High-end software for Coordinate Measuring Machines. The complete range.
MiCAT is the smart software platform from Mitutoyo, setting international standards for sophisticated 3D coordinate measurement. With MiCAT, your coordinate measuring machines become efficient information centres - power houses of design, production and quality control. Streamlined measurements and convenient and reliable data at your fingertips throughout the production process.

Our certified Computer Technology Laboratory (CTL) has developed MCOSMOS – the Mitutoyo Controlled Open System for Modular Operation Support. This is modular CMM software system giving professional control, measurement and evaluation.

MCOSMOS helps you carry out all your measuring and test jobs at lightning speed, simply and safely. MCOSMOS handles large amounts of data with ease, making it available across all the networked areas of the production chain. This streamlines the measuring process, optimises the flow of information and minimises non-conformances. The result is increased efficiency throughout the production process with significantly reduced costs.

With its specialist expansion modules, MCOSMOS can focus in on your company’s very specific measurement requirements. With Mitutoyo software, you are best prepared for every imaginable 3D coordinate measurement challenge, both now and in the future, with maximum flexibility.

Mitutoyo: complete precision
Mitutoyo. Near to you, wherever you are.
Precision measurement technology with global dimensions.

With seven decades of experience, Mitutoyo is a pioneer and a pace-setter in precision measurement technology throughout the world. The Mitutoyo Group has spread out from its birthplace in Japan, and today has a presence in more than 100 countries in the world in the form of branches, factories and national distribution networks.

With this world-wide network, Mitutoyo has become an international leader in providing precision measurement technology from a single source. A claim based both on the quality of the 5000 plus Mitutoyo products and in a service philosophy that sets an example throughout the world.

In its certified Computer Technology Laboratory (CTL) in Oberndorf on the River Neckar in Germany, Mitutoyo employs highly qualified specialists who devote their expertise to developing software for 3D coordinate measurement technology, thereby setting world standards.
MCOSMOS is the modular software system for professional controlling, measuring and evaluation in coordinate measuring technology.
With this sophisticated modular software system developed by Mitutoyo, you will have the capabilities of a variety of software packages and expansion modules at your fingertips. They can make comprehensive measurement evaluations, document and present them in an effective form. The data is archived into clear, practical structures. Of course, all coordinate measuring machines come with their own software package as standard.

**PartManager**
Is the command centre that boots and manages the software package.
Includes: ProtocolDesigner, ProbeBuilder, DialogDesigner, user management, manager program (unmanned shift).

**GEOPAK (Geometry module, online/offline)**
For easy parts program generation (online/offline) for measuring geometrical elements.
Includes: high-speed scanning of control geometries for measuring probes, supports rotary tables as fourth axis, supports user-defined dialogues (variable program creation) and flexible reporting.

**CAT1000S* (3D freeform evaluation module)**
For preparation of setpoint/actual value comparisons from CAD model free form surfaces and measuring points.
Includes: MachineBuilder, automatic traverse path generation (animated), collision control and flexible reporting.

**CAT1000P* (Online/offline programming module)**
For control geometry and uncomplicated parts program generation supported by the CAD model.
Includes: MachineBuilder, automatic traverse path generation (animated), collision control and simulation of complete parts programs.

**SCANPAK (2D profile evaluation module)**
For the scanning and evaluation of workpiece contours.
Includes: Supports single-point/measuring probes, supports rotary tables as fourth axis, variable contour tolerances, best fit, digitised and flexible reporting.

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*Standard CAD import interfaces: ACIS (*.sat), IGES, VDA-FS
Optional CAD import interfaces: CATIA V4, CATIA V5, Pro/E, STEP, Parasolid, Unigraphics and SolidWorks*
PartManager is the versatile management centre within MCOSMOS software, the control centre for all measurement tasks. From PartManager, boot main program modules such as GEOPAK, GEARPAK, CAT1000P/S etc. as well as all configuration programs such as MachineBuilder or DialogDesigner and ProtocolDesigner and user management. Here too, detailed documentation and archiving of data records are organised in a simple, convenient and very user-friendly way.

Use PartManager to organise all your notes, reports, data and images for any measurement process; clearly listed and assigned to each workpiece. A visible indicator is the parts list identifiable at first glance in the available data column. Click on the symbol and you can view the documents and start the programs you need. PartManager contains a user management system with a detailed system of user rights and revision management for measurement programs including change history. Here you have everything you need to comply with the German 21CFR Part 11 Directive.
With the universal geometry measurement program for multidimensional measurement, you can control your workpiece from design to completion. Its multiple functions make GEOPAK one of the most powerful programs available, meeting the most stringent requirements, but very user friendly. For example, you can display step by step what exactly has to be done when aligning a workpiece. In addition to many dedicated reporting options, output on other systems (e.g. QS-Stat, Word, Excel) is also possible. In pallet mode, several workpieces of the same type can also be measured in unmanned operation. Further solutions to quite specific measuring tasks can be found in highly sophisticated hardware components such as various probe systems, probe change systems, swivelling and turning links, rotary tables and clamping and loading systems, with many of which GEOPAK comes as standard.

**GEOPAK means:**

- Clear user guidance with menus and graphics
- Online/offline programming (in tutorial mode, virtual or editor mode)
- High-speed scanning of control geometry elements (when using measuring probe systems)
- Flexible programming by the use of user-definable dialogues and variables
- Support of rotary tables as 4th axis
- Use of various interchangeable probe systems (single point, measuring and laser probe systems, as well as sensors for image processing, including their associated change systems)
- Macros for automatic measurement of all control geometries
- Automatic element recognition
- Easy and rapid program correction (in editor mode or in repeat mode)
- Integration of text, images and sound
- Flexible customer-specific reporting
- PTB-certified algorithms for geometry calculation
- Certified QS-Stat interface
CAT1000P puts an end to laborious data input. It significantly facilitates the programming of measurement tasks in GEOPAK tutorial mode. With just a few mouse clicks, all data for measuring parts and tolerance testing are taken from the CAD model – simply and safely. The same applies to the programming of traverse paths and probe points, and the creation of nominal values for setpoint/actual comparison. Travel and probe paths are clearly shown in a 3D view. They can be changed as desired at the click of the mouse on the model. Possible collisions are calculated in advance and reliably avoided. Probe changes can be automatically suggested.

With the MachineBuilder, you can have a complete CMM workspace – from CMM and the probe change system right through to calibration balls. These configurations enable you to realistically simulate complete measuring programs.

**CAT1000P means:**
- Simple measurement program creation from the CAD model (only for control geometry elements)
- Automatic probe changes are suggested
- Automatic traverse path generation and collision avoidance
- Clear representation of probe points in 3D graphics
- Automatic conversion of standard surfaces in the event of errors in the CAD model
- Simulation of individual traversing steps
- Simulation of complete parts programs
- Offline program creation for optimised machine use
- Reading-in of standard interfaces (IGES/VDAFS/SAT/other direct interfaces as an option: CATIA V4/CATIA V5/Parasolid/PRO/E/STEP/Unigraphics/SolidWorks)
- All interfaces for CAT1000P can also be used with CAT1000S
- Supports the following hole shape elements: solid circle, rectangle, square, triangle, trapezium, hexagon, elongated hole, teardrop

**Standard module for:**

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**CAT1000P, the online/offline programming module. Easy programming from the CAD model.**
CAT1000S shows its strengths in the precise comparison of solid bent surfaces with their desired setpoint entries from CAD data (e.g. bodywork parts). Individual measurement points can be allocated to the next surface or limited to one surface. The measurement results are represented as easy-to-interpret graphics, in which non-conformances are quickly and easily recognisable by colour marking. The cut edges of sheet metal parts can be precisely measured using CAT1000S. Animation and virtual representation of the next scanning process simplifies programming in tutorial mode.

**CAT1000S means:**
- Simple, convenient operation
- Rapid setpoint/actual value comparison between setpoint entry and measurement
- Rotatable and scalable 3D representation
- Representation of non-conformances with colour graduations
- Best fit of measurement points on the CAD model
- Flexible, customer-specific reporting
- Standard interfaces can be read in (IGES/VDAFS/SAT/other direct interfaces as an option: CATIA V4/CATIA V5/Parasolid/PRO/E/STEP/Unigraphics/SolidWorks)
- All interfaces for CAT1000S can also be used with CAT1000P

**Standard module for:**
MCOSMOS 3
SCANPAK, the 2D contour evaluation module. Detection of non-conformances between setpoint and actual value contours.

With SCANPAK, non-conformances between the finished contour and the desired contour can be quantitatively determined. By feeding back the optimised contour in the production process, the workpiece can be successively optimised.

SCANPAK means:
- Sophisticated functions for evaluating and processing contours
- Successful integration of contours into the geometric measurement program
- Simple and safe operation
- Scanning of forms with feedback of data into the CAD system (TRANSPAK) and at machine controls
- Graphic representation of setpoint/actual value comparison
- Support for flexible reporting functions (ProtocolDesigner)
- Supports the Mitutoyo rotary table MRT320 as fourth axis
- Supports single point and measuring probe systems, laser probe systems and sensors for image processing
- Includes the Patchscan function for digitising unknown 3D bodies on freeform surfaces
- Supports the use of variable contour tolerances
- Scanning to known (preset) and unknown contours
- Best fit of contours
- Two-flank scan with the use of measuring probe systems (optional)
MAFIS stands for 'Mitutoyo Airfoil Inspection Software' and enables the calculation of all significant bearing surface parameters, e.g. of turbine blades on aeroplane engines or pump blades. It works in association with the MCOSMOS module SCANPAK, for the automatic scanning of workpiece forms. With SCANPAK the contour is first entered, after which in a separate menu the ‘bearing surface analysis’ can be selected for the evaluation of desired parameters. Using simple pictograms, all the necessary inputs can quickly be carried out. Outputting measured values is possible both in clear lists and graphs. All MAFIS parameters are supported by the MCOSMOS report designer with which individualised ports can be generated with ease.

Optional for: MCOSMOS 3

MAFIS means:

- Simple and safe use with self-explanatory pictograms
- Evaluation of all significant bearing surface parameters
- Support of all output functions of MCOSMOS (screen output, text output, ProtocolDesigner, MeasurLink)
- Contours can be entered using the SCANPAK expansion module
GEARPAK is the MCOSMOS module specialising in measurement and evaluation of involute gear profiles. It is used for the rapid generation of measurement programs and creates evaluations and reports. GEARPAK was certified in 2005 by the Physikalisch Technischen Bundesanstalt (PTB). The results of the test data records deviated by less than 0.1 µm from the PTB’s reference values – an impressive achievement.

The measuring process is by single-point entry or scanning. The range of evaluations includes, in addition to complex gear flank evaluation for profile and flank line (including curvatures and reliefs), also pitch, concentricity, best fit and single and dual flank rolling test. The parameters to be included in the report are determined by the user, with numerical or graphic representation, or a combination of the two being possible.

GEARPAK means:
• Rapid, safe and fully automatic creation of CNC measurement sequences for involute gear profiles (straight and inclined gears)
• Precise evaluation (certified by the PTB)
• Measurement and evaluation according to current standards and tolerance systems (DIN, ISO, AGMA etc.) and customer-specific tolerance tables
• Clearly structured dialogues and functions
• Dialogues for profile and flank line modification (reliefs, curvatures)
• Simple, menu-assisted data input with graphic feedback (self-explanatory pictograms)
• Graphic, numerical and combined reports
• Reports in HTML format
The optional expansion module Pure DMISPAK serves as a powerful conversion tool when importing DMIS programs for further use in MCOSMOS. Vice versa, of course, Pure DMISPAK also ensures easy exporting of MCOSMOS programs into DMIS format.

Pure DMISPAK means:

- The reading in and conversion of DMISPAK measurement programs and their execution under MCOSMOS
- Conversion and outputting of MCOSMOS measurement programs in DMIS format
ROUNDPAK CMM is the roundness testing module within the MCOSMOS concept and supplements the GEOPAK geometry module. It has been specially designed to test roundness and cylindricity in combination with GEOPAK. ROUNDPAK CMM makes available calculation results and many graphic evaluations for circles, cylinders, flat surfaces and straight lines for integration into user-defined reports. Examples of graphic evaluations:

ROUNDPAK CMM means:
- Extended evaluation functions for circles, cylinders, flat surfaces and straight lines.
- Evaluations of the following parameters: rectangularity, cylindrical form, parallelism, concentricity, complete run, circularity, axial runout, straightness, flatness and roundness.

ROUNDPAK CMM, the roundness testing module. Specialising in large workpieces.
With the ProtocolDesigner – a standard tool within MCOSOMOS – you can effortlessly draw up new, personalised forms for the GEOPAK, CAT1000S, MAFIS and ROUNDPAK CMM modules, or adapt existing forms to your personal requirements. The standard report becomes a flexible report and you can create the perfect models for basic pages, first and subsequent pages. For the graphic implementation of your own ideas, there is a wide range of variables, fields, tables and graphs available. You will be helped by an assistant, detailed documentation and detailed online help.

Create with ProtocolDesigner, for example, headings with your company logo and setpoint/actual value comparisons in colourful images, or define new levels and enhance your reports with info-flags.

**ProtocolDesigner means:**
- Personalised form creation for GEOPAK and CAT1000S, SCANPAK, MAFIS and ROUNDPAK CMM
- Incorporation of images from photographs, CAD models or from element graphs
- Easy Excel exports (even where Excel is not installed on your own system)
- Text exports into a CSV file (text-based table format)
- TIFF and multi-TIFF export
- PDF export (128 bit coding)
- ANSI or ASCII export
- HTML/MHTML export
- JPG, BMP and EMF export
The rapid feedback of measured data to processing centres is possible with ‘Correct Plus’ evaluation software. It enables immediate online correction of processes, continuously or randomly checked by a coordinate measuring machine. By contrast with conventional correction by machine or workpiece parameters only – referring to the entire processing program – online correction permits each individual characteristic to be taken into account, for example, position and diameter of holes.

Correct Plus means:
• Incorporation of calculated correction values into the correction value file
• Corrected data is already taken into account in the next workpiece due to the immediate transfer of a correction value file from the machine tool control unit
• Shortening of start-up times for new process cycles
• Rapid transition from 100 % measurements to sampling tests by speedy stabilisation of processes
• Automatic analysis of measurement results, calculation of new tool correction data and direct, rapid creation of correction databases
• By correction to mid-tolerance, significant error reduction in the process
• Supports all commonly-used control units
• No interference with the NC program of the machine tool

Ask for the separate Correct Plus brochure with more detailed information.
MeasurLink® is, for Mitutoyo users, the epitome of perfect measured data management, analysis and storage, giving comprehensive statistical evaluation of your measurements. As the ‘analysis’ component of the Mitutoyo expansion modules, this program is the tool you use to set out and compare your results. MeasurLink is therefore the ideal software for statistical process control, identifying trends and giving the opportunity to take action before the process exceeds preset intervention limits. As with all measurement programs, this is a multi-tasking-capable tool that can run in the background. Particular emphasis is given to simple, clear user-guidance. The dialogue fields can be flexibly arranged to your own requirements. MeasurLink is largely network-capable. Its resources are independent of the measuring device location and can be used all over the world on any authorised computer. Finally: MeasurLink supports, in addition to Coordinate Measuring Machines, all other digital Mitutoyo measuring equipment right through to dial and calliper gauges.

MeasurLink means:
- Optimum configuration with modular program structure
- Real-time control card representation
- Monitoring of various measuring stations in network operation (hall plan, internal/external networks)
- Monitoring of test characteristics from GEOPAK, QVPAK, QSPAK, QIPAK, FORMPAK, ROUNDPAK, SURFPK and FORMTRACEPAK
- Combination of measured data from all Mitutoyo measuring machines
- Clear tables, graphs and evaluations
- Availability of test equipment control and monitoring and test-equipment capability checks using an add-on module

Request the separate MeasurLink brochure with more detailed information.
Anyone who performs precision work needs a partner with sharp vision. Not only in the development and supply of the ideal measuring system, but also beforehand and afterwards – with advice and service. As a manufacturer of measuring machines with the world’s broadest range of products and over seven decades of experience, Mitutoyo has a particularly refined range of services. For absolute customer satisfaction, long before and for a long time after the decision to purchase.

Advice

Depending on your requirements, you can define, in close dialogue with the Mitutoyo specialist consultants, the machine or system selection to fit your specific measuring tasks – either standard or special tailor-made solutions in the context of the revolutionary M3 solution concept from Mitutoyo.

Service

Only seamless service will give you the assurance that you can be sure that you have made the right choice with Mitutoyo – and give us the assurance of being able to satisfy your needs completely, well into the future. That is why we make continuous and comprehensive investments in expanding our already outstanding range of services. Because that, at the end of the day, is the standard against which you will measure your machine suppliers. After all, technical perfection goes without saying – at least from Mitutoyo.

Something else your partners will need to measure up to: Competent advice and service.
When you purchase Coordinate Measuring Machines from Mitutoyo, you are drawing on the outstanding experience and expertise of the world’s leading specialist in production measurement technology. You will also be drawing on decades of knowledge for the tasks of tomorrow. Setting the highest standards for quality, performance and progressive technology.