Equator™ gauging systems

Renishaw's Equator gauging systems provide speed, repeatability and ease of use for manual and automated applications on the shop floor. Its versatility, flexibility and thermal insensitivity deliver high-speed comparative gauging for inspection of medium to high-volume manufactured parts.

The role of Equator™ gauging systems on the shop floor

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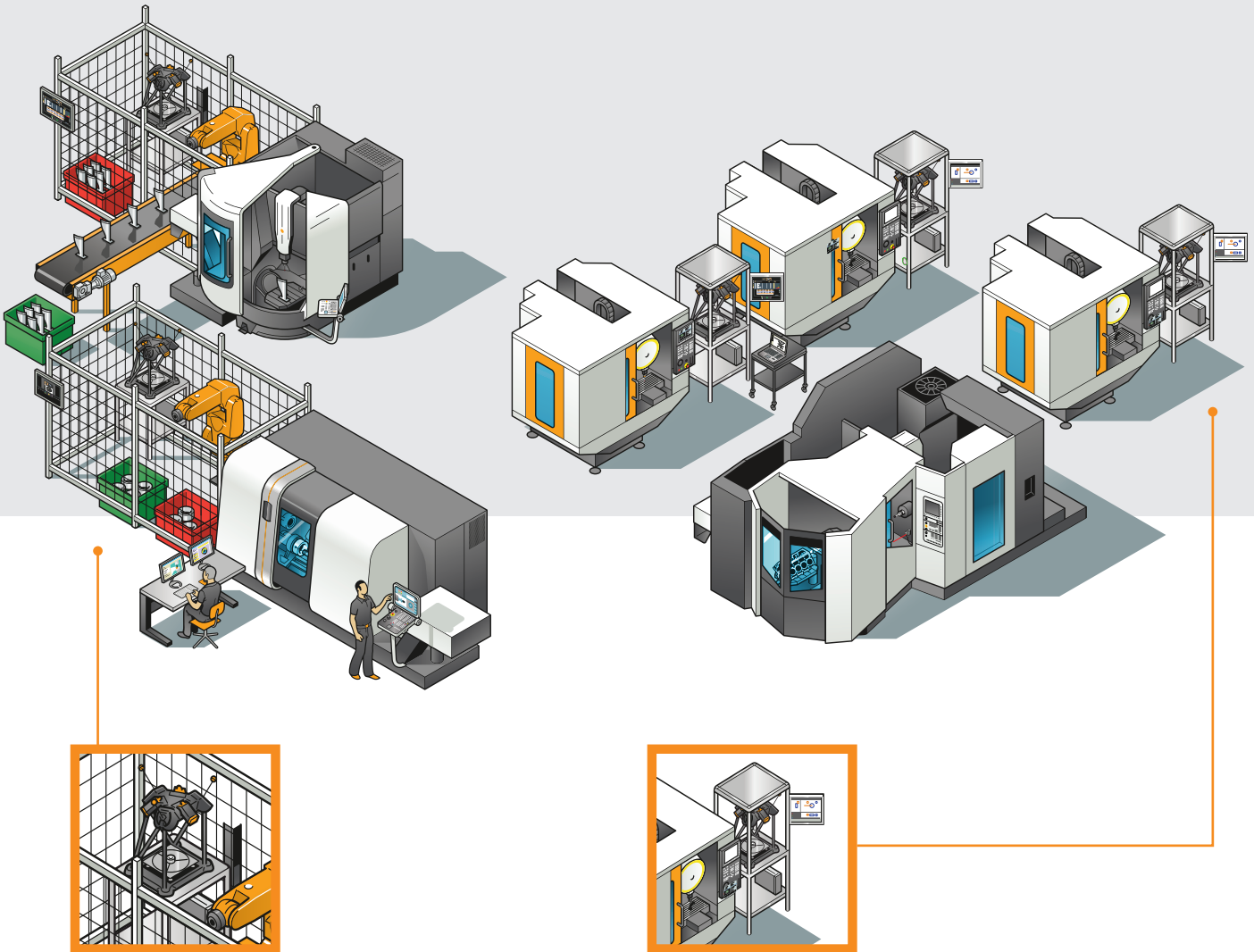
As part of an automated cell

- 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 the machine tool controllers
- Parts can be automatically sorted based on whether they pass or fail inspection

As a standalone gauging system

- Measurement of all critical features is achievable on a single device
- 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

Benefits of Equator gauging systems

Improve process control

With the help of additional IPC software, the Equator gauging systems have the ability to apply automatic offset updates, compensating for common causes of process instability, such as tool wear and thermal drift. Its built-in Process Monitor software makes part-to-part inspection results instantly visible via a status monitor bar graph and feature table.

Reduce inspection costs

The Equator gauging systems can be programmed to inspect multiple different parts, replacing the need for multiple hard gauges and removing the ongoing calibration costs.

Maintain accuracy on the shop floor

The Equator gauging systems can operate in temperatures from 5 - 50 °C and up to 80% humidity, offering inspection confidence on the shop floor. Thermal variation can be addressed by re-zeroing the system.

Minimal training required for operators

The Equator gauging systems are equipped with bar code readers for automatic program selection, allowing operators to run complex gauging routines at the touch of a button.

" 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 systems built-in Process Monitor software can connect directly to the 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 out of tolerance parts are made. Measurement results and process corrections are displayed instantly on a run chart, which shows trends and production history.
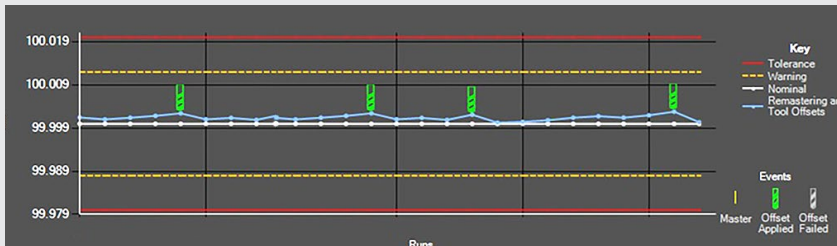
Process Monitor run chart showing CNC updates

> " 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)**

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.
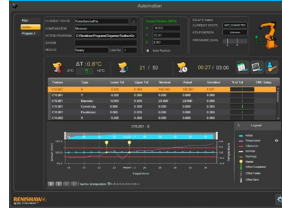
System integration within automated cells
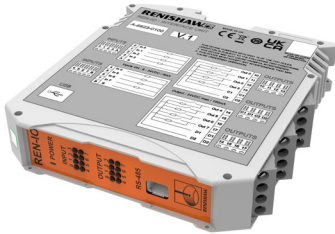
Automation hardware

The REN-IO units with its input and output capabilities 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 (IPC)

Using IPC software for Equator gauges, inspection data is used to make automatic correction to machine tool offsets.

Equator™ gauging systems

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

Automatic Transfer System (ATS)

The Equator ATS 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 ±2 µm uncertainty over a 5 °C - 50 °C temperature range, the Equator gauging family is perfectly suited to inspecting parts right where they are produced; on the shop floor.
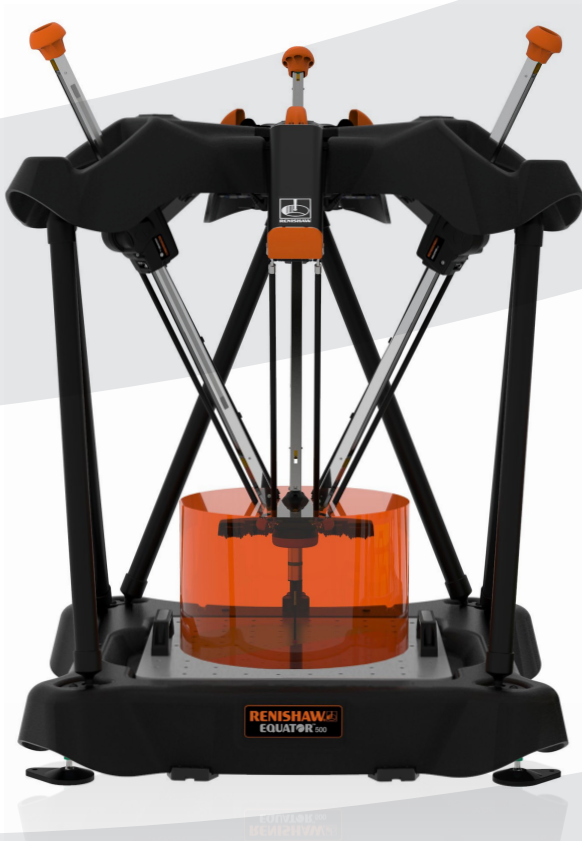
Equator 300

- Working volume XY: Ø 300 mm, Z: 150 mm
- Comparison uncertainty: ±2 µm
- Operating temperature: +5 °C to +50 °C
- Maximum workpiece weight: 25 kg

Equator 300 Extended Height

- Working volume raised by 150 mm (Z), XY: Ø 300 mm, Z: 300 mm
- Allows for better access for mechanical loading systems.
- Extended working volume in Z with use of module changing

Equator 500

- Working volume XY: Ø 500 mm, Z: 250 mm
- Comparison uncertainty: ±2 µm
- Operating temperature: +5 °C to +50 °C
- Maximum workpiece weight: 100 kg

Equator 500 Extended Height

- Working volume raised by 150 mm (Z), XY: Ø 500 mm, Z: 400 mm
- Allows for better access for mechanical loading systems.
- Extended working volume in Z with module changing

Equator™ gauging systems 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.

Equator controller

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

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 when a joystick is not required. It is easily attached to the front of the Equator gauge. The joystick is used to move the probe in x, y and z when the Equator gauge is in manual mode.

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.

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 kits contain styli most commonly used by Equator gauge users and are available in three versions, are available in three versions with each one designed to offer a storage solution for up to six assembled stylus tools.

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.
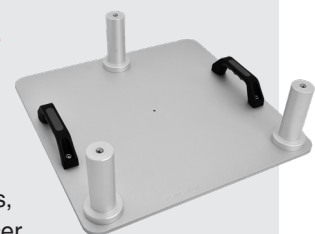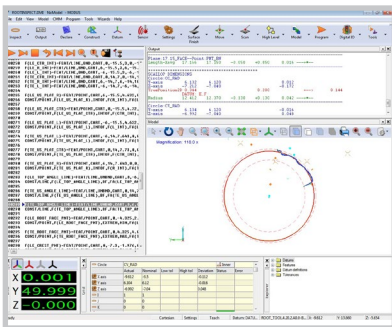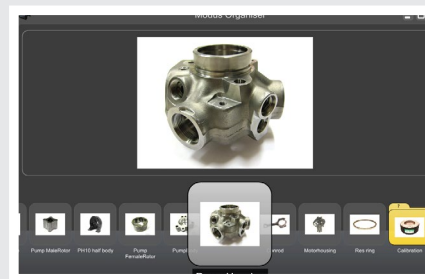
Software

Organiser™ shop floor 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)
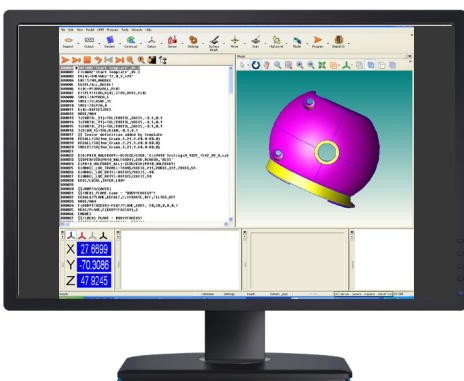
Process control with gauging from Renishaw

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:

Loading

Manually loaded systems or automated cells

Monitoring

Process monitoring highlighting critical features

Controlling

Process control using our IPC software

Reporting

Custom signals and output reports

Service

Renishaw have developed 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.

Technical assistance

We supply technical assistance to all our global customers

Support and upgrades

We provide a variety of support agreements tailored to your individual needs

Training

We offer standard and bespoke training courses to meet your requirements

Spares and accessories

Buy spares and accessories online or obtain quotes from your local Renishaw office
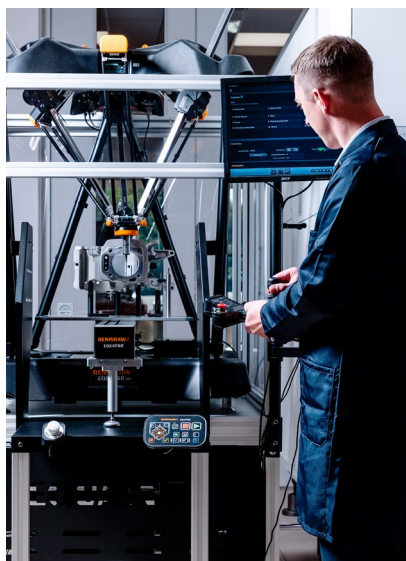
A history of innovation

Renishaw is an established world leader in engineering technologies with a strong history of innovation in product development and manufacturing. Our metrology leadership and our reputation for engineering excellence have put us at the forefront of our markets since 1973.

We design, develop, and deliver solutions and leading-edge products that help manufacturers maximise production output, significantly reduce the time taken to produce and inspect components, and keep their machines running reliably.

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

Our smart manufacturing solutions

- Probing and measurement systems for automated machining
- Machine diagnostics and preventative maintenance
- 3D scanning on machine tools
- Styli, metrology fixtures, racks and accessories