CRYSTA-PLUS M

Bulletin No. 2107

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

Mitutoyo

CRYSTA-PLUS M:
Precision that couldn't be clearer

Welcome to the world of 3D coordinate measuring technology!
CRYSTA-PLUS M is the intelligent alternative to complex and cost-intensive measuring machines or conventional measuring tools. As a high-performance manual 3D coordinate measuring instrument, CRYSTA-PLUS M comes into its own wherever constantly changing measuring tasks, many different types of workpiece and random sampling is the order of the day.

Manual

CRYSTA-PLUS M

All-in-all the most economical solution

Measuring work is a highly individual matter - particularly where measurements cannot always be made in seconds. Spot-checking in production or special tasks, for instance, or pre-setting tools in diesinking EDM. Here, and in all other special measurement tasks, CRYSTA-PLUS M is the ideal solution for performance- and cost-conscious users. CRYSTA-PLUS M combines the capabilities of many individual measuring and test instruments in a single, economical, all-round system - making enormous savings possible from purchase and use all the way through to long-term maintenance.

Economical

CRYSTA-PLUS M comes with high-end MCOSMOS software with Mitutoyo Intelligent Computer Aided Technology (MiCAT) as standard, the user-friendly command center for professional measuring and evaluation. Combined with numerous optional application-specific modules, MCOSMOS will rise with ease to any challenge, however demanding the specification.

Add to that a highly versatile, use-specific range of accessories from specially designed sensor systems through to a flexible clamping system.

With CRYSTA-PLUS M, a whole world of high-performance manual 3D coordinate measuring will open up to you. The plus in performance will soon pay for itself.

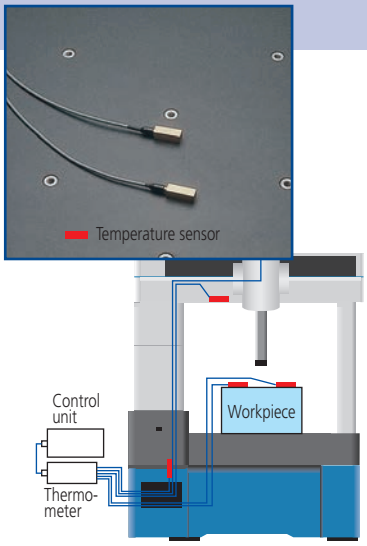
Higher quality, point for point

- Length measuring accuracy 3.5 µm*: impressively accurate for manual 3D coordinate measurement
- High-precision (resolution: 0.5 µm), dustproof glass scales on all axes
- Mitutoyo PC based MCOSMOS software as standard
- Voice guidance for operator through use of MCOSMOS software
- Self-adjusting air bearings on all axes
- FEM-aided design ensures geometric accuracy and vibration resistance
- 3 sizes to choose from
- Space saving and light, compact design built with high quality materials
- Outstanding price/performance ratio
- Integrated thermal-effect and volumetric-error compensation for instrument and workpiece in the temperature range 16 °C to 26 °C (can be added as an option)

Versatile

* For models with 500 mm X-axis travel:
MPEE = (3.5+0.45L/1000) µm with TP20/MH20I probes in the temperature range 19 °C to 21 °C (or 16 °C to 26 °C using the optional thermal-effect compensation).

CRYSTA-PLUS M:
Simply the best ideas



Optional

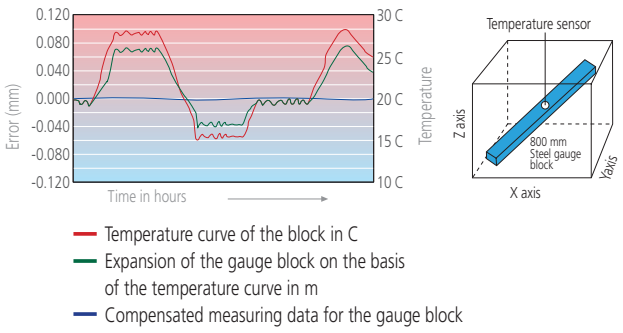
Intelligent

The measuring results are stable even when temperatures fluctuate (option)

Even with the machine environment and the workpiece temperature fluctuating between 16 °C and 26 °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.

Corrections made clear

Temperature-dependent correction using an 800 mm steel gauge block as an example - measured with alternating environmental temperatures diagonally in the room.

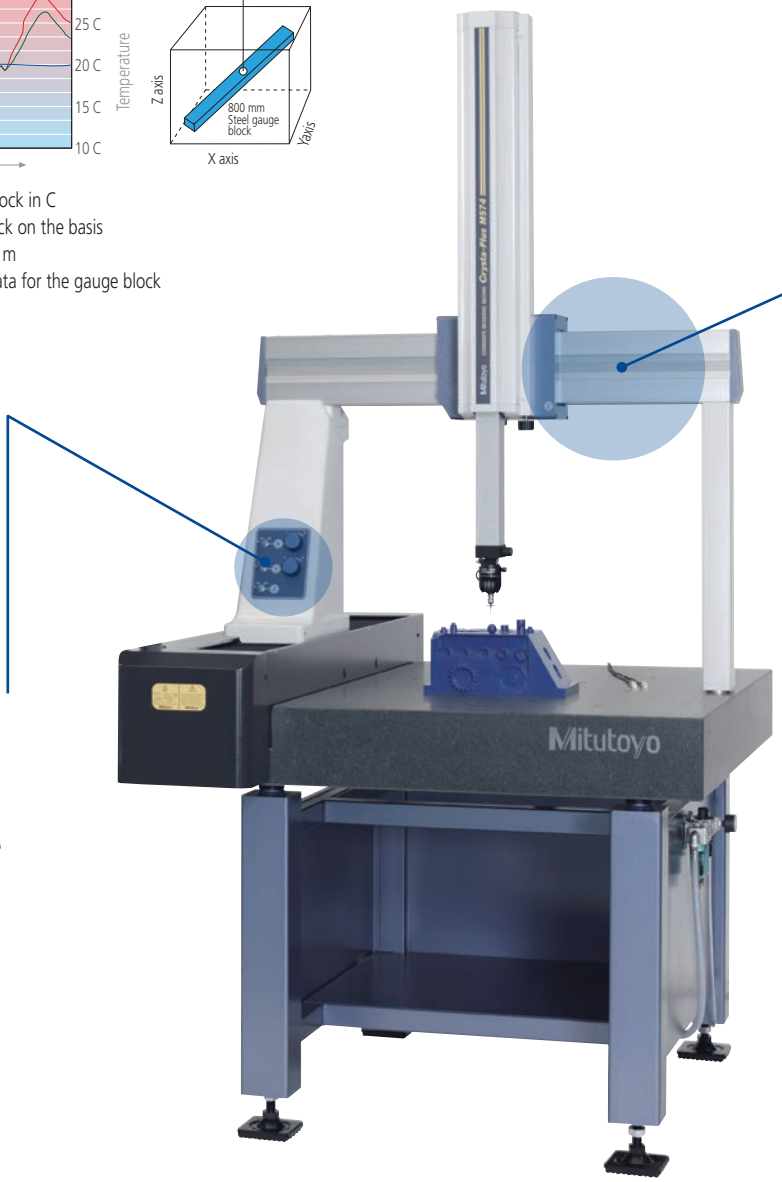


- Temperature curve of the block in C
- Expansion of the gauge block on the basis of the temperature curve in m
- Compensated measuring data for the gauge block

Precise

Positive positioning

All models include air locks for each axis in conjunction with fine adjustment for the X and Y axes. The 7106 model includes rapid traverse in the X, Y, Z axes and the air locks are integrated into a remote switch box.



Uncomplicated

Voice guidance

CRYSTA-PLUS M provides voice guidance for the user throughout the MCOSMOS Software. This prevents misunderstandings and directs full concentration on guiding the instrument. This enables even less-experienced operators to carry out complex measuring tasks safely and without error.

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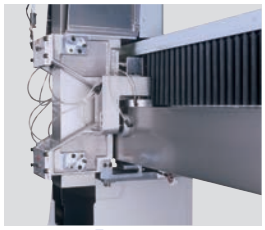
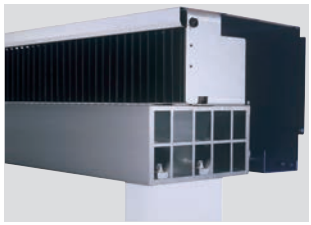
Uncomplicated

Air bearings on all axes
Self-adjusting air bearings on all axes allow CRYSTA-PLUS M to move the probe with outstanding smoothness, speed and precision. They form the basis for absolute measuring accuracy.





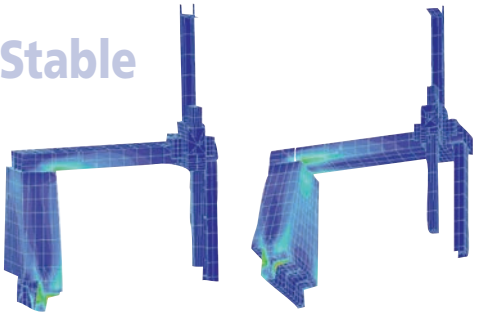
Superior

Compact

Space-saving and light
CRYSTA-PLUS M does not require any special constructual prerequisites at the installation site. Thanks to particularly high-quality lightweight materials and space-saving dimensions, a hard and stable mounting surface with normal machine-standard foundations is quite sufficient.

Modern technology for accurate guidance
Finite element method (FEM) analysis was used to achieve a highly rigid bridge structure design that ensures exceptional guideway straightness and good suppression of vibrations. The high thermal conductivity of the aluminium guideways helps prevent deflection and twisting due to thermal-gradient effects.

Stable



Dustproof glass scales
CRYSTA-PLUS M uses high-precision dustproof glass scales with a resolution of 0.5 µm. Optional sensors on the instrument scales provide temperature compensation. This makes CRYSTA-PLUS M particularly suitable for use in a harsh production environment.

Scale with optional temperature sensor

Constant

Constant measurement
The ergonomically designed guide grip on the Z axis helps prevent measurement inaccuracies due to any unsteadiness in manual operation.
NOTE: Only available on 7106 model

Quality with complete versatility

Series M443

Series M500

Series M700

Model		Crysta-Plus M443	Crysta-Plus M574	Crysta-Plus M7106
Measuring Range	X axis	15.75″ (400 mm)	19.69″ (500 mm)	27.56″ (700 mm)
	Y axis	15.75″ (400 mm)	27.56″ (700 mm)	39.37″ (1000 mm)
	Z axis	11.81″ (300 mm)	15.75″ (400 mm)	23.62″ (600 mm)
Workpiece	Max. workpiece height	18.9″ (480 mm)	23.23″ (590 mm)	31.50″ (800 mm)
	Max. table loading	396 lbs (180 kg)	396 lbs (180 kg)	1760 lbs (800 kg)
Workpiece Clamping	No. of M8 x 1.25″ Threaded Holes	13	13	13
Machine Accuracy	ISO 10360-2 (20 °C ±1 °C)	E=(3.0+4.0L/1000)µm	E=(3.5+4.5L/1000)µm	E=(4.5+4.5L/1000)µm
Probe Repeatability	ISO 10360-2	R=4.0µm (TP20)	R=4.0µm (TP20)	R=5.0µm (TP20)
Environmental temperature		20 °C ±1 °C	20 °C ±1 °C	20 °C ±1 °C
Resolution	Length measuring system	.00002″ (0.5µm)	.00002″ (0.5µm)	.00002″ (0.5µm)
Guidance		Air bearings on all axes	Air bearings on all axes	Air bearings on all axes
Measuring Table	Material	Granite	Granite	Granite
	Dimensions	33.07″ x 51.97″ (624 x 805mm)	25.12″ x 45.67″ (638 x 1160mm)	34.65″ x 67.72″ (880 x 1720mm)
Air supply	Consumption/air pressure	ca. 50 l/min at 0.35 MPa	ca. 50 l/min at 0.35 MPa	ca. 50 l/min at 0.4 MPa
Dimensions	Width	38.62″ (981 mm)	42.60″ (1082 mm)	57.87″ (1470 mm)
	Depth	41.22″ (1047 mm)	57.40″ (1458 mm)	76.77″ (1950 mm)
	Height	77.44″ (1967 mm)	89.96″ (2285 mm)	111.42″ (2830 mm)
Mass	(with supporting table)	904 lbs (410kg)	1421 lbs (646kg)	3968 lbs (1800kg)

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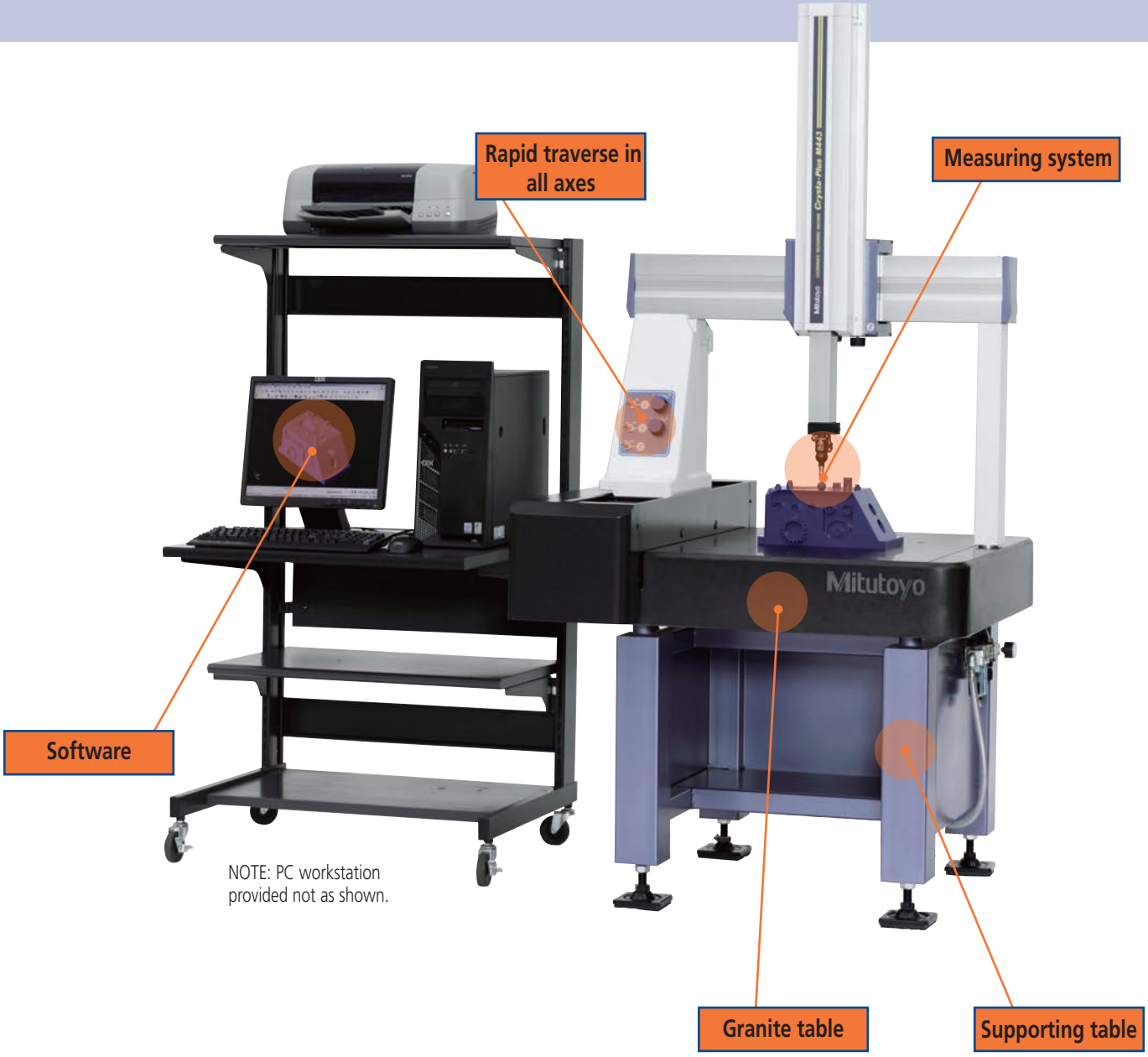
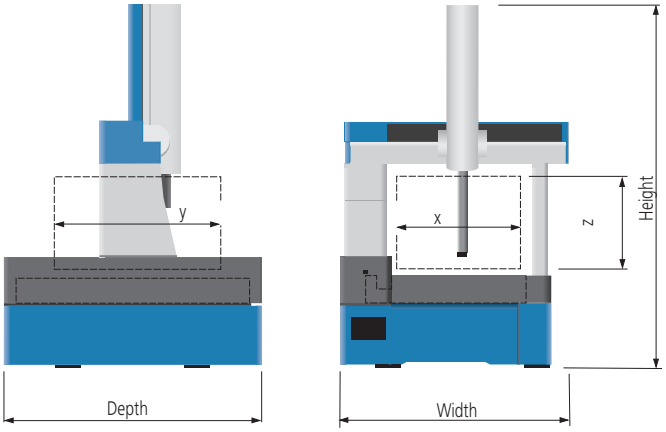
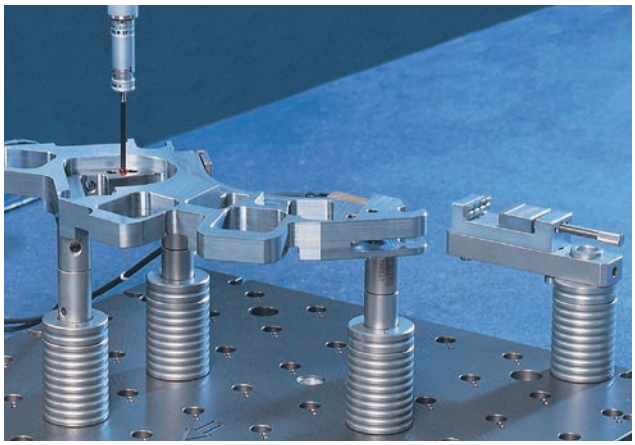
CRYSTA-PLUS M



NOTE: PC workstation provided not as shown.





Quality and versatility in every case: Mitutoyo measuring systems

Leaving nothing to chance in your measuring tasks, Mitutoyo offers an extremely wide range of contact and non-contact measuring systems. Each part is carefully coordinated with the multisensor capability of the CRYSTA-PLUS M.

Contact measuring systems				Non-contact measuring systems
Manual, stepless, rotating measuring systems		Manual rotating, indexable measuring systems		Centering microscope
Measuring head with separate measuring probe	Measuring head with separate measuring probe	Measuring head with separate measuring probe (indexable)	Measuring head with separate measuring probe (indexable)	Located via spindle

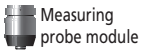
Centering microscope CF20

PEL Extensions 50 - 300 mm

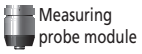
PEL Extensions 50 - 300 mm

TP20 Probe

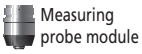
TP20 Probe



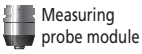
Measuring probe module



Measuring probe module



Measuring probe module



Measuring probe module

Styli M2 thread

Styli M2 thread

Styli M2 thread

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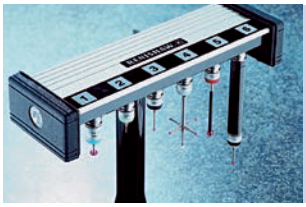


Probe module holder
Manual rack MSR1

Versatile

mcosmos

Applications that support your measurement tasks

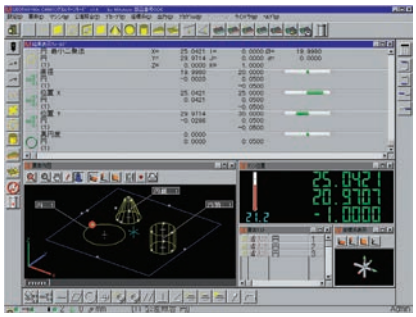
MiCAT
Mitutoyo Intelligent Computer Aided Technology
the standard in world metrology software
CMM

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 for quick and seamless operation. 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.

Resin molded or plastic formed products



CAT1000S

Optional Free Curved Surface Evaluation Program

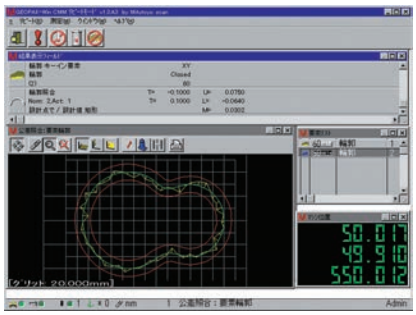
Checks and compares the workpiece with the CAD data and directly outputs the results in the form of CAD data in various formats. It supports IGES/VDAFS CAD data as standard, and software to directly convert from/to various types of CAD data is available as an option.

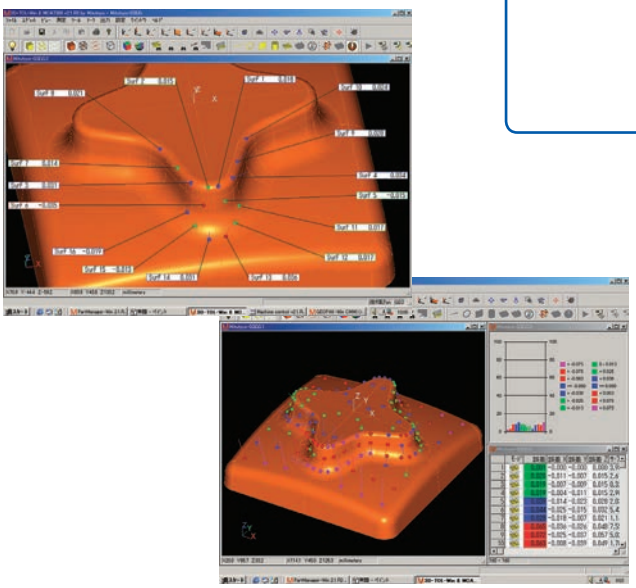
Small parts

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.





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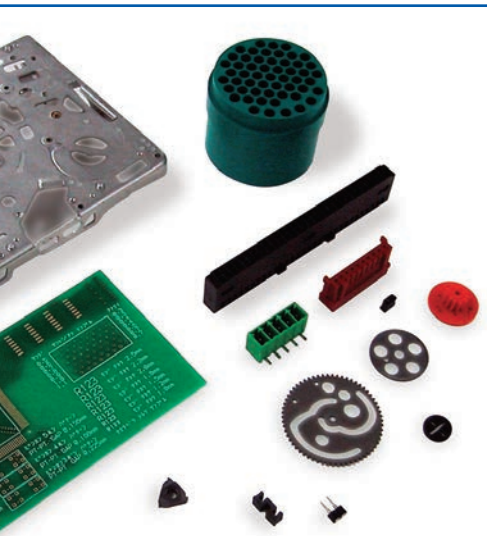
Touch Trigger Probe

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

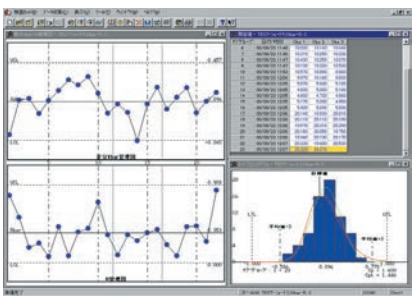
This microscope can measure delicate, easily deformed objects which are difficult to measure by contact-type methods. Observation and measurement are possible through an optional TV monitor.



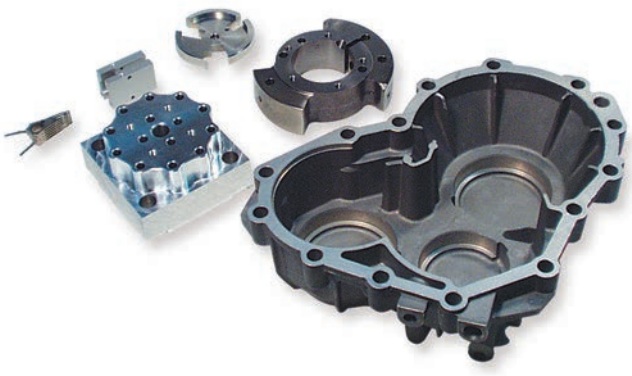
MeasurLink®

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



With Mitutoyo's coordinate measuring machines, you can be sure of gaining the competitive edge provided by the experience and expertise of the world's leading specialist in production measurement technology. You are also benefiting from knowledge accumulated over decades for the tasks of tomorrow. Setting the highest standards in quality, and performance.

- 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

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Precision is our Profession