. 866 mm/s
MACH-V 9106	900 : 1000 : 600	$E = (2,9 + 0,43L/100) \mu\text{m}$	15 to 35 °C	1–20 mm/s	max. 866 mm/s
MACH 403	460 : 460 : 300	$E = (3,5 + 0,4L/100) \mu\text{m}$ $E = (5,0 + 0,5L/100) \mu\text{m}$	15 to 25 °C 10 to 35 °C	1–30 mm/s	max. 1800 mm/s
MACH 806	1021 : 818 : 615	$E = (3,5 + 0,4L/100) \mu\text{m}$ $E = (5,0 + 0,5L/100) \mu\text{m}$	15 to 25 °C 10 to 35 °C	1–30 mm/s	max. 1800 mm/s

\* According to ISO 10360-2 with TP 7 M

## Integration of the MACH 806 into the Production.



MACH V



MACH 806



Request our detailed brochure!

# CNC-Coordinate Measuring Machines CARBapex and CARBstrato

Horizontal CNC coordinate measuring machines for the efficient measurement of bodywork.

- Two different models are available: CARBapex and CARBstrato.
- Single or dual arm measuring systems. Both systems can be synchronously controlled.
- New, high-precision technology for volumetric compensation.
- Software with additional functions, e.g. for the location of bores, edge measurements, for the checking of gap dimensions and for non-contact bodywork measurement (CAD-Compare).
- Supports a wide variety of probes such as touch-trigger probes, measurement probes, laser probes and vision probes (CCD camera).
- Guide range of the x axis dust protected and walkable.
- Collision monitoring with photoelectric barrier on the cross-arm (y axis) on the workpiece side and optional monitoring of the rear area on the cross-arm (CARBstrato).
- Supplied as standard with PC and MCOSMOS software.



CARBapex



CARBstrato

Model		CARBapex	CARBstrato
Measuring range mm	X	6000	6000
	Y	1600	1600
	Z	2400	2400
Accuracy MPE <sub>E</sub> *	Single TP2/TP20	(25 + 28 L/1000) μm; ≤ 95 μm	(18 + 20 L/1000) μm; ≤ 70 μm
	Dual TP2/TP20	(50 + 35 L/1000) μm; ≤ 120 μm	(38 + 30 L/1000) μm; ≤ 90 μm
Probing speed mm/s		1–5	1–10
Drive speed mm/s		max. 433	max. 866
Max. measuring range mm	X	18000	18000
	Single Y	2000	2000
	Dual Y	3900	3900
	Z	3500	3500

\* According to ISO 10360-2 (16 to 26 °C)

# Software System MCOSMOS

MCOSMOS is the MiCAT Technology modular software system for professional control, measurement and evaluation in coordinate measurement.

- Software packages and expansion modules for every requirement.
- With this high-end modular software system developed by Mitutoyo, you will have the capabilities of a variety of software packages and expansion modules at your fingertips. They can make comprehensive measurement evaluations, document and present them in an effective form. The data is archived into clear, practical structures. M-COSMOS 1 of course supplied as standard with all Crysta-Apex C coordinate-measuring machines.

**MiCAT**  
Mitutoyo Intelligent Computer Aided Technology

the standard in world  
metrology software  
**CMM**

MCOSMOS expansion modules



- Statistical evaluation module (MeasurLink)
- 2-D profile evaluation module (SCANPAK)
- Measuring module for involute gear profiles (GEARPAK)
- 3-D freeform surface module (3D-TOL)
- Coordinate measuring instruments – standard interface module (Pure DMISPAK/I++)
- Bearing surface evaluation module (MAFIS)
- NC correction value module (CORRECT PLUS)
- ... further modules on request.

## Features of the software packages

### PartManager

is the command centre that boots the software package and manages the parts program.

### Geometry module (GEOPAK)

For easy parts program generation (online/offline) supported by the CAD model with collision control.

### Online/offline programming module (CAT 300)

For control geometry and uncomplicated parts program generation (online/offline) supported by the CAD model with collision control.

### 3-D freeform surface module (3D-TOL)

For the automatic scanning of workpiece forms and for the preparation of setpoint/actual value comparisons from CAD model form surfaces and measuring points.

### 2-D profile evaluation module (SCANPAK)

for the automatic scanning of workpiece forms.

## MCOSMOS 1 MCOSMOS 2 MCOSMOS 3

PartManager	●	●	●
Geometry module (GEOPAK)	●	●	●
Online/offline programming module (CAT 300)		●	●
3-D freeform surface module (3D-TOL)			●
2-D profile evaluation module (SCANPAK)			●

Supports as standard all probe systems, turning and swivelling heads as well as probe change systems.

## MeasurLink®-Module



Real-Time\_Stat-Measure  
 Real-Time-Plus\_Stat-Measure-Plus  
 Process-Analyzer  
 Process-Manager  
 Gauge management (test and inspection instrument management)  
 Gauge RR (test and inspection instrument capability investigation)  
 Pocket-ML



Sample application

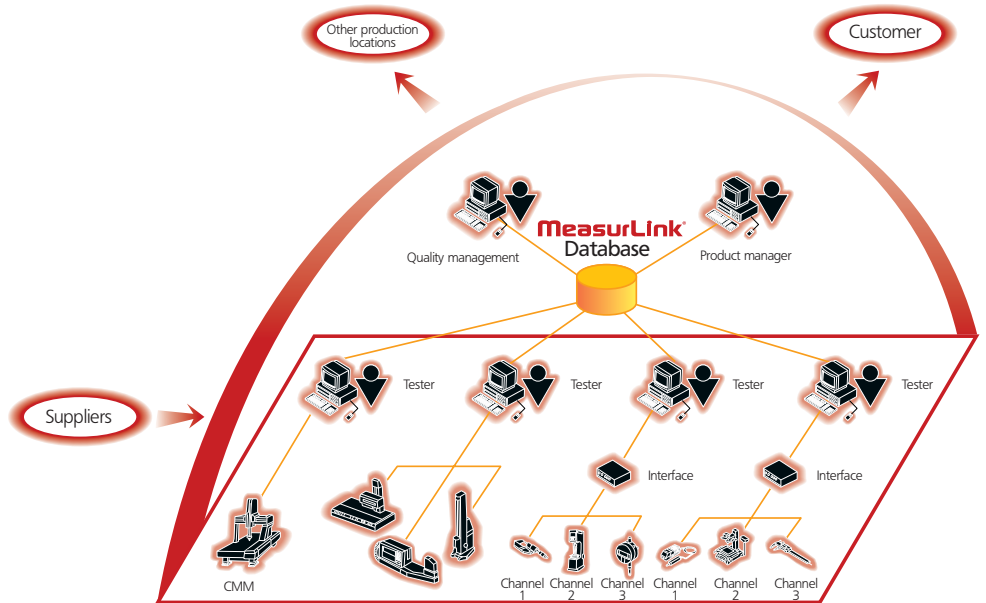


Sample application

# MeasurLink®

The complete solution for quality data processing with no limits.  
 Universal compatibility with custom functionality.

- MeasurLink® is the comprehensive software for the smooth acquisition, monitoring and evaluation as well as the exchange of quality data.
- MeasurLink® supports all Mitutoyo digital measuring systems – from calipers through to vision systems or coordinate measuring machines. Even data from analogue devices can be easily integrated into the process environment after manual acquisition. With its open program architecture, MeasurLink® can even process the measuring results from instruments from other manufacturers and incorporate them into its own work processes. This places the user in a whole new dimension of measured-data-assisted quality assurance.
- With MeasurLink®, all Mitutoyo measuring systems can now be combined in a single quality analysis system. Data obtained from various instruments is collated centrally, evaluated and efficiently documented according to need.



There is a full description of MeasurLink® on page 15.

## Indexible Fixture System REPRO-FIX

The REPRO-FIX flexible fixture system saves even more time and cost, and brings even greater accuracy to measurements in the production environment.

- No matter how specific the task, REPRO-FIX is perfect in combination with coordinate measuring machines. REPRO-FIX exclusive clamping technology is easy to take apart, either completely or in modules.
- The QUICK-RAIL expansion module for positioning REPRO-FIX units makes all this even easier and faster.

