

Equator™ gauging systems

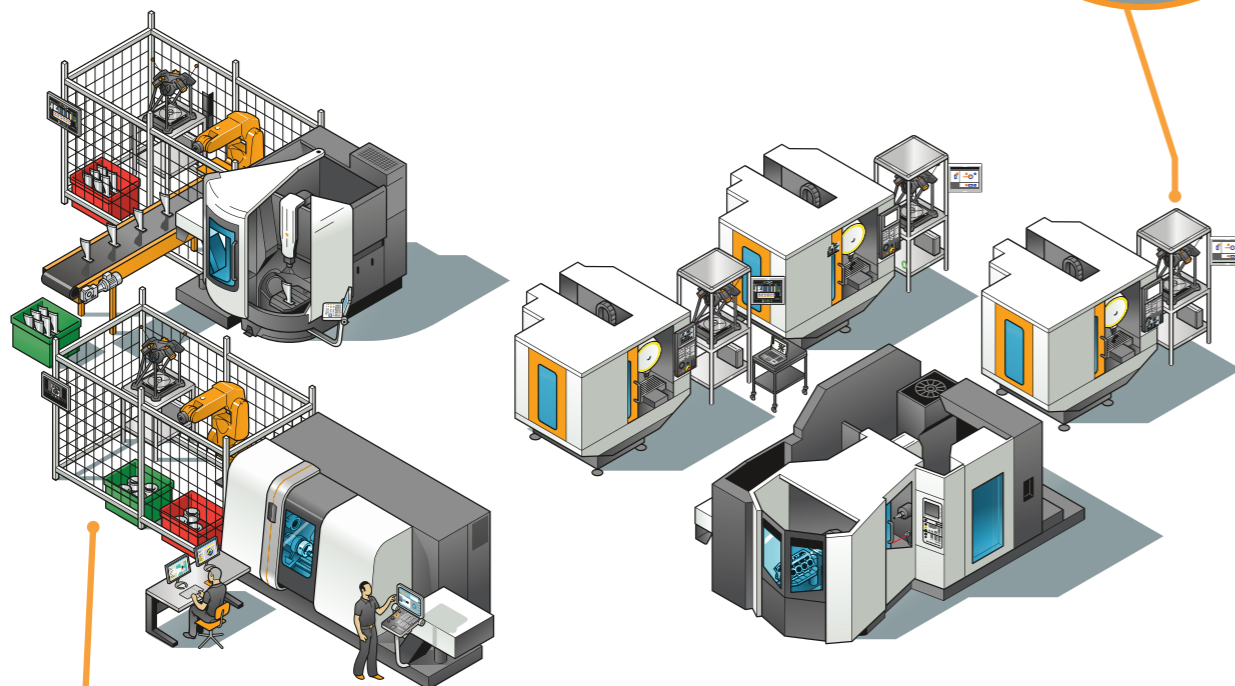
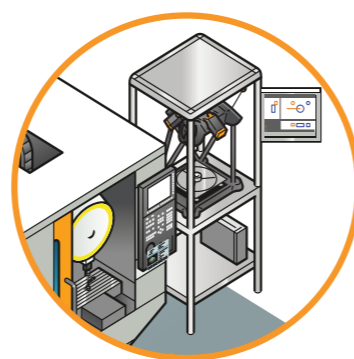


The role of Equator™ gauging systems on the shop floor

To control manufacturing processes, gauges, for example sets of callipers, go / no-go gauges or bore gauges, have been used for decades. The Equator system is a flexible gauge, designed to provide speed, repeatability and ease of use for manual or automated applications on the shop floor.

As a standalone gauging system

- Allows in-process corrections to be made manually or automatically after key manufacturing operations
- Allows increased frequency of inspection, and rapid reaction to process variation
- Provides quality assurance during manufacture, increasing confidence in final part quality
- Both simple and complex measurements are achievable on a single device



As part of an automated cell

- Delivers all the benefits of a standalone Equator gauging system
- Connection to robots and controllers eliminates human error and boosts throughput
- Offset feedback can be sent directly to machine tool controllers
- Parts can be automatically sorted based on whether they pass or fail inspection

Benefits of Equator™ gauging systems

Improve process control

- Apply automatic machine tool updates using IPC software, e.g. to correct the effects of tool wear
- Make part-to-part inspection results instantly visible using the built-in Process Monitor graph
- Understand manufacturing process capability and improve throughput of known good parts

Maintain accuracy on the shop floor

- Measure confidently in machine shop environments
- Systems can operate from 5 - 50 °C and up to 80% humidity
- Cope with thermal variation by re-zeroing the system

Reduce inspection costs

- Replace multiple hard gauges
- Remove ongoing calibration costs
- Inspect different parts with one device

Simple to use

- Minimal training required for operators
- Run complex gauging routines at a touch of a button
- Use bar code readers for automatic program selection

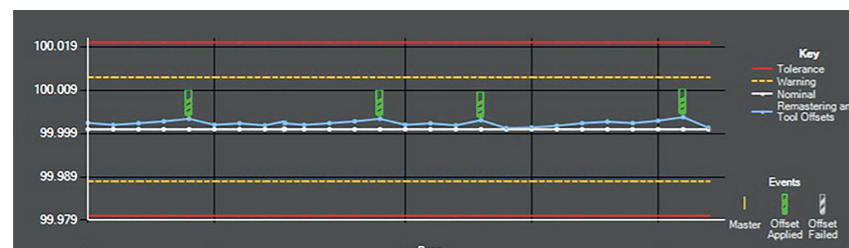


Our customer has done its own inspection of incoming goods, checking against our reported values, and have been thrilled. They have not encountered this level of quality from other suppliers.

PEAK (Germany)

Process control

The Equator™ gauging system has built-in software that can connect directly to CNC controllers. There is a range of options for feeding back offsets and corrections to the process, including the ability to set warning limits so that action is taken before parts are made out of tolerance. Measurement results and process corrections are displayed instantly on a run chart, which shows trends and production history.



Process Monitor run chart showing CNC updates

Update multiple machines

Update several machines on a per feature basis, and feed back to multiple tools. This enables control of multiple manufacturing operations with one gauging cycle.

Manage tool life

Better understand the life of your cutting tools, and set user-defined tool wear warning limits. Sister tooling is supported.

Control processes

Measure size, position and 3D geometry data at the point of manufacture to update offsets and improve process capability. Measurements from multiple parts can be averaged to reduce variation.



For our machining cell, there is no other cost-effective, shop-floor measuring tool comparable, ... with post process measurement and automatic tool compensation. Measuring results from the Equator ... offset the tools when the part deviates from tolerance. Equator's speed allows it to easily keep pace with the process.

Conroe (USA)

System integration within automated cells



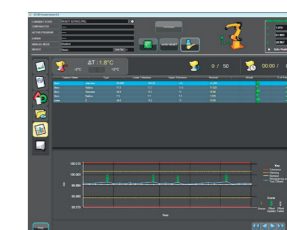
Automation hardware

The EQ-IO input / output units allow the Equator gauge to connect to a variety of equipment in an automated cell with up to 32 digital IO connections.



Automation software

EZ-IO software simplifies setup of automated manufacturing cells to configure communications between Equator systems and the cell controller.



Intelligent process control

Using IPC (intelligent process control) software for Equator gauges, inspection data is used to make automatic correction to machine tool offsets.



Equator gauging system

Operate in a lights-out cell with confidence. Load / unload when needed, automatically apply machine tool updates and have access to instantly visible results, all at machine-side.

Automatic transfer system

The Equator automatic transfer system allows parts to be automatically transferred in and out, using prompts in the gauging program software.



Equator™ gauging systems family

The Equator gauging family includes four highly repeatable, thermally insensitive and programmable inspection devices.

Both the Equator 300 gauge and Equator 500 gauge are available in standard or extended heights. With an exceptional footprint-to-measuring-volume ratio, and $\pm 2 \mu\text{m}$ uncertainty over a $5^\circ\text{C} - 50^\circ\text{C}$ temperature range, the Equator gauging family is perfectly suited to inspecting parts right where they are produced; on the shop floor.



Equator™ 300

- Working volume XY: $\varnothing 300 \text{ mm}$, Z: 150 mm
- Comparison uncertainty: $\pm 2 \mu\text{m}$
- Operating temperature: $+5^\circ\text{C}$ to $+50^\circ\text{C}$
- Maximum workpiece weight: 25 kg



Equator™ 300 Extended Height

- Working volume raised by 150 mm (Z)
- Allows for better access for mechanical loading systems.
- Extended working volume in Z with module changing



Equator™ 500

- Working volume XY: $\varnothing 500 \text{ mm}$, Z: 250 mm
- Comparison uncertainty: $\pm 2 \mu\text{m}$
- Operating temperature: $+5^\circ\text{C}$ to $+50^\circ\text{C}$
- Maximum workpiece weight: 100 kg



Equator™ 500 Extended Height

- Working volume raised by 150 mm (Z)
- Allows for better access for mechanical loading systems.
- Extended working volume in Z with module changing



Equator™ gauging system components



EQR-6 stylus changing rack

The Equator gauge is supplied with an EQR-6 auto change rack facilitating up to six tools which automatically change retaining full repeatability.

SP25 probe kit

Equator scanning systems are supplied with the industry standard SP25 3-axis analogue scanning probe.



Fixture plates

The Equator and Equator Extended Height gauging systems include either M8, M6 or 1/4"-20 plates based on customer requirements. Additional fixture plates for different parts, mastering or calibration can be ordered as accessories.

Stop button and Joystick

The stop button is an alternative configuration to the joystick. It is easily attached to the front of the Equator gauge.

Equator Button Interface

The Equator Button Interface, with simple push-button controls for the shop-floor operators, removes the need for a mouse and keyboard.

Equator Controller

The Equator Controller is a versatile machine controller capable of driving the Equator gauge at high speed and with high repeatability.

Accessories



Enclosures

The Equator™ enclosure provides a self-contained gauging station with an optimised footprint, configurable to individual customer requirements.



Automated transfer systems

Available for the Equator 300 and Equator 500 gauging systems, the Equator automatic transfer system (EQ-ATS) increases accessibility for loading parts. Using the EQ-ATS, parts are automatically transferred in and out of the gauge.



Equator gauge checking kit

The Equator Gauge Checker can be used to validate that the system is working to its manufactured specification. Equator Gauge Checkers are easy to integrate into maintenance schedules and enable a quick health-check to be performed.



Modular fixturing kits

The modular fixturing range for the Equator gauge offers specifically designed grid fixture plates with a repeatable and secure 3-point kinematic system for quick part loading and unloading.



Styli kits

Styli storage kits contain styli most commonly used by Equator gauge users and are available in three versions, at package prices lower than the sum of the contents.



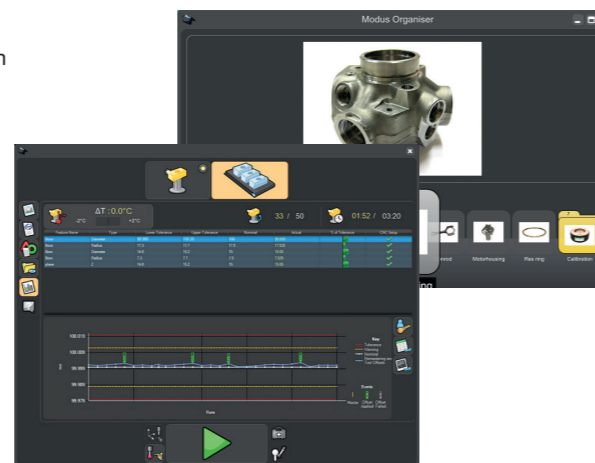
Fixture plate spacers

Available for both Equator 300 and 500 gauging systems, the fixture plate spacer raises the kinematic location of the fixture plate – ideal if gauging shallow parts or using short styli.

Software

Organiser™ shopfloor operator software

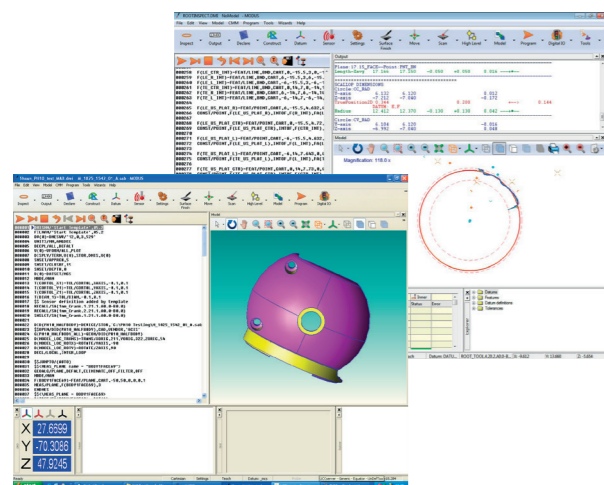
- Intuitive software featuring image-driven program selection, execution and data reporting
- Parts identified by images, part numbers or bar code scanner
- Remaining inspection time and Pass or Fail outcome displayed
- Process Monitor tracks run performance indicating process drift



// Organiser software is the perfect way to run Equator™ gauge on the shop floor, it is so simple and useful. The operators are able to choose programs and start checking the parts in a few seconds. //

Eponsa (Spain)

MODUS™ metrology software



- Rapidly create gauging routines for a wide range of parts
- Easily program scanning or touch measurements on the Equator gauge
- CAD-driven offline programming, supporting IGES, STEP, Parasolid® & VDA-FS formats
- Integration with CATIA® (v4 & v5), Siemens® NX™, Pro/E® and Solidworks® CAD/CAM solutions
- Native DMIS support
- Full motion simulation and collision detection
- Powerful text and graphical reporting
- Flexible data output, including certified Q-DAS

// When we installed the Equator gauge, we were able to measure all the features, including diameter, in the production cell and it was no longer necessary to take parts to the quality room. //

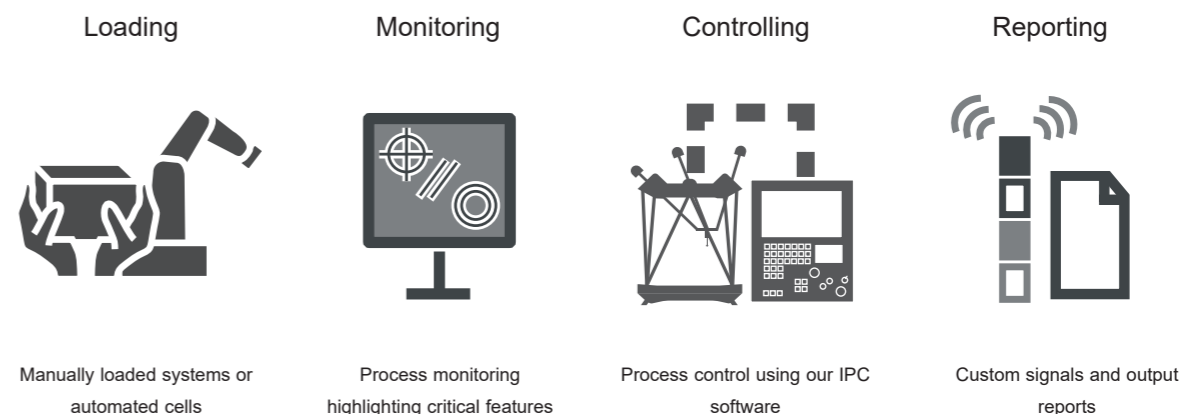
Tremec (Mexico)

Process control with gauging from Renishaw

Turnkey applications

Our skilled application engineers are able to deliver the exact gauging solution for your requirements, including turnkey applications providing fixturing, part programs and gauge repeatability and reproducibility (GR&R) studies.

Our applications engineers can also identify and help to implement solutions tailored to individual needs:



Service

At Renishaw, we enjoy an excellent reputation for offering strong support to our customers through a network of over 70 wholly-owned service and support offices in 35 countries.



About Renishaw

Renishaw is an established world leader in engineering technologies, with a strong history of innovation in product development and manufacturing. Since its formation in 1973, the company has supplied leading-edge products that increase process productivity, improve product quality and deliver cost-effective automation solutions.

A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Products include:

- Additive manufacturing and vacuum casting technologies for design, prototyping, and production applications
- Dental CAD/CAM scanning systems and supply of dental structures
- Encoder systems for high-accuracy linear, angle and rotary position feedback
- Fixturing for CMMs (co-ordinate measuring machines) and gauging systems
- Gauging systems for comparative measurement of machined parts
- High-speed laser measurement and surveying systems for use in extreme environments
- Laser and ballbar systems for performance measurement and calibration of machines
- Medical devices for neurosurgical applications
- Probe systems and software for job set-up, tool setting and inspection on CNC machine tools
- Raman spectroscopy systems for non-destructive material analysis
- Sensor systems and software for measurement on CMMs
- Styli for CMM and machine tool probe applications

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