

Manual Coordinate Measuring Machine CRYSTA-PLUS M443/M500/M700 Series

Catalog No. E4332-196



A low cost, highly accurate, compact and easy-to-operate measuring instrument featuring frictionless air-bearing suspension.

Mitutoyo

Crysta-Plus M: All-in-all the most economical solution

High accuracy and low cost

The Crysta-Plus M has been developed by Mitutoyo in its quest to offer the market low-cost, easy-to-use coordinate measuring machines with no compromise in accuracy. The moving bridge design allows unobstructed access to the measuring table for quick, easy handling of workpieces. All models are equipped with one-touch air clamps for simple axis clamping.

One-Touch Air Clamp

Simply flip the appropriate switch at the foot of the column to air-clamp an axis. This allows workpieces to be quickly and easily measured.



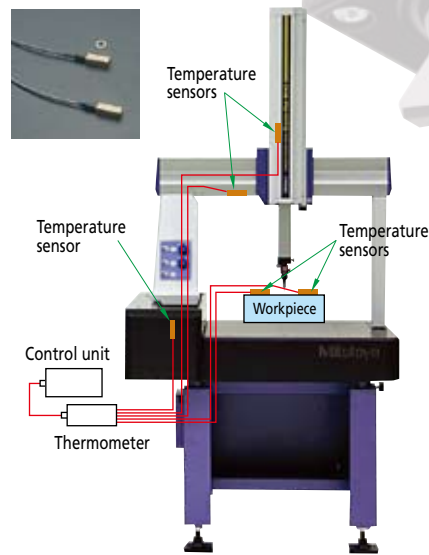
Continuous fine feed over the entire range

Ideal for microscopic measurements.



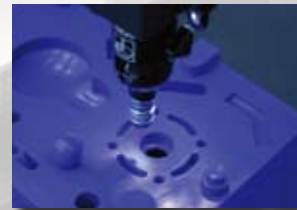
Temperature compensation

Even with the machine environment and the workpiece temperature fluctuating between 15 °C and 30 °C, Crysta-Plus M measures as if thermal conditions were stable. Sensors on the Crysta-Plus M and workpiece record temperature variations and feed the information to the automatic thermal-effect compensation system, which then corrects all measurements back to 20 °C in real time. This results in shop floor measurements being made to a level of accuracy only otherwise possible in thermally stable measurement laboratories.

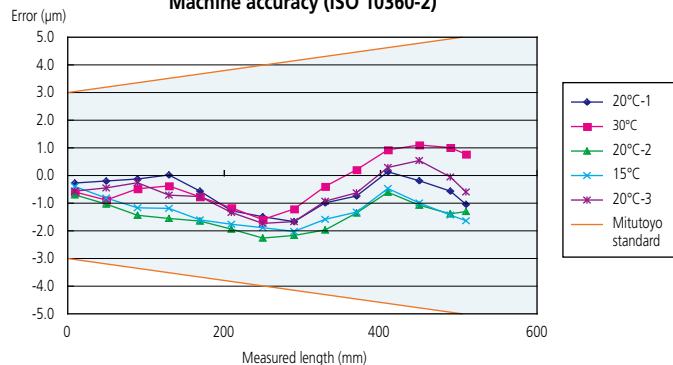


Illuminated working field (option)

To make positioning the probe easier, Crysta-Plus M can be fitted with a white LED illuminator on the spindle. This illuminates the probe stylus directly and also brightens the working field. A very convenient feature, especially when measuring bores.



Machine accuracy (ISO 10360-2)



Crysta-Plus M

Crysta-Plus M700 series

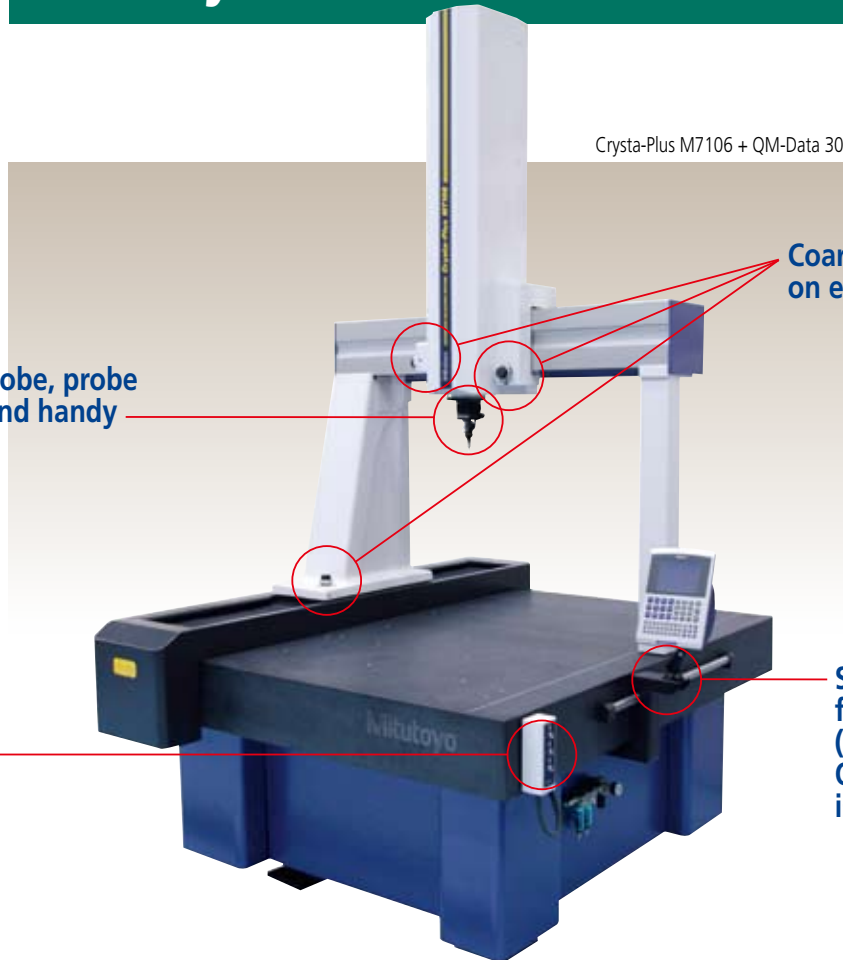
Crysta-Plus M7106 + QM-Data 300

Exchangeable probe, probe disable button and handy illuminator

Coarse/fine feed knob on each axis

Mobile clamp switch BOX

Slideout mounting for QM-Data 300 (Option when QM-Data 300 is used)



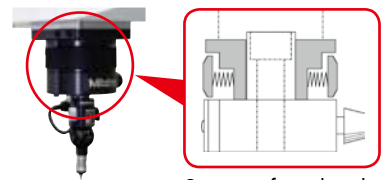
Clamping and coarse/fine feed control on all axes

To complement the size of the Crysta-Plus M700 series, dual-speed feed knobs are provided on each axis for convenient coarse and fine feed (18.85-0.99mm/revolution) positioning control. The axes can be clamped in any desired position using the mobile clamp BOX.



Constant-force handgrip

A comfortable handgrip is mounted on the end of the Z-axis probe holder, its shock-absorbing design reducing the impact of any rough handling that may be applied to the machine by inexperienced operators and minimizing vibration for improved repeatability.



Constant-force handgrip

Quality with complete versatility

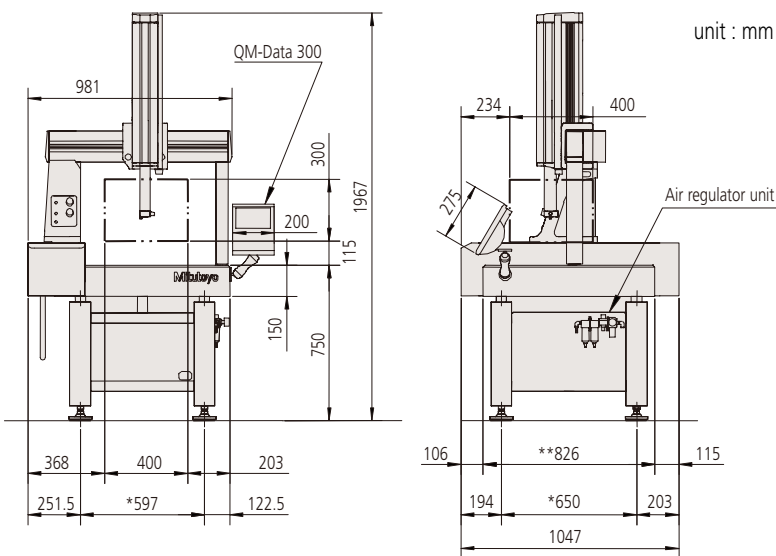
Crysta-Plus M443 with QM-Data 300



Crysta-Plus M443 with PC system



Dimensions (Main Unit)



Mass of main unit : 360kg
Mass of machine stand : 50kg

* Supporting point pitch
**Base size

* Pictures and dimensions shown in this page are an example of system configuration. Contact the dealer or the nearest Mitutoyo sales office for detail of the system configuration.

Crysta-Plus M443	
Mass of main unit	360kg
Mass of machine stand	50kg

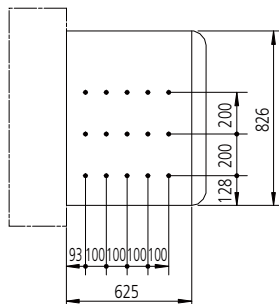
CRYSTA-PLUS M443

Specifications

Item	Crysta-Plus M443	
Measuring range	X axis	400mm
	Y axis	400mm
	Z axis	300mm
Resolution	0.0005mm	
Accuracy (20°C)	ISO 10360-2	$E = (3.0+4.0L/1000)\mu\text{m}$, $R = 4.0\mu\text{m}$ (Probe: MH20i/MH20/TP20+stylus (L 10mm))*
Environmental temperature (using the temperature compensation system)	Temperature range: 15°C to 30°C Temperature variation: 2.0K/h, 5.0K/24h Temperature gradient (vertical/horizontal): 1.0K/m	
Length standard	High-precision linear scale	
Guide method	Air bearing on each axis	
Clamping of each axis	Screw clamp	
Fine feed of each axis	One-touch air clamp, entire measuring range	
Measuring table	Effective size	624mm x 805mm
	Material	Granite
	Workpiece clamping	Tapped insert (M8 x 1.25, 13 positions)
	Maximum loading	180kg
Maximum workpiece height	480mm	
Z-axis balancing method	Counterweight (adjustable by 1.5kg)	
Machine dimensions	Width	981mm
	Depth	1,047mm
	Height	1,967mm
	Mass of main unit	410kg (including machine stand)
Air supply	Pressure	0.35MPa (air source: 0.5-0.9MPa)
	Consumption	50L/min under normal conditions (air source: 100L/min)

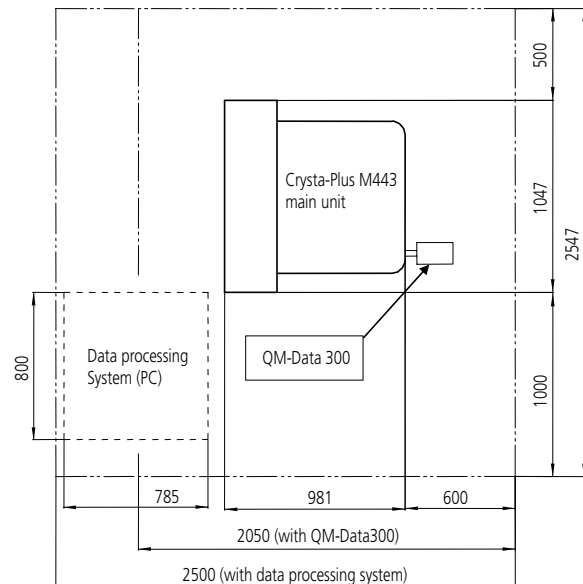
*L = Measured length (mm)

Dimensions (Measuring Table)



Installation floor space

unit : mm



Quality with complete versatility

Crysta-Plus M544 with QM-Data 300

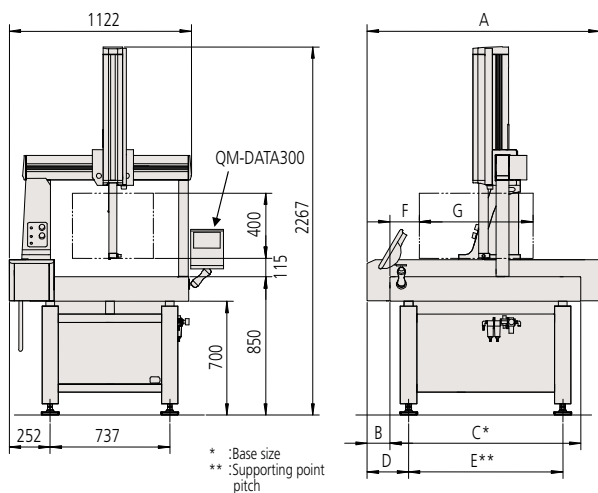


Crysta-Plus M574 with PC system



Dimensions (Main Unit)

unit : mm



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	Crysta-Plus M544	Crysta-Plus M574	Crysta-Plus M544	Crysta-Plus M574
Mass of main unit	450kg	575kg	A	1099mm
Mass of machine stand	62kg	71kg	B	141mm
			C	1175mm
			D	255mm
			E	950mm
			F	180mm
			G	700mm

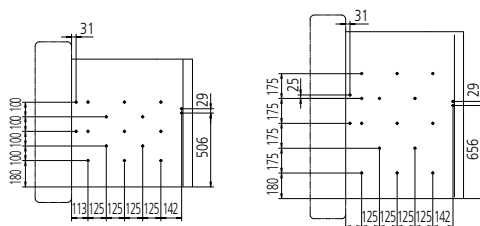
CRYSTA-PLUS M554/M574

Specifications

Item		Crysta-Plus M544	Crysta-Plus M574
Measuring range	X axis	500mm	
	Y axis	400mm	700mm
	Z axis	400mm	
Resolution		0.0005mm	
Accuracy (20°C)	ISO 10360-2	E = (3.5+4.0L/1000)μm, R = 4.0μm (Probe: MH20i/MH20/TP20+stylus (L 10mm))*	
Environmental temperature (using the temperature compensation system)		Temperature range: 15°C to 30°C Temperature variation: 2.0K/h, 5.0K/24h Temperature gradient (vertical/horizontal): 1.0K/m	
Length standard		High-precision linear scale	
Guide method		Air bearing on each axis	
Clamping of each axis		Screw clamp	
Fine feed of each axis		One-touch air clamp, entire measuring range	
Measuring table	Effective size	764mm x 875mm	764mm x 1175mm
	Material	Granite	
	Workpiece clamping	Tapped insert (M8 x 1.25, 13 positions)	
	Maximum loading	180kg	
Maximum workpiece height		595mm	
Z-axis balancing method		Counterweight (adjustable by 1.5kg)	
Machine dimensions	Width	1122mm	
	Depth	1099mm	1434mm
	Height	2267mm	
	Mass of main unit	512kg (including machine stand)	646kg (including machine stand)
	Air supply		0.35MPa (air source: 0.5-0.9MPa)
		50L/min under normal conditions (air source: 100L/min)	

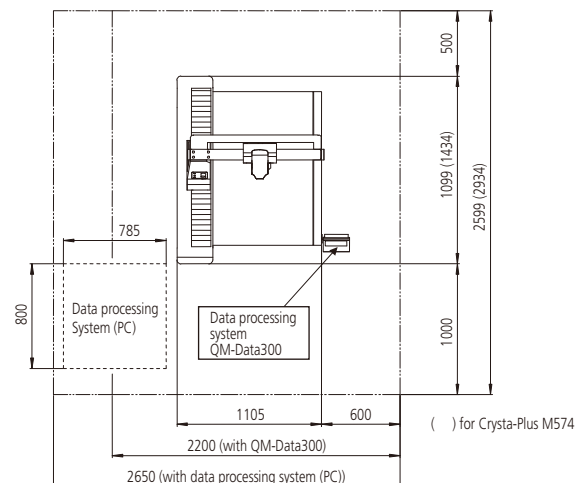
*L = Measured length (mm)

Dimensions (Measuring Table)



Installation floor space

unit : mm



Quality with complete versatility

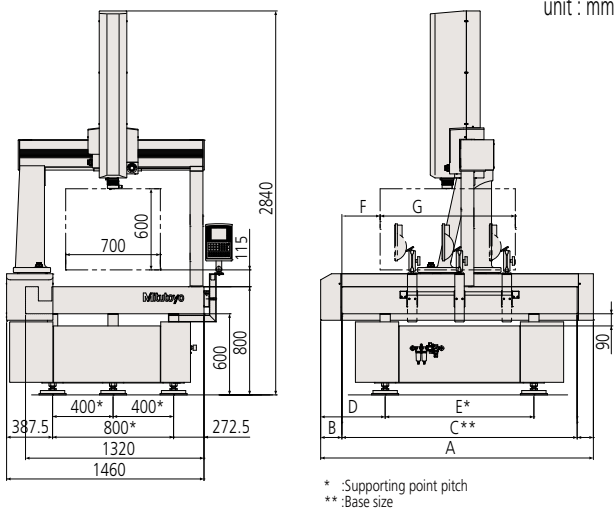
Crysta-Plus M7106 with QM-Data 300



Crysta-Plus M7106 with PC system



Dimensions



* Pictures and dimensions shown in this page are an example of system configuration. Contact the dealer or the nearest Mitutoyo sales office for detail of the system configuration.

	Crysta-Plus M776	Crysta-Plus M7106	Crysta-Plus M776	Crysta-Plus M7106
Mass of main unit	1241kg	1478kg	A	1717mm
			B	157mm
Mass of machine stand	210kg	219kg	C	1440mm
			D	320mm
			E	800mm
			F	283mm
			G	700mm

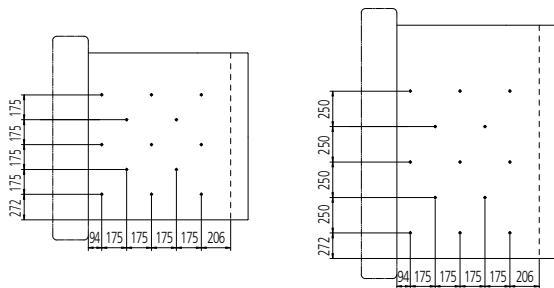
CRYSTA-PLUS M776/M7106

Specifications

Item		Crysta-Plus M776	Crysta-Plus M7106
Measuring range	X axis	700mm	
	Y axis	700mm	1000mm
	Z axis	600mm	
Resolution		0.0005mm	
Accuracy (20°C)	ISO 10360-2	E = (4.5+4.5L/1000)μm, R = 5.0μm (Probe: MH20i/MH20/TP20+stylus (L 10mm))*	
Environmental temperature (using the temperature compensation system)		Temperature range: 15°C to 30°C Temperature variation: 2.0K/h, 5.0K/24h Temperature gradient (vertical/horizontal): 1.0K/m	
Length standard		High-precision linear scale	
Guide method		Air bearing on each axis	
Clamping of each axis		Screw clamp	
Fine feed/coarse feed of each axis		One-touch air clamp (mobile clamp switch Box), entire measuring range	
Measuring table	Effective size	900mm x 1440mm	900mm x 1740mm
	Material	Granite	
	Workpiece clamping	Tapped insert (M8 x 1.25, 13 positions)	
	Maximum loading	500kg	800kg
Maximum workpiece height		800mm	
Z-axis balancing method		Counterweight (adjustable by 1.7kg)	
Machine dimensions	Width	1460mm	
	Depth	1717mm	2017mm
	Height	2840mm	
	Mass of main unit	1451kg (including machine stand)	1697kg (including machine stand)
Air supply	Pressure	0.4MPa (air source: 0.5-0.9MPa)	
	Consumption	50L/min under normal conditions (air source: 100L/min)	

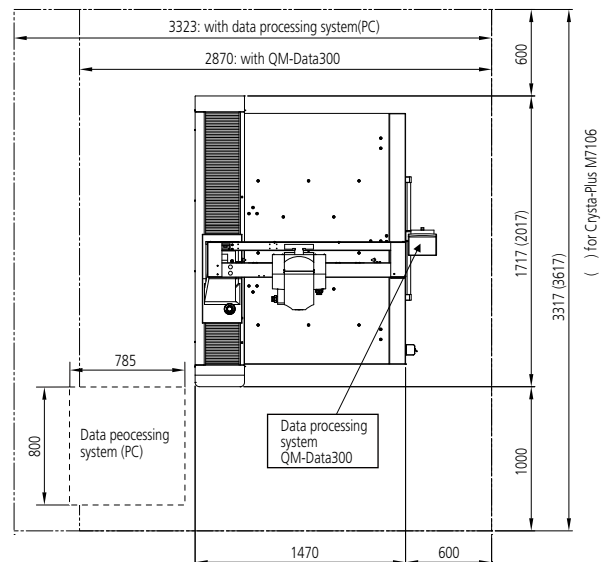
*L = Measured length (mm)

Dimensions (Measuring Table)



Installation floor space

unit : mm



MCOSMOS

Applications that support your measurement tasks

MCOSMOS Manual (GEOPAK)

High Performance General-Purpose Measurement Program

This module is the heart of the MCOSMOS software system and is used to measure and analyze geometric elements. All the functions are provided by icons or pull-down menus, freeing users from the need to memorize complex code numbers. It is unnecessary to switch windows for operations, so even novices can promptly select desired functions. Its main features include easier viewing of measuring procedures and results such as realtime graphic display of measurement results and a function for direct callup of elements from results graphics, which were not previously available. Even if you upgrade to a CNC model in the future, the basic operations remain exactly the same, so you can become familiar with the CNC model's operations just by studying the additional features.



SCANPAK

Optional Contour Measurement Program

Measures two-dimensional unfiltered profiles and performs various evaluations. It can evaluate profile measurement data, based on design data, and calculate various elements and inter-elements by specifying a range from the measurement data.



Resin molded or plastic formed products

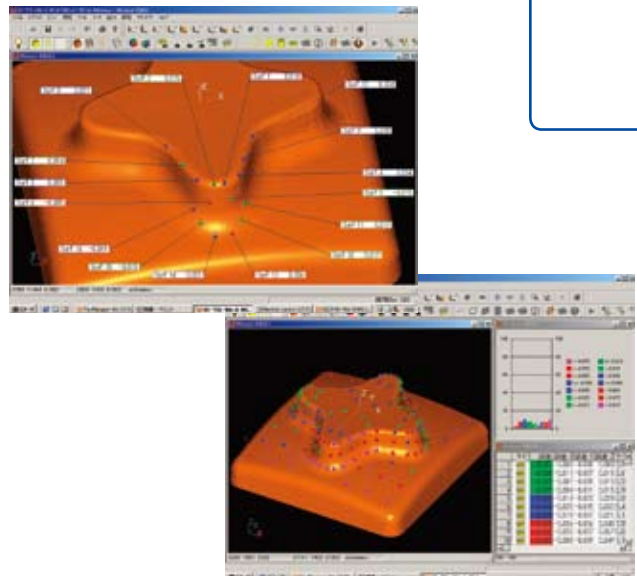


CAT1000S

Optional Free Curved Surface Evaluation Program

Checks and compares the workpiece with the CAD data and directly outputs the results in the form of CAD data in various formats. It supports IGES/VDAFS CAD data as standard, and software to directly convert from/to various types of CAD data is available as an option.

Small parts

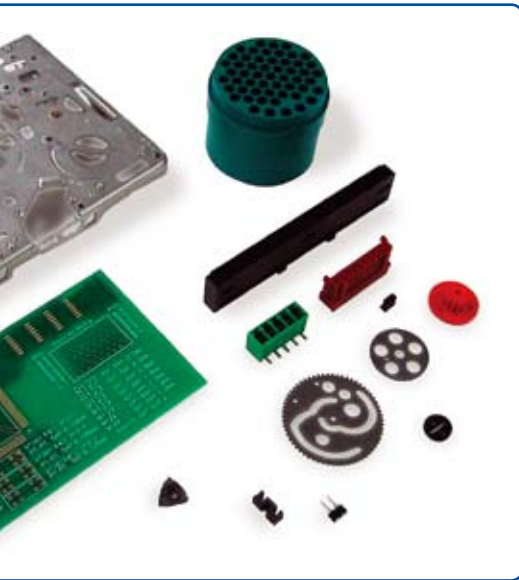


MCOSMOS

Touch Trigger Probe



This is a sensor that collects the coordinate values of the surface of a workpiece which the stylus contacts. Various interchangeable styli are available to suit the task in hand: such as ball styli with various diameters, and others with specially shaped tips to best meet the requirements of a large variety of workpiece shapes and evaluation methods.



Centering Microscope

This microscope can measure delicate, easily deformed objects which are difficult to measure by contact-type methods. Observation and measurement are possible through an optional TV monitor.

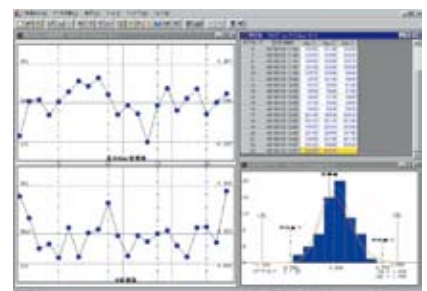


MeasurLink SPC-Super

Optional Statistical Processing, Process Control Program

This program can process various statistical analyses based on the measurement results. A real time display of a control chart allows earlier detection of potential defects such as wear or damage to cutting tools. This allows implementation of effective countermeasures including changes in cutting depth and working conditions. Using this program as a terminal, it is also possible to connect to a higher network environment for integrated control.

Cutting finished products



QM-Data 300

"Gage-like" Operation and Flexibility



QM-Data 300

With QM-Data 300 you can complete the 3-D measurement process simply by following the messages displayed onscreen. A special Gage-like measurement menu makes it fast and accurate...and you won't need a math degree to do it.



Mitutoyo's "AI" Function

Mitutoyo's exclusive "AI" function even frees you from the need to select geometric features*. Based on input data, the QM-Data 300 identifies which geometric feature has been measured, then shows the appropriate graphic display and calculates the dimensions automatically. This lets the operator continue the process without interruption using simple keystrokes.

*Geometric features of Point, Line, Plane, Circle, Cylinder, Cone and Sphere are supported.

Gage-like Measurement Menu

The coordinate system setup is indispensable when a conventional CMM is used. However, this can lead to the impression that "CMM operation is difficult". But QM-Data 300 provides a gage-like measurement menu that frees you from such concerns. Simply touch the features of the workpiece with a touch-trigger probe, following the interactive graphic display. The measured geometry is immediately calculated and displayed. It's so easy, even a beginner can perform complex measurements.

Gage-like measurement menu 1/5

A measurement menu that's as easy to use as a hand tool.



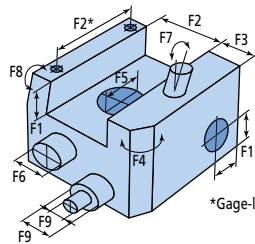
Gage-like measurement menu 2/5

For standard measurements.



Gage-like measurement menu 3/5

For standard measurement.



*Gage-like menu 3/5

Gage-like measurement menu 4/5

For advanced measurement.



Gage-like measurement menu 5/5

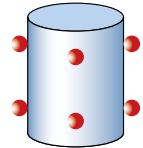
For advanced measurements.



How does the AI function simplify key operation?

Parallelism of cylinder axes

Step 1: Probe the workpiece to measure the first cylinder, then press **F1** key to complete the measurement. The QM-Data 300 automatically identifies first "Cylinder" from the input data.



Step 2: Probe the workpiece to measure the second cylinder, then press the **F4** key to complete the measurement. The QM-Data 300 automatically identifies the second "Cylinder" from the input data.

Step 3: Press the **F8** key three times to begin the parallelism calculation.



Step 4: Press the **F4** key to show the calculated angle between the axes.



QM-DATA 300

For Measurement Efficiency

1-Key function for rapid access

The QM-Data 300's unique 1-Key function lets you call a desired menu display* with a single press of an alphabetic key. If you have a frequently-used menu display, simply assign it to one of the alphabetic keys (A to Z). The registered menu display can then be called up instantly at any time.

*All the menu displays in the main menu category, user menu displays (page 1 to 4) and 1-Key list display are available for assignment except for the gage-like measurement menu displays.

"Learn and Repeat" function

This function is particularly convenient for the repetitive measurement of identical workpieces, such as when sampling for quality control. Using the Learn mode, a sequence of key operations is stored in the internal memory as a part program. It can be executed in the Repeat mode to reproduce the measurement routines without your having to input key operations at each step of the measurement.

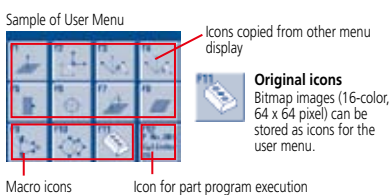
Macro function

This function lets you create and register macros comprising sequential multiple commands converted from a part program. Moreover, your macros can be assigned to icons in the user menu, thereby automating your combined calculations and otherwise complicated measurements.

Allocation-free user menu displays

The QM-Data 300 lets you design an original menu display (user menu). Simply choose a desired icon from the main menu category* and copy it to a blank icon (F1 to F12) in the User Menu display. The registered macro and part program will then be assigned to the blank icon.

*Excludes gage-like measurement menu displays.



For Advanced Measurement

In addition to gage-like measurement menus, the QM-Data 300 provides the experienced operator with a host of advanced functions equal to those of standard CMM software.



Coordinate System Setup



Twelve handy macro icons predefined

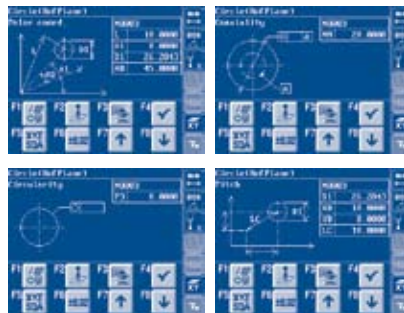
Measurement menu



Feature-feature calculation menu



Sample display of measurement result



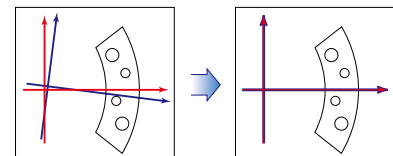
Multiple Language Support

Several operating languages are available: English, Japanese, German, French, Italian, Spanish and Portuguese

Optional Programs

QMFit - best fit of coordinate system

QMFit translates and rotates the part coordinate system so that the measurement results of workpiece features most closely match their nominal values using the "least squares" algorithm. This is highly suitable for measuring parts having low dimensional accuracy, such as pressed and injection-molded components.



QMGraph - visualizing measurement results

QMGraph shows the calculated results of geometrical deviations and tolerance assessments with easy-to-understand drawings.

- Geometrical deviation: Straightness, flatness, roundness
- Tolerance assessment: Positional deviation, XYZ coordinate value



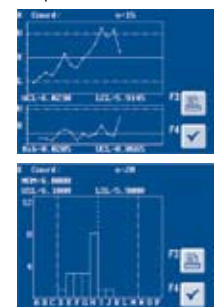
QMScan - digitizing 3-D contour

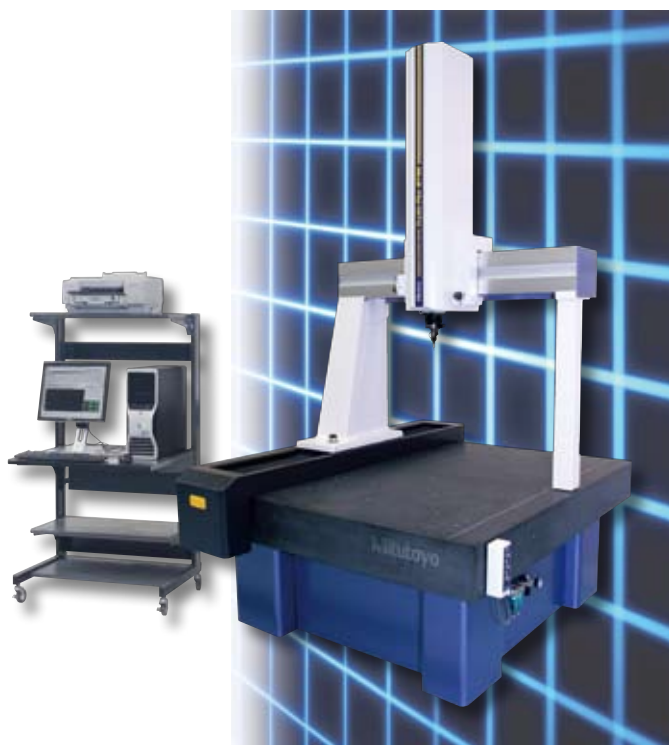
The QMScan uses a contact probe to scan and digitize workpiece contours. The contour-point clouds thus obtained can then be transferred to an external contour modeling system via portable storage media or the RS-232C interface.

QMStat - evaluating SPC parameters

The QMStat features a comprehensive selection of SPC parameters:

- Average, Max., Min., Sigma, Cp/Cpk
- Histogram
- X-Rs control chart
- Run chart





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