

CRYSTA-APEX S



A CMM to meet the challenges of today's production environment.

Mitutoyo

Crysta-Apex S

Precision – Speed – Flexibility

Measuring equipment performance is being challenged as never before. Manufactured products are continuously improving in terms of increased lifetime and decreased energy consumption, often achieved through the application of tighter tolerances, and the ubiquitous Coordinate Measuring Machine now meets these challenges.

In the CRYSTA-Apex S, Mitutoyo offers you an advanced CMM capable of making very accurate measurements at high speed. It's also a future-proof investment since probe systems and software can easily be changed, or added to the system, whenever required. In short, CRYSTA-Apex S provides precision, speed and flexibility.

Precision

The CRYSTA-Apex S is based on proven construction principles optimized to reduce adverse dynamic effects within the system. Dedicated software algorithms guarantee high accuracy by eliminating even miniscule geometrical imperfections in the guideways.

The integrated thermal compensation system enables measurement at temperatures varying between 16 and 26°C by automatically calculating and presenting measurement results as if they were made at the standard reference temperature (20°C). This system works even when temperature gradients of 1 K per metre and per hour are experienced.

Optional active vibration damping makes it possible to locate the CMM in the vicinity of a production line. This can enhance overall measuring efficiency by reducing the time taken to transport workpieces to and from the machine.



Crysta-Apex S

Speed

The CRYSTA-Apex S is equipped with a brand new controller, the UC-400. The UC-400 allows high speed measurements and movements with impressive accuracies. This increases throughput and helps you to save costs.

Flexibility

The CRYSTA-Apex S offers you a fully flexible 3D measuring machine, one that can be equipped with almost any kind of probe, such as:

- Touch-trigger probes
- Scanning probes
- Laser scanners like Mitutoyo's new SurfaceMeasure
- Vision probe QVP



All probe configurations can be changed automatically within a measurement cycle. There are many different kinds of probe changer available to meet the requirements of your application.

The typical home of the CRYSTA-Apex S is the measuring room but, due to easy connectivity to conveyors and robot loading systems, this machine is also a perfect fit for automated measurement applications.










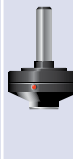
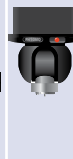










Mitutoyo offers you a wide range of ball styli starting at 0.3 mm diameter, up to disk styli of 35 mm diameter, and with shank lengths from 10 to 150 mm. There's almost certainly an off-the-shelf stylus available for any of your measuring tasks.

Mitutoyo has an excellent reputation for its innovative, own-design and manufactured, high-performance optics. Optical probes, such as the QVP, are offered with different magnifications to enable effective inspection of practically any workpiece.

And flexibility doesn't stop with the hardware: Mitutoyo's MCOSMOS software suite dedicated to CMMs can be customized to suit the way you work. Geometrical measurements, CAD based programming (on- and off-line), PMI data, 2D and 3D comparisons, individual reports to meet your customers needs, data output to other systems such as MeasurLink SPC software are all supported. Even special settings to meet the requirements of FDA 21 part 11 are offered as standard.

Probe systems





Performance – Versatility – Choice

Contact									Non-contact					
Touch-Trigger					Scanning				Vision			Laser Scanning		
Fixed	Indexing	Fixed	Indexing		Fixed	Indexing			Fixed	Indexing		Fixed	Indexing	
PH1	PH10T	PH6M	PH10M	PH10MQ	SP80	PH6M	PH10M	PH10MQ	PH6M	PH10M	PH10MQ	PH6M	PH10M	PH10MQ
														
														
TP200	PAA1+TP200	TP7M				SP25M			QVP			Surface Measure		
SCR200	ACR1	ACR3	SCR200		SCP80	ACR1	FCR25	ACR3	ACR1	ACR3		ACR1	ACR3	
Changer														

Mitutoyo offers the measurement system that best fits your measurement task

- Tactile scanning probes such as SP25M or SP80 for fast measurement with high point density
- High precision, touch-trigger probes with a tip size down to 0.3 mm for probing the smallest features
- Vision systems for fast 2½D measurement
- Laser scanning probes for inspection and reverse engineering tasks
- Automatic changing racks to maximise machine efficiency

Probe changing systems

ACR-1	MRS-ACR3	SCRMP	SCR200	MRS-FCR25
				

MCOSMOS – modular software for all kinds of measurement

- › Organize measurement programs on the network, add pictures of workpiece and fixture positions
- › Add commands and instructions to guide the operator
- › Create individual reports that meet your customers needs
- › Archive results in file formats such as pdf, xls, HTML and many others
- › Implement SPC with MeasurLink or export data to QS-Stat or CAQ-systems like Böhme & Weihs.
- › Export geometric elements to CAD systems
- › Revision Management for authorised usage of validated part programs is standard
- › Meet the requirements of FDA title 21 CFR Part II without extra costs



MCOSMOS packages

MCOSMOS-1 The Basic software package for prismatic workpieces

Easy programming of geometrical elements by joystick control or nominal value input. Special features such as clearance height and automatic element recognition help prevent collisions and reduce programming time.

MCOSMOS-2 The CAD package for freeform surfaces and geometric elements

There is no need to enter geometric parameters when all information is already available in the CAD model. CAD based programming offers you the way to cut down programming time. GD&T entities inside the CAD file helps to characterise all essential features.

MCOSMOS-3 The Full package.

Provides additional tools for evaluation of contours in 2D or on the CAD model.

VIRTUAL MCOSMOS

All three packages above are available as offline versions. Programming in offline mode keeps the CMM free for real measurements. Since you only need the CAD file for programming, you don't even have to wait for the first part to be produced. Many interfaces like CATIA or PRO/E are available to enable import of CAD models directly. VIRTUAL MCOSMOS-2 can be ordered as a multi-licence package for 5 or 10 users.

Additional software packages

MeasurLink

SPC software with a certified AQDEF interface that enables you to collect data originating from machines of different manufacture. The associated database allows you to collect data from anywhere, analyze your process and create individual reports.

Correct Plus

Software for automatic feedback of correction data to connecting NC machining centres with any measurement equipment, e.g. CMM, small tools, transducers or analogue probes.

Gearpak

Turn your CMM into a gear measuring machine! Extend your capabilities, measure spur gears, worm gears, helical gears. Just input the gear parameters and the rest will be done by Gearpak: measurement strategy, path generation, probe changes, and of course the measurement report on your gear.

Roundpak CMM

Special evaluation tool for handling scanning measurements typically from form-measuring instruments. Topographic views and evaluation of form and positional deviations.

Geo_EDM

Captures the offset data of your EDM tools and workpieces. Geo_EDM is the solution for measuring typical geometries in the EDM field, determining offset values and transferring them into special EDM formats. Many different vendor formats such as Charmilles, System 3R, Ingersoll and Mitsubishi are supported.

Crysta-Apex S

Specifications

Model		S544	S574	S776	S7106
Maximum permissible error MPE _E according to ISO 10360- 2:2002, (within Thermal Limits 1)	TP200	(1.9 + 0.3L/100) µm*			
	SP25M/SP80	(1.7 + 0.3L/100) µm*			
Maximum permissible error MPE _E according to ISO 10360- 2:2002, (within Thermal Limits 2)	TP200	(1.9 + 0.4L/100) µm*			
	SP25M/SP80	(1.7 + 0.4L/100) µm*			
Maximum permissible probing error MPE _P according to ISO 10360-2:2002	TP200	1.9 µm			
	SP25M/SP80	1.7 µm*			
Maximum permissible scanning error MPE _{THP} and scanning time according to ISO 10360-4:2002	SP25M/SP80	2.0 µm (110 s)			
Measuring range	X axis	505 mm		705 mm	
	Y axis	405 mm	705 mm		1005 mm
	Z axis	405 mm		605 mm	
Resolution		0.0001 mm (0.1 µm)			
Guide method		Air bearings on each axis			
Drive speed	8 - 300 mm/s (CNC mode), max. speed: 519 mm/s				
	0 - 80 mm/s (I/S mode: high)				
	0 - 3 mm/s (I/S mode: low)				
	0.05 mm/s (I/S mode: fine feed)				
Max. measuring speed		8 mm/s			
Max. drive acceleration		Each axis: 1,333 mm/s ² , max. combined acceleration: 2,309 mm/s ²			
Table loading	Max. height	545 mm		800 mm	
	Max. mass	180 kg		800 kg	1000 kg
Mass (including the control device and installation platform)		515 kg	625 kg	1675 kg	1951 kg
Air supply	Pressure	0.4 MPa			
	Consumption	50 L/min under normal conditions (air source: 100 L/min)		60 L/min under normal conditions (air source: 120 L/min)	
Dimensions	A	3200 mm	3500 mm	3300 mm	3600 mm
	B	1122 mm	1458 mm	1650 mm	1950 mm
	C	173.5 mm		420 mm	470 mm
	D	713 mm	1013 mm	800 mm	1000 mm
	E	2900 mm			
	F	1082 mm		1470 mm	
	G	722 mm		800 mm	
	H	2185 mm		2730 mm	
	I	550 mm		810 mm	
	J	750 mm		700 mm	

* L = measured length in mm

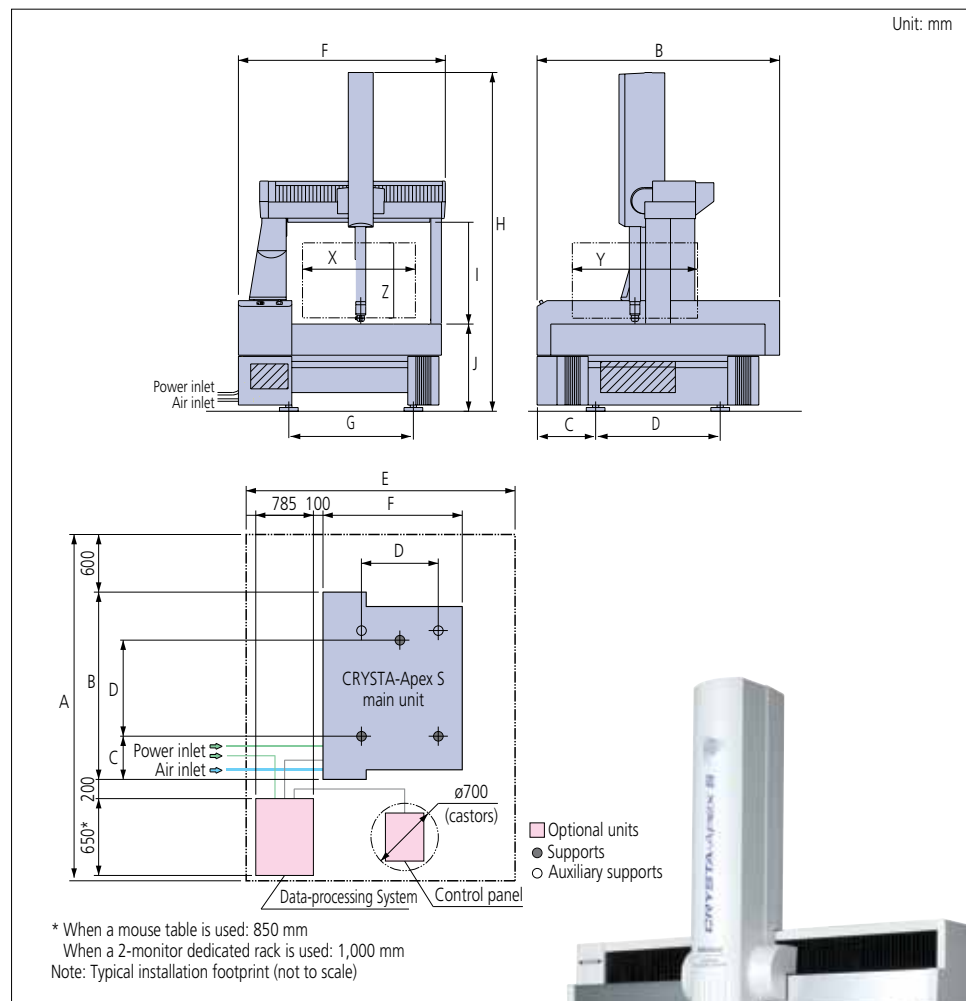
Installation environment		Thermal Limits 1	Thermal Limits 2
Limits within which accuracy is guaranteed	Temperature range	18 - 22 °C	16 - 26 °C
	Rate of change	1 K per hour or less	
	Gradient	2 K in 24 hours or less	5 K in 24 hours or less
		1 K or less per metre	

S9106	S9108	S9166	S9168	S9206	S9208	S121210
(1.9 + 0.3L/100) μm*						
(1.7 + 0.3L/100) μm*						
(1.9 + 0.4L/100) μm*						
(1.7 + 0.4L/100) μm*						
1.9 μm						
1.7 μm						
2.0 μm (110 s)						
905 mm						
1005 mm		1605 mm		2005 mm		1205 mm
605 mm	805 mm	605 mm	805 mm	605 mm	805 mm	
0.0001 mm (0.1 μm)						
Air bearings on each axis						
8 - 300 mm/s (CNC mode), max. speed: 519 mm/s						8 - 400 mm/s
0 - 80 mm/s (I/S mode: high)						
0 - 3 mm/s (I/S mode: low)						
0.05 mm/s (I/S mode: fine feed)						
8 mm/s	3 mm/s	8 mm/s	3 mm/s	8 mm/s	3 mm/s	
Each axis: 1,333 mm/s ² , max. combined acceleration: 2,309 mm/s ²	Each axis: 1,000 mm/s ² , max. combined acceleration: 1,732 mm/s ²	Each axis: 1,333 mm/s ² , max. combined acceleration: 2,309 mm/s ²	Each axis: 1,000 mm/s ² , max. combined acceleration: 1,732 mm/s ²	Each axis: 1,333 mm/s ² , max. combined acceleration: 2,309 mm/s ²	Each axis: 1,000 mm/s ² , max. combined acceleration: 1,732 mm/s ²	Each axis: 1,000 mm/s ²
800 mm	1000 mm	800 mm	1000 mm	800 mm	1000 mm	
1200 kg		1500 kg		1800 kg		2000 kg
2231 kg	2261 kg	2868 kg	2898 kg	3912 kg	3942 kg	4050 kg
0.4 MPa						
60 L/min under normal conditions (air source: 120 L/min)						100 L/min under normal conditions
3600 mm		4300 mm		4700 mm		3995 mm
1950 mm		2690 mm		3090 mm		2545 mm
470 mm		700 mm		800 mm		420 mm
1000 mm		1320 mm		1500 mm		1700 mm
3200 mm						
1670 mm						
1000 mm						
2730 mm	3130 mm	2730 mm	3130 mm	2730 mm	3130 mm	
800 mm	1000 mm	800 mm	1000 mm	800 mm	1000 mm	
700 mm						

Specifications

S122010	S123010
$(2.5 + 0.3L/100) \mu\text{m}^*$	
$(2.3 + 0.3L/100) \mu\text{m}^*$	
$(2.5 + 0.4L/100) \mu\text{m}^*$	
$(2.3 + 0.4L/100) \mu\text{m}^*$	
2.2 μm	
2.0 μm	
2.8 μm (50 s)/2.5 μm (50 s)	
1205 mm	
2005 mm	3005 mm
1005 mm	
0.0001 mm (0.1 μm)	
Air bearings on each axis	
mm/s (CNC mode), max. speed: 693 mm/s	
0 - 80 mm/s (I/S mode: high)	
0 - 3 mm/s (I/S mode: low)	
0.05 mm/s (I/S mode: fine feed)	
5 mm/s	
mm/s ² , max. combined acceleration: 1,732 mm/s ²	
1200 mm	
2500 kg	3000 kg
6150 kg	9110 kg
0.4 MPa	
der normal conditions (air source: 150 L/min)	
4795 mm	5795 mm
3345 mm	4345 mm
725 mm	920 mm
1890 mm	2500 mm
3585 mm	
2200 mm	
1345 mm	
3645 mm	
1200 mm	
600 mm	

DIMENSIONS



Crysta-Apex S 9106

Precision **Precision**



Mitutoyo

Coordinate Measuring Machines	1
Vision Measuring Systems	2
Form Measurement	3
Optical Measuring	4
Sensor Systems	5
Test Equipment and Seismometers	6
Digital Scale and DRO Systems	7
Small Tool Instruments and Data Management	8

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