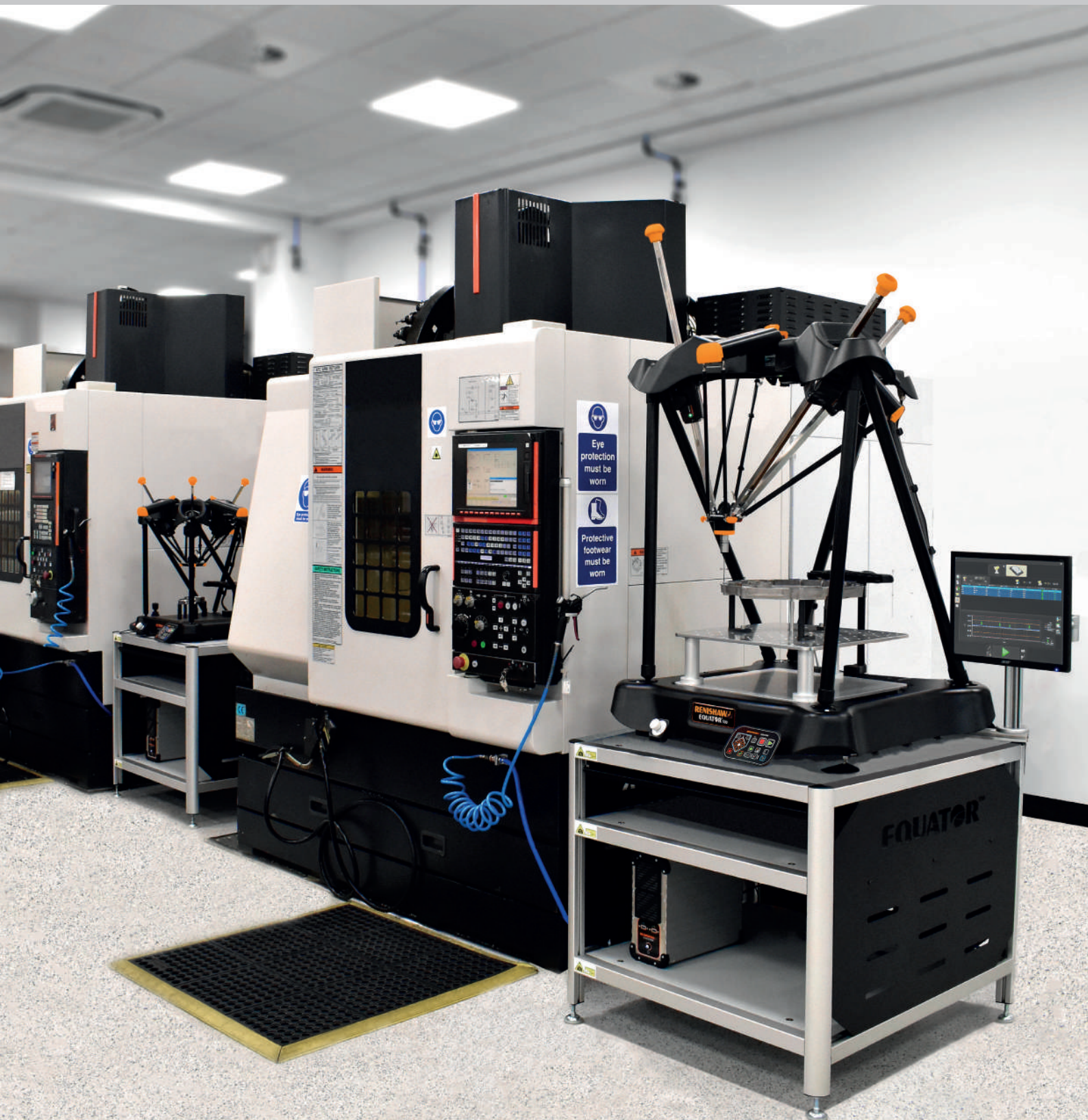


# Equator™ gauging systems



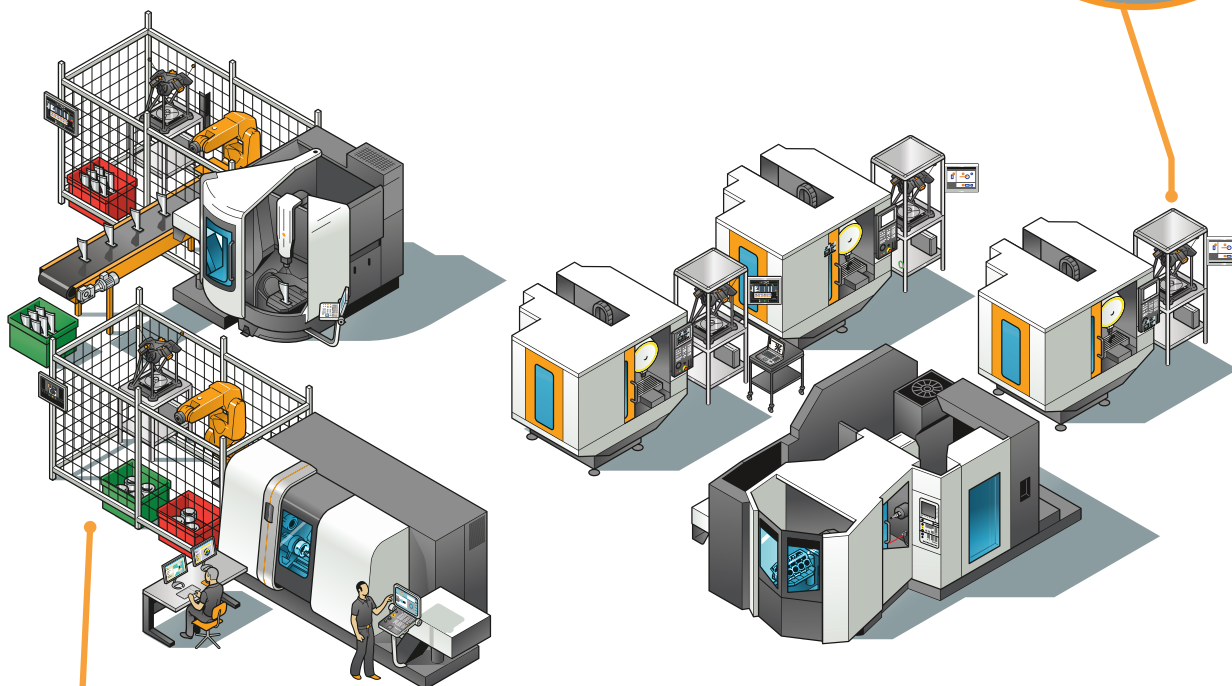


## The role of Equator™ gauging systems on the shop floor

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



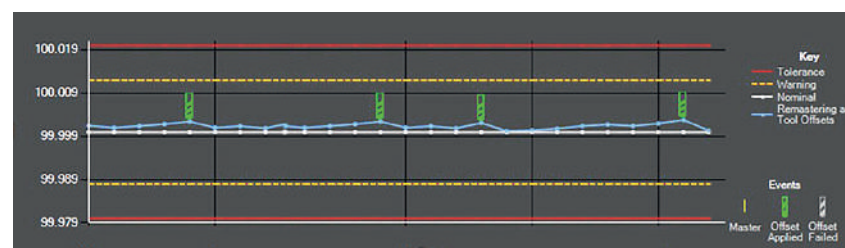
Our customer has done its own inspection of incoming goods, checking against our reported values, and have been thrilled. They have not encountered this level of quality from other suppliers.

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



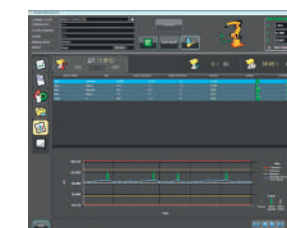
### Automation hardware

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



### Equator™ 300 Extended Height

- Working volume raised by  $150 \text{ mm}$  (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:  $250 \text{ mm}$
- Comparison uncertainty:  $\pm 2 \mu\text{m}$
- Operating temperature:  $+5^\circ\text{C}$  to  $+50^\circ\text{C}$
- Maximum workpiece weight:  $100 \text{ kg}$



### Equator™ 500 Extended Height

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





## Equator™ gauging system components



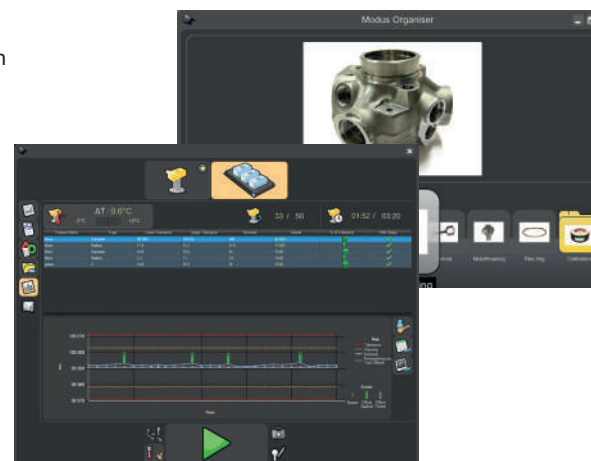
## Accessories



## 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. //

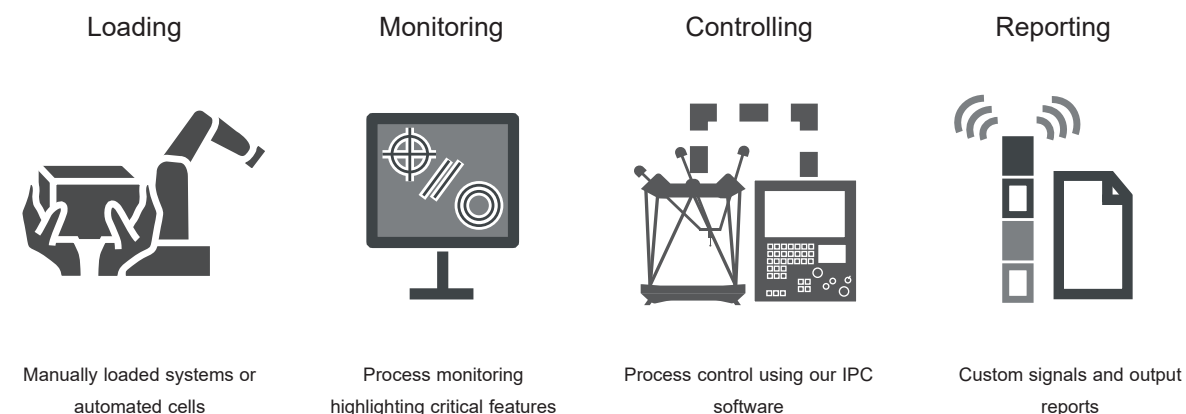
Eponsa (Spain)

## Process control with gauging from Renishaw

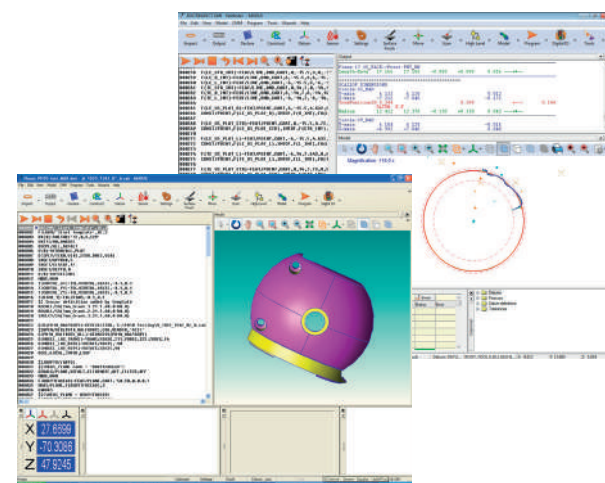
### Turnkey applications

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:



### MODUS™ metrology software



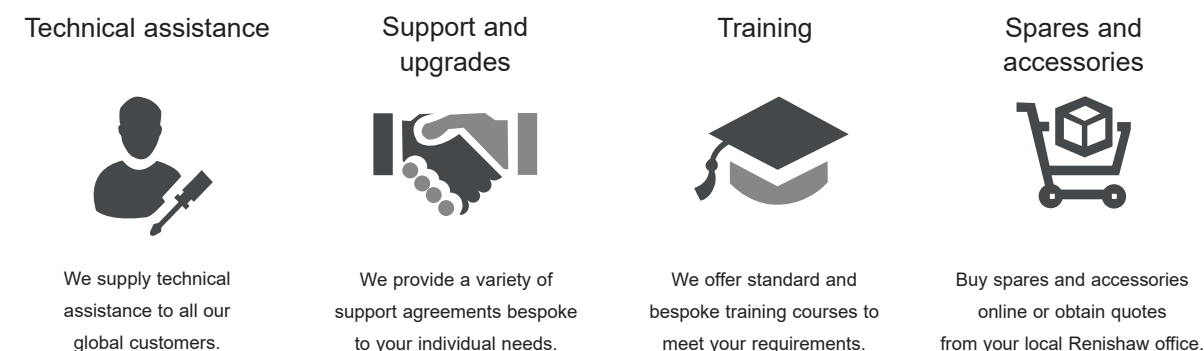
- Rapidly create gauging routines for a wide range of parts
- Easily program scanning or touch measurements on the Equator gauge
- CAD-driven offline programming, supporting IGES, STEP, Parasolid® & VDA-FS formats
- Integration with CATIA® (v4 & v5), Siemens® NX™, Pro/E® and Solidworks® CAD/CAM solutions
- 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)

## 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

For worldwide contact details, visit [www.renishaw.com/contact](http://www.renishaw.com/contact)



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H - 5504 - 8200 - 09

Part no.: H-5504-8200-09-B  
Issued: 07.2018