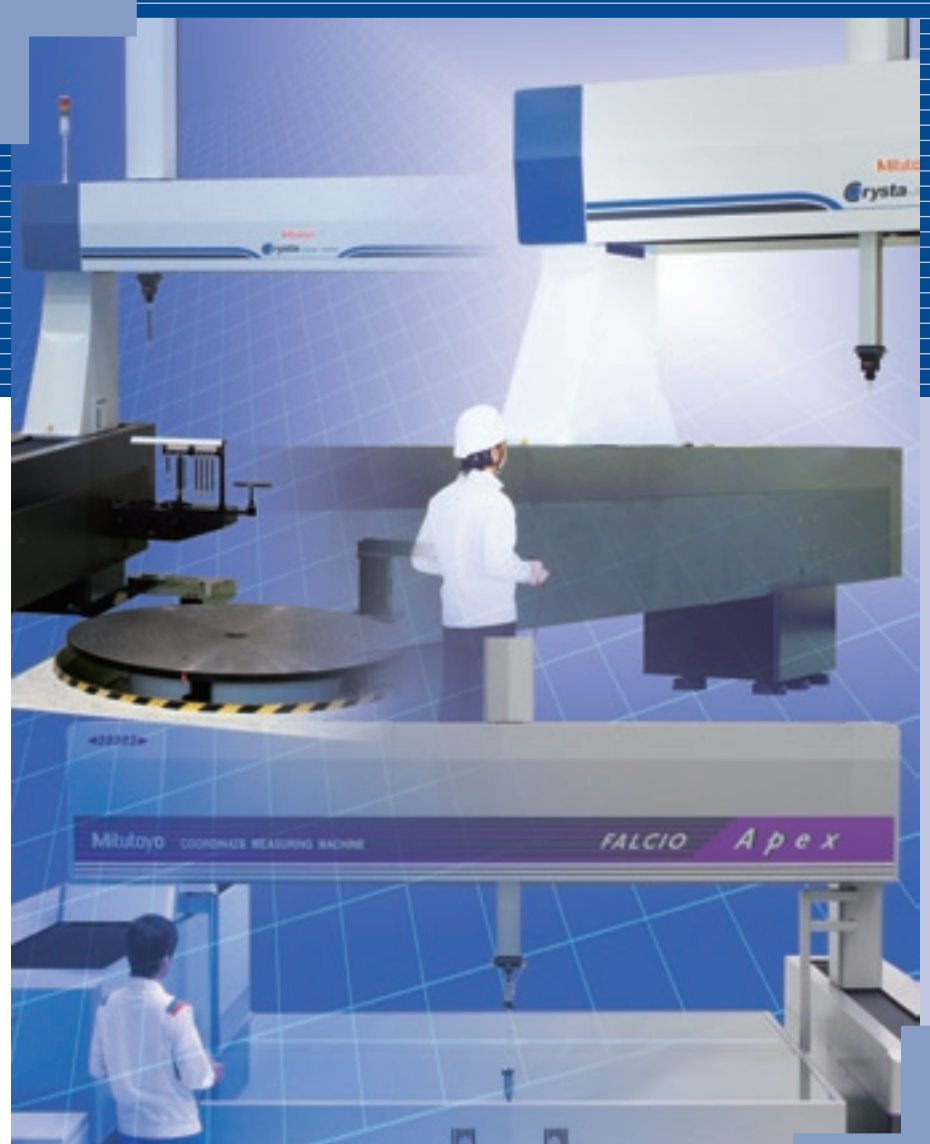


CNC Coordinate Measuring Machines SPECIAL SPECIFICATIONS INTRODUCTION

Catalog No.E16007



This document introduces many of the special specifications for CNC coordinate measuring machines intended to respond to customer measurement needs.

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CNC Coordinate Measuring Machines SPECIAL SPECIFICATIONS INTRO

Based on our well-received standard coordinate measuring machine technology, we have developed, designed, and manufactured coordinate measuring machines using various special specifications in response to customer demands in order to increase customer satisfaction.

This catalog introduces concrete examples of some of the coordinate measuring machines built using these specifications, which are intended to provide support and solutions for expanding your business.

Specifications that offer a special size for measuring various long, large workpieces

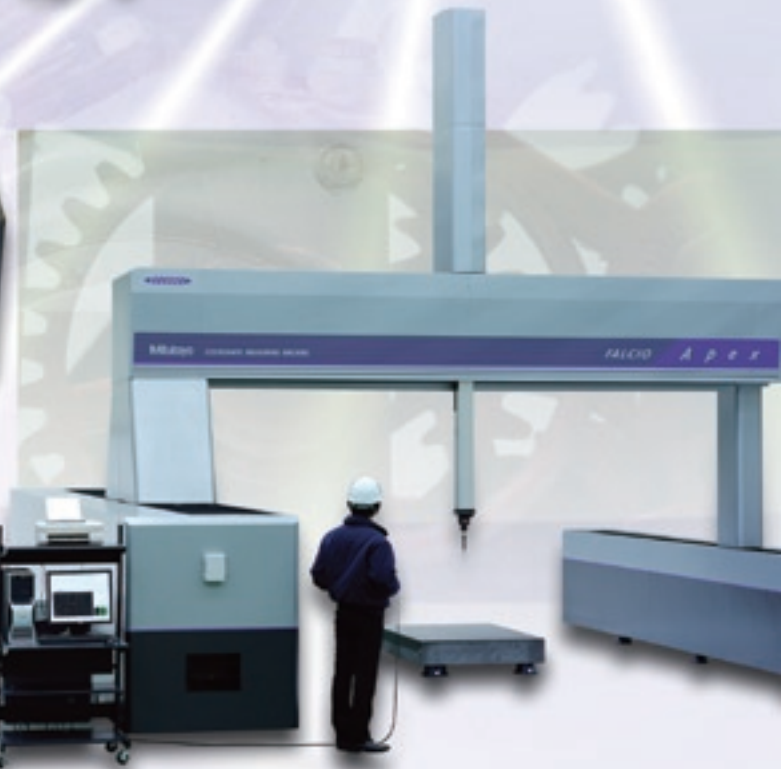


Specifications including a large rotary table for highly efficient measurement of large cylindrical workpieces



Your support has kept us in business for 40 years.

Mitutoyo

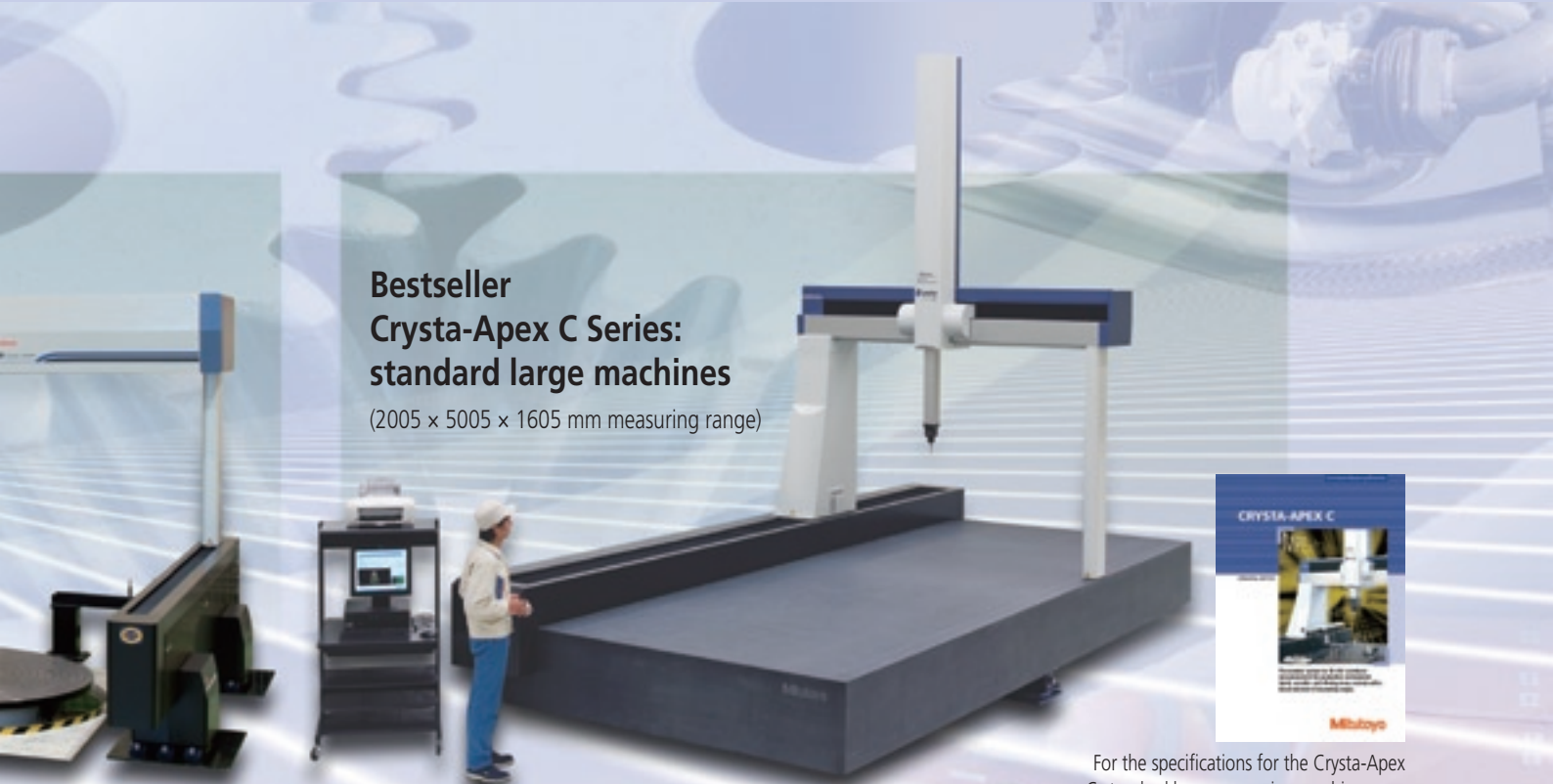


Specifications that offer a special size for highly accurate measurement of various large workpieces

DUCTION

Bestseller Crysta-Apex C Series: standard large machines

(2005 × 5005 × 1605 mm measuring range)



For the specifications for the Crysta-Apex C standard large measuring machines, see **Catalog No. E4275-191.**

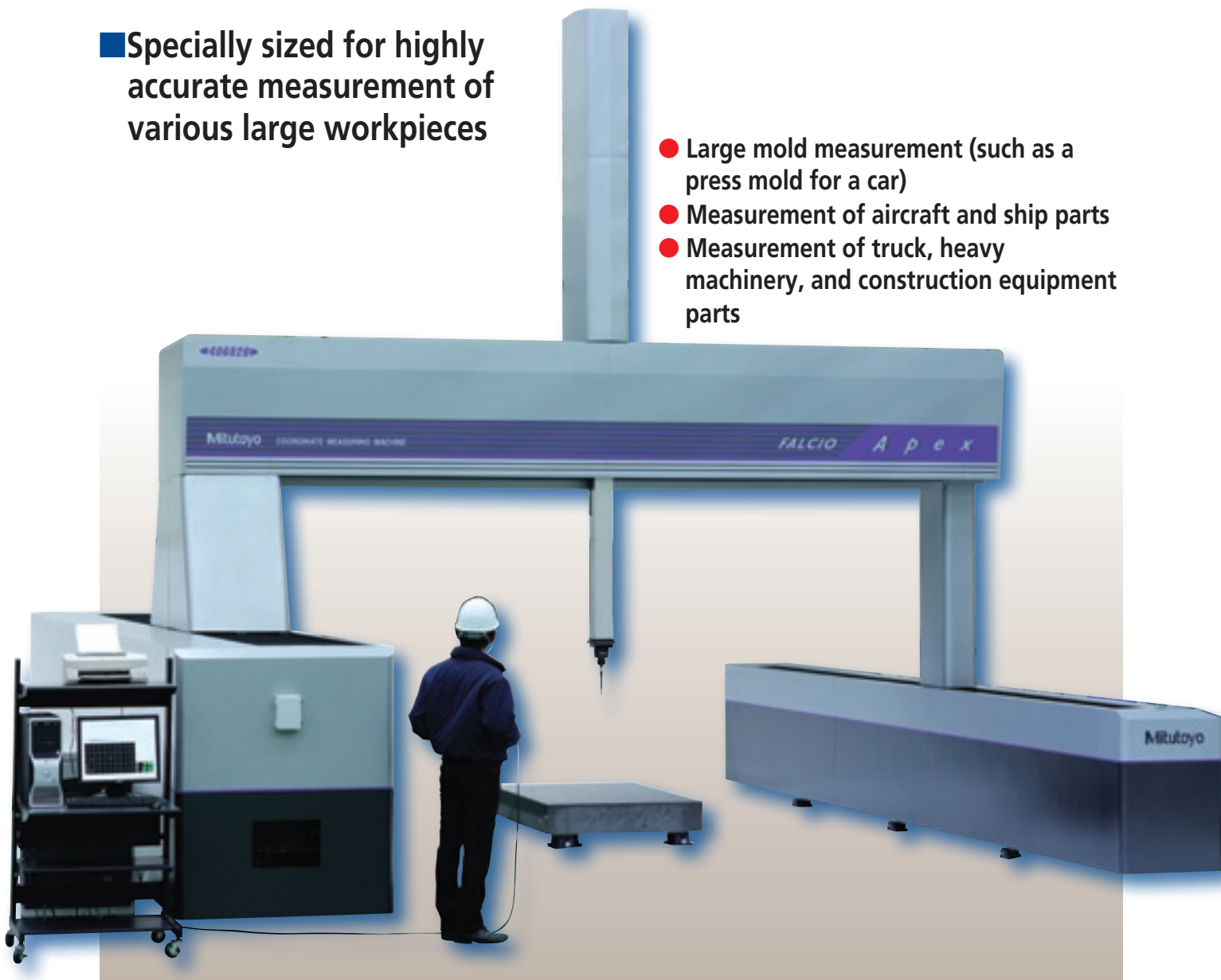
Specifications that offer a special size for measuring various large workpieces



Large Separate Guide Type FALCIO Apex Series

■ Specially sized for highly accurate measurement of various large workpieces

- Large mold measurement (such as a press mold for a car)
- Measurement of aircraft and ship parts
- Measurement of truck, heavy machinery, and construction equipment parts



■ Main specifications

Model No.	FALCIO Apex						
	203015G	203020G	204015G	303012G	305015G	305020G	406020G
Measuring range (mm)	X	2005			3005		4005
	Y	3005		4005	3005	5005	
	Z	1505	2005	1505	1205	1505	2005
Measuring error MPE _L (μm) L: measuring length (mm)	[TP200] (4.8+5L/1000)	[TP200] (9+7L/1000) [SP25M] (7+7L/1000)	[TP200] (4.8+5L/1000)	[TP200] (4.9+5L/1000)	[TP200] (5.5+5L/1000)	[TP200] (9.5+10L/1000) [SP80] (6+8L/1000)	[TP200] (10+10L/1000) [SP25M] (8+8L/1000)
Max. workpiece weight (kg)	Depends on the basic specifications	Depends on the basic specifications	Depends on the basic specifications	Depends on the basic specifications	Depends on the basic specifications	Depends on the basic specifications	Depends on the basic specifications

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Large Separate Guide Type FALCIO Apex 30303G

- Specially sized for measuring large, thin workpieces

Imaging probe: QVP



Worktable (with a backlight)

- Measurement of a large sheet for an LCD



■ Main specifications

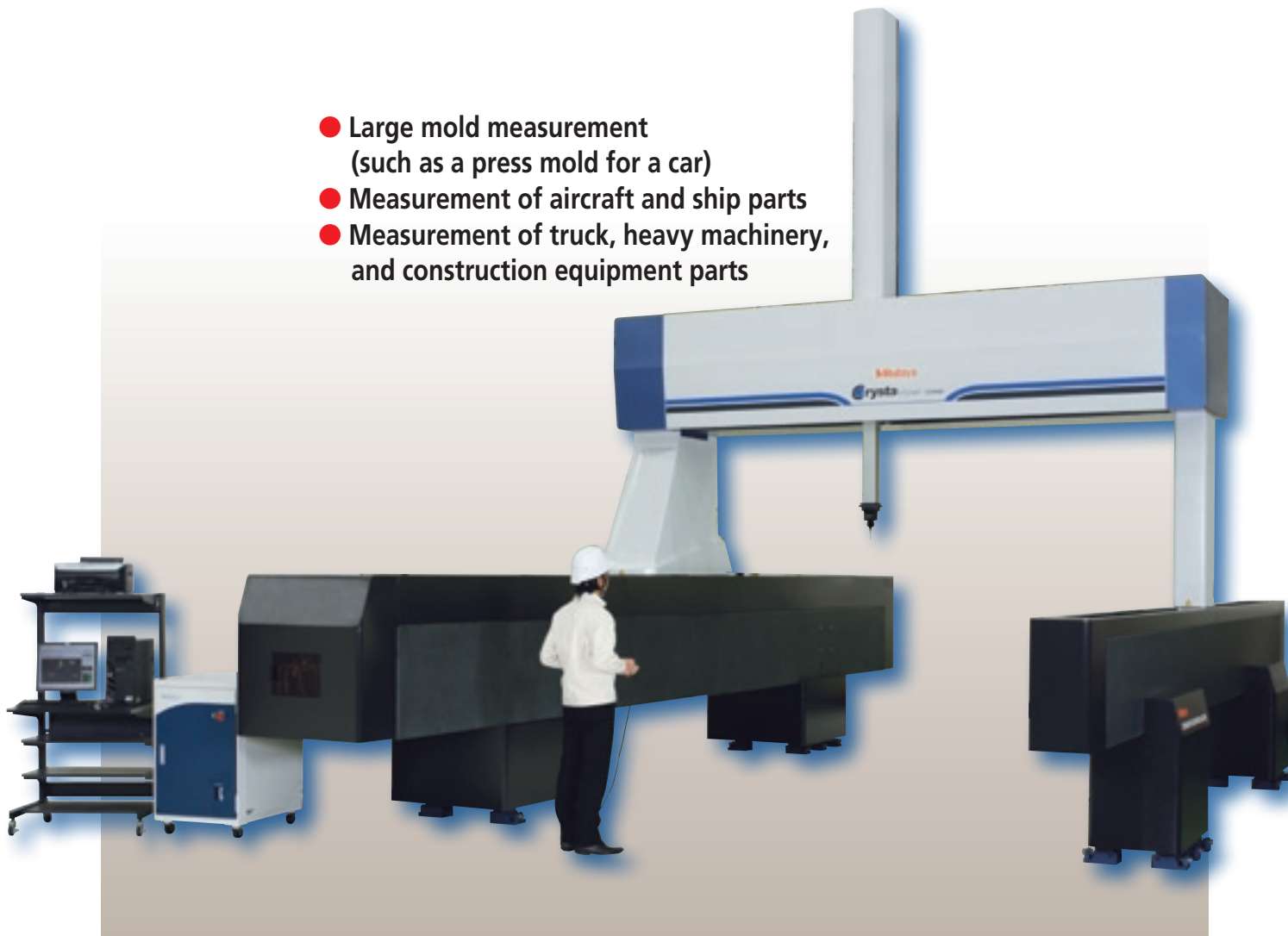
Model No.	FALCIO Apex 30303G	
Measuring range (mm)	X	3005
	Y	3005
	Z	305
*Measuring error MPE _c (μm)	[TP200]	
L: measuring length (mm)	(5.5+5L/1000)	
Max. workpiece weight (kg)	50(glass table)	

* For the accuracy when using the QVP, the error is 4 μm or less per meter when using the standard lens (x 3 magnification).

Large Separate Guide Type Crysta-Apex C Series

■ Specially sized for measuring various large workpieces

- Large mold measurement (such as a press mold for a car)
- Measurement of aircraft and ship parts
- Measurement of truck, heavy machinery, and construction equipment parts



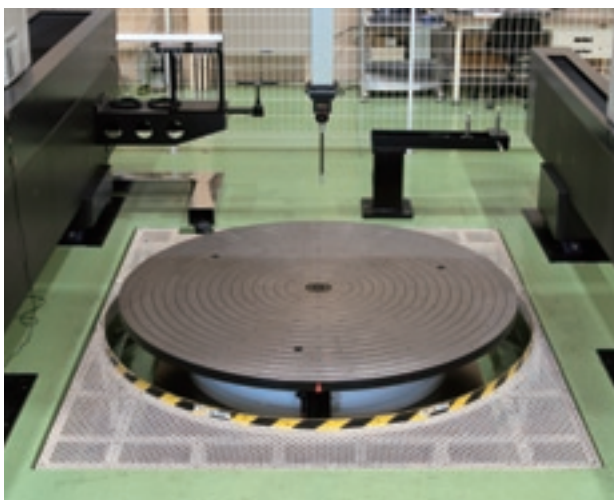
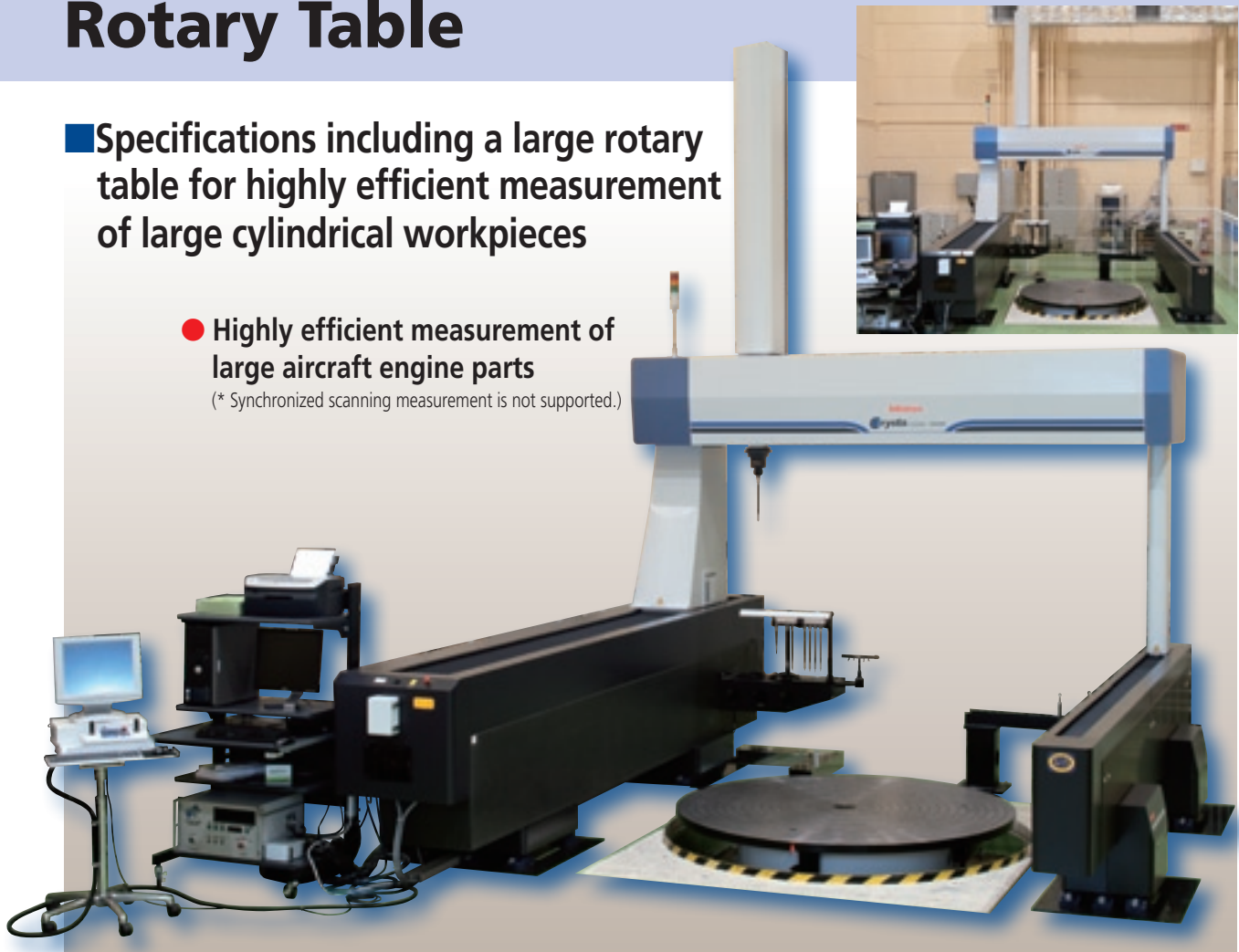
■ Main specifications

Model No.	Crysta-Apex C		
	203016G	306020G	
Measuring range (mm)	X	2005	3005
	Y	3005	6005
	Z	1605	2005
Measuring error MPE _e (μm)	[TP200] (9+8L/1000)	[TP200] (11+9L/1000)	
L: measuring length (mm)	[SP25M] (6+8L/1000)	[SP25M] (8+9L/1000)	
Max. workpiece weight (kg)	Depends on the basic specifications	Depends on the basic specifications	

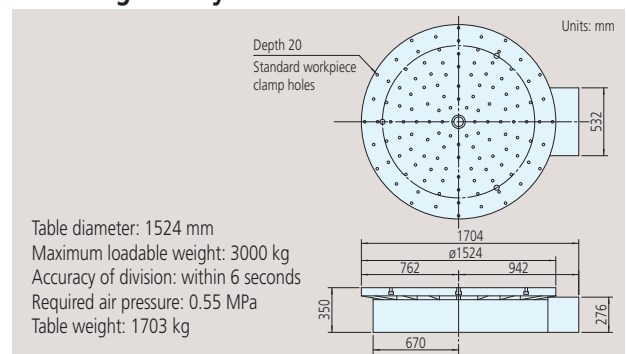
Large Separate Guide Type Specifications Including a Large Rotary Table

■ Specifications including a large rotary table for highly efficient measurement of large cylindrical workpieces

- Highly efficient measurement of large aircraft engine parts
(* Synchronized scanning measurement is not supported.)



■ Main specifications and external dimensions of the large rotary table

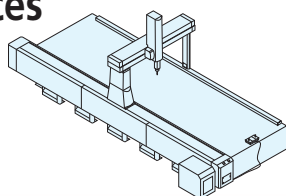


■ Main specifications

Model No.	Crysta-Apex C203016G	
	Includes a rotary table (ø1500mm)	
Measuring range (mm)	X	2005
	Y	3005
	Z	1605
*Measuring error MPE _e (μm)	[TP200]	
L: measuring length (mm)	(9+8L/1000)	
Max. workpiece weight (kg)	3000 (depends on the rotary table specifications)	

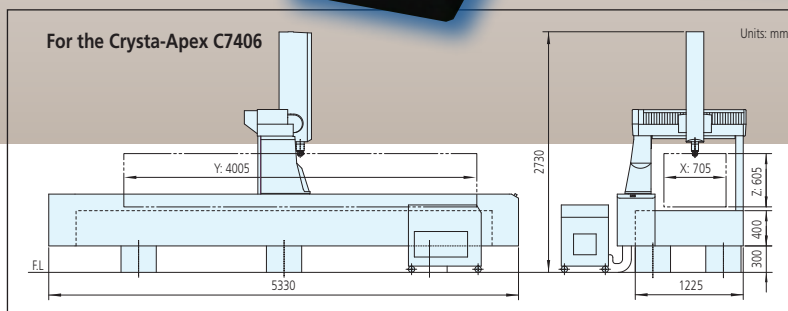
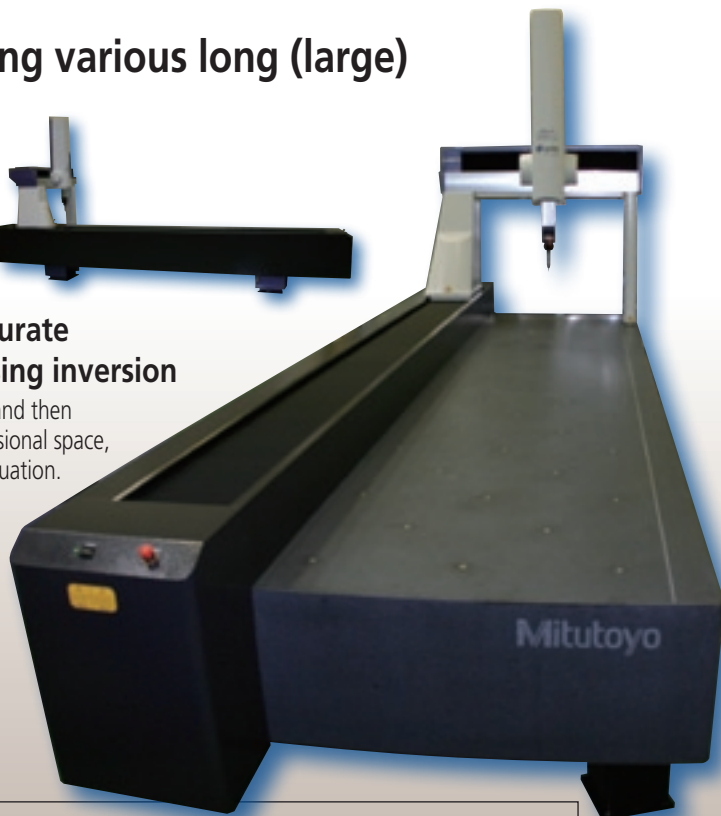
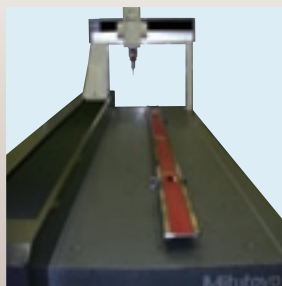
Crysta-Apex C700/900 Series Specially Sized

■ Specially sized for measuring various long (large) workpieces



● Application example: highly accurate evaluation of straightness by using inversion

By measuring a straightness master in advance and then calculating the straightness error in three-dimensional space, you can perform high accuracy straightness evaluation.

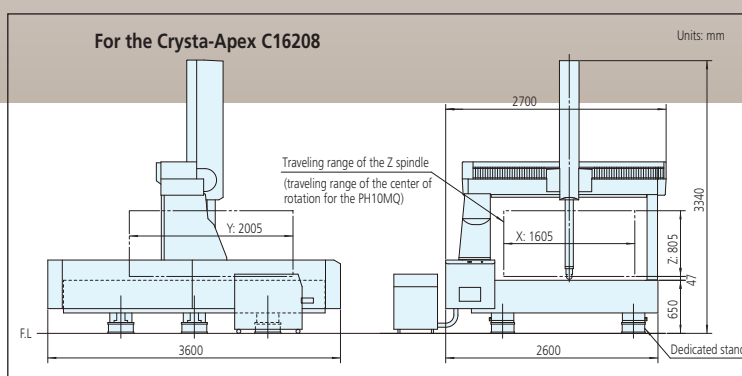
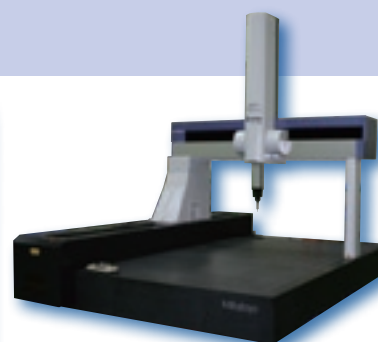
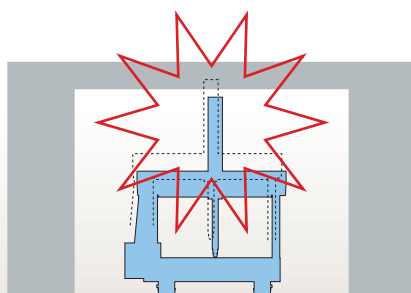


■ Main specifications

Model No.	Crysta-Apex C							
	774	7256	7306	7406	7406ST	7506	976	9104
Measuring range (mm)	X	705	705	705	705	705	905	905
	Y	705	2505	3005	4005	4005	5005	1005
	Z	405	605	605	605	605	605	405
Measuring error MPE _z (μm) L: measuring length (mm)	Same as standard machine 776	[SP25M] (1.9+4L/1000)	[SP25M] (1.9+4L/1000)	[TP200] (3.0+3L/1000)	[SP25M] (1.9+4L/1000)	[TP200] (3.0+3L/1000)	Same as standard machine 9106	Same as standard machine 9106
Special straightness (μm)	—	Y axis straightness (in the direction of the X axis) 1.0μm/2500mm	Y axis straightness (in the direction of the X axis) 1.0μm/3000mm	—	Y axis straightness (in the direction of the X axis) 1.4μm/4000mm	—	—	—
Max. workpiece weight (kg)	800	Guaranteed accuracy: 1000 Permissible load: 2500	Guaranteed accuracy: 1000 Permissible load: 2500	1000	Guaranteed accuracy: 1000 Permissible load: 2500	1000	1000	1200
Machine weight (kg)	1700	5550	5900	6350	6550	7850	1920	2200
Remark		Various conditions must be satisfied for guaranteed straightness.	Various conditions must be satisfied for guaranteed straightness.		Various conditions must be satisfied for guaranteed straightness.			

Crysta-Apex C1600/2000 Series Specially Sized

■ Special specifications based on the ceiling height and workpiece size for the overall height of the machine frame



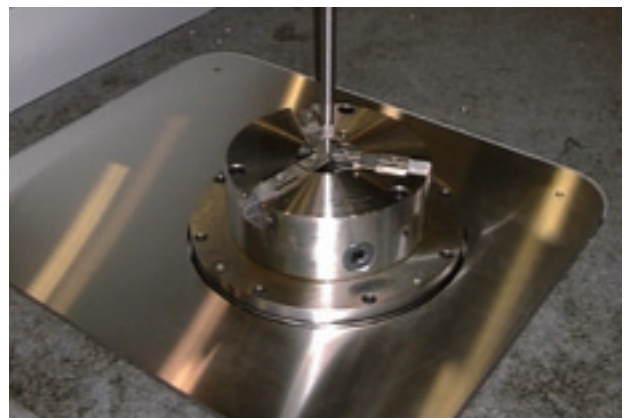
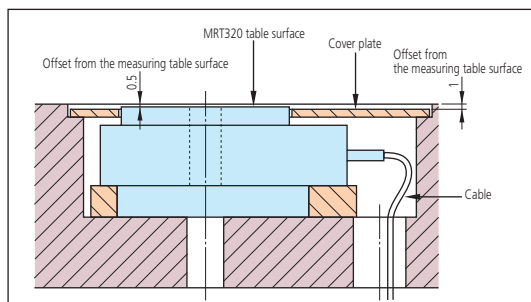
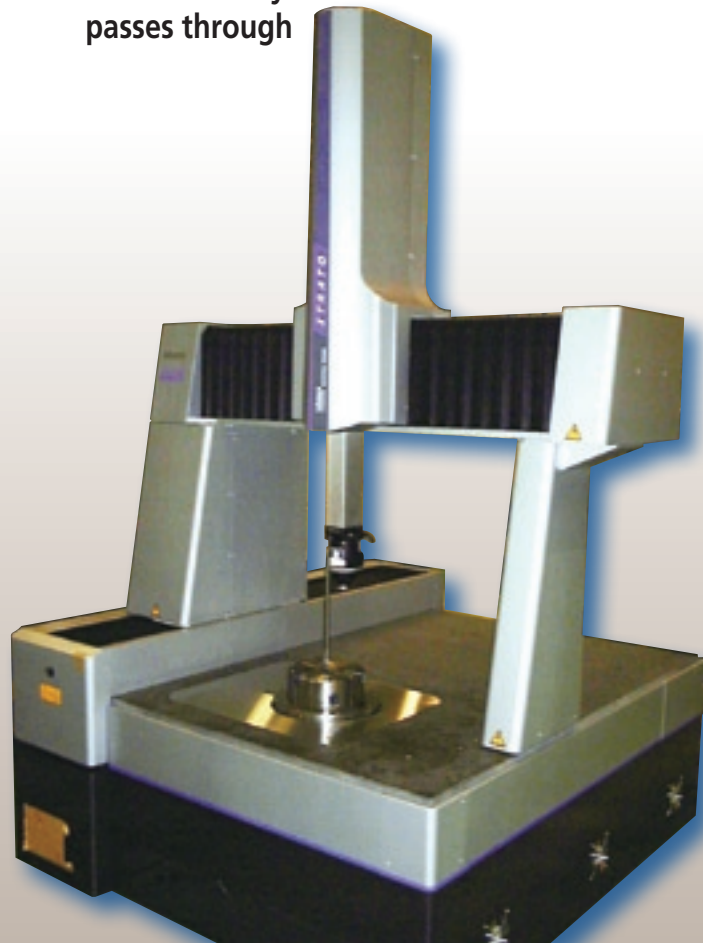
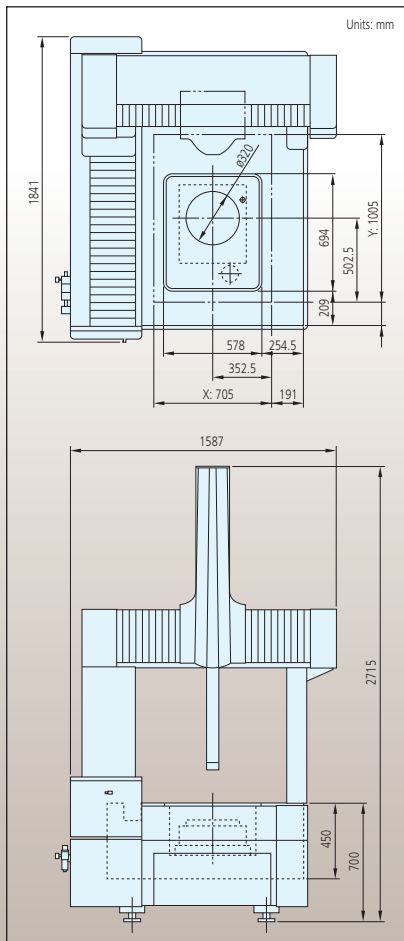
■ Main specifications

Model No.	Crysta-Apex C				
	16208	162012	163014	16528	20408
Measuring range (mm)	X	1605			
	Y	2005			
	Z	805	1205	1405	805
Measuring error MPE _E (μm) L: measuring length (mm)	Same as standard machine 163012	Same as standard machine 163012	[SP25M] (4+5L/1000)	[TP200] (18+18L/1000)	[TP200] (7+6L/1000) [SP25M] (4.5+6L/1000)
Max. workpiece weight (kg)	3500 (same as the standard machine)	3500 (same as the standard machine)	3500 (same as the standard machine)	2000 (same as the standard machine)	5000 (same as the standard machine)

FALCIO Apex Series Specifications Including an Embedded Rotary Table

■ Special specifications for a standard size machine for which the MRT320 rotary table is embedded in the measuring table so the measuring range is not sacrificed

● Special specifications including an embedded MRT320 rotary table and a $\varnothing 60$ mm hole that passes through



Crysta-Apex C Series Special Type Specifications

Special high accuracy specifications

■ Special specifications that offer higher accuracy than the standard specifications

■ Main special high accuracy specifications

Model No.	Special high accuracy Crysta-Apex C	
	122010	123010
Measuring range (mm)	X	1205
	Y	2005
	Z	1005
Measuring error MPE _E (μm) L: measuring length (mm)	[SP25M] (1.9+3L/1000) Standard accuracy: (2.3+3L/1000)	[SP25M] (1.9+3L/1000) Standard accuracy: (2.3+3L/1000)
Remark	Temperature environment: 18 to 22°C	Temperature environment: 18 to 22°C

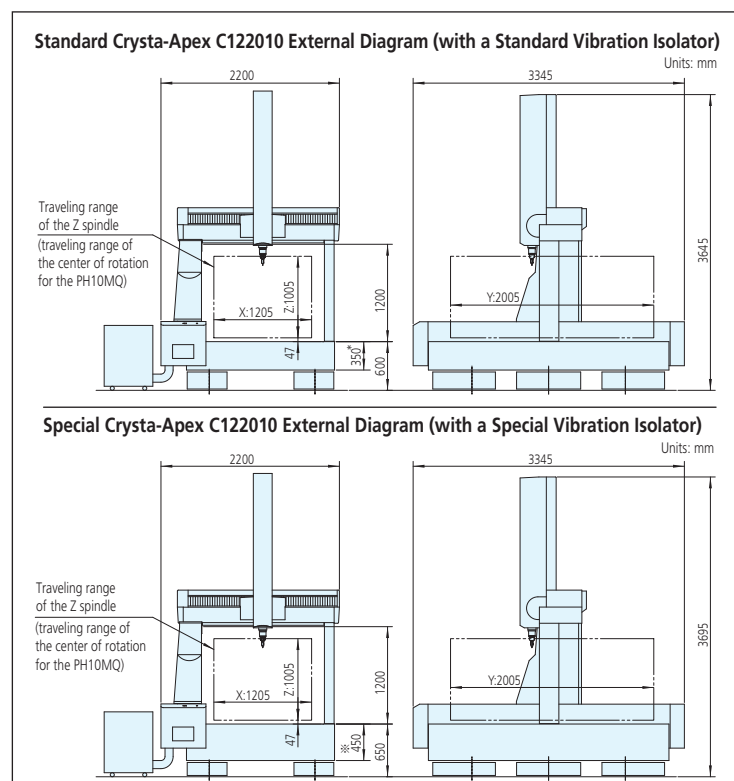
Crysta-Apex C122010 For Measuring 5-Ton Workpieces (Vibration Isolator Specifications)

■ For workpieces that are too heavy to measure using a standard machine, we offer a base with increased rigidity that will not become deformed, and therefore less accurate, due to the weight. We also offer a vibration isolator.

- Measurement of the mold for car parts

■ Main specifications

Model No.	Crysta-Apex C122010	
Measuring range (mm)	X	1205
	Y	2005
	Z	1005
Measuring error MPE _E (μm)	Same as the standard machine	
Max. workpiece weight (kg)	5000	
Machine weight (kg)	7800	
Remark	Vibration isolator specifications Required air pressure for the vibration isolator: 0.45 MPa (Air pressure source: At least 0.55 MPa)	



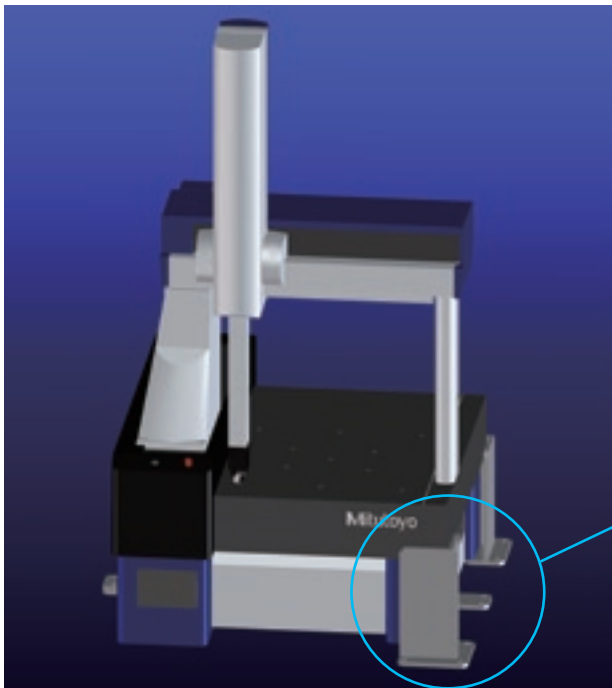
Other Special Specifications

■ Simplified dust-proof rack

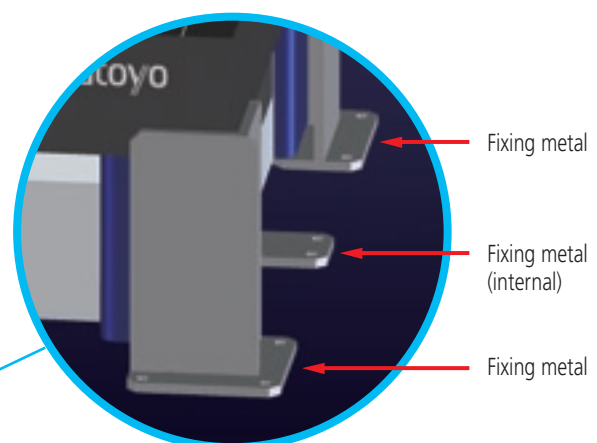


■ Anti-earthquake retrofitting

- In the event of an earthquake, this retrofitting prevents slippage between the machine stand and measuring table and prevents the machine stand from moving. The retrofitting also reduces the damage caused by man-made disasters as much as possible.



Target models
Crysta-Apex C500/700/900/1200 Series
Crysta-Plus M700 Series



*1: If the retrofitting cannot be constructed due to the installation conditions of the coordinate measuring machine main unit or a retrofitting for another model is desired, please contact us for information.

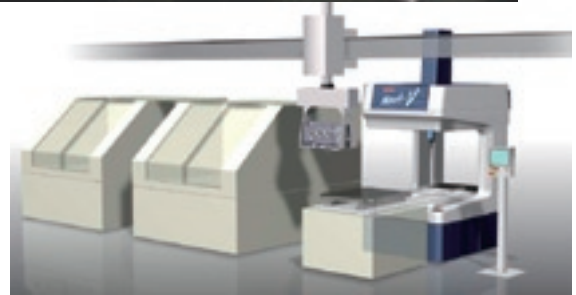
*2: Constructing the retrofitting might be difficult depending on the floor finish. For details, please contact us in advance.

Caution

Because an earthquake is a natural disaster and the effects of such an event cannot be perfectly anticipated, we cannot guarantee that the retrofitting will prevent the machine from tipping over or ensure your safety. Also note that the retrofitting is not intended to maintain the accuracy of a coordinate measuring machine.

Other Special Specifications

■ In-line measurement using MACH-V



■ Simplified conveyor: KOMEG



This simplified conveyor accurately positions mass-produced, heavy workpieces on the coordinate measuring machine.

Other Special Specifications

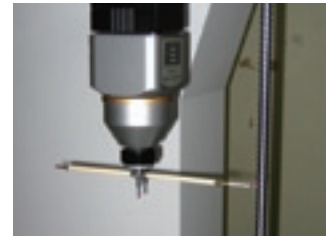
Ball screw evaluation system (V-groove rotary scanning measurement system)

- This system, which includes a coordinate measuring machine, rotary table, and scanning probe, enables the use of a rotary table for synchronized scanning by contacting two surfaces of a workpiece for scanning (V-groove scanning) in order to measure objects such as the shafts of ball screws.

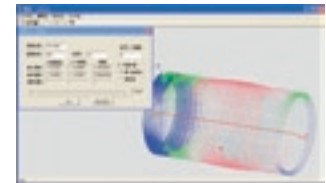
Coordinate measuring machine: LEGEX9106

Scanning probe: MPP310Q

Rotary table: MRT320

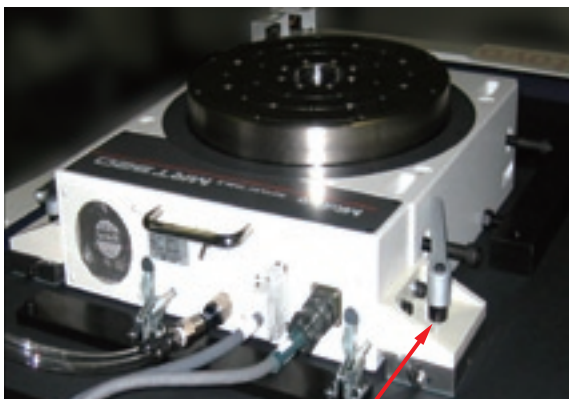


Measurement example: single lead error, cumulative lead error, lead variation, drunken error, PCD variation



Float-type special rotary table: MRT320

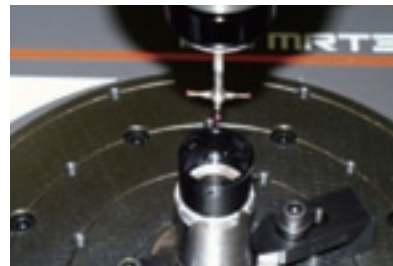
- This special rotary table slides smoothly while moving to make the operator's work easier.



Sliding mechanism
(uses three air bearings)

* The specifications for the rotary table accuracy are the same as those for the standard MRT320.

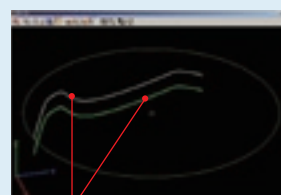
Measurement of a cylindrical cam using the MRT320 rotary table



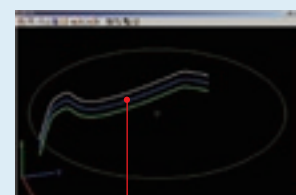
Rotary table: MRT320



Cylindrical cam



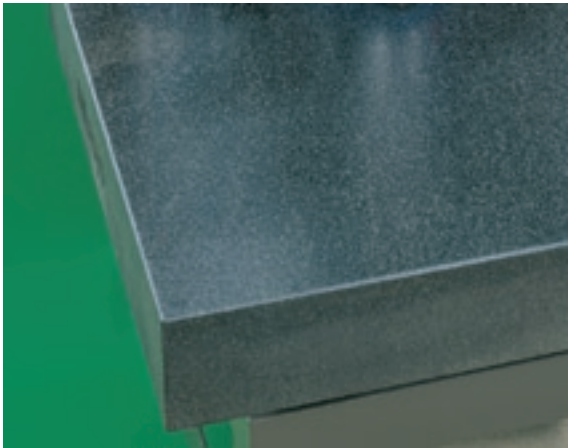
Calculation of the central contour from two contours



The calculated central contour

Special Precision Granite Surface Plate Introduction

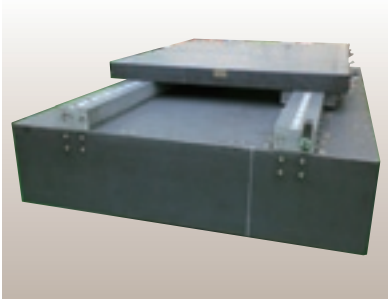
■ Can be used as a structural member of a device



- Suction base for an LCD slit coater
- Suction base for an LCD spin coater
- Suction base for an LCD inspection device
- One-axis air slider stage for an exposure device
- Base for an LCD inspection device
- Various other special machining processes

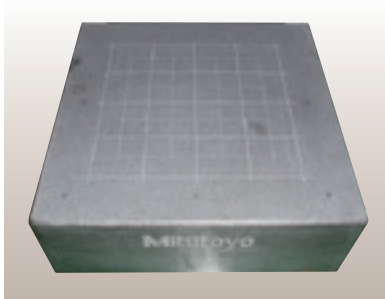
Special machining examples

One-axis air slider



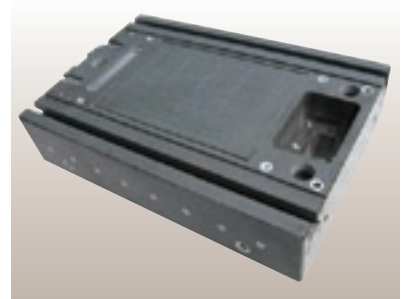
One-axis air slider

Suction plate



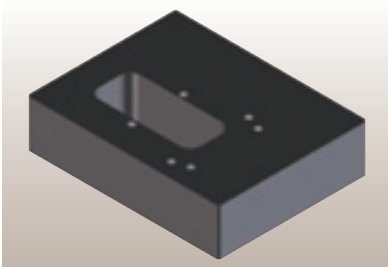
Small grooves, small hole machining

Suction plate



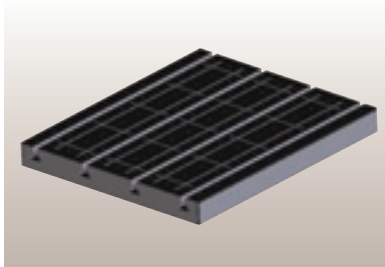
Drilling, T-groove machining, small holes for bushing screws, small-groove machining

Hard disk measuring machine base



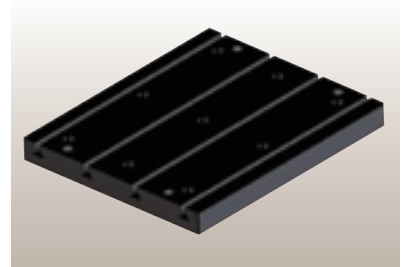
Cut holes, bushing screw machining

Semiconductor inspection device base



Small holes, narrow grooves, T-groove machining

Electrical discharge machine base

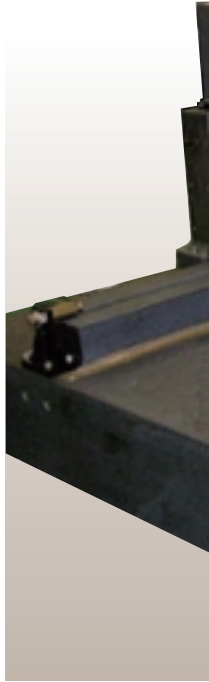
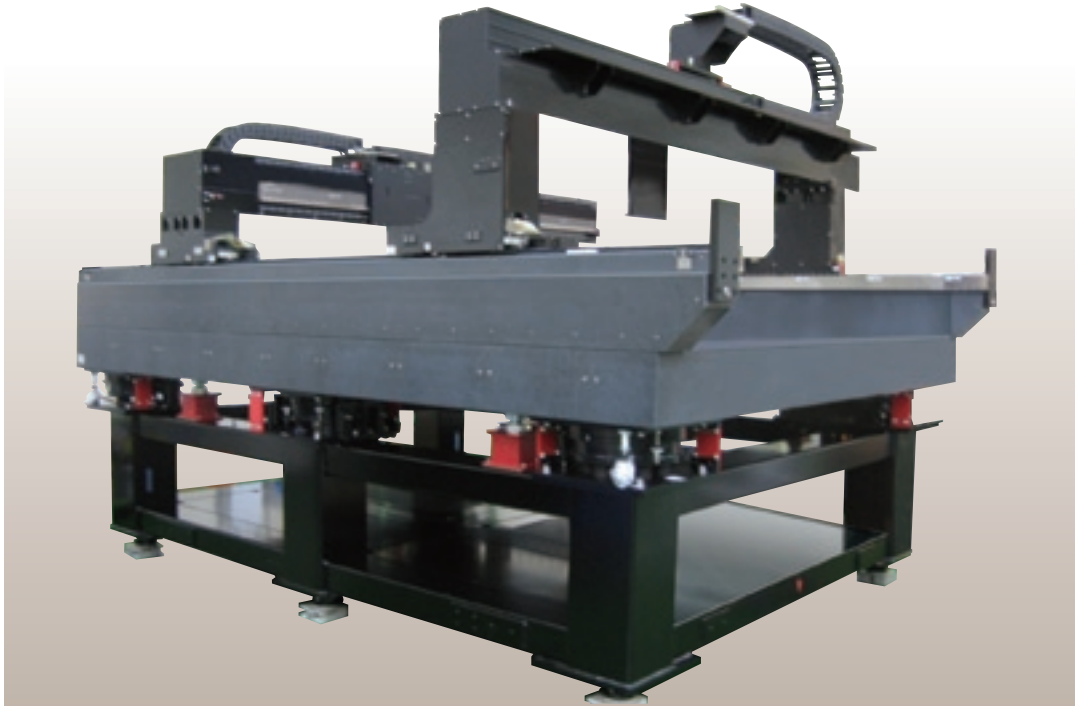


T-grooves, bushing screw machining



Gantry Stage Introduction

■ Stage for highly accurate two-dimensional positioning



▲ Gantry stage

Gantry stage that uses stone structural members for the base and aluminum structural members for the moving parts

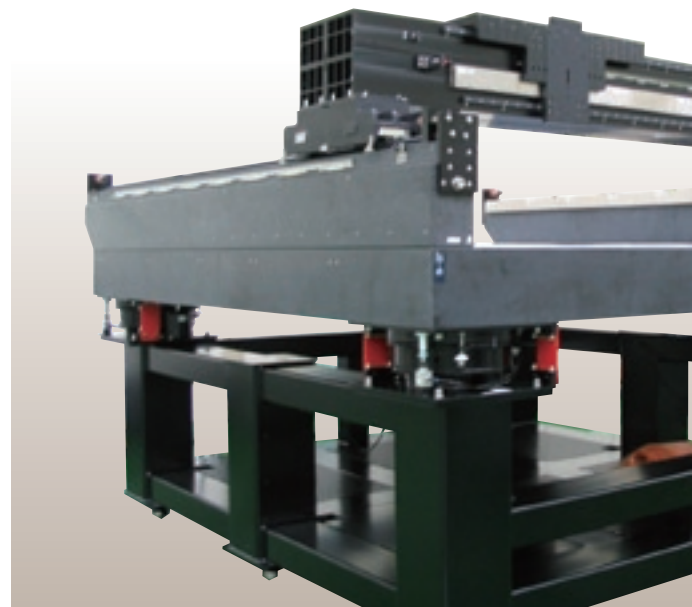
- Linear guide specifications
- Coreless linear motor specifications

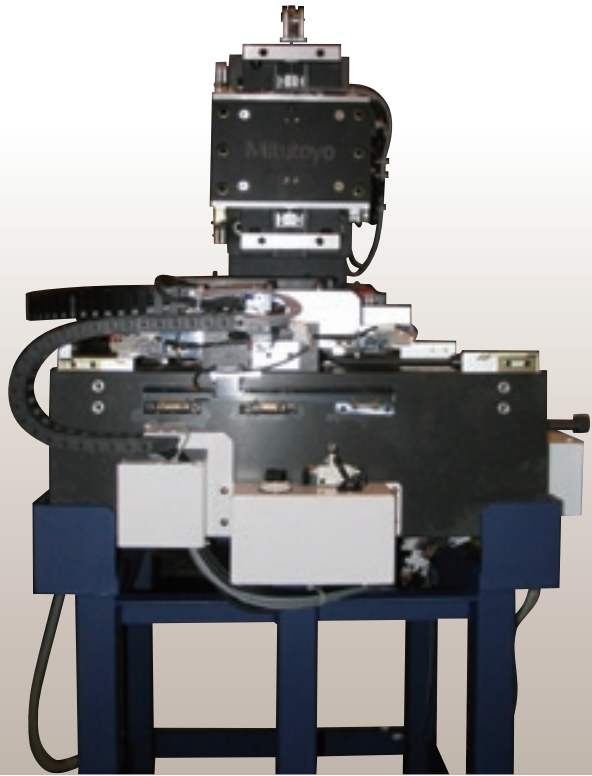
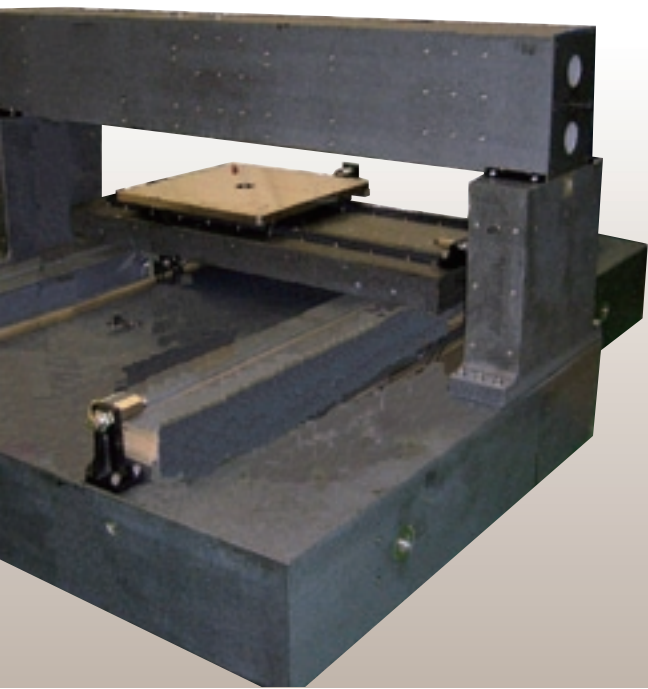
Gantry stage ▶

Can be used in a clean room
Because the gantry is mobile, a large panel is available.

Applications
Repair device for an LCD panel
Inspection device for an LCD panel

Size: 3360 × 4000 mm
Stroke: X-axis: 3030 mm Y-axis: 3030 mm





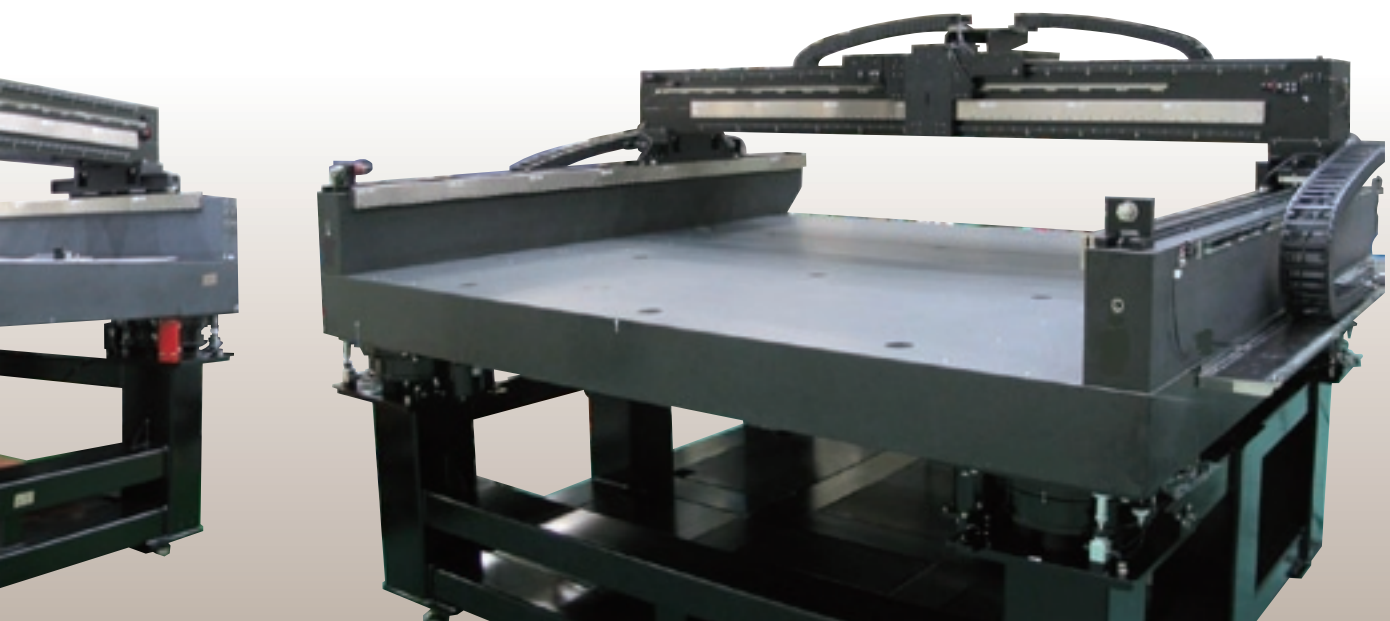
▲ Mobile table stage

Mobile table stage that uses stone structural members

- Air bearing specifications
- Can be used in a clean room

Applications
Inspection devices for LCD panels
Machining lasers for LCD panels

Size: 2000 × 2500 mm
Stroke: X-axis: 1500 mm Y-axis: 600 mm



Large Measuring Machine Assembly Plant



■ Overview:

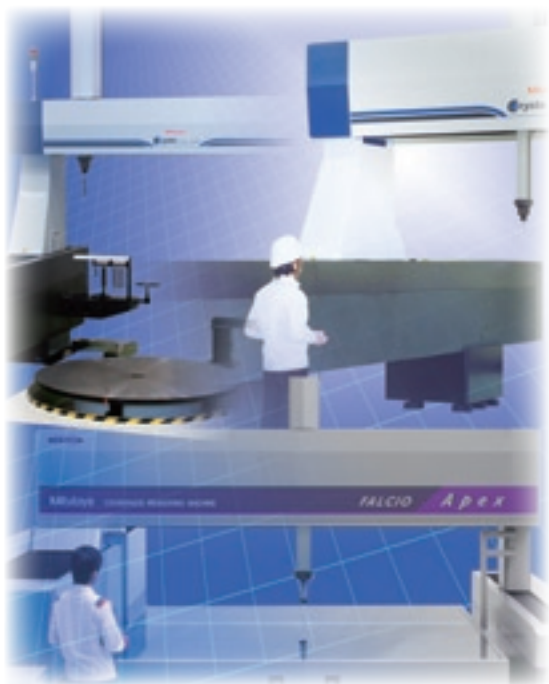
- Manufactured models: large coordinate measuring machines, FPD-related equipment
- Environment, manufacturing facilities
 - Assembly environment: $20\text{ °C} \pm 1\text{ °C}$
 - Grade slab: 1 m
 - 20-ton cranes: 3
- Number of manufactured units: 100 machines per month

■ Main facilities

- Air-conditioning: Our delivent fan system suppresses variation in the room temperature as much as possible.
- Lighting: We use highly efficient lights whose brightness is controlled using inverters to conserve energy. Our system suppresses the initial illuminance, gradually increases the supplied power, and maintains a constant illuminance of 650 to 700 lux.

Mitutoyo





Export permission by the Japanese government may be required for exporting our products according to the Foreign Exchange and Foreign Trade Law. Please consult our sales office near you before you export our products or you offer technical information to a nonresident.

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

Specifications are subject to change without notice.

Note: All information regarding our products, and in particular the illustrations, drawings, dimensional and performance data contained in this pamphlet, as well as other technical data are to be regarded as approximate average values. We therefore reserve the right to make changes to the corresponding designs, dimensions and weights. The stated standards, similar technical regulations, descriptions and illustrations of the products were valid at the time of printing. Only quotations submitted by ourselves may be regarded as definitive.

Our products are classed as regulated items under Japanese Foreign Exchange and Foreign Trade Law. Please consult us in advance if you wish to export our products to any other country. If the purchased product is exported, even though it is not a regulated item (Catch-All controls item), the customer service available for that product may be affected. If you have any questions, please consult your local Mitutoyo sales office.

Note: These machines in this catalog incorporate a main unit Startup system (relocation detection system), which disable operation when an unexpected vibration is applied or the machine is relocated. Be sure to contact your nearest Mitutoyo Sales Office prior to relocating this machine after initial installation.

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