

# CRYSTA-APEX S

PRE 1374



The high performance CMM

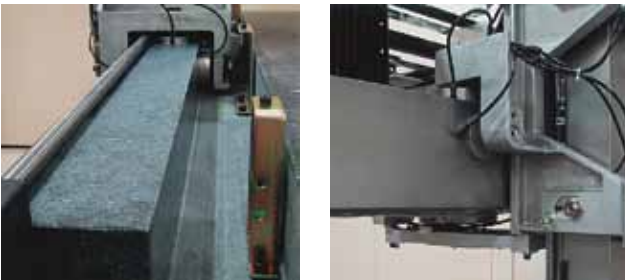
**Mitutoyo**

# Precision - Speed - Flexibility: Crysta-Apex S

The challenges for measurement equipment are rising. Products are continuously improving – as a result the lifetime is increasing while the energy consumption is reduced. These targets lead to smaller tolerances. Additionally, the throughput of the production is driven up. All these facts must be taken into account for your measuring equipment.

With the CRYSTA-Apex S CMM series, Mitutoyo offers you a high accuracy CMM capable to measure at high speed and acceleration. It's also an investment for the future since probe systems and software can easily be changed, or added. To say it with just 3 words: CRYSTA-Apex S offers you precision, speed and flexibility.

## Precision



The CRYSTA-Apex S is based on a proven construction optimized to reduce the dynamic behaviour of the system. Special algorithms help to increase the accuracy by eliminating the mechanical deviations of the CMM.

The integrated temperature compensation enables you to measure at alternating temperature conditions between 16 and 26°C - the measurement results will automatically be corrected to the reference temperature of 20°. Temperature gradients of 1K per meter and hour are possible.

Optional active vibration damping offers you to locate the CMM near the production. This brings you fast measurement results and reduces the dynamic effects from the production.



# Crysta-Apex S

## Speed:

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

## Flexibility

With the CRYSTA-Apex S, Mitutoyo offers you a fully flexible 3D measuring machine. The CRYSTA-Apex S can be equipped with almost every kind of probe:

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



All the probe configurations can be changed automatically within a measurement cycle. There are many different kinds of probe changers available to meet your needs. This reduces the downtime of your CMM.

The typical home of the CRYSTA-Apex S is the measuring room, but it is also a perfect choice for automated measurement solutions. The CRYSTA-Apex S can easily be connected to loading systems like conveyers or robots.

Mitutoyo offers you a wide range of styli starting at diameters of 0.3 mm up to disk styli with diameters of 35 mm, lengths from 10 mm up to 150 mm. There's probably a stylus for all of your measuring tasks. Go for the Mitutoyo quality!







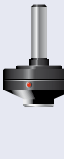


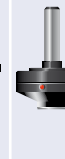


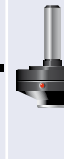








Mitutoyo is very proud of its optical components since they have a high reputation on the market. For optical probes like the QVP we offer optics in different magnifications catching the essential features of your parts.

The flexibility doesn't stop with the hardware - also Mitutoyo's CMM software MCOSMOS can be modified the way you need it. Geometrical measurements, CAD based programming - on and offline. PMI data, 2D and 3D compares, individual reports to meet your customers needs, data output to other systems like MeasurLink SPC software are all supported. And even special settings to meet the requirements of FDA 21 part 11 are offered as standard

MCOSMOS also offers you the opportunity to other vendor's CMM's with its I++ interface.

Mitutoyo CMM's: Experience and innovation.

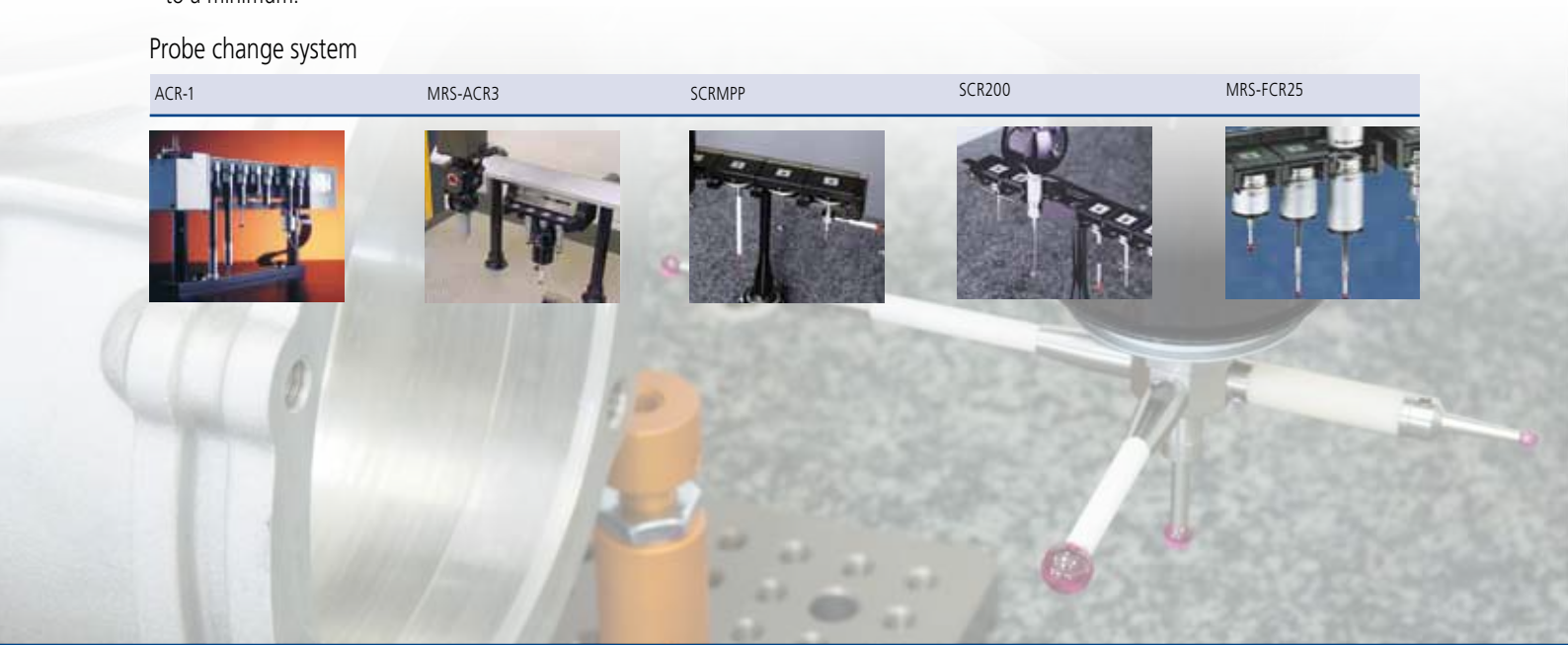
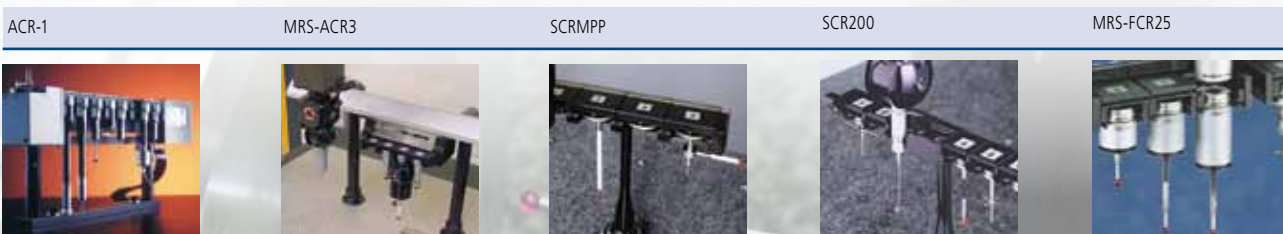
# Probe systems – for the right touch.

Contact										Non-contact				
Touch-Trigger					Scanning					Vision			Laser Scanner	
Fixed	Index	Fixed	Index	Index	Fixed	Index	Index	Index	Fixed	Index	Index	Fixed	Index	
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 aims to offer you the measurement system that fits best to your measurement task:

- tactile scanning probes like SP25M or SP80 for fast measurements with high point density,
- high precision touch-trigger probes with tips down to 0.3 mm even for the smallest features,
- vision systems for fast 2.5D measurements,
- Laser scanner for inspection and reverse engineering,
- automatic changing racks for flexible multi sensor measurements reducing machine downtime to a minimum.

### Probe change system



## MCOSMOS – The modular software for all kinds of measurement

- › Organize your measurement programs on the network, add pictures of workpiece and fixture positions.
- › Add commands and instructions to guide the operator.
- › Create individual reports meeting your customers needs.
- › Archive your results in formats like pdf, xls, HTML or many other.
- › SPC with MeasurLink or export to QS-Stat or CAQ-systems like Böhme & Weihs.
- › Export geometric elements to CAD systems.
- › Revision Management for authorised usage of validated part programs **as standard**. Meet the requirements of FDA title 21 CFR Part 11 without extra costs.



### Mitutoyo offers the following packages:

<b>MCOSMOS-1:</b>	<b>The Basic software package for prismatic workpieces.</b> Easy programming of geometrical elements by joystick control or input of nominal values. Special features like clearance height or automatic element recognition helps you to prevent collisions and to reduce the programming time.
<b>MCOSMOS-2:</b>	<b>The CAD package for freeform surfaces and geometric elements.</b> Why typing-in parameters when all features are already available in the CAD model? CAD based programming offers you the way to cut down the programming time once more. GD&T entities inside the CAD file helps you to measure all essential features.
<b>MCOSMOS-3:</b>	<b>The Full package.</b> MCOSMOS-3 provides additional tools for measurement evaluation of contours in 2D or on the CAD model.
<b>VIRTUAL MCOSMOS:</b>	All three packages are available as an offline version. 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 being produced. Many CAD interfaces like CATIA or PRO/E are available. That enables you to import your CAD models without any data getting lost. VIRTUAL MCOSMOS-2 can be ordered as multi-license package for 5 and 10 users.

### Additional software packages to meet your needs:

<b>MeasurLink:</b>	SPC software with certified AQDEF interface. Allows you to collect data from different vendors and devices. Its database offers you to collect data worldwide, analyse your process and create individual reports.
<b>Correct Plus:</b>	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.
<b>Gearpak:</b>	Turn your CMM into a gear measurement device! Extend your capabilities, measure gears, worm gears, helical gears. Just input the gear parameters - the rest will be done by Gearpak: measurement strategy, path generation, probe changes, and of course the measurement report of your gear.
<b>Roundpak CMM:</b>	Special evaluation tool for scanning measurements typically known of form measuring instruments. Topographic views and evaluation of form and position deviations.
<b>Geo_EDM:</b>	Capture the offset data of your EDM tools and workpieces. Geo_EDM is the solution for measuring the typical geometries in the EDM field, determining its offset value and transfer them into special EDM formats. Lots of vendor for mats like Charmilles, System 3R, Ingersoll and Mitsubishi are supported.

# Let's talk details.

Model No.		CRYSTA-Apex S544	CRYSTA-Apex S574	CRYSTA-Apex S776	CRYSTA-Apex S7106
Maximum Permissible error $MPE_e$ according to ISO 10360-2:2002 (unit: $\mu\text{m}$ , L in mm) Temperature 1*	TP200	1.9 + 0.3L/100	1.9 + 0.3L/100	1.9 + 0.3L/100	1.9 + 0.3L/100
	SP25M SP80	1.7 + 0.3L/100	1.7 + 0.3L/100	1.7 + 0.3L/100	1.7 + 0.3L/100
Maximum Permissible error $MPE_e$ according to ISO 10360-2:2002 (unit: $\mu\text{m}$ , L in mm) Temperature 2*	TP200	1.9 + 0.4L/100	1.9 + 0.4L/100	1.9 + 0.4L/100	1.9 + 0.4L/100
	SP25M SP80	1.7 + 0.4L/100	1.7 + 0.4L/100	1.7 + 0.4L/100	1.7 + 0.4L/100
Maximum Permissible probing error $MPE_p$ according to ISO 10360-2:2002 (unit: $\mu\text{m}$ )	TP200	1.9	1.9	1.9	1.9
	SP25M SP80	1.7	1.7	1.7	1.7
Maximum Permissible scanning error $MPE_{THP}$ (unit: $\mu\text{m}$ ) and scanning time (unit: s) according to ISO 10360-4:2002	SP25M	2.3 (90s)	2.3 (90s)	2.3 (90s)	2.3 (90s)
	SP80	2.0 (110s)	2.0 (110s)	2.0 (110s)	2.0 (110s)
Measuring range	X axis	505 mm		705 mm	
	Y axis	405 mm	705 mm	705 mm	1005 mm
	Z axis	405 mm		605 mm	
Resolution		0.0001 mm (0.1 $\mu\text{m}$ )		0.0001 mm (0.1 $\mu\text{m}$ )	
Guide method		Air bearings on each axis		Air bearings on each axis	
Drive speed		8-300 mm/s (CNC mode), max. speed: 519 mm/s 0 - 80 mm/s (J/S Mode: High Speed) 0 - 3 mm/s (J/S Mode: Low Speed) 0.05 mm/s (J/S Mode: Fine Speed)		8 - 300 mm/s (CNC mode), max. speed: 519 mm/s 0 - 80 mm/s (J/S Mode: High Speed) 0 - 3 mm/s (J/S Mode: Low Speed) 0.05 mm/s (J/S Mode: Fine Speed)	
Max. measuring speed		8 mm/s		8 mm/s	
Max. drive acceleration		Each axis: 1,333 mm/s <sup>2</sup> , max. combined acceleration: 2,309 mm/s <sup>2</sup>		Each axis: 1,333 mm/s <sup>2</sup> , max. combined acceleration: 2,309 mm/s <sup>2</sup>	
Workpiece	Maximum height	545 mm		800 mm	
	Maximum 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		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 (unit:mm)	A	3200	3500	3300	3600
	B	1122	1458	1650	1950
	C	173,5	173,5	420	470
	D	713	1013	800	1000
	E	2900	2900	2900	2900
	F	1082	1082	1470	1470
	G	722	722	800	800
	H	2185	2185	2730	2730
	I	550	550	810	810
	J	750	750	700	700

CRYSTA-Apex S500/700/900		Installation Temperature environment 1*	Installation Temperature environment 2*
Limits within which accuracy is guaranteed	Temperature Range	20 ± 2 °C	16 - 26 °C
	Rate of change	1 °C per hour or less 2 °C in 24 hours or less	1 °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

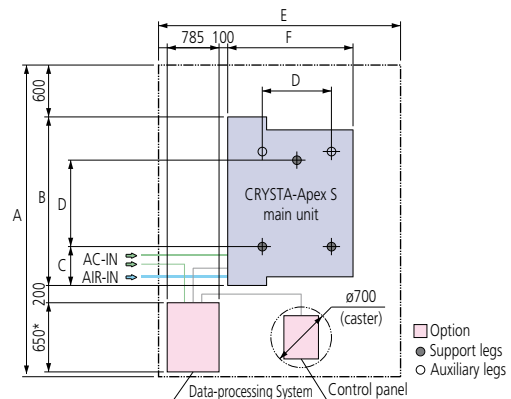
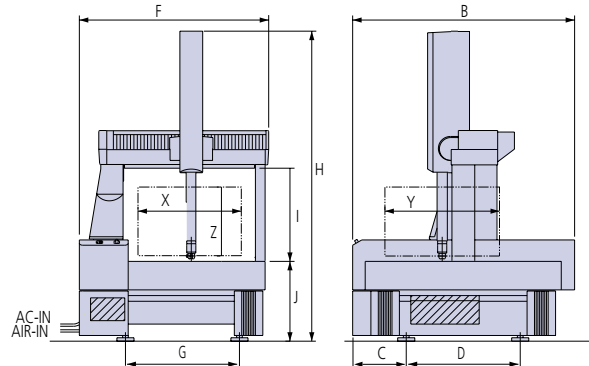
# Specifications

CRYSTA-Apex S		CRYSTA-Apex S		CRYSTA-Apex S	
9106 (Z600)	9108 (Z800)	9166 (Z600)	9168 (Z800)	9206 (Z600)	9208 (Z800)
1.9 + 0.3L/100		1.9 + 0.3L/100		1.9 + 0.3L/100	
1.7 + 0.3L/100		1.7 + 0.3L/100		1.7 + 0.3L/100	
1.9 + 0.4L/100		1.9 + 0.4L/100		1.9 + 0.4L/100	
1.7 + 0.4L/100		1.7 + 0.4L/100		1.7 + 0.4L/100	
1.9		1.9		1.9	
1.7		1.7		1.7	
2.3 (90s)		2.3 (90s)		2.3 (90s)	
2.0 (110s)		2.0 (110s)		2.0 (110s)	
1005 mm		1605 mm		2005 mm	
905 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					
0 - 80 mm/s (J/S Mode: High Speed)					
0 - 3 mm/s (J/S Mode: Low Speed)					
0.05 mm/s (J/S Mode: Fine Speed)					
8 mm/s (3 mm/s for Type Z800)					
Each axis: 1,333 mm/s <sup>2</sup> (1,000 mm/s <sup>2</sup> Type Z800), max. combined acceleration 2,309 mm/s <sup>2</sup> (1,732 mm/s <sup>2</sup> Type Z800)					
800 mm (Z=605 mm) / 1000 mm (Z=805 mm)					
1200 kg		1500 kg		1800 kg	
2231 kg (Z=600 mm)		2868 kg (Z=600 mm)		3912 kg (Z=600 mm)	
2261 kg (Z=800 mm)		2898 kg (Z=800 mm)		3942 kg (Z=800 mm)	
0.4 MPa					
60 L/min under normal conditions (air source: 120 L/min)					
3600		4300		4700	
1950		2690		3090	
470		700		800	
1000		1320		1500	
3200		3200		3200	
1670		1670		1670	
1000		1000		1000	
2730	3130	2730	3130	2730	3130
800	1000	800	1000	800	1000
700		700		700	



## Dimensions

unit: mm



\* When a mouse table is used: 850 mm  
When a 2-monitor dedicated rack is used: 1,000 mm



Example of a CMM with a pallet loading system

CMM • software • probe systems • probe changers • styli • rotary tables • loading systems • fixtures  
 • cabins and enclosures • calibration • training • service • consultation  
**Mitutoyo: Experience and innovation.**

**Ask for further individual brochures of Mitutoyo products:**



MCOSMOS



Probe systems



Styli

Coordinate Measuring Machines	_____
Vision Measuring Systems	_____
Form Measurement	_____
Optical Measuring	_____
Sensor Systems	_____
Test Equipment and Seismometers	_____
Digital Scale and DRO Systems	_____
Small Tool Instruments and Data Management	_____

Further information can be found in our product lounge  
 Coordinate Measuring Machines: [www.mitutoyo.eu](http://www.mitutoyo.eu)

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