Mitutoyo

Mitutoyo Quality

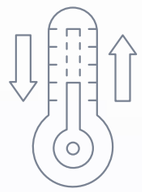
Shop-floor Type
CNC Coordinate Measuring Machine
MiSTAR series

Coordinate Measuring Machines

Catalog No.E16028(4)

Precision measurement for any shop floor.

The new standard for CNC coordinate measuring machines, carrying the future of quality control.



Guaranteed accuracy

in the on-site environment temperature range

Guarantees measurement accuracy in the on-site environment (10° to 40°C). In addition, real-time temperature compensation minimizes errors due to temperature changes. Allows you to start measuring workpieces immediately after processing them without temperature stabilization.

Environment resistant

An environment-resistant absolute scale prevents errors even if oil adheres to the scale surface. Even in environments with airborne oil mist, measurement accuracy deterioration is minimal, reducing the need for frequent maintenance.

Highly efficient

High-speed and high-acceleration drive shortens the total measurement time. Allows immediate measurement by simply placing the workpiece, with a touch panel enabling intuitive operation. A variety of optional services are also available for improved measurement efficiency.

CNC coordinate measuring machine for any installation environment

MiSTAR series

Scan to watch a movie.

Environment

Making 3D measurements in shop-floor environments possible.

Uses an environment-resistant absolute scale that withstands contamination, such as oil mist, and a linear guide structure.
High reliability as a result of real-time temperature compensation technology that guarantees accuracy over a wide temperature range.
Delivers maximum permissible length measurement error of $E_{0,MPE}$ (2.2+3L / 1000) µm[*1].
The MiSTAR series can be installed on a shop floor and operated next to processing machines on production lines.

*1 When used with SP25M in temperature environment 1 (18 °C to 22 °C).

You may have the following concerns...

You want to perform accuracy checks of workpieces immediately after processing them beside the production line. 1 2

You want to introduce a 3D measuring machine without establishing a quality assurance room. 2 3

You want a compact CMM to install in a limited space. 5

The temperature at your shop floor can be 30°C or higher in the summer, raising concern about errors due to thermal expansion. 1 2

You want to reduce running costs related to air conditioning and air supply. 6

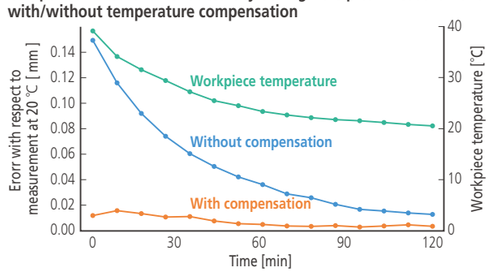
Solved with the MiSTAR series!

It's compact and doesn't take up much space, so we installed and use it beside a production line.
It is efficient because measurements can be performed simultaneously with manufacturing.
It helped us cut costs because there was no need to set up a measuring room and air piping.

1 No requirement for temperature stabilization

Corrects temperatures of the MiSTAR unit and the workpiece in real time, minimizing errors due to temperature changes. Measurement can be started immediately without temperature stabilization, shortening the cycle time.

Comparison measurement accuracy during hole pitch measurement with/without temperature compensation



2 Guaranteed measurement accuracy in the on-site environment temperature range

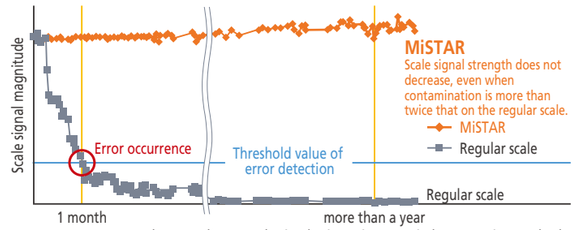
Guarantees measurement accuracy in the on-site environment (10°C to 40°C), enabling high-precision measurement without setting up a dedicated measuring room.

3 Maintains measurement accuracy even when contaminated with oil

Uses an environment-resistant absolute scale that withstands contamination, preventing errors such as miscount even in environments with airborne oil mist. This decreases the requirement for frequent maintenance.

* Number of inquiries for repair for scale miscount since the launch of the MiSTAR series (2019): 0

Results of endurance testing in oil mist environment



Note: These results were obtained using Mitutoyo's in-house testing methods.

4 Precisely chosen measuring table material

The measuring table is made of stone, a material not susceptible to rust. Compared to cast iron, the table is less likely to deform due to heat or deteriorate over time, and can be used for a long time.

5 Compact design with highly flexible installation options

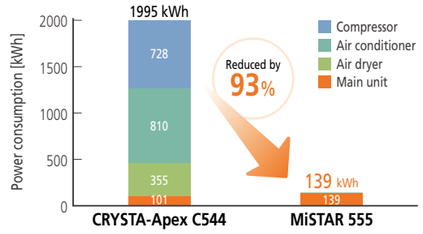
It can be installed with one 100 V power supply and 1.26 m² of space. No need to prepare an air source, giving you greater layout flexibility.

6 Reduced power consumption and lower running costs

Significantly reduces running costs, as there is no need for air conditioning or equipment related to air supply.

Note 1: The operational hours of CMM is 16 h/day (2-shift system/day) and operational day is 20 days/month.
Note 2: Air-conditioning power consumption was calculated under the following condition.
Rated cooling capacity: 2.8 kW, Room: 18 m³, Operating environment according to JIS C 9612 (Preset temperature: 27 ℃ for cooling, 20 ℃ for warming)
Note 3: Compressor power consumption is calculated based on air consumption of 400 L.

Power consumption



Usability

Increased productivity by reducing operators' workload.

The three-sided open architecture as a result of the cantilever structure.
Compared to the portal structure, placing and handling workpieces on the measurement table is noticeably more flexible and easier, enhancing productivity.

You may have the following concerns...

- It is difficult to access the measurement stage and the installation locations are limited. → 1
- Only certain operators can handle measurements. You want measurements to be easy for any operator. → 2 4
- You are concerned if the process can be automated once mass production starts. → 1
- You have many objects to measure. You want to increase efficiency even just a little. → 2
- You want to perform measurement immediately, while pausing the processing machine. → 3

Solved with the MiSTAR series!

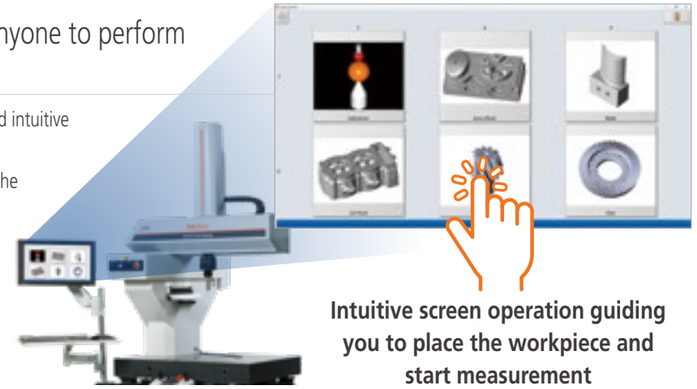
We can handle workpieces from various directions.
The operation is easy, and the time needed for measurement has been significantly reduced.

1 Workpieces can be handled from various directions

Offers significant layout flexibility due to the three-sided open architecture and allows you to place and handle the workpiece from various directions. Easy to link it with peripheral devices such as machine tools and transport robots.

2 One-touch operation allowing anyone to perform measurements easily

A standard feature, Quick Launcher, enables simple and intuitive operation.
Requires you simply to place the workpiece and press the icon to start measurement.
Anyone, even if you are an inexperienced operator, can easily operate it.



Intuitive screen operation guiding you to place the workpiece and start measurement

Easy to start-up for anyone

3 Allows immediate measurement without the need to recover the origin setting

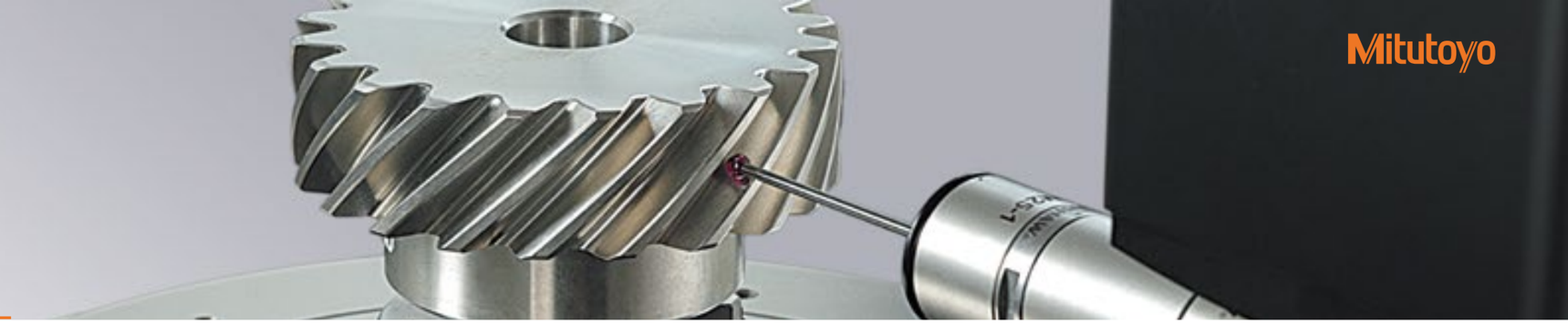
Uses an environment-resistant absolute scale developed in-house.
Reads the absolute position of the scale when the system is powered off and then re-powered on, allowing you to start the measurement from the most recent position of the probe, instead of moving to the home position as in conventional models.

4 The clamping system to support easy fixing of any workpiece (optional)

The flexible clamping system will free you from the hassle of fixing workpieces and setting them on the measuring table.
Regardless of the skill level of the operator, anyone can perform the measurement immediately.

Pallet receiver

Clamping system



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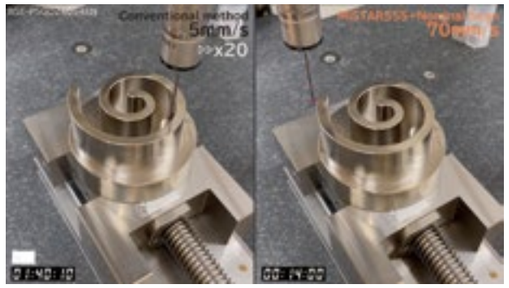
Performance

Nominal scanning improves measurement efficiency with high-speed scanning

Nominal scanning measurement enables high-speed and high-precision scanning measurement even on workpieces with complex shapes, significantly improving measurement efficiency.

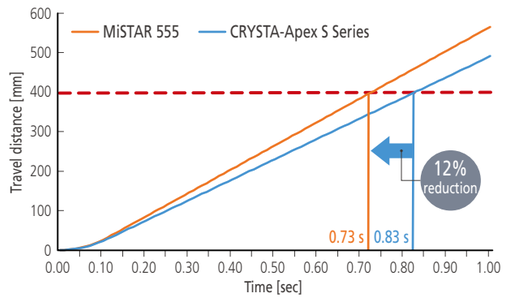
Scan to watch a movie.



High-speed and high-acceleration drive

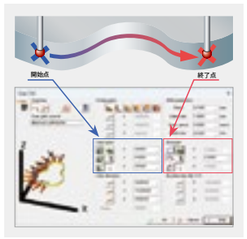
Maximum drive speed of 606 mm/s, maximum drive acceleration of 2695 mm/s².
It moves rapidly from one measuring point to the next, reducing the total measurement time.

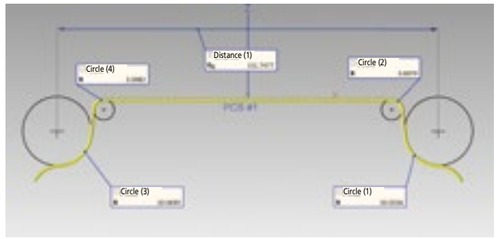
Comparison of drive speed and acceleration



Unknown scanning enables immediate measurement of unknown shapes with no CAD data

Unknown scanning allows you to start contour measurement immediately, even if you don't have CAD data. It is easy to operate and requires only 3 steps: the start point, the endpoint, and the direction of measurement. An easy-to-understand guidance indicates which direction and which way around the measurement is performed. Also allows various dimensional analyses, such as corner R, based on the contour data acquired.



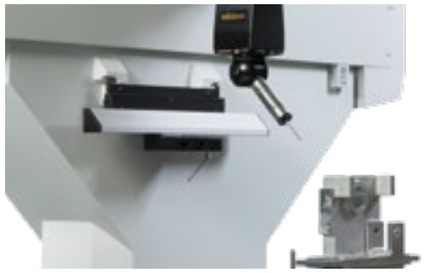


Ideal if you have this situation

You need to measure diagonal holes efficiently

Motorized probe head PH10MQ

Probe head that automatically controls the probe positions. SP25M scanning probe and the TP200 touch probe can be mounted, enhancing the efficiency of complex workpiece measurements.



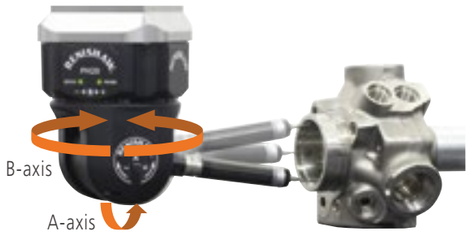
Ideal if you have this situation

You handle many workpieces with complex shapes

PH20 5-axis Control Touch-Trigger System

Allows you to set the positioning at any angle and measure inclined surfaces and holes with narrow frontages and broad bases. The head rotates at high speed to enable high-speed measurement while maintaining high accuracy.

Scan to watch a movie.

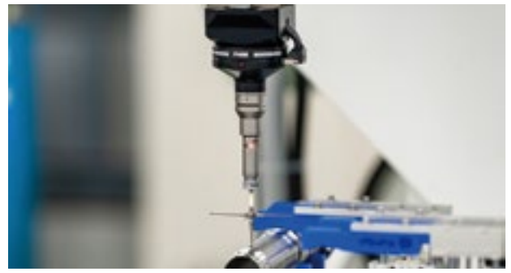


Ideal if you have this situation

You have limited workpieces you can measure

Fixed probe head PH6M

This is a fixed head facing downwards only. You can choose between the SP25M scanning probe and the TP200 touch probe. Suitable for measuring workpieces that do not require changes in probe positions.



Ideal if you have this situation

You need to measure rotating workpieces efficiently

MRT240 Rotary Table System

Efficiently measures rotating workpieces such as gears, cylindrical cams, and impellers. When used in conjunction with a scanning probe, synchronous profile measurement is also supported. Enables the measurements of a wide variety of contour shapes.

Software

Application software that offers both functionality and operability.

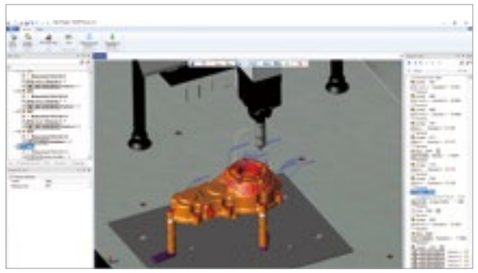
We offer an extensive lineup of application software for generating measurement programs automatically, conducting gear analysis, performing evaluations using CAD and so on.
From simple to complex measurements, these software applications can resolve any measurement issues that our customers may encounter.

Automatic Measurement Program Generation Software for CMMs

MiCAT Planner

Allows you to automatically generate measuring programs from a 3D CAD model. Anyone can easily generate high-quality measurement programs. Significantly improves both the utilization rate of the CMM and the efficiency of measurement work.

Scan to watch a movie.



Generating measurement programs without the operator's expertise.
Significant improvement in the quality and efficiency of inspections.

1 **No experience necessary**

No advanced skills or extensive knowledge required. Anyone can easily generate measurement programs with intuitive operation.

2 **Reduced work hours and improved utilization rate**

Significantly reduces the time required to create measurement programs. Contributes to shortening the work hours of inspection and production flows and improves the utilization rate.

3 **High-quality measurement program**

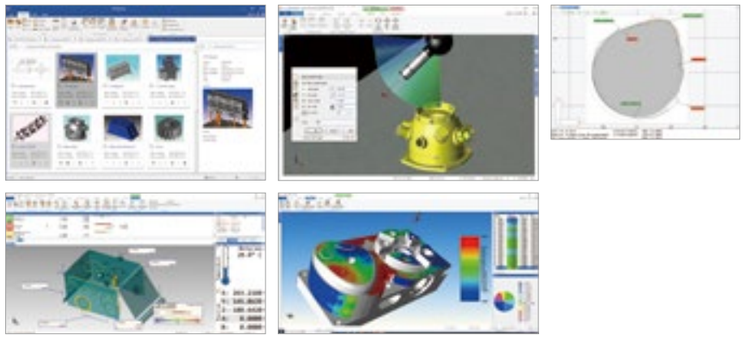
Allows you to develop an optimal measurement procedure that takes into account the overall measurement items, eliminating variations in measurement quality from person to person.

Data Processing Software for CMMs

MCOSMOS

It is a family of data processing programs for CMMs that run on Windows.
With a wide range of optional software, it is compatible with a wide variety of probes and enables fully automated measurement of any workpiece.

Scan for more information.



Various software programs not listed above are also available. For more information, please refer to the MCOSMOS (№16008) catalog.

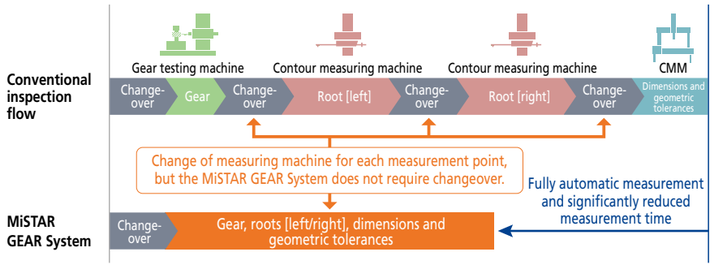
On-site gear measuring machine

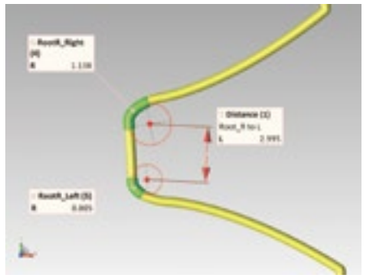
MiSTAR GEAR System

There is no requirement for changeovers due to the combined functions of gear evaluation, dimensional measurement, and geometric tolerance evaluation, greatly improving measurement efficiency.

Eliminates the need for changeovers due to batch measurement of gear evaluation and dimensional and shape evaluation

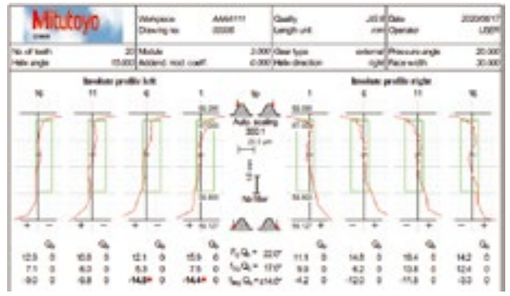
For example, in the case of eAxle gears, the evaluation of the roots is essential to prevent breakage due to the high torque load.
The MiSTAR GEAR System enables measurements of the gears, dimensions, and root shape with a single unit without changeovers, significantly reducing the measurement time and worker-hours.

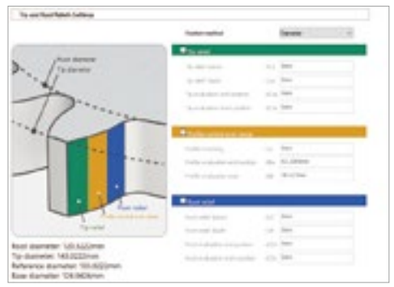




Intuitive operation

- A 3D model is created based on the gear specifications entered, allowing you to visually check whether the measurement will be conducted as expected.
- Automated measurement program generation and the measurement guidance display allow you to set the coordinate system quickly and easily.
- Measurement results and tolerance judgments are displayed in real-time, enabling early detection of abnormalities.

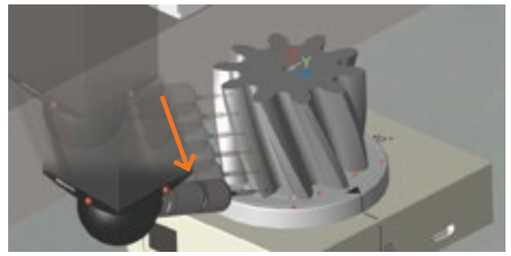




High-speed scanning using the 4-axis nominal scanning

Scanning will be even faster by "4-axis nominal scanning"*1. Measurement time can be reduced by up to 50%*2 compared to the previous models. Furthermore, "Batch Tooth Profile Scanning" enables non-stop measurement and evaluation of all tooth profiles, pitches, tips, and roots, thereby improving measurement efficiency.

*1 A rotary table (optional) is required.
*2 This may differ depending on the gear size and required accuracy.

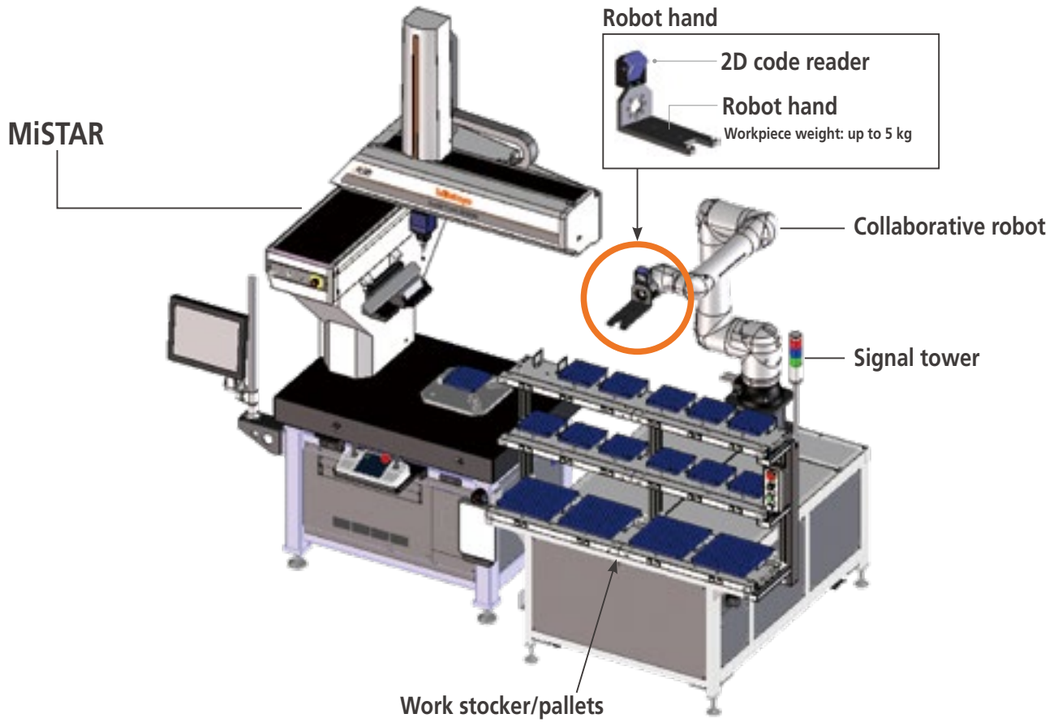


Basic configuration for MiSTAR GEAR System

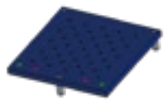
Shop-floor type CNC CMM	MiSTAR series
Rotary table	MRT240, MRT320
Automatic stylus changer	FCR25
Data processing equipment for CMMs	MCOSMOS
Gear measurement and evaluation software	GEARPAK Express
Probe system	PH10MQ, SP25M

MiSTAR Example with Robot and Work Stocker

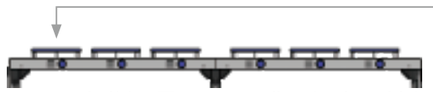
See an example of an automation package that combines MiSTAR with a collaborative robot and a work stocker below.
Mitutoyo offers an automated system that eliminates the need for in-house robot setup and programming.



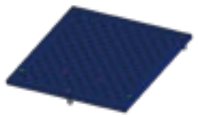
pallet selection according to the workpiece to be measured



Pallet □150 mm



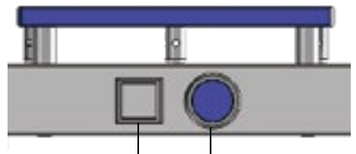
Shelf for □150 mm pallets (6 placeable)



Pallet □250 mm

Shelf for □250 mm pallets (4 placeable)

Work stocker control unit



Lamp to display measurement results
Steady green: All measurement items OK
Steady red: FAIL for any of the measurement items
Flashing red: 2D barcode reading error

SET button
Steady blue: Waiting for measurement
Flashing blue: Measuring
Light off: Measurement ended/ Waiting for SET button operation

Challenges before introduction

Shortage of operators for measurements

Need of operators to always be present

Need to increase the utilization rate

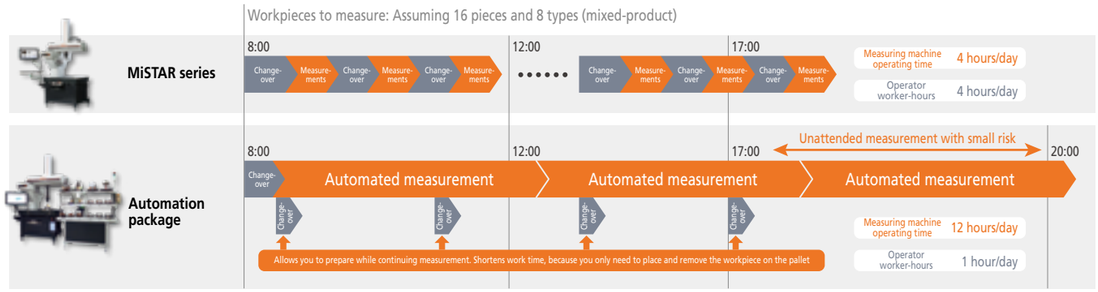
Risk of careless mistakes

Heavy workload of preparation for each measurement

Solving these concerns

- Enables unattended measurement!
- Reduces introduction cost (standard specifications)
- Shortens the time for system start-up!
- No professional skills required!
- No special design required by use of pallets

Significant improvement in work efficiency in mixed-product measurement



Compared to the MiSTAR stand-alone system

Measuring machine utilization rate **Approx. 3 times**

Operator worker-hours **Approx. 1/4**

Easy operation No PC operation required! Simply place the workpiece and press the button!

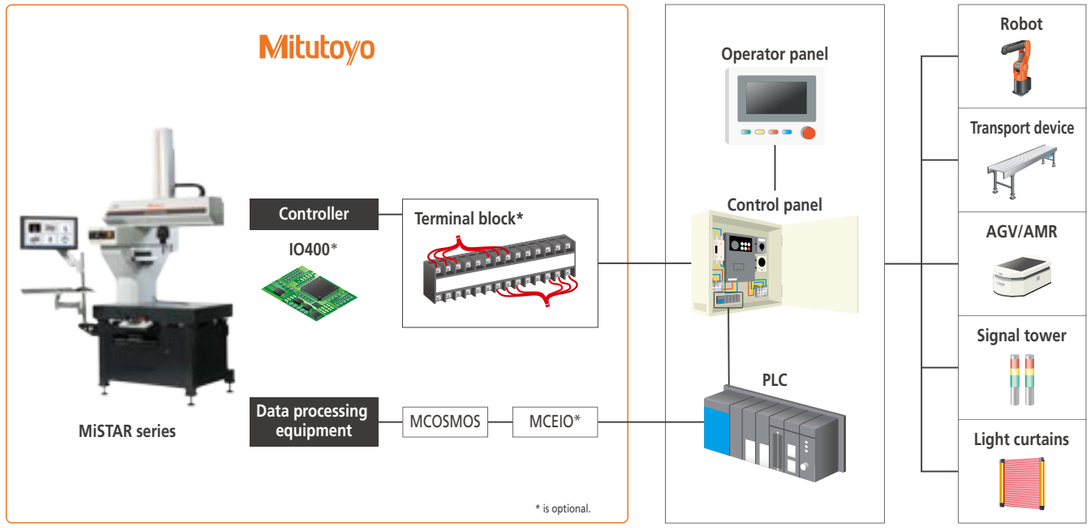
Allows you to prepare for the next measurement while continuing automated measurement, thereby improving the efficiency of operations.
Measurement is also possible after dark, extending the operating time of your CMM.
Compared to the MiSTAR stand-alone system, the utilization rate of the measuring machine is about 3 times higher, while the operator's worker-hours are about 1/4.
Furthermore, operation is easy by simply placing the workpiece on the table and pressing a button.
There is no need for PC work, reducing the workload of operators.

Factory Automation

Easy to build automation.

Equipped with the IO400, the MiSTAR series can be easily connected to external control devices.
Allows system expansion without major changes to production lines or systems when needed, such as when automation is introduced in the future.

Expandability in the future, affinity with external equipment



External devices, such as transport devices, signal towers, and safety devices, which were previously custom-designed for each customer, have now become semi-standard specifications.
These can be easily connected by simply adding a board to be incorporated into the control device, if you need to work with automation and limited labor in the future.
They can be added to the machine even after delivery. The MiSTAR series also supports communication with PLCs of various manufacturers.

Usage examples by customers

Building an automatic production line with over 80% worker-hours reduction! How did they do it?

Kosei Plant Factory, Shimabara City, Nagasaki Prefecture

Kosei Plant Factory manufactures high-precision parts for various industrial equipment using composite lathes, and is highly evaluated by manufacturers of semiconductor-manufacturing equipment. The company worked to meet the growing number of orders and realized complete-lot measurement after processing, providing an example of automation utilizing the MiSTAR 555.

Scan for more information.

Smart Factory

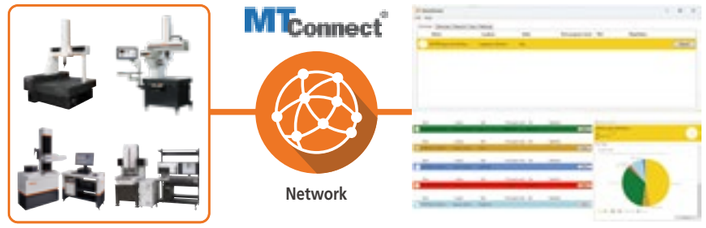
Realizing a smart factory by "visualization."

Multiple CMMs can be monitored in real-time from the network, reducing the work of grasping the operating status and managing measuring machines.
Collected data on measuring machines will be used for preventive maintenance, building a system that does not stop.

Monitoring and logging of measuring machine operational status

Status Monitor

Monitors the operating status of the CMM (standby, automated measurement, error occurrence, etc.). Other measuring machines connected to the network can also be monitored simultaneously. "Visualizing the operational status" allows you to reduce waste and improve the operating ratio of your production facilities.

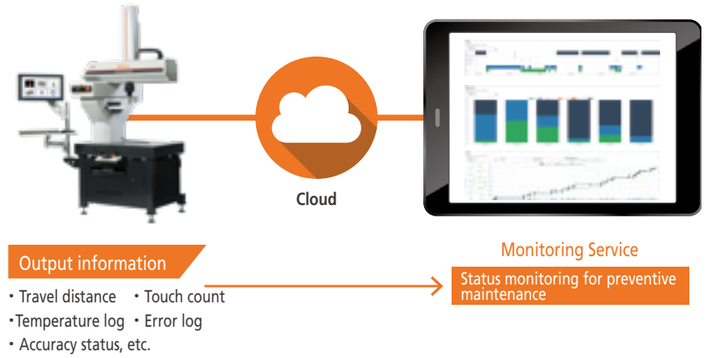


Maintains the reliability of measuring machines through status monitoring

Monitoring Service

* Provided under the Ultimate Contract or Visualization Service.

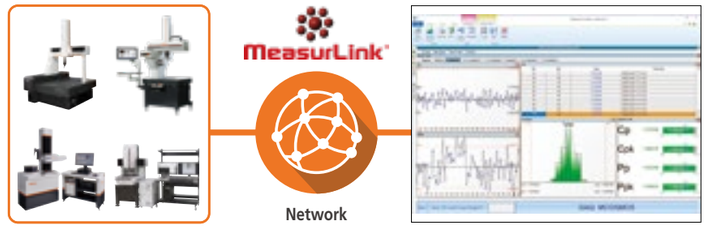
By collecting and accumulating the travel distance of each axis, the probe touch count, and the accuracy status of the measuring machine in the cloud, "visualization of status" and "equipment that does not stop" through preventive maintenance can be realized.



Process management based on measurement data collection and analysis

MeasurLink

MeasurLink realizes "visualization of quality" by real-time statistical processing of measurement data. It will help you enhance quality control with various functions including data logging, measuring machine management, and Gage R&R.



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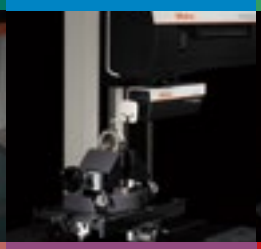
Coordinate Measuring Machines

Vision Measuring Systems

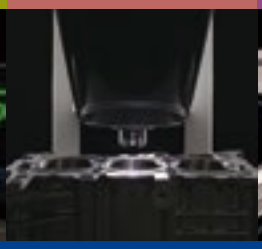
Form Measurement



Optical Measuring

Sensor Systems

Test Equipment



Digital Scale and DRO Systems

Small Tool Instruments and Data Management

Whatever your challenges are, Mitutoyo supports you from start to finish.

Mitutoyo is not only a manufacturer of top quality measuring products but one that also offers qualified support for the lifetime of the equipment, backed up by comprehensive services that ensure your staff can make the very best use of the investment.

Apart from the basics of calibration and repair, Mitutoyo offers product and metrology training, as well as IT support for the sophisticated software used in modern measuring technology. We can also design, build, test and deliver measuring solutions and even, if deemed cost-effective, take your critical measurement challenges in-house on a sub-contract basis.

Find additional product literature and our product catalogue

https://www.mitutoyo.co.jp/global.html

Notes on Export Regulations:
Do not commit an act, which could directly or indirectly, violate any law or regulation of Japan, your country or any other international treaty, relating to the export or re-export of any commodities.

Mitutoyo

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