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Coordinate Measuring Machines

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Coordinate Measuring Machines

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Crysta-Apex S Series

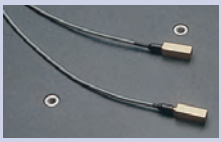
SERIES 191 — Standard CNC CMM

Designed and constructed using all Mitutoyo's experience in CNC CMM technology, CRYSTA-Apex S and Crysta-Apex C feature lightweight materials and an innovative machine structure, providing high motion stability, high accuracy, and affordability. The temperature correction function (16°C to 26°C) can yield accurate measurements even on the shop floor. In addition to point-to-point measurement, the MPP-310Q and Metris Laser probes provide a contact/non-contact scanning function.

CRYSTA-Apex S544

CRYSTA-Apex S776

CRYSTA-Apex S9106



Temperature compensation system (photo: temperature sensors)

Joystick controller

The machine structure has been optimized using FEM (Finite-Element Method) and modal analysis.

Technical Data

Length standard:	High accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	519mm/sec
Max. acceleration:	2309mm/sec^2 (1732mm/sec^2 Type Z800)
Air pressure:	0.4MPa
Air consumption:	50L/min (500 series) 60L/min (700, 900 series)

Guaranteed accuracy temperature environment*

Temperature range		18°C - 22°C	16°C - 26°C
Temperature change	Per hour	1.0K	1.0K
	Per 24 hours	2.0K	5.0K
Temperature gradient	Vertical	1.0K/m	1.0K/m
	Horizontal	1.0K/m	1.0K/m

*When using temperature compensation system.

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation. Refer to page VIII for details.

SPECIFICATIONS

Model No.		Crysta-Apex S544	Crysta-Apex S574	Crysta-Apex S776	Crysta-Apex S7106	Crysta-Apex S9106 [Cysta-Apex S9108]	Crysta-Apex S9166 [Cysta-Apex S9168]	Crysta-Apex S9206 [Cysta-Apex S9208]
Range	X-axis	19.88" (505mm)	19.88" (505mm)	27.75" (705mm)	27.75" (705mm)	35.62" (905mm)	35.62" (905mm)	35.62" (905mm)
	Y-axis	15.94" (405mm)	27.75" (705mm)	27.75" (705mm)	39.56" (1005mm)	39.56" (1005mm)	63.18" (1605mm)	78.93" (2005mm)
	Z-axis	15.94" (405mm)	15.94" (405mm)	23.82" (605mm)	23.81" (605mm)	23.81" 605mm [31.69" (805mm)]	23.81" 605mm [31.69" (805mm)]	23.81" 605mm [31.69" (805mm)]
Resolution		.000004" (0.0001mm)						
Accuracy*	MPE_E	(1.7+3L/1000)μm**, (1.7+4L/1000)μm***						
	MPE_P	1.7μm						
	MPE_{THP}	2.3μm						
	MPT_{THP}	110 SEC						
Work table	Material	Granite						
	Size	25.11" x 33.86" (638mm x 860mm)	25.11" x 45.67" (638mm x 1160mm)	34.64" x 55.90" (880mm x 1420mm)	34.64" x 67.71" (880mm x 1720mm)	42.51" x 67.71" (1080mm x 1720mm)	42.51" x 91.33" (1080mm x 2320mm)	42.51" x 107.0" (1080mm x 2720mm)
	Tapped insert	M8 x 1.25mm						
Workpiece	Max. height	21.46" (545mm)	21.46" (545mm)	31.49" (800mm)	31.49" (800mm)	31.49" (800mm) [39.36" (1000mm)]	31.49" (800mm) [39.36" (1000mm)]	31.49" (800mm) [39.36" (1000mm)]
	Max. load	396 lbs (180kg)	396 lbs (180kg)	1763 lbs (800kg)	2204 lbs (1000kg)	2645 lbs (1200kg)	3306 lbs (1500kg)	3968 lbs (1800kg)
Mass (including stand and controller)		1135 lbs (515kg)	1377 lbs (625kg)	3692 lbs (1675kg)	4301 lbs (1951kg)	4918 lbs (2231kg) [4984 lbs (2261kg)]	6322 lbs (2868kg) [6388 lbs (2898kg)]	8624 lbs (3912kg) [8690 lbs (3942kg)]
Dimensions (W x D x H)		42.60x44.17x86.02" (1082x1122x2185mm)	42.60x57.40x86.02" (1082x1458x2185mm)	57.87x64.96x107.48" (1470x1650x2730mm)	57.87x76.77x107.48" (1470x1950x2730mm)	65.74x76.77x107.48" (1670x1950x2730mm) [65.74x76.77x123.22"] [(1670x1950x3130mm)]	65.74x105.90x107.48" (1670x2690x2730mm) [65.74x105.90x123.22"] [(1670x2690x3130mm)]	65.74x121.65x107.48" (1670x3090x2730mm) [65.74x121.65x123.22"] [(1670x3090x3130mm)]

*When using temperature compensation system.
ISO10360-2: 2001 & ISO 10360-4, Probe system used: SP25M with ø4 x 50mm stylus, L: Measuring length (mm)
**Guaranteed accuracy temperature range: 64.4°F - 71.6°F (18°C - 22°C).
***Guaranteed accuracy temperature range: 60.8°F - 78.8°F (16°C - 26°C).

Crysta-Apex C/S Series

SERIES 191 — Standard CNC CMM

Crysta-Apex C205016

Crysta-Apex S122010

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation. Refer to page VIII for details.

SPECIFICATIONS

Model No.		Crysta-Apex C203016 [Crysta-Apex C203020]	Crysta-Apex C204016 [Crysta-Apex C204020]	Crysta-Apex C205016 [Crysta-Apex C205020]
Range	X-axis	78.93″ (2005mm)	78.93″ (2005mm)	78.93″ (2005mm)
	Y-axis	118.30″ (3005mm)	157.67″ (4005mm)	197.04″ (5005mm)
	Z-axis	63.18″ (1605mm) [78.93″ (2005mm)]	63.18″ (1605mm) [78.93″ (2005mm)]	63.18″ (1605mm) [78.93″ (2005mm)]
Resolution		.000004″ (0.0001mm)		
Accuracy*	MPE_E	(4.5+8L/1000)μm**, (4.5+9L/1000)μm*** [(6+9L/1000)μm**, (6+10L/1000)μm***]		
	MPE_P	6.0μm [7.5μm]		
	MPE_{THP}	6.0μm [7.5μm]		
	MPT_{THP}	150 SEC		
Work table	Material	Granite		
	Size	86.61″ x 165.55″ (2200mm x 4205mm)	86.61″ x 204.92″ (2200mm x 5205mm)	86.61″ x 244.29″ (2200mm x 6205mm)
	Tapped insert	M8 x 1.25mm		
Workpiece	Max. height	70.86″ (1800mm) [86.61″ (2200mm)]	70.86″ (1800mm) [86.61″ (2200mm)]	70.86″ (1800mm) [86.61″ (2200mm)]
	Max. load	8818 lbs (4000kg)	11023 lbs (5000kg)	13227 lbs (6000kg)
Mass (including controller and stand)		31085 lbs (14100kg) [31195 lbs (14150kg)]	42990 lbs (19500kg) [43100 lbs (19550kg)]	61729 lbs (28000kg) [61839 lbs (28050kg)]
Dimensions (W x D x H)		122.04 x 181.10 x 196.45″ (3100 x 4600 x 4990mm) [122.04 x 181.10 x 227.95″] [(3100 x 4600 x 5790mm)]	122.04 x 220.47 x 198.42″ (3100 x 5600 x 5040mm) [122.04 x 220.47 x 229.92″] [(3100 x 5600 x 5840mm)]	122.04 x 259.84 x 202.36″ (3100 x 6600 x 5140mm) [122.04 x 259.84 x 233.85″] [(3100 x 6600 x 5940mm)]

* When using temperature compensation system.
ISO 10360-2:2009 / ISO 10360-5:2010 $P_{FTU.MPE}$ /ISO10360-4, Probe system used: SP25M with ø4 x 50mm stylus, L: Measuring length (mm)
**Guaranteed accuracy temperature range: 64.4°F - 71.6°F (18°C - 22°C).
***Guaranteed accuracy temperature range: 60.8°F - 78.8°F (16°C - 26°C), 60.8°F - 75.2°F (16°C - 24°C) for 1600, 2000 Series.

SPECIFICATIONS

Model No.		Crysta-Apex S121210	Crysta-Apex S122010	Crysta-Apex S123010	Crysta-Apex C163012 [Crysta-Apex C163016]	Crysta-Apex C164012 [Crysta-Apex C164016]	Crysta-Apex C165012 [Crysta-Apex C165016]
Range	X-axis	47.24″ (1200mm)	47.24" (1200mm)	47.24" (1200mm)	63.18″ (1605mm)	63.18″ (1605mm)	63.18″ (1605mm)
	Y-axis	47.24″ (1200mm)	78.8″ (2000mm)	118.1" (3000mm)	118.30″ (3005mm)	157.67″ (4005mm)	197.04″ (5005mm)
	Z-axis	39.4″ (1000mm)	39.4" (1000mm)	39.4" (1000mm)	47.44″ (1205mm) [63.18″ (1605mm)]	47.44″ (1205mm) [63.18″ (1605mm)]	47.44″ (1205mm) [63.18″ (1605mm)]
Resolution		.000004″ (0.0001mm)					
Accuracy*	$E_{0.MPE}$	(2.3+3L/1000)μm**, (2.3+4L/1000)μm***			(3.3+4.5L/1000)μm**, (3.3+5.5L/1000)μm***, [(4.5+5.5L/1000)μm**, (4.5+6.5L/1000)μm***]		
	$P_{FTU.MPE}$	2.0μm			5.0μm [6.0μm]		
	MPE_{THP}	2.8μm (50s)			6.0μm [7.0μm] (120s)		
Work table	Material	Granite					
	Size	55.90″ x 85.23″ (1420mm x 2165mm)	55.90″ x 116.73″ (1420mm x 2965mm)	55.90″ x 156.10″ (1420mm x 3965mm)	70.86" x 165.55" (1800mm x 4205mm)	70.86″ x 204.92″ (1800mm x 5205mm)	70.86″ x 244.29″ (1800mm x 6205mm)
	Tapped insert	M8 x 1.25mm					
Workpiece	Max. height	47.24″ (1200mm)	47.24″ (1200mm)	47.24″ (1200mm)	55.11″ (1400mm) [70.86″ (1800mm)]	55.11″ (1400mm) [70.86″ (1800mm)]	55.11″ (1400mm) [70.86″ (1800mm)]
	Max. load	4409 lbs (2000kg)	5511 lbs (2500kg)	6613 lbs (3000kg)	7716 lbs (3500kg)	9920 lbs (4500kg)	11023 lbs (5000kg)
Mass (including controller and stand)		8928 lbs (4050kg)	13558 lbs (6150kg)	20084 lbs (9110kg)	23368 lbs (10600kg) [23479 lbs (10650kg)]	32628 lbs (14800kg) [37738 lbs (14850kg)]	42990 lbs (19500kg) [43100 lbs (19550kg)]
Dimensions (W x D x H)		86.61x100.19x143.50″ (2200x2545x3645mm)	86.61x131.69x143.50″ (2200x3345x3645mm)	86.61x171.06x143.50″ (2200x4345x3645mm)	106.29 x 181.10 x 162.99″ (2700 x 4600 x 4140mm) [106.29 x 181.10 x 194.49″] [(2700 x 4600 x 4940mm)]	106.29 x 220.47 x 164.96″ (2700 x 5600 x 4190mm) [106.29 x 220.47 x 196.46″] [(2700 x 5600 x 4990mm)]	106.29 x 259.84 x 166.93″ (2700 x 6600 x 4240mm) [106.29 x 259.84 x 198.43″] [(2700 x 6600 x 5040mm)]

LEGEX

SERIES 356 — Ultra-high Accuracy CNC CMM

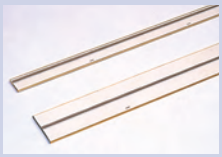
Achieving premium performance, the fixed bridge structure and precision air bearings resting on the rigid guideways ensure superior stability of motion and ultra-high measuring accuracy. It is suitable for complex small to medium size workpieces such as a gear, bearing, lens, die, or scroll rotor which require high dimensional accuracy. The MPP-300Q probe adds a scanning function to the standard point-to-point measurement.

LEGEX 574

FEATURES

- The most accurate CNC CMM family is launched, made possible by rigorous analysis of all possible error-producing factors and elimination or minimization of their effects.
- A newly developed, ultra-high accuracy crystallized-glass scale with the ultra-low expansion coefficient of 0.01x10-6/K is used on each axis.
- The fixed bridge structure and precision air bearings running on highly rigid guideways ensure superior motion stability and ultra-high geometrical accuracy.
- Many types of optional probe systems are available, including touch-trigger probes, laser scanning probes, and a vision measuring probe.

LEGEX 774



Mitutoyo original standard type glass scale (above) and ultra-high accuracy glass scale with virtually zero thermal expansion (below)

CMM calibration tool using the virtually zero thermal expansion glass gage

Technical Data

Length standard:	Ultra high accuracy linear encoder (glass scale with virtually zero thermal expansion coefficient)
Guide system:	Air bearing
Max. drive speed:	200mm/sec
Max. acceleration:	1000mm/sec^2
Air pressure:	0.4MPa (0.5MPa: LEGEX 9106)
Air consumption:	120L/min

Guaranteed accuracy temperature environment*

Temperature range		20±2°C
Temperature change	Per hour	0.5K
	Per 24 hours	1.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation.

SPECIFICATIONS

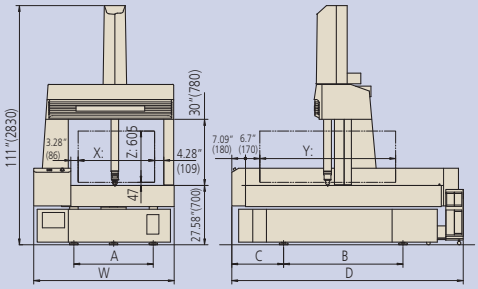
Model No.		LEGEX 574	LEGEX 774	LEGEX 776	LEGEX 9106	LEGEX 12128
Range	X-axis	20.07" (510mm)	27.95" (710mm)	27.95" (710mm)	35.82" (910mm)	47.63" (1210mm)
	Y-axis	27.95" (710mm)	27.95" (710mm)	27.95" (710mm)	39.76" (1010mm)	47.63" (1210mm)
	Z-axis	17.91" (455mm)	17.91" (455mm)	24.01" (610mm)	24.01" (610mm)	31.69" (805mm)
Resolution		.0000004" (0.00001mm)				
Accuracy*	MPE_E	(0.35+L/1000)µm				(0.6+1.5L/1000)µm
	MPE_P	0.45µm				0.6µm
	MPE_{THP}	1.4µm				1.8µm
	MPT_{THP}	150 SEC				
Work table	Material	Cast iron (Ceramic coating optional)	Cast iron (Ceramic coating optional)	Cast iron (Ceramic coating optional)	Cast iron (Ceramic coating optional)	Cast iron (Ceramic coating optional)
	Size	21.65" x 29.52" (550mm x 750mm)	29.52" x 29.52" (750mm x 750mm)		37.40" x 41.33" (950mm x 1050mm)	49.21" x 49.21" (1250mm x 1250mm)
	Tapped insert	M8 x 1.25mm				
Workpiece	Max. height	27.8" (706mm)	27.4" (696mm)	33.93" (862mm)	33.70" (856mm)	41.57" (1056mm)
	Max. load	440 lbs (200kg)	1102 lbs (500kg)		1763 lbs (800kg)	2205 lbs (1000kg)
Mass (main unit)		8598 lbs (3900kg)	11023 lbs (5000kg)	11243 lbs (5100kg)	14330 lbs (6500kg)	23148 lbs (10500kg)
Dimensions (W x D x H)		62.44 x 100.00 x 102.16" (1586 x 2540 x 2595mm)	78.07 x 102.20 x 101.77" (1856x 2596 x 2585mm)	78.07 x 102.20 x 113.58" (1856 x 2596 x 2885mm)	80.94 x 125.98 x 119.29" (2056 x 3200 x 3030mm)	92.75 x 142.59 x 141.33" (2356 x 3622 x 3590mm)

* When using temperature compensation system.
ISO10360-2: 2001 & 10360-4, Probe system used: MPP-300Q L: Measuring length (mm)

Technical Data

Length standard:	High accuracy linear encoder
Guide system:	Air bearing
Max. drive speed:	519mm/sec (500mm/sec: 1600 series)
Max. acceleration:	0.23G (0.13G: 1600 series)
Air pressure:	0.4MPa
Air consumption:	50L/ min: 700 Series 70L/ min: 900 Series 150L/ min: 1600 Series

Dimensions



Item	STRATO-Apex 776	STRATO-Apex 7106	STRATO-Apex 9106	STRATO-Apex 9166
A	29.13"(740mm)		37.01"(940mm)	
B	27.56" (700mm)	39.37"(1000mm)		55.51" (1410mm)
C	20.47"(520mm)		24.11"(612.5mm)	
D	76.38" (1940mm)	88.19"(2240mm)		111.81" (2840mm)
W	67.32"(1710mm)		75.20"(1910mm)	

STRATO-Apex
Guaranteed accuracy temperature environment*

Temperature range		66.2˚F - 69.8˚ F (19°C - 21°C)
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

FALCIO-Apex 162012

FALCIO-Apex 1600
Guaranteed accuracy temperature environment*

Temperature range		64.4˚F - 71.6˚ F (18°C - 22°C)
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation.

STRATO-Apex

SERIES 355 — High Accuracy CNC CMM

High performance models in the STRATO / FALCIO-Apex series have a high-end moving bridge type CNC CMM with upgraded kinematic accuracy.

STRATO-Apex 700/900

FEATURES

- High measuring accuracy and high-speed motion.
- Full-digital motion control.
- Improved rigid air bearings on all axial guideways.

Temperature compensation system.

SPECIFICATIONS

Model No.		STRATO-Apex 776	STRATO-Apex 7106	STRATO-Apex 9106	STRATO-Apex 9166
Range	X-axis	27.75" (705mm)		35.62" (905mm)	
	Y-axis	27.75" (705mm)	39.56" (1005mm)	39.56" (1005mm)	63.18" (1605mm)
	Z-axis	23.81" (605mm)			
Resolution		0.0000008" (0.00002mm)			
Accuracy*	MPE_E	(0.9+2.5L/1000)µm			
	MPE_P	0.9µm			
	MPE_{THP}	1.8µm			
Work table	Material	Granite			
	Tapped insert	M8 x 1.25mm			
Workpiece	Max. height	30.31"(770mm)	30.31"(770mm)	30.31"(770mm)	30.31"(770mm)
	Max. loading	1102lbs (500kg)	1763lbs (800kg)	1763lbs (800kg)	2645lbs (1200kg)
Mass (main unit)		4088lbs (1895kg)	4806lbs (2180kg)	5313lbs (2410kg)	6801lbs (3085kg)

FALCIO-Apex

SERIES 355 — High Accuracy CNC CMM

SPECIFICATIONS

Model No.		FALCIO-Apex 162012 [FALCIO-Apex 162015]	FALCIO-Apex 163012 [FALCIO-Apex 163015]	FALCIO-Apex 164012 [FALCIO-Apex 164015]
Range	X-axis	63.18" (1605mm)		
	Y-axis	78.93" (2005mm)	118.30" (3005mm)	157.67" (4005mm)
	Z-axis	47.44" (1205mm) [59.25" (1505mm)]		
Resolution		0.000004" (0.0001mm)		
Accuracy*	MPE_E	(2.8+4.0L/1000)µm [(3.3+4.5L/1000)µm: Z-axis = 1505mm]		
	MPE_P	2.8µm [3.3µm]		
	MPE_{THP}	2.8µm(90s) [3.5µm (90s)]		
Work table	Material	Granite		
	Size	72.83" x 129.13" (1850mm x 3280mm)	72.83" x 168.50" (1850mm x 4280mm)	72.83" x 207.87" (1850mm x 5280mm)
	Tapped insert	M8 x 1.25mm		
Workpiece	Max. Ht.	53.14" (1350mm) [64.96" (1650mm)]		
	Max. Wt	7716 lbs (3500kg)	8818 lbs (4000kg)	9920 lbs (4500kg)
Mass (includes controller & air stand)		21054 lbs (9550kg) [21164 lbs (9600kg)]	30864 lbs (14000kg) [30974 lbs (14050kg)]	55115 lbs (25000kg) [55225 lbs (25050kg)]
Dimensions (WxDxH)		110.35 x 145.07 x 170.86" (2803 x 3685 x 4340mm) [110.35 x 145.07 x 194.48"] [(2803 x 3685 x 4940mm)]	110.35 x 145.07 x 172.83" (2803 x 3685 x 4390mm) [110.35 x 145.07 x 196.45"] [(2803 x 4685 x 4990mm)]	110.35 x 145.07 x 176.77" (2803 x 3685 x 4490mm) [110.35 x 145.07 x 200.39"] [(2803 x 5685 x 5090mm)]

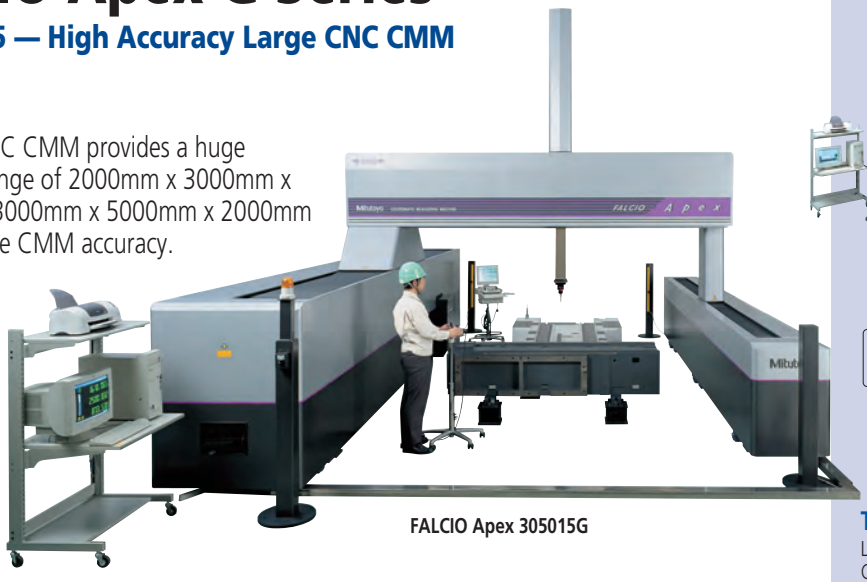
* When using temperature compensation system.
ISO10360-2: 2001 & ISO10360-4, L: Measuring length (mm), Probe system: SP25M with ø4 x 50mm stylus

FALCIO Apex G Series

SERIES 355 — High Accuracy Large CNC CMM

FEATURES

This giant CNC CMM provides a huge measuring range of 2000mm x 3000mm x 1500mm to 3000mm x 5000mm x 2000mm with large-size CMM accuracy.



FALCIO Apex 305015G

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation. Refer to page VIII for details.

SPECIFICATIONS

Model No.		FALCIO Apex 203015	FALCIO Apex 204015	FALCIO Apex 205015	FALCIO Apex 305015
Range	X-axis	78.94″ (2005mm)			118.31″ (3005mm)
	Y-axis	118.31″ (3005mm)	157.68″ (4005mm)	197.05″ (5005mm)	
	Z-axis	59.25″ (1505mm)			
Resolution		.000004″ (0.0001mm)			
Accuracy*	MPEE	(3.5+4L/1000)µm [(4.4+4.5L/1000)µm]			
	MPEP	3.5µm [4.0µm]			
	MPETHP	3.8µm (90s) [4.2µm (90s)]			
Mass (main unit)		26455 lbs (12000kg)	30864 lbs (14000kg)	33069 lbs (15000kg)	35273 lbs (16000kg)

* The machine is equipped with the temperature compensation system.
According to ISO 10360-2 methods when using the SP25M probe system with a ø4 x 50mm stylus. L: Measuring length (mm)

Technical Data

Length standard: High accuracy linear encoder
Guide system: Air bearing
Max. drive speed: 520mm/sec

Guaranteed accuracy temperature environment*

Temperature range		18°C - 22°C
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.

Crysta-Apex C Series

SERIES 191 — Standard Large CNC CMM

- **Operating Convenience**
  The user makes a measurement by simply operating the X, Y, and Z control wheels to bring the touch-trigger probe into contact with target points on the workpiece.
- **Measuring Large Workpieces**
  Large workpieces that exceed the measuring range of the CP1057 can be measured, indirectly, by moving the CP1057's main unit along the surface plate and linking the measurement results obtained before and after movement.
- **A Choice of Probes**
  Various probes are available for the CP1057, such as a point probe that can be used for scribed line pointing measurements, in addition to the standard touch-trigger probe.
- **Temperature Compensation System (Option)**
  An optional temperature compensation system can be installed in the CP1057 to ensure measuring accuracy is maintained over a wide temperature range 59°F - 86°F (15°C to 30°C).

SPECIFICATIONS

Model No.		Crysta-Apex C203016G	Crysta-Apex C306016G
Range	X-axis	78.94″ (2005mm)	118.31″ (3005mm)
	Y-axis	118.31″ (3005mm)	236.41″ (6005mm)
	Z-axis	63.18″ (1605mm) [78.93" (2005)]	
Resolution		.000004″ (0.0001mm)	
Accuracy*	MPEE	(6+6L/1000)µm [(7+7L/1000)µm]	(7+6L/1000)µm [(8+7L/1000)µm]
	MPEP	6µm [7µm]	7µm [8µm]
	MPETHP	6.5µm (90s) [7.5µm (90s)]	7.5µm (90s) [8.5µm (90s)]
Mass (main unit)		26455 lbs (12000kg)	35273 lbs (16000kg)

* The machine is equipped with the temperature compensation system.
According to ISO 10360-2 methods when using the SP25M probe system with a ø4 x 50mm stylus. L: Measuring length (mm)

Technical Data

Length standard: High accuracy linear encoder
Guide system: Air bearing
Max. drive speed: 500mm/sec

Guaranteed accuracy temperature environment*

Temperature range		18°C - 22°C
Temperature change	Per hour	1.0K
	Per 24 hours	2.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

*When using temperature compensation system.

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation. Refer to page VIII for details.

CARBstrato / CARBapex

SERIES 355 — Car Body Measuring System

		CARBstrato
SINGLE ARM	401420	157.47" x 55.11" x 78.73" (4000mm X 1400mm X 2000mm)
	401424	157.47" x 55.11" x 94.48" (4000mm X 1400mm X 2400mm)
	401620	157.47" x 62.99" x 78.73" (4000mm X 1400mm X 3000mm)
	401624	157.47" x 62.99" x 94.48" (4000mm X 1600mm X 2400mm)
	601620	236.21" x 62.99" x 78.73" (6000mm X 1600mm X 2000mm)
	601624	236.21" x 62.99" x 94.48" (6000mm X 1600mm X 2400mm)
	601626	236.21" x 62.99" x 102.36" (6000mm X 1600mm X 2600mm)
	801620	314.95" x 62.99" x 78.73" (8000mm X 1600mm X 2000mm)
	801624	314.95" x 62.99" x 94.48" (8000mm X 1600mm X 2400mm)
	801626	314.95" x 62.99" x 102.36" (8000mm X 1400mm X 2600mm)
DUAL ARM	601420D	236.21" x 110.23" x 78.73" (6000mm X 1400mm X 2000mm)
	601424D	236.21" x 110.23" x 94.48" (6000mm X 1400mm X 2400mm)
	601426D	236.21" x 110.23" x 102.36" (6000mm X 1400mm X 2600mm)
	601430D	236.21" x 110.23" x 118.10" (6000mm X 1400mm X 3000mm)
	601620D	236.21" x 125.98" x 78.73" (6000mm X 1600mm X 2000mm)
	601624D	236.21" x 125.98" x 94.48" (6000mm X 1600mm X 2400mm)
	601626D	236.21" x 125.98" x 102.36" (6000mm X 1600mm X 2600mm)
	601630D	236.21" x 125.98" x 118.10" (6000mm X 1600mm X 3000mm)
	801620D	314.95" x 125.98" x 78.73" (8000mm X 1600mm X 2000mm)
	801624D	314.95" x 125.98" x 94.48" (8000mm X 1600mm X 2400mm)
	801626D	314.95" x 125.98" x 102.36" (8000mm X 1600mm X 2600mm)
	801630D	314.95" x 125.98" x 118.10" (8000mm X 1600mm X 3000mm)
Resolution		1μ
Accuracy*		(18+20L/1000)μm

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation.

		CARBapex
SINGLE ARM	401420	157.47" x 55.11" x 78.73" (4000mm X 1400mm X 2000mm)
	401424	157.47" x 55.11" x 94.48" (4000mm X 1400mm X 2400mm)
	401620	157.47" x 62.99" x 78.73" (4000mm X 1400mm X 3000mm)
	401624	157.47" x 62.99" x 94.48" (4000mm X 1600mm X 2400mm)
	601620	236.21" x 62.99" x 78.73" (6000mm X 1600mm X 2000mm)
	601624	236.21" x 62.99" x 94.48" (6000mm X 1600mm X 2400mm)
	601626	236.21" x 62.99" x 102.36" (6000mm X 1600mm X 2600mm)
	801620	314.95" x 62.99" x 78.73" (8000mm X 1600mm X 2000mm)
	801624	314.95" x 62.99" x 94.48" (8000mm X 1600mm X 2400mm)
	801626	314.95" x 62.99" x 102.36" (8000mm X 1400mm X 2600mm)
DUAL ARM	601420D	236.21" x 110.23" x 78.73" (6000mm X 1400mm X 2000mm)
	601424D	236.21" x 110.23" x 94.48" (6000mm X 1400mm X 2400mm)
	601426D	236.21" x 110.23" x 102.36" (6000mm X 1400mm X 2600mm)
	601430D	236.21" x 110.23" x 118.10" (6000mm X 1400mm X 3000mm)
	601620D	236.21" x 125.98" x 78.73" (6000mm X 1600mm X 2000mm)
	601624D	236.21" x 125.98" x 94.48" (6000mm X 1600mm X 2400mm)
	601626D	236.21" x 125.98" x 102.36" (6000mm X 1600mm X 2600mm)
	601630D	236.21" x 125.98" x 118.10" (6000mm X 1600mm X 3000mm)
	801620D	314.95" x 125.98" x 78.73" (8000mm X 1600mm X 2000mm)
	801624D	314.95" x 125.98" x 94.48" (8000mm X 1600mm X 2400mm)
	801626D	314.95" x 125.98" x 102.36" (8000mm X 1600mm X 2600mm)
	801630D	314.95" x 125.98" x 118.10" (8000mm X 1600mm X 3000mm)
Resolution		1μ
Accuracy*		(25+28L/1000)μm

Technical Data

Length standard: High accuracy linear encoder
Guide system: Air bearing (Y and Z) Linear Guide (X)
Max. drive speed: 866mm/sec (CARBstrato) / 519mm/sec (CARBapex)
Max. acceleration: 0.2G (CARBstrato) / 0.1G (CARBapex)

Guaranteed accuracy temperature environment*

Temperature range		60.8˚F - 78.8˚F 16˚C - 26˚C
Temperature change	Per hour	1.0K
	Per 24 hours	5.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

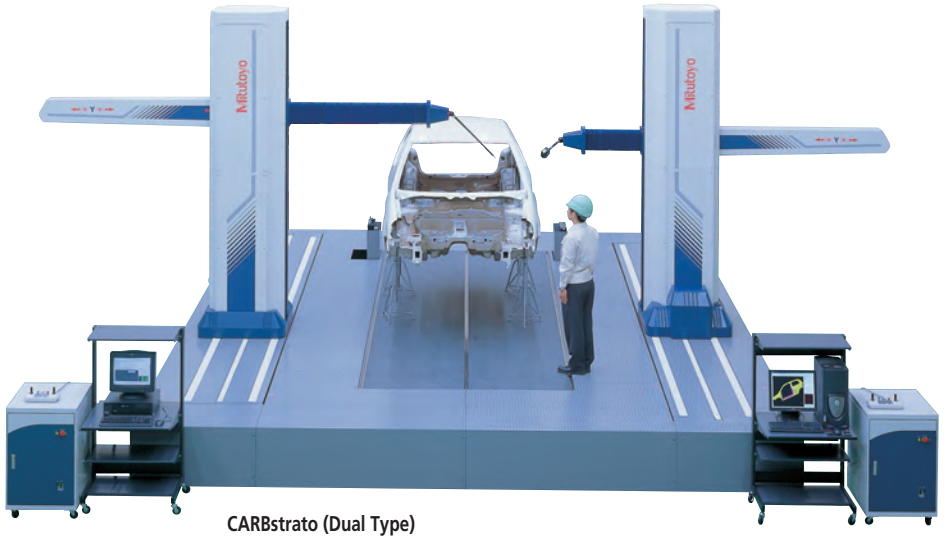
*When using temperature compensation system.

FEATURES: CARBstrato

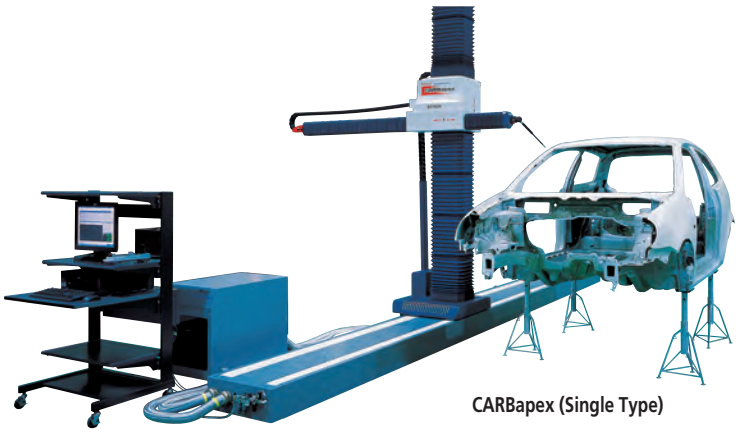
A very large, high precision, horizontal-type CNC CMM scaled for measuring car bodies. Single-arm or dual-arm types are available. The dual-arm configuration measures by controlling two arms simultaneously, one from each side.

FEATURES: CARBapex

A large, affordable, horizontal-type CNC CMM scaled for measuring card bodies. Single-arm or dual-arm types are available. The dual-arm configuration measures by controlling two arms simultaneously, one from each side.



CARBstrato (Dual Type)



CARBapex (Single Type)

SPECIFICATIONS

Model No.		CARBstrato	CARBapex
Range	X-axis	236.22" (6000mm)	236.22" (6000mm)
	Y-axis	62.99" (1600mm)	62.99" (1600mm)
	Z-axis	94.49" (2400mm)	94.49" (2400mm)
Accuracy* MPEE	Single	18+20L/1000≤70μm	25+28L/1000≤95μm
	Dual	38+30L/1000≤90μm	50+35L/1000≤120μm
Max Measuring Range	X-axis	708.66" (18000mm)	708.66" (18000mm)
	Z-axis	137.80" (3500mm)	137.80" (3500mm)
	Single Y	78.74" (2000mm)	78.74" (2000mm)
	Dual Y	153.54" (3900mm)	153.54" (3900mm)
Dimensions (H x W x D)		155.63x176.10x288.35" (3953x4473x7324mm)	144.33x163.19x275.59" (3666x4145x7000mm)

Conformed standard: ISO10360-2: 2001
Probe system used:: TP2/TP20 with ø3 x 20mm stylus
L: Measuring length (mm)

MACH-V565 /9106

SERIES 360 — In-line Type CNC CMM

FEATURES

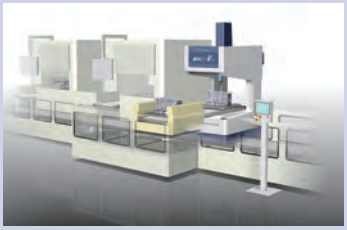
The MACH-3A and MACH-V maximize machining operations by performing in-line or near-line, high speed coordinate measuring in conjunction with your CNC machine tools. These high throughput machines can be incorporated right into the manufacturing line and can provide pre/post machining feedback to your machine tool for machining adjustments.

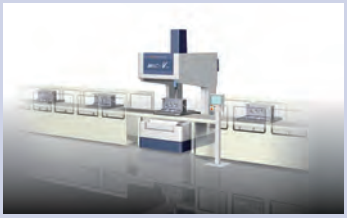
MACH-V9106

SPECIFICATIONS

Model No.		MACH-V565	MACH-V9106
Range	X-axis	19.88″ (505mm)	35.63″ (905mm)
	Y-axis	23.82″ (605mm)	39.57″ (1005mm)
	Z-axis	19.88″ (505mm)	23.81″ (605mm)
Resolution		0.000004″ (0.0001mm)	
Accuracy*	MPE$_E$	(2.5+3.5L/1000)µm / (2.9+4.3L/1000)µm / (3.6+5.8L/1000)µm**	
	MPE$_P$	2.5µm (2.2µm: using SP25M)	
Dimensions (W x D x H)		86.81x41.57x103.86″ (2205x1056x2638mm)	118.31x57.36x112.68″ (3005x1457x2862mm)

* The machine is equipped with the temperature compensation system.
** Guaranteed accuracy temperature range:
66.2˚F - 69.8˚F (19˚C - 21˚C), 59˚F - 77˚F (15˚C - 25˚C), 41˚F - 95˚F (5˚C - 35˚C)





Technical Data

Length standard: High accuracy linear encoder
Guide system: Linear guide: MACH-V
Max. drive speed: 866mm/sec: MACH-V
Max. acceleration: 0.86G: MACH-V

Guaranteed accuracy temperature environment

Temperature range		5°C - 35°C
Temperature change	Per hour	2.0K
	Per 24 hours	10.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

Main Unit Startup System

This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation.

MACH-3A 653

SERIES 360 — In-line Type CNC CMM

SPECIFICATIONS

Model No.		MACH-3A 653
Range	X-axis	23.81" (605mm)
	Y-axis	19.88" (505mm)
	Z-axis	11.22" (285mm)
Resolution		0.000004" (0.0001mm)
Accuracy*	MPE$_E$	(2.5 + 3.5L/1000)µm, (2.8 + 4.2L/1000)µm, (3.2 + 5.0L/1000)µm, (3.5 + 5.7L/1000)µm, (3.9 + 6.5L/1000)µm**
	MPE$_P$	2.5µm
Dimensions W x D x H		(1870 x 1280 x 1920mm) 73.62″ x 50.39″ x 75.59″

* The machine is equipped with the temperature compensation system.
According to ISO 10360-2 methods when using the TP7M probe system with a ø4 x 20mm stylus. L: Measuring length (mm)
**Guaranteed accuracy temperature range: 19°C - 21°C / 15°C - 25°C / 10°C - 30°C / 5°C - 35°C / 35°C - 40°C

Technical Data

Length standard: High accuracy linear encoder
Guide system: Linear guide
Max. drive speed: 1212mm/sec
Max. acceleration: 1.2G

Guaranteed accuracy temperature environment

Temperature range		5°C - 40°C
Temperature change	Per hour	2.0K
	Per 24 hours	10.0K
Temperature gradient	Vertical	1.0K/m
	Horizontal	1.0K/m

Main Unit Startup System

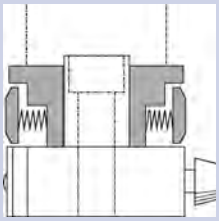
This machine incorporates a startup system (relocation detection system), which disables operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo prior to relocating this machine after initial installation.

Crysta-Plus M443 / 574 / 7106

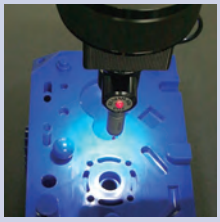
SERIES 196 — Manual-Floating Type CMM

Manual floating type CMMs developed in quest for high-accuracy, low-cost and easy operation. The Crysta-Plus M is suitable to measure a wide range of applications from a simple dimension to complex form.

One-touch air clamp and fine feed for rapid and easy positioning



Ergonomically designed guide grip on Z-axis for reliable measurement
(only for Crysta-Plus M776 and M7106)



Probe illumination (optional) to illuminate the probe and styli directly and brighten the working field

FEATURES

- Smooth operation utilizing high-precision air bearings and lightweight moving members.
- Continuous fine feed over the entire measuring range.
- One-touch air clamp for each axis.

Crysta-Plus M443

Crysta-Plus M574

Crysta-Plus M7106

Technical Data

Length standard:	High accuracy linear encoder
Guide system:	Air bearing
Axis clamp:	One-touch air clamp (Screw clamp: M776, M7106)
Fine feed range:	Entire range
Air pressure:	0.4MPa (0.35MPa: M443, M574)
Air consumption:	50L/min

Guaranteed accuracy temperature environment

Temperature range		19°C - 21°C	**15°C - 30°C***
Temperature change	Per hour	—	**2.0K**
	Per 24 hours	—	**5.0K**
Temperature gradient	Vertical	0.5K/m	**1.0K/m**
	Horizontal	0.5K/m	**1.0K/m**

*The values shown in Bold in the table above apply to the case when using the temperature compensation system. (Option)

SPECIFICATIONS

Model No.		Crysta-Plus M443	Crysta-Plus M574	Crysta-Plus M7106
Range	X-axis	15.74" (400mm)	19.69" (500mm)	27.56" (700mm)
	Y-axis	15.74" (400mm)	27.56" (700mm)	39.37" (1000mm)
	Z-axis	11.81" (300mm)	15.74" (400mm)	23.62" (600mm)
Resolution		.00002" (0.0005mm)		
Accuracy*	E	(3.0+4.0L/1000)µm	(3.5+4.5L/1000)µm	(4.5+4.5L/1000)µm
	R	4.0µm		5.0µm
Work table	Material	Granite		
	Size	24.56" x 31.69"(624mm x 805mm)	30.07" x 46.25"(764mm x 1175mm)	35.43" x 68.50"(900mm x 1740mm)
	Tapped insert	M8 x 1.25mm		
Workpiece	Max. Ht.	18.90" (480mm)	23.22" (590mm)	31.49" (800mm)
	Max.Wt.	396 lbs (180kg)		1763 lbs (800kg)
Mass (main unit & stand)		903 lbs (410kg)	1424 lbs (646kg)	3968 lbs (1800kg)
Dimensions (W x D x H)		38.62x41.22x77.44" (981x1047x1967mm)	56.45x47.44x89.25" (1434x1205x2267mm)	57.48x79.40x111.81" (1460x2017x2840mm)

* ISO10360-2: 2001, L: Measuring length (mm), Temp: 20°C ± 1°C, Probe system: TP20

CMM Probes

Scanning probe system

MPP-300Q
MPP-300
Ultra-high accuracy and low measuring force type

SP80
High accuracy type and available with 500mm long extension stylus

SP25M
Compact and high accuracy type

MPP-10
For effective screw depth measurement

Optical (non-contact) probe system

QVP (Quick Vision Probe)
For video measurement

CF20
Centering microscope system

CMM Probes

Micro Touch probe
UMAP-CMM

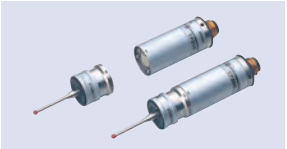
Probe heads

PH10M / PH10MQ
Motor drive index type

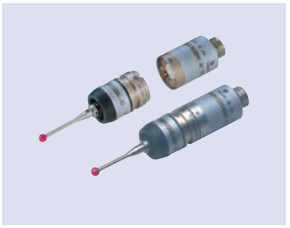
MIH
Manual index type

Touch-trigger probe system

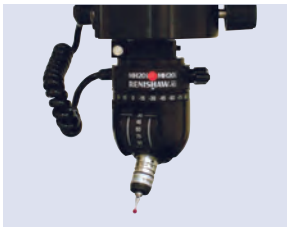
TP7M
High accuracy type



TP200
Compact and high accuracy (stylus change) type



TP20 Compact (stylus change) type



MH20i / MH20 Manual head type

SurfaceMeasure 606

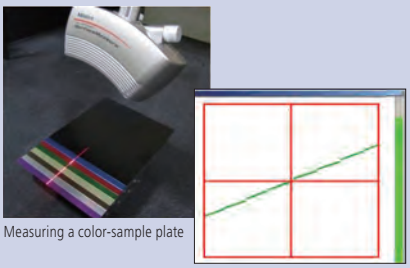
Non-Contact Line-Laser Probe

FEATURES

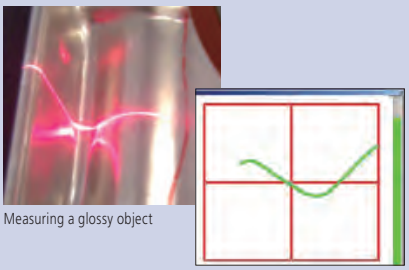
New scanning probe automatically adjusts to workpiece surface characteristics to deliver highly efficient measurements.

With a conventional laser probe, laser intensity and camera sensitivity must be adjusted according to the environment and the workpiece material. In contrast, the SurfaceMeasure 606, which automatically adjusts these factors, enables simpler and more comfortable laser scanning.

NEW-STYLE
Coordinate Measuring Machines



Measuring a color-sample plate

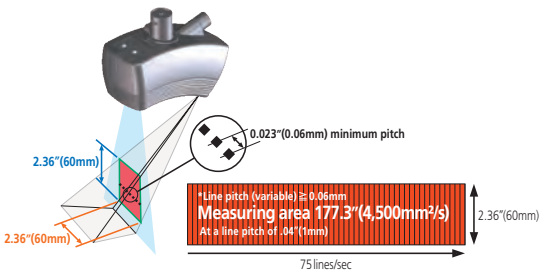


Measuring a glossy object

Since the laser intensity and camera sensitivity are automatically adjusted, stable shape data can be obtained even when the workpiece has multiple colors and varying degrees of reflectance.

SPECIFICATIONS

Working distance: 3.66"(93mm)
Max. scan width: 2.36"(60mm)
Measuring range: 2.36"(60mm)
Scanning error: 12 µm [1σ/sphere fit]
[Target: Specific reference ball ø1.18"(30mm)]
(According to Mitutoyo's acceptance procedure)
Resolution: 0.06mm
Max. Acquisition rate: 75,000 points/sec
1,000 points/line
75 Hz
Laser Class: Class 2 [EN/IEC60825-1(2007)]
Mass: .948lb (430g)



MCOSMOS

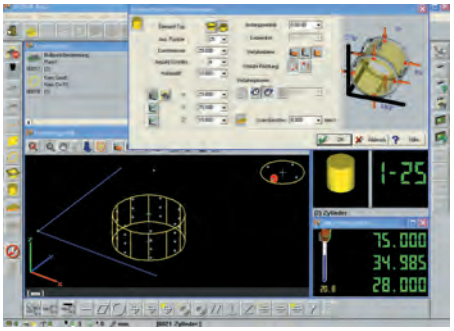
Software for Manual / CNC Coordinate Measuring Machine

Three levels of module configuration

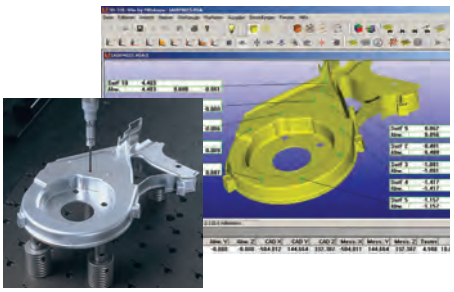
MCOSMOS has three choices of module configuration. From the basic MCOSMOS C1 to the advanced MCOSMOS C3, you can choose a best configuration for your measurement applications.

Module included	GEOPAK	CAT1000P	CAT1000S	SCANPAK
MCOSMOS C1	✔	—	—	—
MCOSMOS C2	✔	✔	✔	—
MCOSMOS C3	✔	✔	✔	✔

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



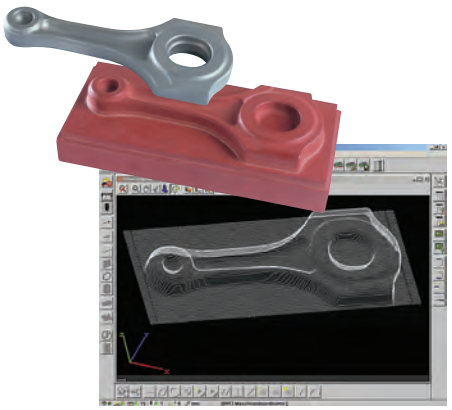
GEOPAK (Geometry module)
Geopak is our universal geometric measurement program, which allows you to control the measurement of your workpiece from drawing to completion, or simply to run existing measurement programs on a repeat basis.



CAT1000S (free form surface evaluation module)
In addition to the online/offline part program creation, CAD model based generation of surface measurement points, and comparison of actual/nominal data, with graphical output.

GEARPAK (gear measurement and analysis module)
Advances in CMM controller techniques make the measurement of gears feasible, and the Gearpak module takes advantage of this to bring sophisticated measurement capabilities within easy reach.

CAT1000P (offline part program module)
For online/offline part program creation, using the measurement of geometric elements directly from the CAD model, with automatic collision avoidance.



SCANPAK (2D profile evaluation module)
For the scanning and evaluation of workpiece contours (2D), and data transfer to CAD system.

MAFIS (Mitutoyo Airfoil Inspection System)
Evaluation and analysis of airfoil shape such as Turbine Blades require special calculations according to the particular design specifications.
The MAFIS system uses cross sectional data of the shape obtained by Scanpak to perform these calculations, and output the result via the standard geometry program.