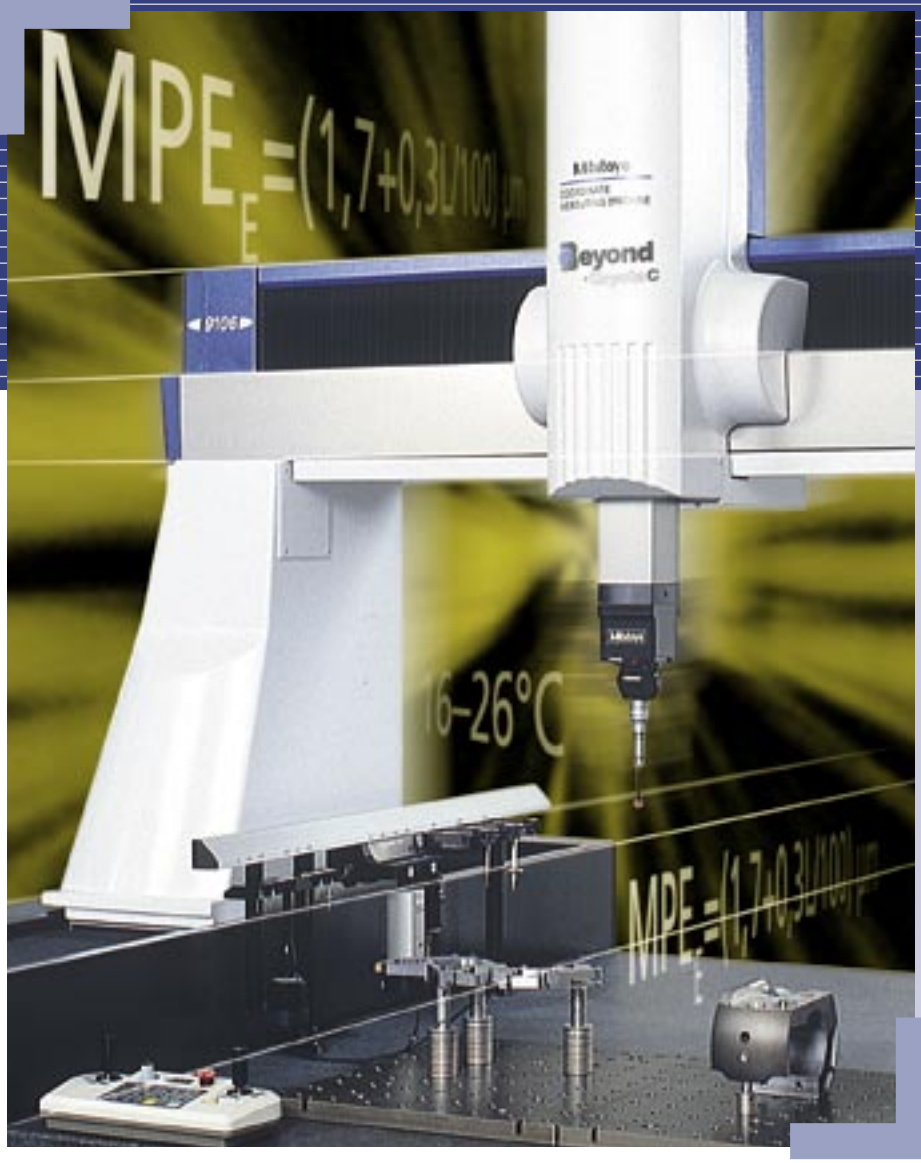
BEYOND-CRYSTA C

CNC Coordinate Measuring Machine

CATALOG No. E4248-191



The modular system for 3D CNC coordinate measurement in the production environment. Quick, versatile, and offering many variants with a broad selection of measuring ranges.

Mitutoyo

Systematic performance with future in mind

Beyond-Crysta C is more than just a powerful measuring machine. When you invest in this flexible and economical modular system for your production operations today, you'll also be taking care of the measuring tasks of tomorrow. With it, you'll be fully equipped to face the future. When change arrives, as it will, you won't have to replace all your instruments at once. You'll have the capability to meet the quality standards of tomorrow without incurring additional costs.

Intelligence

Modular. The modular system means that Beyond-Crysta C can be easily converted and upgraded, adapting to changing requirements as they arise, such as new customer specifications, new measuring tasks or new production conditions, without replacement of the measuring machine itself being necessary. You can react with flexibility, intelligence and economy - without forever having to invest in completely new systems.

Multiple sensors. With Beyond-Crysta C you have a multisensor-capable 3D coordinate measuring machine. This means that you can, without great expense, alternate between contact, optical (image processing) and laser systems. You can even use probe and sensor systems from other major manufacturers. This opens up the entire breadth of modern measuring techniques - all rolled into one intelligent system concept.

Integrated. With its fully automatic measuring sequences, Beyond-Crysta C can be perfectly integrated into the production process itself. Networking between production machines and a feedback system causes no difficulty either. Beyond-Crysta C, as a measuring island in production or in the test laboratory, will ensure absolute precision. Wherever and however you use this intelligent system, all you need is the appropriately configured software, and not, as has otherwise been the rule, a completely new measuring instrument for each application.

Mitutoyo

Beyond-Crysta C

Experience and innovation.
All rolled into one advanced system.

Production-orientated and integrated 3D CNC measurement requires particular performance specifications, outstanding robustness and absolute reliability. Beyond-Crysta C gets full marks with convincing advantages in terms of performance, stability and economic efficiency - another product of Mitutoyo's competence and experience.

Competence

Specially developed and equipped for demanding conditions, Beyond-Crysta C opens up new dimensions in reliable quality control. With a total of 13 variants in four series, there's a full range of perfect solutions whatever your requirements. There is also a very wide range of accessories from specially designed sensors through to a versatile clamping system.

Beyond-Crysta C comes with high-end MCOSMOS software with Mitutoyo Intelligent Computer Aided Technology (MiCAT) as standard, the user-friendly command centre for professional measuring and evaluation. Combined with numerous optional application-specific modules, MCOSMOS will rise with ease to any challenge, however demanding the specification.

Hardware or software, hard-and-fast conditions or more flexible requirements, Beyond-Crysta C will always give you the innovative lead you expect from Mitutoyo - and a view to the future too.



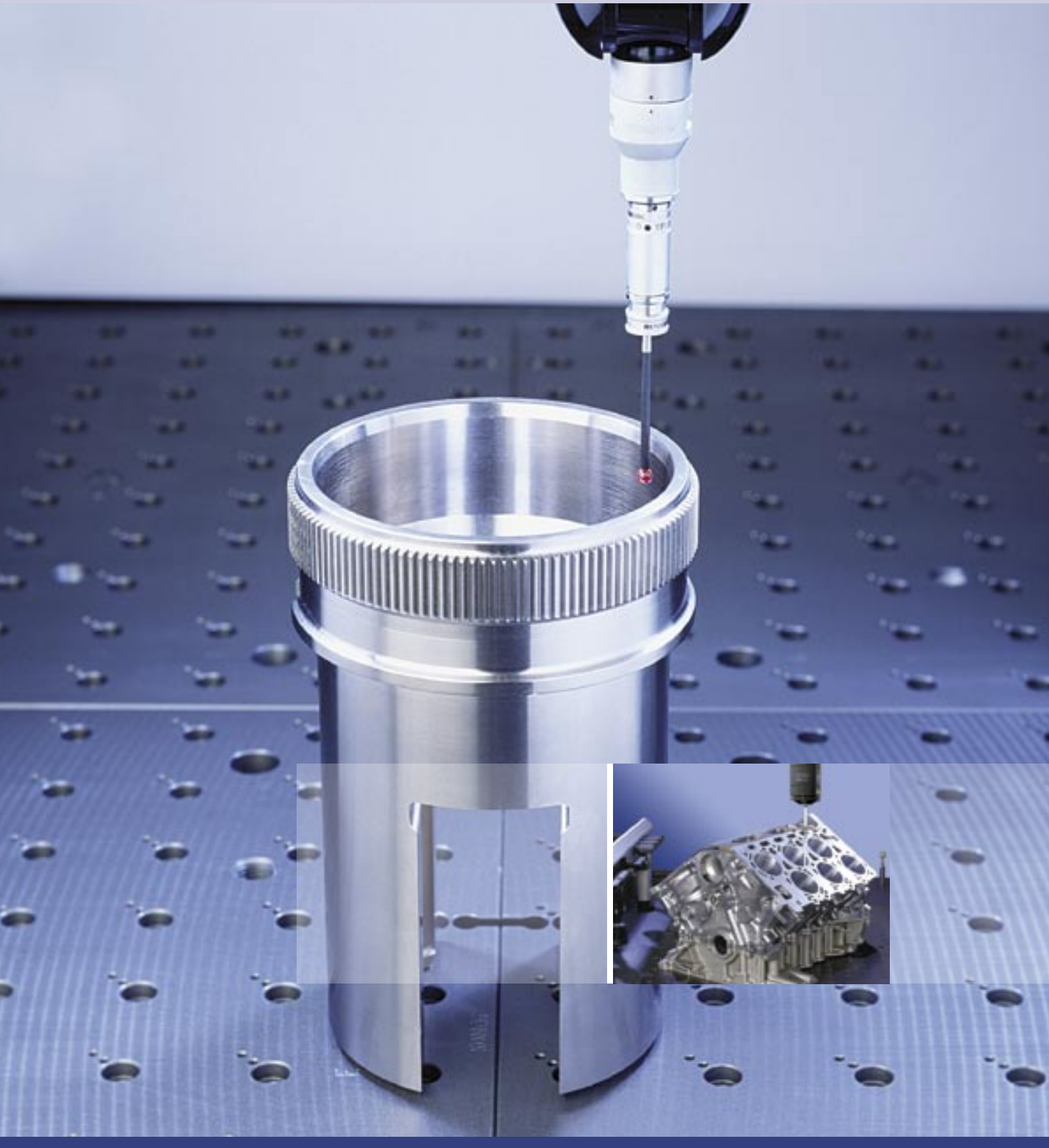
Mitutoyo

Competence

Mitutoyo offers a comprehensive range of clamping systems, loading equipment and thermo cabinets.



Beyond-Crysta C:
Greater quality, point for point

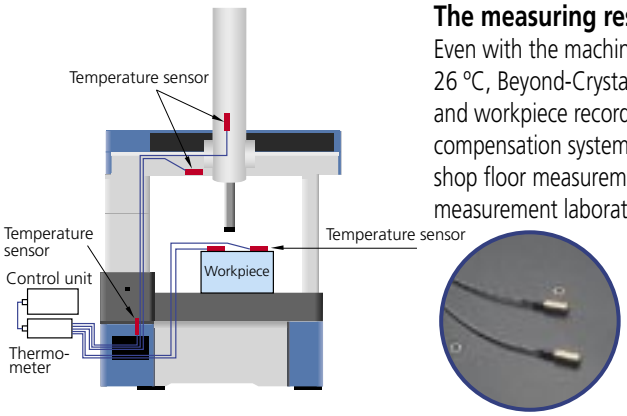


- Maximum drive speed 520 mm/s
- Length measuring accuracy 1.7 µm*
- Maximum acceleration 0.23 g
- Integrated thermal-effect compensation for instrument and workpiece in the temperature range 16 °C to 26 °C
- High precision (resolution: 0.1 µm), dustproof glass scales on all axes
- Self-adjusting air bearings on all axes
- Fully-digital servo control for low-vibration movements
- FEM-aided design ensures geometric accuracy and vibration resistance
- High-end software as standard
- Configuration to requirements: compatible with probe systems and sensors by other major manufacturers
- A perfect match provided by 13 variants in four series
- Space saving and light, compact design built with high quality materials
- Outstanding price/performance ratio

Performance

* For models with 50, 700 or 900 mm X-axis travel:
MPE_E = (1.7+0.3L/100) µm in the temperature range 18 °C to 22 °C with MPP-100 or SP25M probes
MPE_E = (1.9+0.4L/100) µm in the temperature range 16 °C to 26 °C with TP200 probe
For models with 1200 mm X-axis travel:
MPE_E = (2.3+0.3L/100) µm in the temperature range 18 °C to 22 °C with MPP100 or SP25M probes
MPE_E = (2.5+0.4L/100) µm in the temperature range 16 °C to 26 °C with TP200 probe

Beyond-Crysta C: Top-class technology. Perfection as standard.



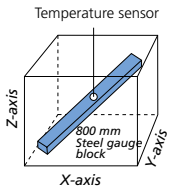
The measuring results are stable even when temperatures fluctuate

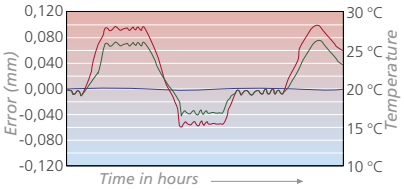
Even with the machine environment and the workpiece temperature fluctuating between 16 °C and 26 °C, Beyond-Crysta C measures as if thermal conditions were stable. Sensors on the Beyond-Crysta C and workpiece record temperature variations and feed the information to the automatic thermal-effect compensation system, which then corrects all measurements back to 20 °C in real time. This results in shop floor measurements being made to a level of accuracy only possible otherwise in thermally stable measurement laboratories.

Intelligent

Corrections made clear

Temperature-dependent correction using an 800 mm steel gauge block as an example - measured with alternating environmental temperatures diagonally in the room.



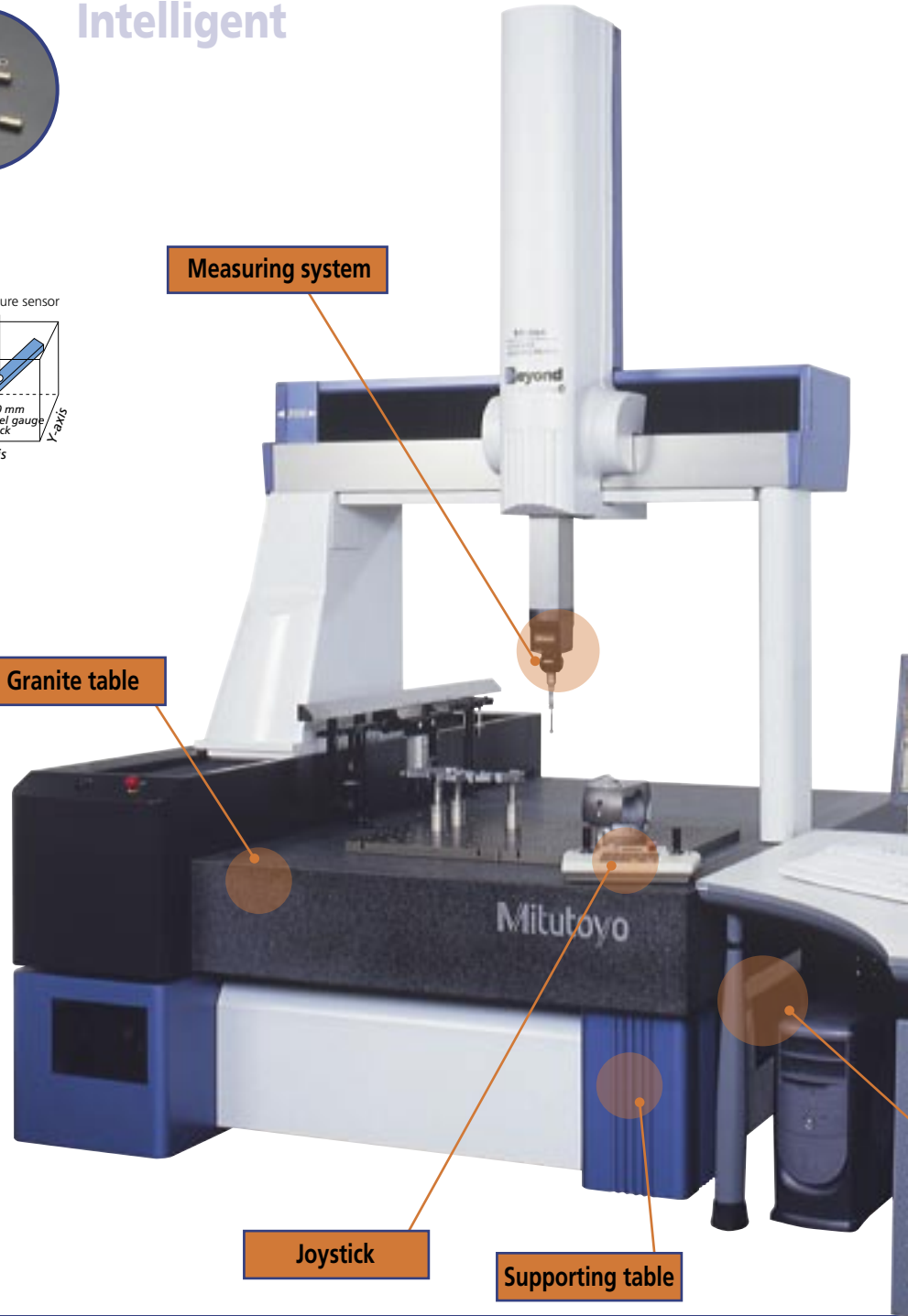


- Temperature curve of the gauge block in °C
- Expansion of the gauge block on the basis of the temperature curve in µm
- Compensated measuring data for the gauge block

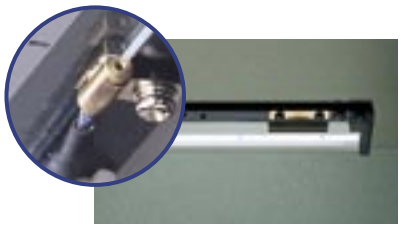
A perfect match

13 variants in four series

With a total of 13 variants in four series with bridge (X axis) travel between 500 and 1200 mm, the Beyond-Crysta C series opens up an outstandingly wide choice of applications. Even users with highly specific measuring requirements will surely find a configuration to match their needs.



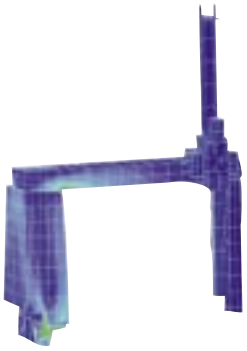
Mitutoyo



Dustproof glass scales
Beyond-Crysta C has high-precision dustproof glass scales with a resolution of 0.1 µm. Sensors on the scales provide temperature compensation, a feature that makes Beyond-Crysta C particularly suitable for use in a harsh production environment.

Precise

Modern technology for accurate guidance
Finite element method (FEM) analysis was used to achieve a highly rigid bridge structure design that ensures exceptional guideway straightness and good suppression of vibrations. The high thermal conductivity of the aluminium guideways helps prevent deflection and twisting due to thermal-gradient effects.



Stable

Perfection

Compact

Space-saving and light
Beyond-Crysta C does not require any special constructual prerequisites at the installation site. Thanks to particularly high-quality lightweight materials and space-saving dimensions, a hard and stable mounting surface with normal machine-standard foundations is quite sufficient.

Superior

Air bearings on all axes
Self-adjusting air bearings on all axes allow Beyond-Crysta C to move the probe with outstanding smoothness, speed and precision. They form the basis for absolute measuring accuracy.

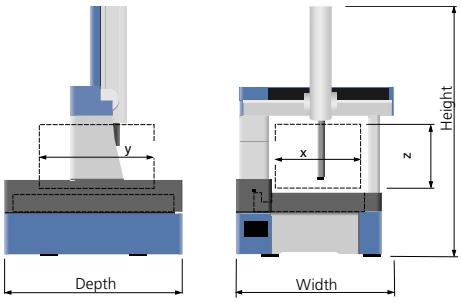
Quick

Speed and acceleration
With a maximum acceleration of 0.23 g and a drive speed of up to 520 mm/s, Beyond-Crysta C sets the standard in its class.

Controlled

Dynamism and flexibility with fully digital drive control
The Beyond-Crysta C drive control works with an extremely high-performance 32-bit Digital Signal Processor. It perfectly controls digital signals of all control circuits, drive movements, positioning and speed, to give maximum measuring quality. Control algorithms for accessory devices can also be installed quickly and easily.

Quality with complete versatility



Series 500

Series 700

			544	574	776	7106
Measuring range		X axis	505 mm	505 mm	705 mm	705 mm
		Y axis	405 mm	705 mm	705 mm	1005 mm
		Z axis	405 mm	405 mm	605 mm	605 mm
Workpiece clamping		No. of M8 threaded holes	9	13	10	13
Workpiece		Max. workpiece height	545 mm		800 mm	
		Max. table loading	180 kg		800 kg	1000 kg
Accuracy ISO 10360-2	16 - 26 °C	TP200	MPE_E=(1.9+0.4L/100) µm		MPE_E=(1.9+0.4L/100) µm	
		MPP-100 / SP25M	MPE_E=(1.7+0.4L/100) µm (only SP25M)		MPE_E=(1.7+0.4L/100) µm	
	18 - 22 °C	TP200	MPE_E=(1.9+0.3L/100) µm		MPE_E=(1.9+0.3L/100) µm	
		MPP-100 / SP25M	MPE_E=(1.7+0.3L/100) µm (only SP25M)		MPE_E=(1.7+0.3L/100) µm	
Accuracy ISO 10360-4		MPP-100	—		MPE_{THP}=3.0 µm / MPT_τ=110 s	
		SP25M	MPE_{THP}=2.3 µm / MPT_τ=110 s		MPE_{THP}=2.3 µm / MPT_τ=110 s	
		SP80	—		MPE_{THP}=2.0 µm / MPT_τ=120 s	
Resolution		Length measuring system	0.1 µm		0.1 µm	
Guidance			Air bearings on all axes		Air bearings on all axes	
Drive speed		CNC mode	8 to 300 mm/s (max. 520 mm/s)		8 to 300 mm/s (max. 520 mm/s)	
		Joystick	Rapid drive mode: max. 80 mm/s		Rapid drive mode: max. 80 mm/s	
			Slow drive mode: 0.05 mm/s		Slow drive mode: 0.05 mm/s	
Measuring speed			1 to 8 mm/s (CNC)		1 to 8 mm/s (CNC)	
Acceleration			Per axis 0.13 G (max. 0.23 G)		Per axis 0.13 G (max. 0.23 G)	
Measuring table		Material	Granite		Granite	
		Dimensions	638 x 860 mm	638 x 1160 mm	880 x 1420 mm	880 x 1720 mm
Air supply		Consumption/air pressure	Approx. 12.5 l/min at 0.4 MPa		Approx. 15.0 l/min at 0.4 MPa	
Machine dimensions		Width	1082 mm		1470 mm	
		Depth	1122 mm	1458 mm	1650 mm	1950 mm
		Height	2185 mm		2730 mm	
Machine mass incl. supporting table and controller			515 kg	625 kg	1675 kg	1951 kg

Mitutoyo

Series 900

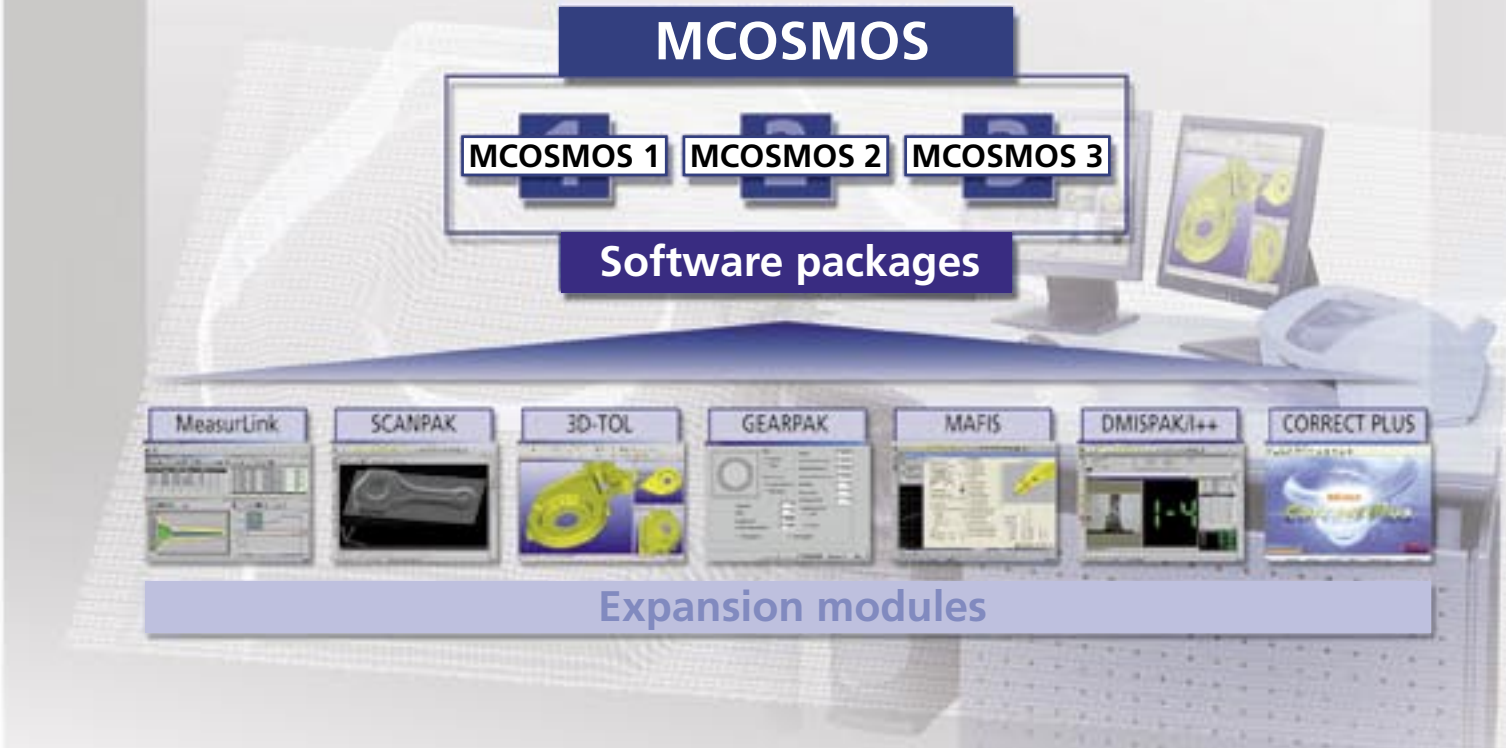
Series 1200

9106/9108	9166/9168	9206/9208	121210	122010	123010
905 mm	905 mm	905 mm	1205 mm	1205 mm	1205 mm
1005 mm	1605 mm	2005 mm	1205 mm	2005 mm	3005 mm
605 mm / 805 mm	605 mm / 805 mm	605 mm / 805 mm	1005 mm	1005 mm	1005 mm
13	18	23	16	24	36
800 mm / 1000 mm			1200 mm		
1200 kg	1500 kg	1800 kg	2000 kg	2500 kg	3000 kg
MPE_E=(1.9+0.4L/100) µm			MPE_E=(2.5+0.4L/100) µm		
MPE_E=(1.7+0.4L/100) µm			MPE_E=(2.3+0.4L/100) µm		
MPE_E=(1.9+0.3L/100) µm			MPE_E=(2.5+0.3L/100) µm		
MPE_E=(1.7+0.3L/100) µm			MPE_E=(2.3+0.3L/100) µm		
MPE_{THP}=3.0 µm / MPT_τ=110 s			MPE_{THP}=3.5 µm / MPT_τ=110 s		
MPE_{THP}=2.3 µm / MPT_τ=110 s			MPE_{THP}=2.8 µm / MPT_τ=120 s		
MPE_{THP}=2.0 µm / MPT_τ=120 s			MPE_{THP}=2.8 µm / MPT_τ=120 s		
0.1 µm			0.1 µm		
Air bearings on all axes			Air bearings on all axes		
8 to 300 mm/s (max. 520 mm/s)			8 to 300 mm/s (max. 520 mm/s)		
Rapid drive mode: max. 80 mm/s			Rapid drive mode: max. 80 mm/s		
Slow drive mode: 0.05 mm/s			Slow drive mode: 0.05 mm/s		
1 to 8 mm/s (CNC) / 1 to 3 mm/s (CNC)			1 to 5 mm/s (CNC)		
Per axis 0.13 G (max. 0.23 G) / Per axis 0.1 G (max. 0.17 G)			Per axis 0.1 G (max. 0.17 G)		
Granite			Granite		
1080 x 1720 mm	1080 x 2320 mm	1080 x 2720 mm	1400 x 2165 mm	1400 x 2965 mm	1400 x 3965 mm
Approx. 15.0 l/min at 0.4 MPa			Approx. 25.0 l/min at 0.4 MPa		
1670 mm			2200 mm		
1950 mm	2690 mm	3090 mm	2420 mm	3220 mm	4220 mm
2730 mm / 3130 mm			3630 mm		
2231 kg / 2261 kg	2868 kg / 2898 kg	3912 kg / 3942 kg	4050 kg	6150 kg	9110 kg

Software packages and expansion modules to meet every requirement

MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
cmm

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



The high-end MiCAT software suite developed by Mitutoyo puts the capabilities of a variety of powerful software packages at your fingertips. Available to suit any purpose, from basic geometry measurement to digitising complex profiles and surfaces, measurement results can be presented in a professional manner using a powerful protocol design function to give concise reports in a variety of adaptable formats. MiCAT promotes real cost-effectiveness by allowing you to purchase only the software functionality you want.

MCOSMOS 1 is supplied as standard equipment with all coordinate measuring machines and you have the choice of using the product as is, upgrading with optional modules or buying extra functionality from the outset with MCOSMOS 2 or MCOSMOS 3, both of which can be upgraded to suit your needs.

Mitutoyo

Professional

Software package features

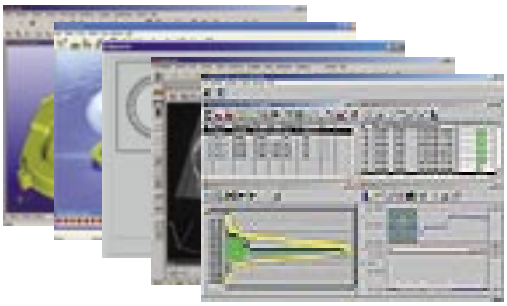
	MCOSMOS 1	MCOSMOS 2	MCOSMOS 3
PartManager The command centre that manages the MCOSMOS software modules.	●	●	●
Geometry (GEOPAK) For easy part-program generation (online/offline) and measurement of geometric components combined with flexible protocol reporting.	●	●	●
Online/offline programming (CAT 300) Allows easy part-program generation (online/offline) supported by the use of CAD data for rapid programming and collision detection.		●	●
3-D Freeform Surface Analysis (3D-TOL) Enables automatic analysis of surface form using CAD data to provide nominal/actual comparisons.			●
2-D profile Evaluation and 3D Digitising (SCANPAK) Combines autmatic scanning of workpiece profiles and 3D surface digitising capabilities.			●

Support for all available probe systems, rotary/swivel heads as well as probe-change systems comes as standard (see following page).

MCOSMOS expansion modules

Statistical evaluation module (MeasurLink)
2-D Profile evaluation module (SCANPAK)
Measuring and evaluation module for involute gear profiles (GEARPAK)
3-D freeform surface evaluation module (3D-TOL)
Coordinate measuring instruments - standard interface module (Pure DMISPAK/I++)
Aerofoil evaluation module (MAFIS)
NC Compensation value module (CORRECT PLUS)

... further modules on request



Quality and versatility in every case: Mitutoyo measuring systems

Contact measuring systems

Touch-trigger probe heads
for single point or multipoint measurement

Dynamically measuring probe heads
for single point or multipoint measurement

Manual, stepless, Rotating measuring head with separate measuring probe.	Rigid measuring system. Measuring head with separate measuring probe.	Motorised rotating and swivelling measuring system.	Measuring head with separate measuring probe. Compact measuring system.	Motorised rotating and swivelling measuring system.
PH1 TP200	PH6M PAA1 Adapter TP7 TP200	PH10MQ PH10M PAA1 Adapter TP200 TP7	PH10T TP200	MPP-100	SP80	PH10MQ PH10M Special measuring probes for effective thread length measurement MPP-10 SP25M
SCR200	ACR1 / MRS-ACR3 / SCR200	SCR200	MRS-SCRMPP	MRS-SCP80	ACR1 / FCR25 / MRS-ACR3

Probe exchange systems

Probe exchange system overview:

ACR1

SCR200

MRS-SCP80

MRS-FCR25

SCRMPP

MRS-ACR3

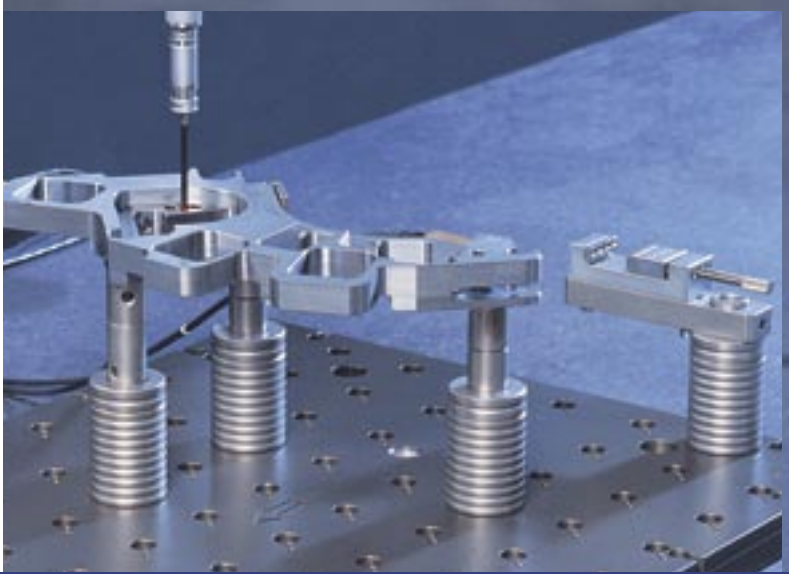
Versatile

Optical (non-contact) measuring systems

Video measuring head for single point or multipoint measurement.	**Laser measuring systems** for single point measuring, contour measuring and digitisation.
Video measuring heads, also in combination with other measuring systems.	Laser-scan measuring heads, also in combination with other measuring systems.

ACR1 / MRS-ACR3

Probe exchange systems



With Mitutoyo's coordinate measuring machines, you can be sure of gaining the competitive edge provided by the experience and expertise of the world's leading specialist in production measurement technology. You are also benefiting from knowledge accumulated over decades for the tasks of tomorrow. Setting the highest standards in quality, performance and progress.

- Coordinate Measuring Machines
- Vision Measuring Systems
- Surface-, Form- and Contour-Measurement
- Optical Measuring
- Sensor Systems
- Hardness Measuring
- Digital Scale and DRO Systems
- Small Tool Instruments and Data Management

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

Mitutoyo

78.000502 (2) AeBS, Printed in Japan