

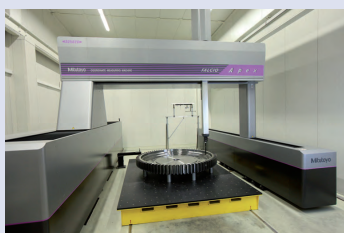
CMM Software Page 582



Mobile 3D Systems and Manual CMMs Page 586



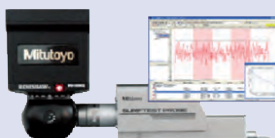
Small- and Medium Size CMMs Page 588



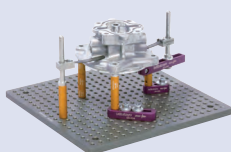
Large Size CMMs Page 592



In-Line and Shopfloor CMMs Page 597

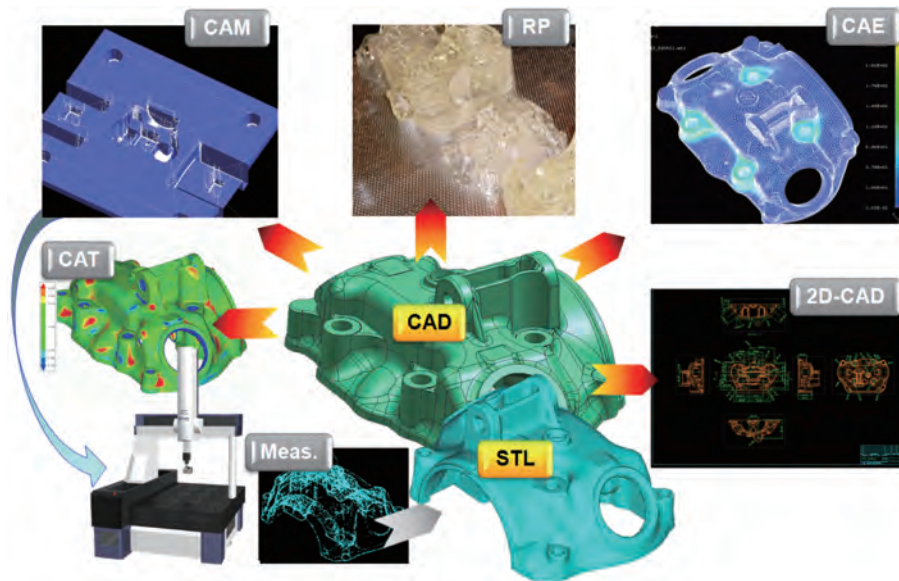
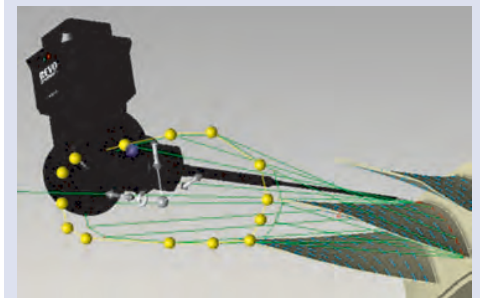


Measuring Heads, Probes and Styli Page 600



Fixtures and Enclosures Page 606

CMM Software



CMM Software

MCOSMOS - The Modular Software for all Kinds of Measurent

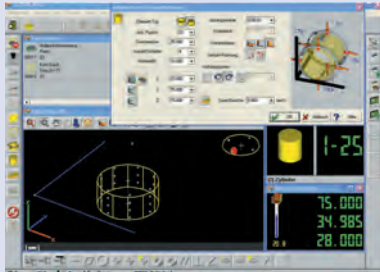
- Organize your measurement programs on the network
- Add comands and instructions to guide the operator
- Create individual reports meeting your customer's needs
- Archieve your results in formats like PDF, XLS, HTML and many other
- SPC with MeasurLink or export data to CAQ systems
- Export detected geometrical elements to CAD systems
- Revision Management for authorised usage of validated partprograms **as standard**
- Meet the requirements of FDA Title 21 CFR Part 11 without extra costs

The following packages are also available for Offline programming.

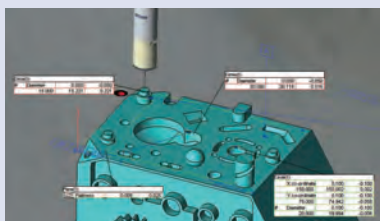
The so called "**Virtual MCOSMOS**" packages allow you to create part programs whilst the CMM is proofing your product quality.



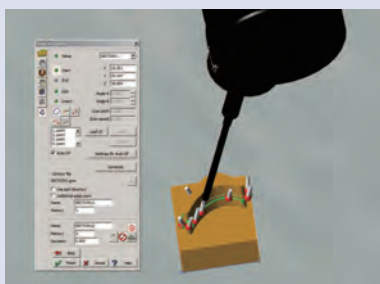
PartManager



GEOPAK



CAT1000P



CAT1000S



For details, please ask for the MCOSMOS brochure.



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

Software package

	MCOSMOS-1 Basic package	MCOSMOS Manual	MCOSMOS-2 CAD package	MCOSMOS-3 Full package
Part Manager				
• System configuration				
• Part program handling				
• Data management				
• Create report templates				
GEOPAK				
• On/Off-line				
• For prismatic elements				
• Operator guidance				
• Parametric programs				
CAT1000P				
• CAD programming				
• For prismatic elements				
• Collision control				
• Incl. simulation				
CAT1000S				
• CAD programming				
• Free-form inspection				
• Surface + edge points				
• Graphical Reports				
SCANPAK				
• For 2D contours				
• Evaluate + manipulate				
• Graphical Reports				
• Data exchange to CAD + NC				

Additional software packages meeting your needs:

MeasurLink:

SPC software with certified AQDEF interface. Allows you to collect data from different vendors and devices. Its database offers collecting and analyzing data from all over the world, analyse your process and create individual reports.

Correct-Plus:

Software for automatic feedback of correction data. It connects NC machining centers with any kind of measurement device like CMM, Small Tools, transducers or analogue probes.

GEARPAK:

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.

ROUNDPAK-CMM

Special evaluation tool for scanning measurements typically known from form measurement instruments. Topographic views and evaluation of form and position deviations.

GEO_EDM:

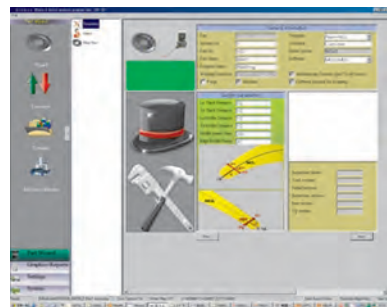
Capture the offset data of your EDM tools and workpieces. GEO_EDM is the solution for measuring the typical geometries in the EDM field, determining offset values and transferring this data to EDM centers. Lots of vendor formats like Charmilles®, Mitsubishi®, Ingersoll or System 3R® are supported.

CMM Software

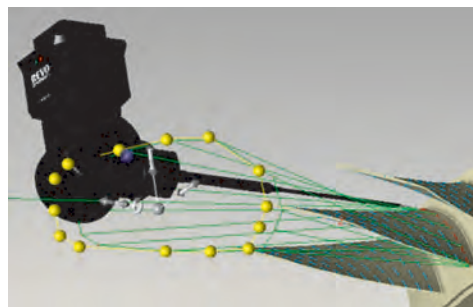
MAFIS Express - Rapid Air Foil Inspection Software

Mitutoyo introduces the fastest way for inspecting blades and blisks: MAFIS Express.

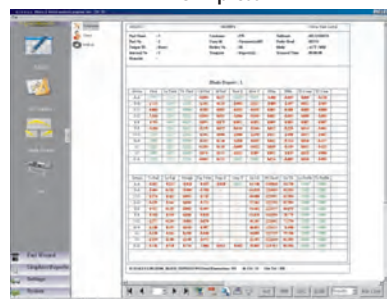
- Increases your throughput by time savings up to 90%
- Intuitive programming and easy handling
- For many kinds of airfoils like blades, blisks, gas turbines
- Easy Off-line programming on the CAD model
- Individual setting of the inspection routine: measure all or just some dedicated intersections
- Support of standards set by Rolls-Royce®, P&W, Siemens®, GE®, Honeywell®, SNECMA, Turbomeca® and others
- Ideal with the Revo® or SP25M probe heads



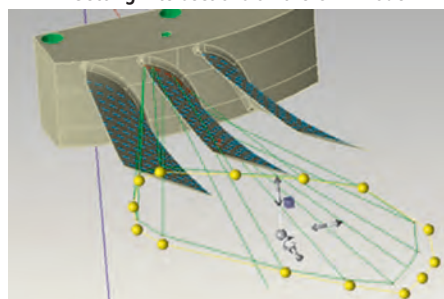
MAFIS Express



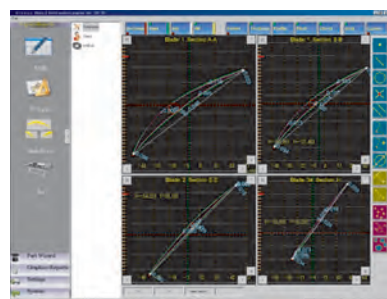
Setting intersections on the CAD model



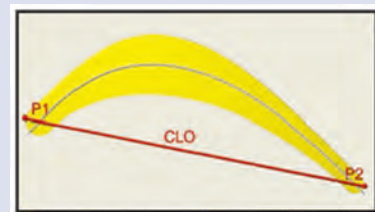
Numerical evaluation



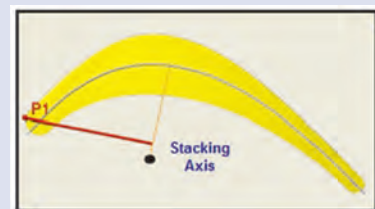
Optimizing the probe path



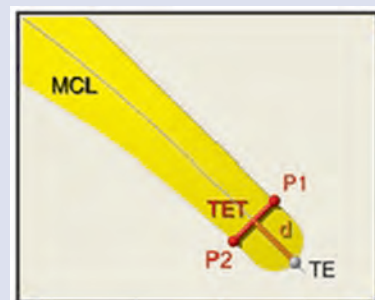
Graphical evaluation



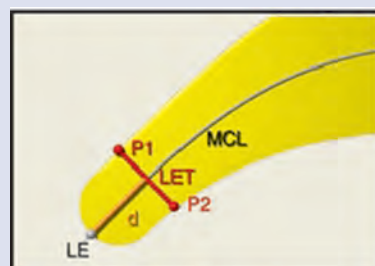
Overall Chord Length



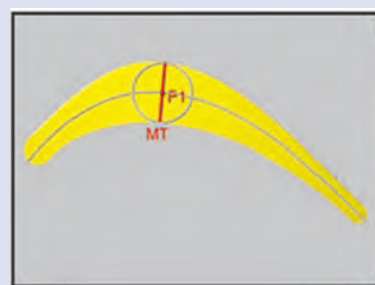
Stacking Axis



Trailing Edge – thickness on specific distance



Leading Edge – thickness on specific distance



Maximum thickness



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CMM Software

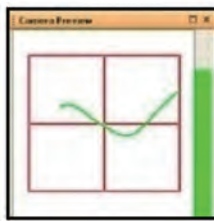
MSURF-S and MSURF-I

MSURF-S

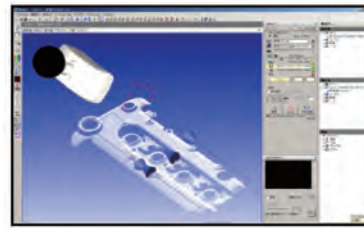
- Scanning paths can be created by simply defining three items : the scanning starting point, the scanning length, and the scanning width
- Scanning paths can be stored as measurement macros
- Point cloud data obtained from scanning can be exported in text or STL format
- MSURF-S can be started from MCOSMOS

MSURF-I

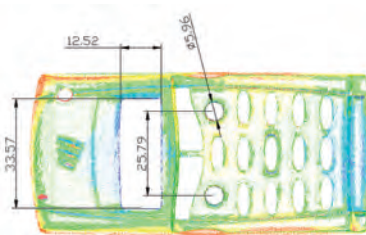
- Importing CAD data
- Feature-by-feature comparison
- Comparison of cross-sectional shapes



Screen sample from MSURF-S



Screen sample from MSURF-S

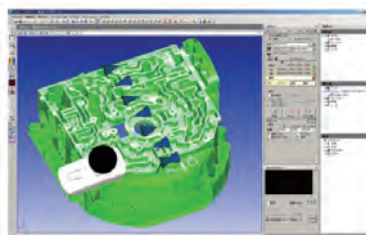


Screen sample from MSURF-I

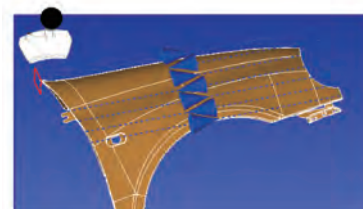
MSURF-G

Off-line version for part program generation

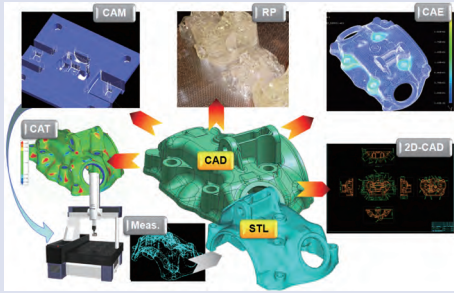
- Semi-automatic function for creating measurement paths with optimum probe orientation
- Detection of collision between the probe and the workpiece model
- Generation of simulated data for the point cloud expected to be obtained through scanning
- Displaying measurement movements (scanner movements) in animation



Screen sample from MSURF-G



Screen sample from MSURF-G



Screen sample from MSURF-S/I



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

SpinArm-Apex S Series

Series 195 - Multi-axis Portable Coordinate Measuring System

This multi-axis portable coordination measuring system is designed to give you a portable solution. The SpinArm-Apex offers you the following benefits:

- Compact and lightweight so you can transport it easily.
- It has a brake function.
- It is counterbalanced, giving you easy, extended operation
- Wireless communication including a laser scanner for improved mobility.
- Thermal compensation.
- Automatic probe recognition



SpinArm

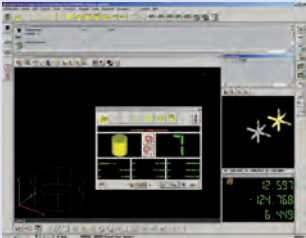
SpinArm-Apex S Models

No.	Model	Ø Measuring range [mm]	Repeatability	Point-to-point distance accuracy ¹	Number of axis
02AMA175	186	1800	± 0,04 mm	± 0,055 mm	6
02AMA174	246	2400	± 0,05 mm	± 0,065 mm	6
02AMA173	306	3000	± 0,08 mm	± 0,1 mm	6
02AMA172	366	3600	± 0,1 mm	± 0,135 mm	6
02AMA166	247	2400	± 0,055 mm	± 0,08 mm	7
02AMA165	307	3000	± 0,09 mm	± 0,135 mm	7
02AMA164	367	3600	± 0,11 mm	± 0,165 mm	7

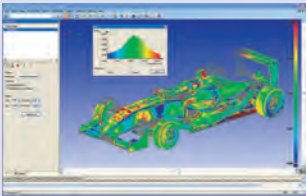
¹ Inspection method is conformed to Mitutoyo standard.



SurfaceMeasure



MCOSMOS



MSURF-M



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

This product is not for use in the United States of America or for export into the United States of America.

CRYSTA-PLUS M Series

Series 196 - Manual CMM

This is a manual floating type coordinate measuring machine designed to give you very high accuracy in a wide range of applications, from simple dimensional to complex form measurement. The Crysta-Plus M offers you the following benefits:

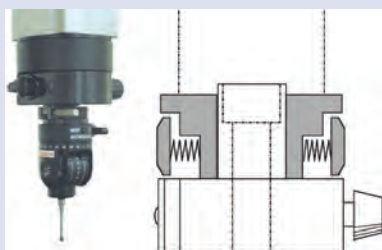
- High-precision air bearings and lightweight moving members give you very smooth operation.
- Versatile for connection with powerful MCOSMOS software or simple QM-Data 300D calculator
- Continuous fine feed over the entire measuring range.
- You can also add an optional temperature compensation system.

Specifications

Guide system	Air bearing
Axis clamp	One-touch air clamp
Fine feed	Entire range
Digital step	0,5 µm



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)

Accuracy is specified for the following environmental conditions for the CMM

Temperature range		19°C - 21°C	15°C - 30°C*
Temperature change	Per hour	-	2 K
	Per 24 hours	-	5 K
Temperature gradient	Vertical	0.5 K/m	1 K/m
	Horizontal	0.5 K/m	1 K/m

*The values shown in bold in the table above apply when using the temperature compensation system (optional):



Crysta-Plus M brochure on request



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.



Crysta-Plus M574



Crysta-Plus M7106

Crysta-Plus M Models:

No.	Model	Range [mm]	$E_{0,MPE}^{(1)}$	$P_{FTU,MPE}$ [µm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]	Temp.-Unit ⁽²⁾
196-683	443	400 x 400 x 300	(3+0,4L/100) µm	4	180	480	410	
196-684D	443	400 x 400 x 300	(3+0,4L/100) µm	4	180	480	410	●
196-591	544	500 x 400 x 400	(3,5+0,45L/100) µm	4	180	595	495	●
196-592	544	500 x 400 x 400	(3,5+0,45L/100) µm	4	180	595	495	●
196-596	574	500 x 700 x 400	(3,5+0,45L/100) µm	4	180	595	615	
196-597	574	500 x 700 x 400	(3,5+0,45L/100) µm	4	180	510	615	●
196-342	776	700 x 700 x 600	(3,5+0,45L/100) µm	5	500	800	1560	
196-352	7106	700 x 1000 x 600	(3,5+0,45L/100) µm	5	800	800	1800	

⁽¹⁾ According to ISO 10360-2:2010 when using probe TP20. L= measured length [mm].

⁽²⁾ Temperature compensation unit for temperature range 15-30°C (see table in coloured area).

DATA PROCESSING OPTIONS:



MCOSMOS

CRYSTA-APEX S Series

Series 191 - Standard CNC CMM

The CRYSTA-APEX S Series is a high performance, cost effective coordinate measuring machine, designed and constructed according to Mitutoyo's extensive experience in CNC CMM technology. It offers you the following benefits:

- Lightweight materials and an innovative machine structure deliver high motion stability, accuracy and affordability.
- The temperature compensation function (16°C to 26°C) allows you to take accurate measurements even on the shop floor.
- Compatible vision and scanning probe technologies give you flexible and effective measurement capabilities.



CRYSTA-Apex S9106

CRYSTA-Apex S Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Multi-Wire*	Mass [kg]
191-243	544	500 x 400 x 400	180	545		515
191-247	574	500 x 700 x 400	180	545		625
191-244	544	500 x 400 x 400	180	545	●	515
191-248	574	500 x 700 x 400	180	545	●	625
191-252	776	700 x 700 x 600	800	800	●	1675
191-254	7106	700 x 1000 x 600	1000	800	●	1951
191-292	9106	900 x 1000 x 600	1200	800	●	2231
191-292H	9108	900 x 1000 x 800	1200	1000	●	2261
191-294	9166	900 x 1600 x 600	1500	800	●	2868
191-294H	9168	900 x 1600 x 800	1500	1000	●	2898
191-296	9206	900 x 2000 x 600	1800	800	●	3912
191-296H	9208	900 x 2000 x 800	1800	1000	●	3942

*Multi-Wire:CMM is ready for touch trigger probe, scanning probe, optical probe including laser scanner probe.

Specifications

Digital step	0,1 µm
E _{0,MPE} ⁽¹⁾	(1,7+0,3L/100) µm ⁽²⁾ (1,7+0,4L/100) µm ⁽³⁾ L=measured length [mm]
P _{FTU,MPE}	1,7 µm
MPE _{THP}	2,3 µm
Drive speed	520 mm/s

⁽¹⁾ According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus Ø4x50mm.
⁽²⁾ For temperature range 18°C - 22°C.
⁽³⁾ For temperature range 16°C - 26°C.

Accuracy is specified for the following environmental conditions for the CMM:

Temperature range		18°C - 22°C	16°C - 26°C
Temperature change	Per hour	1 K	1 K
	Per 24 hours	2 K	5 K
Temperature gradient	Vertical	1 K/m	1 K/m
	Horizontal	1 K/m	1 K/m



Joystick controller No. 06AAN641 (optional)

- Features:
- 2 Levers
 - Speed control
 - Axis clamping
 - Change operating position
 - Store position



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CRYSTA-APEX S1200 Series

Specifications

Scale	High accuracy linear encoder
Digital step	0,1 µm
$E_{0,MPE}^{(1)}$	$(2,3+0,4L/100) \mu m^{(2)}$ L = measured length [mm]
$P_{FTU,MPE}$	2 µm
MPE_{THP}	2,8 µm
Guide system	Air bearings on each axis
Drive speed	520 mm/s

(1) According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus Ø4x50mm.

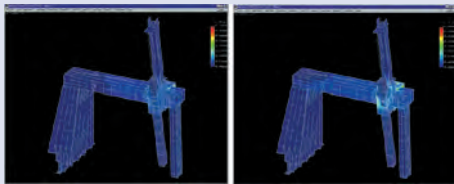
(2) For temperature range 16°C-26°C.



Temperature compensation system
(temperature sensors)

Accuracy is specified for the following environmental conditions for the CMM:

Temperature range		18°C - 22°C	16°C - 26°C
Temperature change	Per hour	1 K	1 K
	Per 24 hours	2 K	5 K
Temperature gradient	Vertical	1 K/m	1 K/m
	Horizontal	1 K/m	1 K/m



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



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Refer to the CRYSTA-Apex S brochure

Series 191 - Standard CNC CMM

The CRYSTA-APEX S Series is a high performance, cost effective coordinate measuring machine, designed and constructed according to Mitutoyo's extensive experience in CNC CMM technology. It offers you the following benefits:

- Lightweight materials and an innovative machine structure deliver high motion stability, accuracy and affordability.
- The temperature compensation function (16°C to 26°C) allows you to take accurate measurements even on the shop floor.
- Compatible vision and scanning probe technologies give you flexible and effective measurement capabilities.



CRYSTA-Apex S 122010

CRYSTA-Apex S Models:

No.	Model	Range [mm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
191-392	121210	1200 x 1200 x 1000	2000	1200	4050
191-394	122010	1200 x 2000 x 1000	2500	1200	6150
191-396	123010	1200 x 3000 x 1000	3000	1200	9110

STRATO-APEX Series

Series 355 - High accuracy CNC CMM

This a high accuracy CNC coordinate measuring machine that allows you to get accurate results at lightning speed.

The STRATO-APEX Series offers you the following benefits:

- High measurement accuracy and high-speed motion
- High-performance scanning.
- Ultra high precision scales on each axis.
- Anti-vibration system reduces the impact of nearby vibration sources (optional for 574)



STRATO-Apex 9106

STRATO-Apex Models:

No.	Model	Range [mm]	$E_{0,MPE}^{(1)}$	$P_{FTU,MPE}$	MPE_{THP}	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
355-522	574	500 x 700 x 400	$(0,7+0,25L/100) \mu m$	0,7	1,8	180	570	1530
355-502	776	700 x 700 x 600	$(0,9+0,25L/100) \mu m$	0,9	1,8	500	770	1895
355-507	7106	700 x 1000 x 600	$(0,9+0,25L/100) \mu m$	0,9	1,8	800	770	2180
355-512	9106	900 x 1000 x 600	$(0,9+0,25L/100) \mu m$	0,9	1,8	800	770	2410
355-517	9166	900 x 1600 x 600	$(0,9+0,25L/100) \mu m$	0,9	1,8	1200	770	3085

⁽¹⁾ According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus ø4x50 mm.
L=measured length [mm]

Specifications

Digital step	0,02 μm
Drive speed	519 mm/s
3D Acceleration	2598 mm/s ²

Accuracy is specified for the following environmental conditions for the CMM:

Temperature range	19°C - 21°C	
Temperature change	Per hour	1 K
	Per 24 hours	2 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

Specifications

Drive speed	200 mm/s
3D Acceleration	981 mm/s ²
Digital step	0,01 µm

Accuracy is specified for the following environmental conditions for the CMM

Temperature range		20±2°C
Temperature change	Per hour	0 K
	Per 24 hours	1 K/m
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



CMM calibration using a virtually zero thermal expansion glass gauge



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

LEGEX Series

Series 356 - Ultra-High Precision Premium CNC CMM

This LEGEX Series is the most accurate CNC coordinate measuring machine that gives you the ultimate accuracy.

The LEGEX Series offers you the following benefits:

- Rigorous analysis of all possible error-producing factors, and elimination or minimisation of their effects, delivers unsurpassed accuracy of 0,35µm.
- Ultra-high accuracy crystallised-glass scale with the ultra-low expansion coefficient of $0,01 \times 10^{-6}/K$ is used on each axis.
- The fixed bridge structure and precision air bearings, running on highly rigid guideways, give you superior motion stability and ultra-high geometrical accuracy.
- You can use many different types of optional probe systems, including touch-trigger probes, laser scanning probes, and a vision measuring probe.



LEGEX 774

LEGEX Models:

No.	Model	Range [mm]	$E_{0,MPE}^{(1)}$	$P_{FTU,MPE}$ [µm]	MPE_{THP} [µm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
356-373-5	574	510 x 710 x 455	(0,35+0,1L/100) µm	0,45	1,4	200	706	3900
356-353	774	710 x 710 x 455	(0,35+0,1L/100) µm	0,45	1,4	500	696	5000
356-357	776	710 x 710 x 605	(0,35+0,1L/100) µm	0,45	1,4	500	862	5100
356-363	9106	910 x 1010 x 605	(0,35+0,1L/100) µm	0,45	1,4	800	856	6500
356-343	12128	1210 x 1210 x 810	(0,6+0,15L/100) µm	0,6	1,8	1000	1056	10500

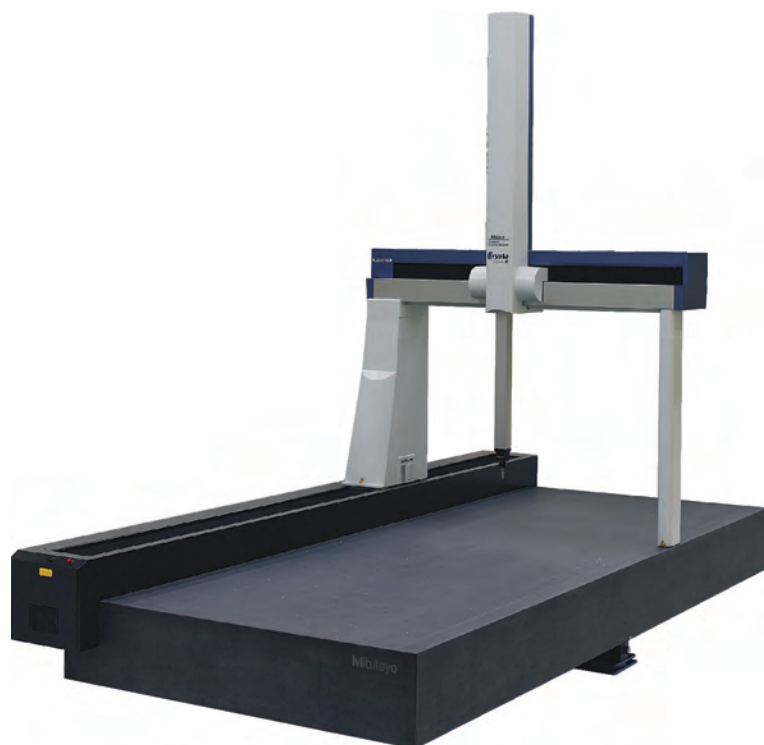
(¹) According to ISO 10360-2:2010 when using MPP-310Q probe system.
L=measured length [mm]

CRYSTA-APEX S Series

Series 191 - Standard CNC CMM

Large size and high performance CNC CMM, designed to provide high accuracy in various environment, ready for touch trigger probe, scanning probe, optical probe and laser scanner probe.

- Proven bridge type construction
- High rigidity air-bearing guiding on every axis
- High accuracy
- High speed and acceleration
- Temperature compensation from 16° to 24°C
- Glass scale with high resolution 0,1 µm
- Granite working table with M8 threads
- Multi-Function Joystick Box including two levers and speed adjustment



CRYSTA-Apex S 205016

CRYSTA-Apex S Models:

No.	Model	Range [mm]	$E_{0,MPE}^{(1)}$	$P_{FTU,MPE}$ [µm]	MPE_{THP} [µm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
191-262-2	163012	1600 x 3000 x 1200	(3,3+0,55L/100) µm	5	6	3500	1400	10600
191-272-2	164012	1600 x 4000 x 1200	(3,3+0,55L/100) µm	5	6	4500	1400	14800
191-282-2	165012	1600 x 5000 x 1200	(3,3+0,55L/100) µm	5	6	5000	1400	19500
191-262H-2	163016	1600 x 3000 x 1600	(4,5+0,55L/100) µm	6	7	3500	1800	10650
191-272H-2	164016	1600 x 4000 x 1600	(4,5+0,55L/100) µm	6	7	4500	1800	14850
191-282H-2	165016	1600 x 5000 x 1600	(4,5+0,55L/100) µm	6	7	5000	1800	19550
191-362-2	203016	2000 x 3000 x 1600	(4,5+0,9L/100) µm	6	6	4000	1800	14100
191-372-2	204016	2000 x 4000 x 1600	(4,5+0,9L/100) µm	6	6	5000	1800	19400
191-382-2	205016	2000 x 5000 x 1600	(4,5+0,9L/100) µm	6	6	6000	1800	28000
191-362H-2	203020	2000 x 3000 x 2000	(6+1L/100) µm	7,5	7,5	4000	2200	14150
191-372H-2	204020	2000 x 4000 x 2000	(6+1L/100) µm	7,5	7,5	5000	2200	19450
191-382H-2	205020	2000 x 5000 x 2000	(6+1L/100) µm	7,5	7,5	6000	2200	28050

⁽¹⁾According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus Ø4x50mm.

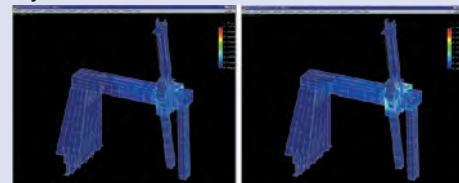
L= measuring length [mm]

Specifications

Digital step	0,1 µm
Drive speed	520 mm/s



Joystick controller



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



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

CRYSTA-APEX C Gantry Series

Specifications

Digital step	0,1 µm
Drive speed	500 mm/s

Accuracy is specified for the following environmental conditions for the CMM:

Temperature range		18°C - 22°C	16°C - 26°C
Temperature change	Per hour	1 K	1 K
	Per 24 hours	2 K	5 K
Temperature gradient	Vertical	1 K/m	1 K/m
	Horizontal	1 K/m	1 K/m

Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.

Foundation

This type series always requires a special foundation. Please contact your local Mitutoyo partner for further details.

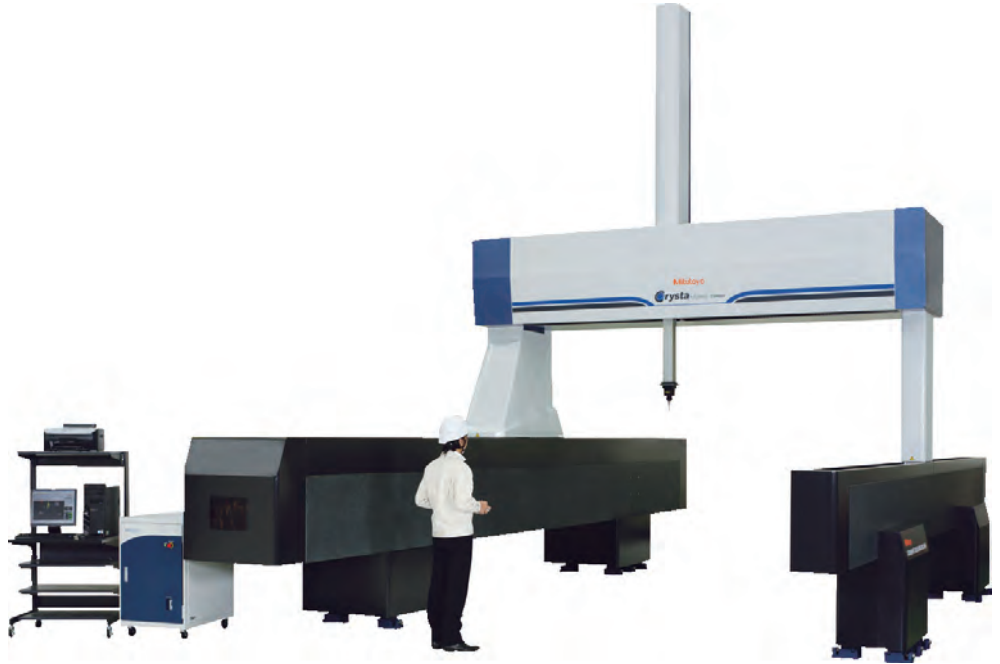


Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

Series 191 - Standard Large CNC CMM

High precision gantry type CNC CMM, designed to provide top scanning performance for your largest workpieces, ready for touch trigger probe, scanning probe, optical probe, laser scanner probe.

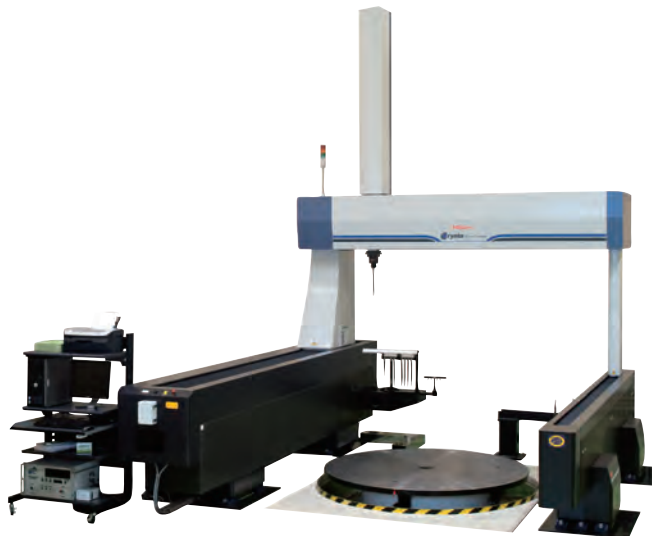
- Improve structural rigidity gantry type construction with compensation technology
- High accuracy
- High speed and acceleration
- Temperature compensation from 18° to 22°C
- High precision glass scale with resolution 0,1 µm
- Multi-Function Joystick Box including two levers and a speed adjustment
- Available in many different sizes from 2000 x 3000 x 1500 mm to 3000 x 5000 x 2000 mm.



CRYSTA-Apex C 203016 G

No.	Range [mm]	$E_{0,MPE}^{(1)}$	$P_{FTU,MPE}$ [µm]	MPE_{THP} [µm]	Mass [kg]
Crysta-Apex C 203016 G	2000 x 3000 x 1600	(6+0,6L/100) µm	6	6,5	12000
Crysta-Apex C 306020 G	3000 x 6000 x 2000	(8+0,7L/100) µm	8	8,5	16000

(¹) According to ISO 10360-2:2010 when using probe SP25M, module SH25-1, stylus ø4x50 mm.
L= measured length [mm].



FALCIO-APEX Series

Series 355 - High accuracy CNC CMM

High precision large size bridge type CNC CMM, designed to provide top scanning performance with high accuracy, ready for touch trigger probe, scanning probe, optical probe, laser scanner probe.

- Improve structural rigidity bridge type construction with compensation technology
- High accuracy
- High speed and acceleration
- Temperature compensation from 18° to 22°C
- High precision glass scale with resolution 0,1 µm
- Integrated vibration-damping units with auto-levelling air springs
- Granite working table with M8 threads
- Multi-Function Joystick Box including two levers and a speed adjustment



FALCIO-Apex 163012

FALCIO-Apex Models:

No.	Model	Range [mm]	$E_{0,MPE}^{(1)}$	$P_{FTU,MPE}$ [µm]	MPE_{THP} [µm]	Loading Weight [kg]	Loading Height [mm]	Mass [kg]
355-592-1	162012	1600 x 2000 x 1200	(2,8+0,4L/100) µm	2,8	2,8	3500	1350	9500
355-594-1	162015	1600 x 2000 x 1500	(3,3+0,45L/100) µm	3,3	3,5	3500	1650	9600
355-597-1	163012	1600 x 3000 x 1200	(2,8+0,4L/100) µm	2,8	2,8	4000	1350	14000
355-599-1	163015	1600 x 3000 x 1500	(3,3+0,4L/100) µm	3,3	3,5	4000	1650	14050
355-602-1	164012	1600 x 4000 x 1200	(2,8+0,4L/100) µm	2,8	2,8	4500	1350	25000
355-604-1	164015	1600 x 4000 x 1500	(3,3+0,45L/100) µm	3,3	3,5	4500	1650	25050

⁽¹⁾ According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus ø4x50 mm.
L= measured length [mm].

Specifications

Digital step	0,1 µm
Drive speed	500 mm/s

Accuracy is specified for the following environmental conditions for the CMM:

Temperature range		18°C - 22°C
Temperature change	Per hour	1 K
	Per 24 hours	2 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

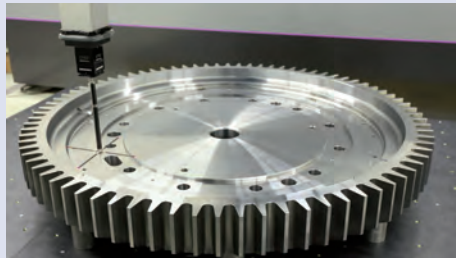
Specifications

Digital step	0,1 µm
Drive speed	520 mm/s



Accuracy is specified for the following environmental conditions for the CMM:

Temperature range		18°C - 22°C
Temperature change	Per hour	1 K
	Per 24 hours	2 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



Scanning with probe SP80 and 100 mm styli.

Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.

Foundation

This type series always requires a special foundation. Please contact your local Mitutoyo partner for further details.



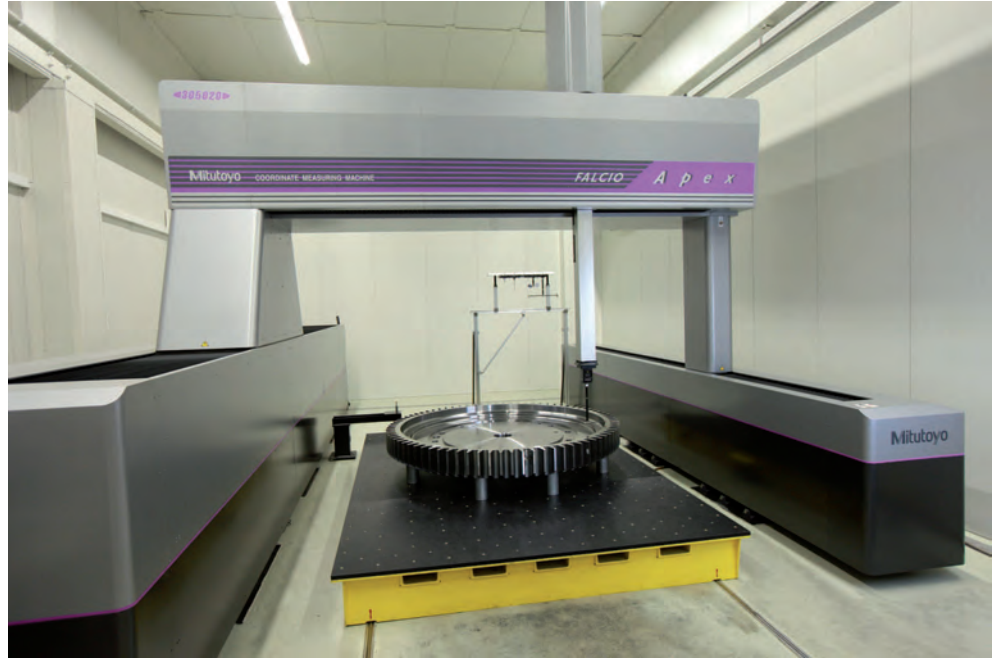
Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

FALCIO-APEX Gantry Series

Series 355 - High accuracy Large CNC CMM

High precision gantry type CNC CMM, designed to provide top scanning performance for your largest workpieces, ready for touch trigger probe, scanning probe, optical probe, laser scanner probe.

- Improve structural rigidity gantry type construction with compensation technology
- High accuracy
- High speed and acceleration
- Temperature compensation from 18° to 22°C
- High precision glass scale with resolution 0,1 µm
- Multi-Function Joystick Box including two levers and a speed adjustment
- Available in many different sizes from 2000 x 3000 x 1600 mm to 3000 x 5000 x 2000 mm.



FALCIO-Apex 305020 G measuring a gear for a wind turbine engine

No.	Range [mm]	$E_{0,MPE}^{(1)}$	$P_{FTU,MPE}$ [µm]	MPE_{THP} [µm]	Mass [kg]
FALCIO-Apex 203015 G	2000 x 3000 x 1500	(3,5+0,45L/100) µm	3,5	3,8	12000
FALCIO-Apex 305020 G	3000 x 5000 x 2000	(4,4+0,45L/100) µm	4	4,2	16000

⁽¹⁾ According to ISO 10360-2:2010 when using probe SP25M, moule SM25-1, stylus Ø4x50 mm.
L=measured length [mm].



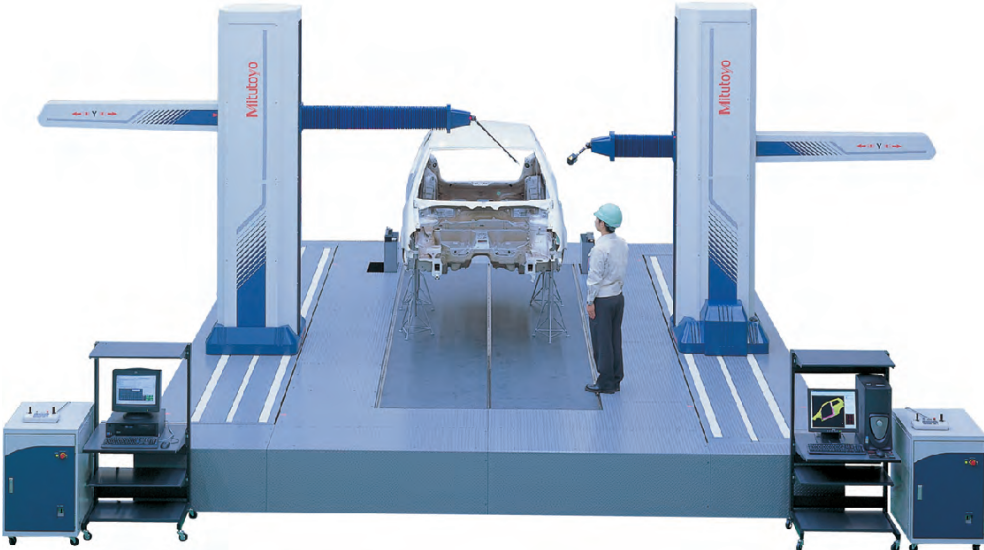
CARB-Strato Series / CARB-Apex Series

Series 360 - Car Body Measuring System

A large, horizontal-type arm CNC CMM for measuring car bodies or similar components. Single/dual-head types are available ; the dual-head type measures by controlling two heads simultaneously, one from each side.

MAIN FEATURES CARBstrato : large, high precision, dual-head type.

MAIN FEATURES CARBapex : large, single-head type, affordable.



CARBstrato

No.	Accuracy ⁽¹⁾ E _{0,MPE}
CARBstrato	(18+20L/1000)µm
CARBapex	(25+28L/1000)µm

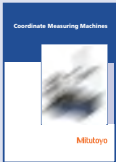
⁽¹⁾ According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus ø 4x50 mm.
L= measured length (mm).



CARBapex

Specifications

Range X-axis	4000-8000 mm
Range - Y-axis	1400-1600 mm
Range - Z-axis	2000-2600 mm
Scale	High accuracy linear encoder
Guide system	X-axis : linear guide ; YZ-axis : air bearing
Drive speed	866 mm/sec (CARBstrato) 519 mm/sec (CARBapex)
3D Acceleration	0,2G (CARBstrato) 0,1G (CARBapex)
Digital step	0,1 µm



CARBstrato / CARBapex Series brochure on request

Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.

Foundation

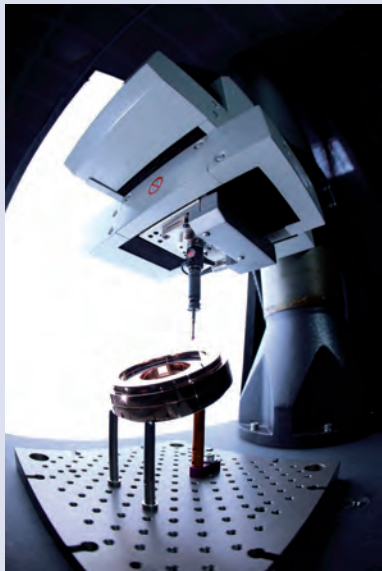
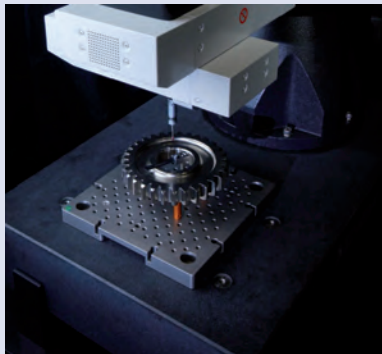
This type series always requires a special foundation. Please contact your local Mitutoyo partner for further details.



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

Specifications

Digital step	0,02 μm
$E_{0,MPE}^{(1)}$	(2+0,5L/100) μm (19-21°C) (3+0,72L/100) μm (10-35°C) L = measured length [mm]
$P_{FTU,MPE}$	2 μm
MPE_{THP}	2,5 μm
Drive speed	340 mm/s
3D Acceleration	6750 mm/s ²



⁽¹⁾ According to ISO 10360-2:2010 when using probe SP25M, module SM25-1, stylus $\varnothing 4 \times 50 \text{ mm}$.

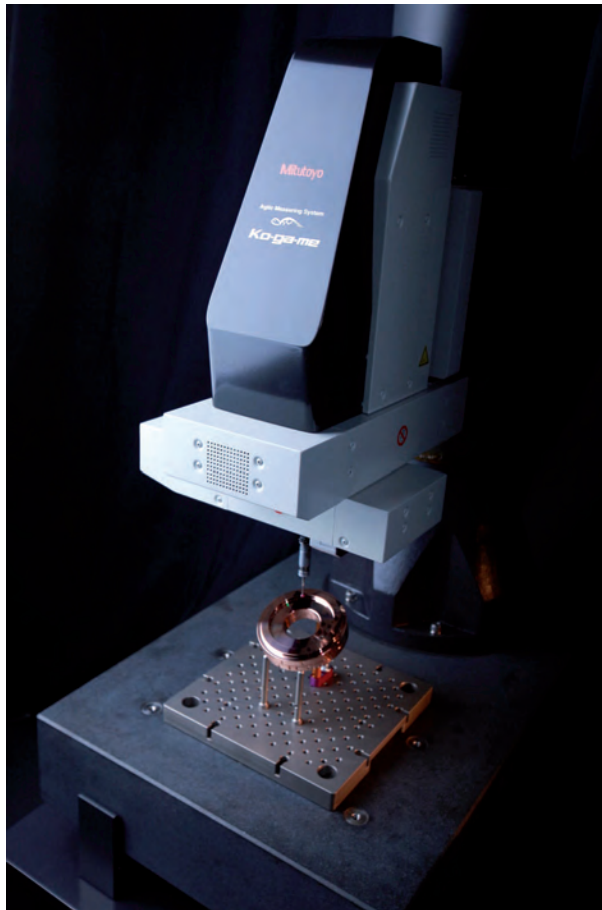


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MACH KO-GA-ME Series

Series 357 - Agile Measurement System

- Compact in-line system
- High-speed measurements
- For scanning and touch-trigger measurements
- Ideal for single feature inspection
- Extremely Small Footprint - perfect for automated cells
- Also as stand alone solution
- Designed for production environment 10°C-35°C



MACH Ko-ga-me 884-3V with optional stand

MACH Ko-ga-me Models:

No.	Model	Range [mm]	Mass [kg]
357-157TC	12128-3V	120 x 120 x 80	36

MACH-3A 653

Series 360 - High-Speed In-Line CMM

Super high speed and acceleration Production-line Coordinate Measuring Machine with horizontal spindle, designed for intensive use in hostile workshop environment.

- Super High speed and acceleration
- Drastic reduction of the measurement cycle compared with any conventional CMM
- All in One Compact design to minimize the foot print in the workshop and to improve the dust resistance
- Work piece handling and routing in the same posture as for other horizontal spindle machining centres
- Control unit and PC are installed in the dust-tight rack with heat exchanger.
- Ease-of-maintenance construction and air-free operation using high accuracy linear ball bearing
- Temperature compensation from 5°C to 40°C
- Glass scale with high resolution 0,1 µm
- Safety joystick box with deadman switch and speed adjustment
- Optional with index table for higher flexibility



No.	Model	Range [mm]
360-412	MACH-3A 653	600 x 500 x 285 mm

Specifications

Digital step	0,1 µm
E _{0,MPE} ⁽¹⁾	(2,5+0,35L/100) µm ⁽²⁾ (3,9+0,65L/100) µm ⁽³⁾
P _{FTU,MPE}	2,5 µm
Drive speed	1212 mm/s

⁽¹⁾According to ISO 10360-2:2010 when using probe TP7M, stylus ø4x50 mm. L= measured length [mm].

⁽²⁾For temperature range 19°C-21°C.

⁽³⁾For temperature range 5°C-40°C.

Accuracy is specified for the following environmental conditions for the CMM

Temperature range		5°C - 40°C
Temperature change	per hour	2 K
	per 24 hours	10 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m

Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

MACH-V 9106

Series 360 - In-line type CNC CMM

High speed and acceleration Production-line Coordinate Measuring Machine with vertical spindle, designed for intensive use in hostile workshop environment.

- Higher speed and accuracy with barycentric drive
- Improved dust resistance by installing all drive system and scale units in the dust-tight enclosure on the machine top
- Control unit and PC are installed in the dust-tight rack
- Space-saving design helps installation in a production line
- Flexible loading options due open access to the measuring area
- Ease-of-maintenance construction and air-free operation using high accuracy linear ball bearing
- Temperature compensation from 5° to 35°C
- Glass scale with high resolution 0,1 µm.

Specifications

Digital step	0,1 µm
$E_{0,MPE}^{(1)}$	(2,5+0,35L/100) µm ⁽²⁾ (3,6+0,58L/100) µm ⁽³⁾
$P_{FTU,MPE}$	2,5 µm
Drive speed	866 mm/s

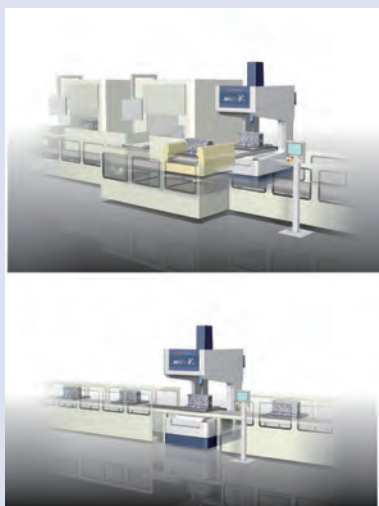
⁽¹⁾According to ISO 10360-2:2010 when using probe TP7M, stylus ø4x50 mm. L=measured length [mm].

⁽²⁾For temperature range 19°C-21°C.

⁽³⁾For temperature range 5°C-35°C.

Accuracy is specified for the following environmental conditions for the CMM:

Temperature range		5°C - 35°C
Temperature change	per hour	2 K
	per 24 hours	10 K
Temperature gradient	Vertical	1 K/m
	Horizontal	1 K/m



MACH-V 9106

No.	Model	Range [mm]
360-226A	MACH-V9106	900 x 1000 x 600

Safety System

For this type series, Mitutoyo offers a customized safety system. Depending on the local situation in your facility, Mitutoyo will propose a tailor-made solution meeting the requirements of the Machinery Directive.



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

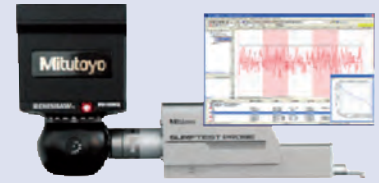
CMM Probes

SURFTEST Probe

Surface Roughness Measurement directly on the CMM!

This latest Mitutoyo probe head closes the gap between typical dimensional CMM measurements and surface roughness inspection. Instead of having to take the workpiece to another measuring instrument or using additional portable systems, the SURFTEST Probe adds roughness measurement capability to your CMM and so avoids all the cost and inconvenience of additional systems. It brings the proven technology of the SJ-310 series to the CMM with all its highly capable range of detectors developed for handling specialist applications such as roughness measurement on gears, inside small holes or deep grooves, in addition to simple flat surface measuring tasks.

- Proven technology from Mitutoyo's SJ-310 SurfTest
- Chose from five types of detector for variant applications
- High accuracy – no CMM movement during measurement
- One CNC measurement cycle produces all results
- Graphical and numerical output
- One Measurement report for all GD&T requirements



SURFTEST Probe



Optional detectors

SurfaceMeasure

Mitutoyo's Laser Line Scanning Probe

- Suitable for inspection by CAD comparison and reverse engineering purposes.
- Autojoint mounting compatible with PH10M/MQ and automatic probe change racks.
- Automatic laser intensity and camera sensitivity adjustment according to the surface texture.
- Powder-sprayless measurement even for glossy or multiple colors surfaces.
- High Speed Scanning by High Acquisition rate of 75000 points/sec (1000 points/line).
- Scanning uncertainty: 12 µm.
- Maximum scanning width: 60 mm.
- Working Distance: 93 mm.



SurfaceMeasure

QVP

Mitutoyo's Vision Probe System for CMMs

- Fast optical measurements – the perfect choice for small features and soft materials
- Ideal in combination with tactile probes
- Prepared for automatic probe change
- Four objective lenses offer different optical magnification
- From 0,375 x to 3,75 x
- White LED ring light
- White LED coaxial light



QVP (Quick Vision Probe)



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

CMM Probes



MPP-310Q

MPP-310Q

Ultra-High Precision Scanning Probe

- High resolution of 0,01 μm
- Measuring range $\pm 1\text{ mm}$
- Extremely low measuring forces of 0,03 N
- Styli length up to 200 mm
- Air bearing for smooth measurements
- Axis clamping for scanning on slanted or arched surfaces



PH20

Rapid tactile measurements at any probe angle

- Head touch for improved repeatability
- Feature-based calibration for improved accuracy
- Probe change with TP20 moduls
- Allowing subsequent measurement at any head angle
- Full support in MCOSMOS



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

CMM Probes

Scanning probe systems



SP80



SP25M



SP600M

Touch-trigger probe systems



TP7M
High accuracy type



TP200
Compact and high accuracy (stylus change type)



SCR200
Rack



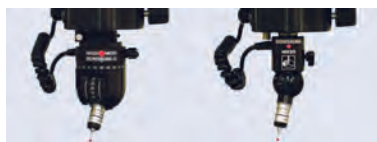
Micro Touch Probe
UMAP-CMM



TP20
Compact type



MCR20
Rack



MH20i / MH20
Manual Probes

Probe heads



PH10M
Motor drive index type



MIH
Manual index type



PH1
Simple manual type



TP8
Manual Indexable
Probe



CMM Probes brochure on demand



Mitutoyo offers you over 600 styli plus highly specialised equipment for your measuring task - Refer to the small tool section of the catalogue for detailed information.

Styli Kits

Mitutoyo offers you over 600 styli plus highly specialised equipment within a wide range of selected materials like steel, aluminium, ceramics, ruby, zirconium oxide or silicon nitride.



Styli Kit M2
Addition



Styli Kit M2
Basic 1



Styli Kit M2
Basic 2



Styli Kit M2
Expansion

Styli Kit M2 Addition

No.	Contents	Description	ø mm	L mm	Price [€]
K651382		wooden box			356,00
	1x Part No. K651058	5-way stylus holder M2		7,5	
	1x Part No. K651040	Extension steel M2		30	
	1x Part No. K651039	Extension steel M2		20	
	4x Part No. K651038	Extension steel M2		10	
	1x Part No. K651022	Stylus steel-ruby M2	4	20	
	1x Part No. K651021	Stylus steel-ruby M2	3	20	
	5x Part No. K651019	Stylus steel-ruby M2	2	20	
	1x Part No. K651012	Stylus steel-ruby M2	1	10	
	2x Part No. K651223	Pin spanner ø 1,2 mm		23	

Styli Kit M2 Basic 1

No.	Contents	Description	ø mm	L mm	Price [€]
K651377		wooden box			649,00
	1x Part No. K651012	Stylus steel-ruby M2	1	10	
	1x Part No. K651014	Stylus steel-ruby M2	2	10	
	1x Part No. K651019	Stylus steel-ruby M2	2	20	
	1x Part No. K651016	Stylus steel-ruby M2	3	10	
	1x Part No. K651021	Stylus steel-ruby M2	3	20	
	1x Part No. K651022	Stylus steel-ruby M2	4	20	
	1x Part No. K651031	Cylinder stylus steel M2	3	13	
	1x Part No. K651062	Adaptor M2		7	
	1x Part No. K651054	5-way stylus M2	2	30	
	1x Part No. K651083	Disk stylus steel M2	18	7,5	
	1x Part No. K651085	Disk stylus steel - ruby M2	6	10	
	1x Part No. K651038	Extension steel M2		10	
	1x Part No. K651039	Extension steel M2		20	
	2x Part No. K651223	Pin spanner ø 1,2 mm		23	

Styli Kit M2 Basic 2

No.	Contents	Description	ø mm	L mm	Price [€]
K651354		wooden box			737,00
	1x Part No. K651235	Stylus tungsten carbide-ruby M2	0,5	20	
	1x Part No. K651249	Stylus tungsten carbide-ruby M2	1	20	
	1x Part No. K651019	stylus steel-ruby M2	2	20	
	1x Part No. K651347	Stylus carbon fiber-ruby M2	4	50	
	1x Part No. K651348	Stylus carbon fiber-ruby M2	5	50	
	1x Part No. K651349	Stylus carbon fiber-ruby M2	6	50	
	1x Part No. K651350	Stylus extension CRP M2		40	
	1x Part No. K651351	Stylus extension CRP M2		50	
	1x Part No. K651352	Stylus extension CRP M2		70	
	1x Part No. K651353	Stylus extension CRP M2		90	
	1x Part No. K651058	5-way stylus holder M2		7,5	
	1x Part No. K651223	pin spanner ø 1,2 mm			

Styli Kit M2 Expansion

No.	Contents	Description	ø mm	L mm	Price [€]
K651378		wooden box			1348,00
	1x Part No. K651236	Stylus tungsten carbide-ruby M2	0,7	10	
	1x Part No. K651248	Stylus tungsten carbide-ruby M2	1	20	
	2x Part No. K651257	Stylus tungsten carbide-ruby M2	1,5	30	
	1x Part No. K651233	Stylus tungsten carbide-ruby M2	0,3	10	
	1x Part No. K651276	Stylus tungsten carbide-ruby M2	0,5	10	
	1x Part No. K651012	Stylus steel-ruby M2	1	10	
	1x Part No. K651013	Stylus steel-ruby M2	1,5	10	
	1x Part No. K651014	Stylus steel-ruby M2	2	10	
	1x Part No. K651015	Stylus steel-ruby M2	2,5	10	
	2x Part No. K651020	Stylus steel-ruby M2	2,5	20	
	1x Part No. K651032	Cylinder stylus-ruby M2	2	20	
	1x Part No. K651052	4-way stylus-ruby M2	1	10	
	1x Part No. K651098	Tip stylus tungsten carbide M2		10	
	1x Part No. K651083	Disk stylus steel M2	18	7,5	
	1x Part No. K651084	Disk stylus steel M2	25	7,5	
	1x Part No. K651041	Extension steel M2		40	
	2x Part No. K651223	Pin spanner ø 1,2 mm		23	

Styli Kits

Styli Kit M2 Professional

No.	Contents	Description	ø mm	L mm	Price [€]
K651379		wooden box			2776,00
	1x Part No. K651236	Stylus tungsten carbide-ruby M2	0,7	10	
	1x Part No. K651248	Stylus tungsten carbide-ruby M2	1	20	
	1x Part No. K651233	Stylus tungsten carbide-ruby M2	0,3	10	
	2x Part No. K651276	Stylus tungsten carbide-ruby M2	0,5	10	
	2x Part No. K651012	Stylus steel-ruby M2	1	10	
	1x Part No. K651013	Stylus steel-ruby M2	1,5	10	
	3x Part No. K651014	Stylus steel-ruby M2	2	10	
	5x Part No. K651019	Stylus steel-ruby M2	2	20	
	1xPart No. K651015	Stylus steel-ruby M2	2,5	10	
	2xPart No. K651020	Stylus steel-ruby M2	2,5	20	
	1x Part No. K651016	Stylus steel-ruby M2	3	10	
	2x Part No. K651021	Stylus steel-ruby M2	3	20	
	3x Part No. K651017	Stylus steel-ruby M2	4	10	
	3x Part No. K651022	Stylus steel-ruby M2	4	20	
	2x Part No. K651018	Stylus steel-ruby M2	5	10	
	2x Part No. K651024	Stylus steel-ruby M2	6	10	
	1x Part No. K651025	Stylus steel-ruby M2	8	11	
	1x Part No. K651030	Cylinder stylus steel M2	1,5	11	
	1x Part No. K651031	Cylinder stylus steel M2	3	13	
	1x Part No. K651032	Cylinder stylus steel M2	2	20	
	1x Part No. K651062	Adaptor M2		7	
	1x Part No. K651052	4-way stylus-ruby M2	1	10	
	1x Part No. K651053	5-way stylus-ruby M2	2	18	
	1xPart No. K651054	5-way stylus-ruby M2	2	30	
	1xPart No. K651097	Tip stylus steel M2		15	
	1xPart No. K651098	Tip stylus tungsten carbide M2		10	
	1x Part No. K651083	Disk stylus steel M2	18	7,5	
	1x Part No. K651084	Disk stylus steel M2	25	7,5	
	1xPart No. K651085	Disk stylus steel - ruby M2	6	10	
	1xPart No. K651090	Hollow ball ceramic M2		11	
	1xPart No. K651058	5-way stylus holder M2		7,5	
	4xPart No. K651037	Extension steel M2		5	
	2x Part No. K651038	Extension steel M2		10	
	2x Part No. K651039	Extension steel M2		20	
	2xPart No. K651040	Extension steel M2		30	
	2x Part No. K651041	Extension steel M2		40	
	2x Part No. K651223	Pin spanner ø 1,2 mm		23	

Styli Kit M2 Starter

No.	Contents	Description	ø mm	L mm	Price [€]
K651376		wooden box			140,00
	1x Part No. K651012	Stylus steel-ruby M2	1	10	
	1x Part No. K651019	Stylus steel-ruby M2	2	20	
	1x Part No. K651021	Stylus steel-ruby M2	3	20	
	1x Part No. K651022	Stylus steel-ruby M2	4	20	
	1x Part No. K651038	Extension steel M2		10	
	1x Part No. K651039	Extension steel M2		20	
	2x Part No. K651223	Pin spanner ø 1,2 mm		23	

Styli Kit M3 CRP 1

No.	Contents	Description	ø mm	L mm	Price [€]
K651318		Wooden box			345,00
	1x Part No. K651297	Stylus carbon fiber-ruby M3	3	21	
	1x Part No. K651298	Stylus carbon fiber-ruby M3	4	21	
	1x Part No. K651301	Stylus carbon fiber-SiNi M3	4	21	
	1x Part No. K651299	Stylus carbon fiber-ruby M3	4	31	
	1x Part No. K651300	Stylus carbon fiber-ruby M3	4	40	
	1x Part No. K651303	Stylus carbon fiber-ruby M3	5	50	
	1x Part No. K651223	pin spanner ø 1,2 mm			



Styli Kit M2 Professional



Styli Kit M2 Starter



Styli Kit M3 CRP 1



Styli Kit M3 CRP 2

Styli Kits

Styli Kit M3 CRP 2

No.	Contents	Description	ø mm	L mm	Price [€]
K651319		Wooden box			361,00
	1x Part No. K651302	Stylus carbon fiber-ruby M3	5	21	
	1x Part No. K651304	Stylus carbon fiber-ruby M3	5	21	
	1x Part No. K651303	Stylus carbon fiber-ruby M3	5	50	
	1x Part No. K651306	Stylus carbon fiber-ruby M3	6	50	
	1x Part No. K651309	Stylus carbon fiber-ruby M3	6	75	
	1x Part No. K651223	Pin spanner ø 1,2 mm			



Styli Kit M3
CRP 3

Styli Kit M3 CRP 3

No.	Contents	Description	ø mm	L mm	Price [€]
K651320		Wooden box			408,00
	1x Part No. K651302	Stylus carbon fiber-ruby M3	5	21	
	1x Part No. K651304	Stylus carbon fiber-ruby M3	5	21	
	1x Part No. K651303	Stylus carbon fiber-ruby M3	5	50	
	1x Part No. K651306	Stylus carbon fiber-ruby M3	6	75	
	1x Part No. K651309	Stylus carbon fiber-ruby M3	8	100	
	1x Part No. K651223	Pin spanner ø 1,2 mm			



Styli Kit M3
Linear Height

Styli Kit M3 Starter

No.	Contents	Description	ø mm	L mm	Price [€]
K651380		Wooden box			201,00
	1x Part No. K651146	Stylus steel-ruby M3	1	21	
	1x Part No. K651147	Stylus steel-ruby M3	2	21	
	1x Part No. K651148	Stylus steel-ruby M3	3	21	
	1x Part No. K651151	Stylus steel-ruby M3	4	31	
	1x Part No. K651152	Stylus steel-ruby M3	5	33,5	
	1x Part No. K651157	extension steel M3		20	
	1x Part No. K651159	extension steel M3		35	
	2x Part No. K651223	Pin spanner ø 1,2 mm		23	



Styli Kit M3
Starter

Styli Kit M4

No.	Contents	Description	ø mm	L mm	Price [€]
K651383		Wooden box			891,00
	1x Part No. K651184	Stylus ceramic-ruby M4	8	100	
	1x Part No. K651182	Stylus ceramic-ruby M4	8	50	
	1x Part No. K651216	Adaptor ceramic M4/M3	7	100	
	1x Part No. K651215	Adaptor ceramic M4/M3	7	75	
	1x Part No. K651214	Adaptor ceramic M4/M3	7	50	
	1x Part No. K651204	extension ceramic M4	7	50	
	1x Part No. K651203	extension ceramic M4	7	30	
	1x Part No. K651170	Adaptor M3/M2	4	5	
	1x Part No. K651208	Adaptor M4/M3	7	9	
	2x Part No. K650346	Pin spanner	1,7	49	
	2x Part No. K651223	Pin spanner	1,2	23	
	1x Part No. K651058	5-way stylus holder M2	7	7,5	
	1x Part No. K651169	5-way stylus holder M3	10	13	
	1x Part No. K651206	5-way stylus holder M4	15	18	
	1x Part No. K651186	Stylus steel-ruby M4	1	19,5	
	4x Part No. K651187	Stylus steel-ruby M4	2	19	
	1x Part No. K651188	Stylus steel-ruby M4	4	18	



Styli Kit M4



Order the "Styli and Accessories Leaflet" now!
Your insight in the full range of Mitutoyo Styli and much more!

CMM Fixtures

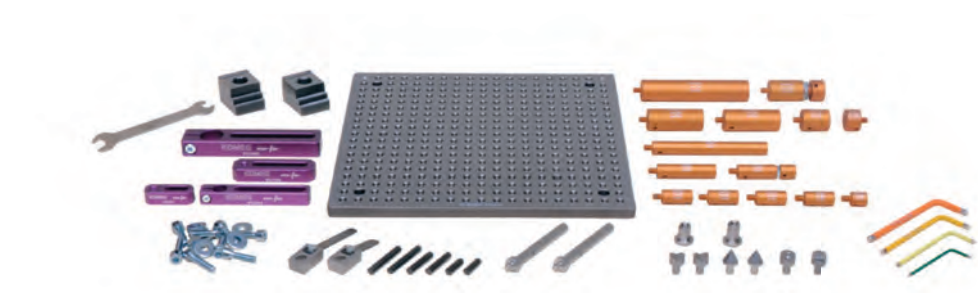
CMM Fixtures

Mitutoyo offers you the full range of CMM equipment from the machine itself to probe systems, software up to clamping systems.

The Fixture series "eco-fix" offer you:

- a quick, easy & flexible way to create fixtures,
- practice-oriented modular concept,
- time and cost-saving way to built fixtures,
- easy adaption of product changes to the fixtures,
- leight-weight aluminium parts,
- strong, hardcoated and anodised parts for long life under rough conditions.

eco-fix Kit S

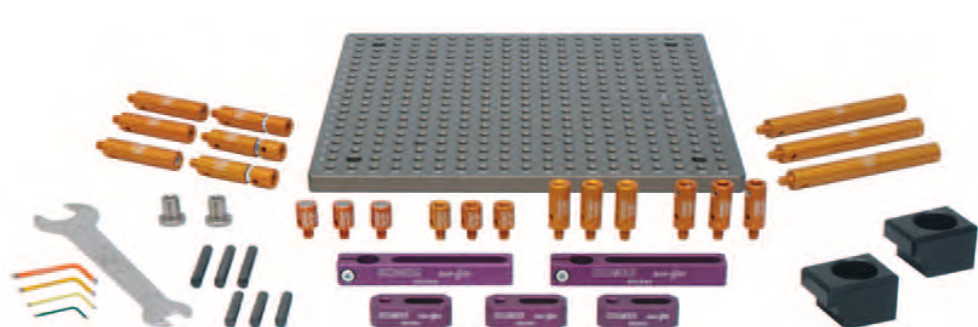


For prismatic parts

- 59 parts,
- Base plate 250x250mm,
- M6 threats in a grid of 50x50mm,
- Location pins 25-100mm,
- Stopper elements,
- Back squares,
- Cone receiver,
- V-Blocks,
- Spring clips

No.	Price [€]
K551048	940,00

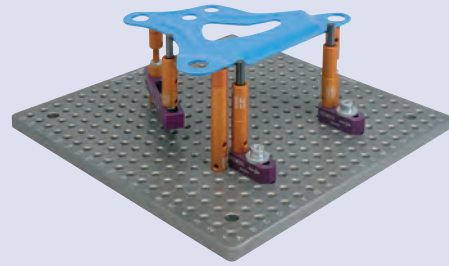
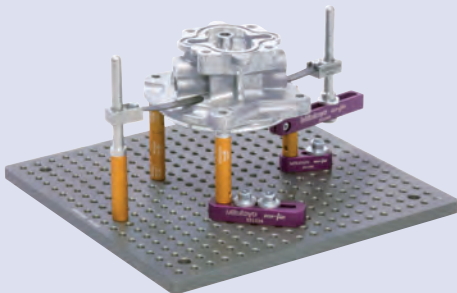
eco-fix Kit Mag S



For magnetic parts – ideal for shett-metal

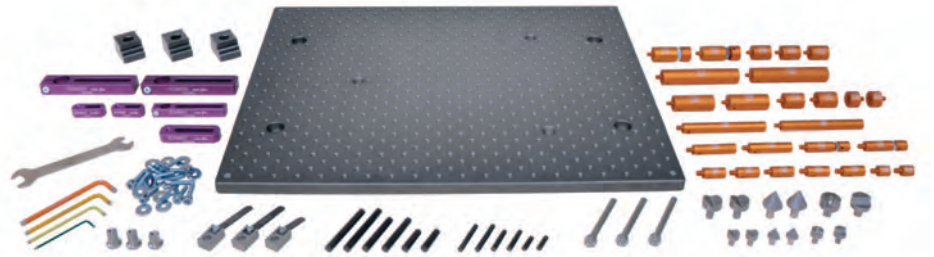
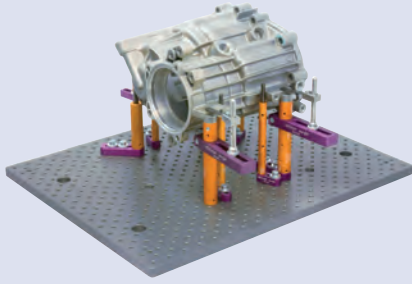
- 70 parts,
- Base plate 250x250mm,
- M6 threats in a grid of 50x50mm,
- Location pins 25-100mm,
- Magnetic receivers

No.	Price [€]
K551089	973,00



CMM Fixtures

eco-fix Kit L

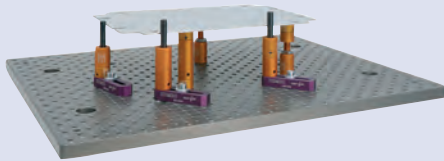


For prismatic parts

- 98 parts,
- Base plate 500x400mm,
- M6 threads in a grid of 50x50mm,
- Location pins 25-100mm,
- Stopper elements,
- Back squares,
- Cone receiver,
- V-Blocks,
- Spring clips

No.	Price [€]
K551049	1752,00

eco-fix Kit Mag L



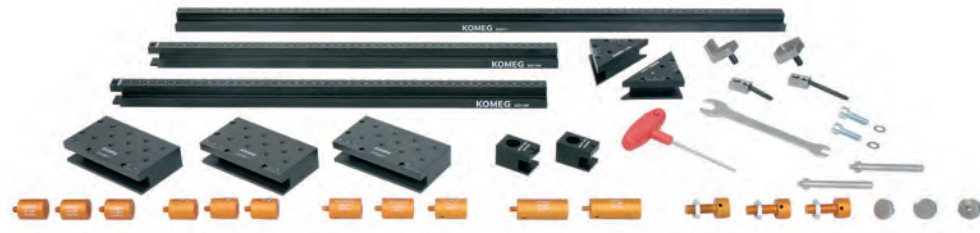
For magnetic parts – ideal for sheet-metal

- 79 parts,
- Base plate 500x400mm,
- M6 threads in a grid of 50x50mm,
- Location pins 25-100mm,
- Magnetic receivers

No.	Price [€]
K551090	1452,00

CMM Fixtures

eco-fix Kit quick-rail



The perfect system for a big variation of parts

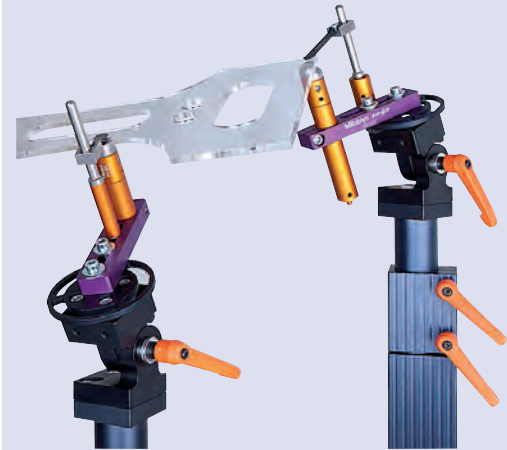
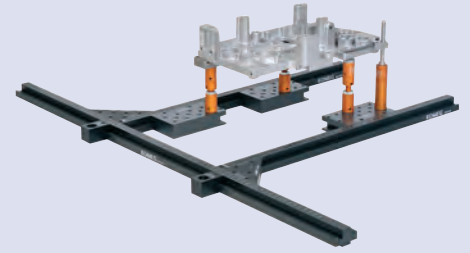
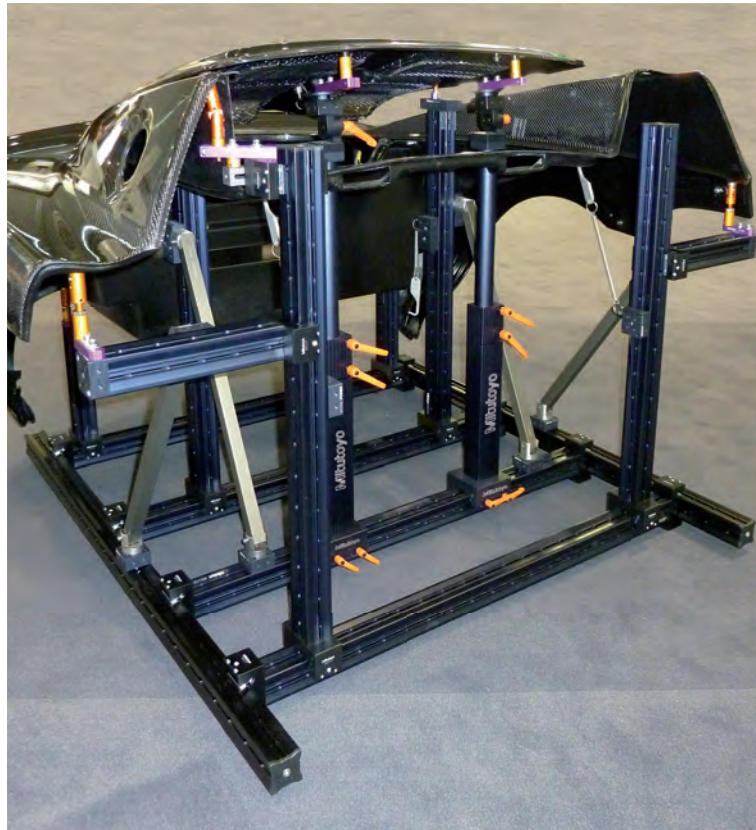
- 3 rails
- 1 rail with 800mm length, fixed to CMM
- 2 rails 500mm for flexible positioning of rail and base plates
- Location pins 25-100mm,
- Stopper elements,
- Back squares,
- Spring clips,

No.

K550914

VARI-FIX

- flexible RST profiles
- fully height-adjustable
- rotative parts allow 360° positioning
- combinable with all eco-fix parts



CMM Enclosures

Protect your investment for contamination, improve reliability of measurements and reduce maintenance costs. Mitutoyo's Inspection Enclosures are designed to help keep your CMMs and instruments free of airborne contamination.

Features and benefits:

- Standard fans create positive pressure inside the enclosure to exclude airborne contaminants, increase reliability of measurements and reduce CMM maintenance costs.
- Air-conditioning option is available to add temperature control to the clean air environment.
- Enclosed volume provides greatly improved working conditions for intricate inspection operations.
- Double doors fold back enabling easy access for part loading.
- Modular Design with removable panels enables easy construction around existing machines, straightforward relocation (if required) and assists in annual CMM servicing.
- Enclosures are robustly built to withstand the demands of a busy shopfloor manufacturing facility.
- Transparent, polycarbonate, easy-clean panels pass sufficient light for normal use and are shatterproof, tough and durable.
- Clean, functional design enhances the appearance of your CMMs.

Technical details:

- Framework fabricated from extruded aluminium.
- Lower panels made from PVC - available in a variety of colours
- Upper panels in clear polycarbonate.





The procedure for assessing the performance of CMMs is defined in the international standard series EN ISO 10360. Mitutoyo is keen to always quote the most recent ISO standards. This page gives you an overview of the ISO parameters Mitutoyo shows in this catalogue.

Maximum Permissible Measuring Error (MPE) of length measurement $E_{0,MPE}$ [EN ISO 10360-2]

The test procedure under this standard is that a coordinate measuring machine (CMM) is made to perform a series of measurements on five different test lengths in each of seven directions, as shown in Figure 1, to produce a set of 35 measurements. This sequence is then repeated twice to produce 105 measurements in all. If these results, including allowances for the uncertainty of measurement, are equal to or less than the values specified by the manufacturer then the performance of the CMM has been proved to meet its specification.

The standard allows up to five measurements to exceed the specified value (two NG results among 3-time measurements in the same position are not allowed). If this is the case, additional 10-times measurements for the relevant position are performed. If all the 10 results, including the uncertainty allowance, are within the specified value, the CMM is assumed to pass the test. The uncertainties to be considered in determining the maximum permissible measuring error are those concerning calibration and alignment methods used with the particular material standards of length involved with the test. (The values obtained by adding an extended uncertainty combining the above two uncertainties to all test results must be less than the specified value.) The result of the test may be expressed in any of the following three forms (unit: μm).

$$E_{0,MPE}=A+L/K \leq B$$

$$E_{0,MPE}=A+L/K$$

$$E_{0,MPE}=B$$

- A: Constant (μm) specified by the manufacturer
- K: Dimensionless constant specified by the manufacturer
- L: Measured length (mm)
- B: Upper limit value (μm) specified by the manufacturer

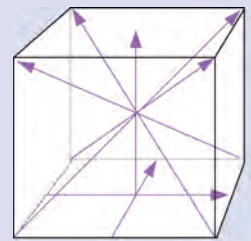


Figure 1 Typical test measurement directions within the CMM measuring volume

Maximum Permissible Scanning Probing Error MPE_{THP} [EN ISO 10360-4]

This is the accuracy standard for a CMM if equipped with a scanning probe. The test procedure is to perform a scanning measurement of 4 planes on the standard sphere and then, for the least squares sphere center calculated using all the measurement points, calculate the range (dimension 'A' in Figure 3) in which all measurement points exist. Based on the least squares sphere center calculated above, calculate the distance between the calibrated standard sphere radius and the maximum measurement point or minimum measurement point, and take the larger distance (dimension 'B' in Figure 3). Add an extended uncertainty that combines the uncertainty of the stylus tip shape and the uncertainty of the standard test sphere shape to each A and B dimension. If both calculated values are less than the specified values, this scanning probe test is passed.

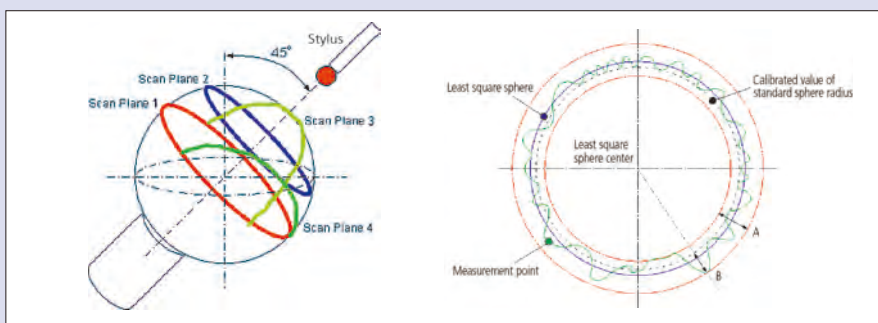


Figure 3 Target measurement planes for the maximum permissible scanning probing error and its evaluation concept

Maximum Permissible Single Stylus Form Error $P_{FTU,MPE}$ [EN ISO 10360-5]

The test procedure under this standard is that a probe is used to measure defined target points on a standard sphere (25 points, as in Figure 2) and the result used to calculate the position of the sphere center by a least squares method. Then the distance R from the sphere center for each of the 25 measurement points is calculated, and the radius difference $R_{max} - R_{min}$ is computed. An extended uncertainty that combines the uncertainty of the stylus tip shape and that of the standard test sphere is added to the radius difference. If this final calculated value is equal to or less than the specified value, the probe has passed the test.

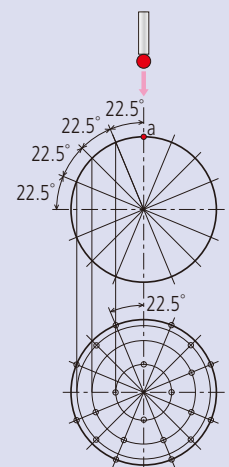


Figure 2 Target points on standard sphere for determining the Maximum Permissible Single Stylus Form Error