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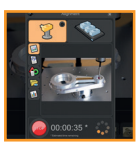
Equator™ versatile gauge with MODUS™ software

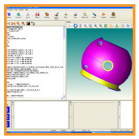
Process control

Use feature measurement history to control processes at all temperatures



Ease of use

Simple shop-floor operation and flexibility to switch parts and designs



Speed

Fast scanning and rapid touch trigger gauging

What is Equator?

The Equator gauge is a comparator for medium to high volume gauging applications, making it an ideal process control device for continuous part manufacture, or for flexible production of a variety of parts re-occurring as regular batches.

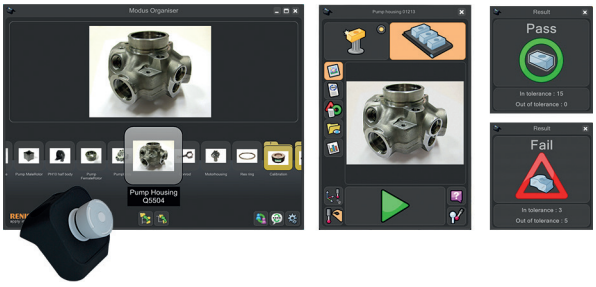
Equator is a robust system designed specifically for the shop floor, proven in hundreds of applications across multiple industries. It can cope with wide changes in temperature, by re-zeroing the system using the principle of mastering.

Equator is:

- Flexible - can gauge multiple parts and copes easily with design changes;
- Fast and automated;
- Low cost of ownership with no calibration required;
- Consistent and not operator dependent - excellent Gauge R&R;
- Thermally insensitive;
- Small machine footprint relative to part size.

Organiser™ – operator system software

Organiser™ is the user-friendly software that shop floor operators use to control the Equator gauging system, with little or no training. A customised user interface is created for each part and inspection is started with just one operation.



Control your process with Process Monitor

Process Monitor shows the history of feature measurements and proportion of tolerance for each feature. It enables shop floor management of the mastering process according to temperature, time or number of parts measured. Data from Equator can be used to update tool offsets, compensating for the effects of tool wear and thermal drift during the machining process.

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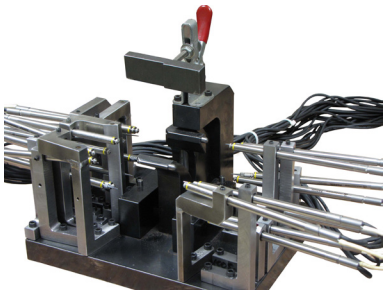
Equator - replace existing gauging



Replace custom gauges

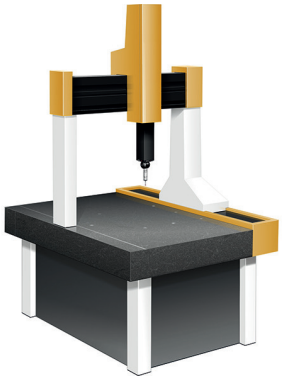
Equator is a radical alternative to traditional dedicated gauging:

- Custom gauges lack flexibility - designed for one part only. Equator can switch programs and fixtures in seconds;
- Custom gauges require many sensors to compute geometry. Equator can rapidly capture geometry by scanning complex features;
- Custom gauges are expensive to make, plus difficult and costly to change. Equator programs can be rapidly altered for design changes.

Replace hand gauges

Equator is an ideal alternative to multiple manual devices such as vernier or digital callipers, micrometres and plug gauges:

- Hand gauges are fast but manual. Equator is often faster and automated;
- Hand gauges can be inconsistent and are operator dependent. Equator has excellent Gauge R&R which can be proven on each part and feature.



Expand CMM inspection capacity on the shop floor

While CMMs are highly accurate, flexible, absolute systems they are only certified in temperature controlled rooms:

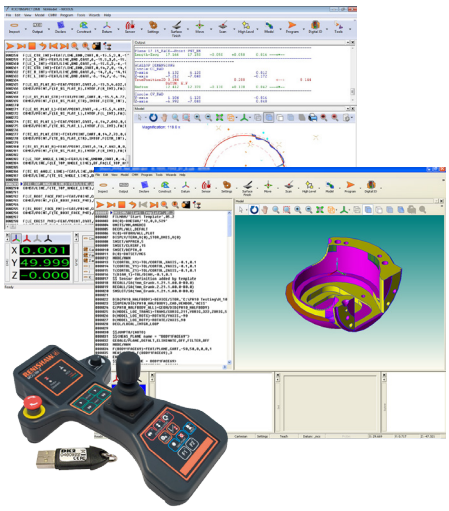
- Equator can cope with rapidly changing temperature differences on the shop floor;
- Equator cost of ownership is low, with no need for periodic calibration;
- Equator has a compact footprint and can be installed on bench tops or in enclosures throughout the shop floor environment.

MODUS™ - easy to programme, easy to use

MODUS™ – programmer software

MODUS Equator™ is a powerful metrology software package developed by Renishaw, enabling programmers to create and run DMIS part programs on Equator 300. **It** provides a comprehensive suite of 3-dimensional metrology functions, delivered via an intuitive user interface that features full graphical display of measurement routines. Wizards provide a quick and easy way to specify common measurement tasks, ensuring good practice is applied.

- Flexible part programming – programs can be developed offline from CAD data, or in 'teach' mode using a joystick.
- Fast report creation with clear, concise graphics.
- Reporting of multi-part inspection.



Equator Controller

The Equator Controller is a versatile machine controller capable of driving the Equator at high speed and with high repeatability. The controller allows the real time machine control to run alongside the metrology software interface. It uses the proven UCCserver software to allow for easy setup and use of the system, and implements the powerful I++ command protocol.

EZ-IO kit

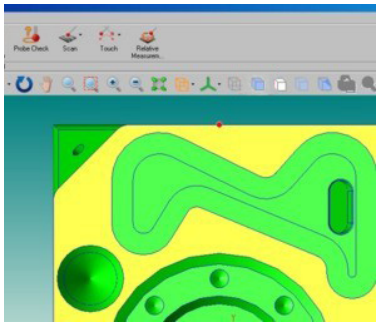
The Equator™ EZ-IO kit is designed for automation integrators, to provide easily-configured communications between the Equator and a variety of equipment in automated work-cells. Equator is typically integrated with part loading, performed by a robot or shuttle system.

The EZ-IO kit includes EZ-IO software, which runs on the Equator Controller, and one EQIO (Input/Output) interface unit. The easy to use EZ-IO software forces a pre-defined handshaking protocol between Equator and automation equipment, connected via 16 digital I/O lines. The master cell controller (often the robot) selects the appropriate DMIS program if the cell handles a variety of parts, and signals to start the inspection process. Equator, acting as a slave, typically communicates that:

- it is ready to accept parts;
- gauging has been completed;
- the part can be unloaded;
- whether the part has passed or failed.

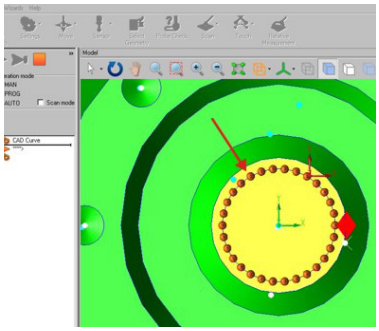
An additional EQIO interface can be purchased for each installation if a larger number of DMIS programs need to be selected.

MODUS™ features



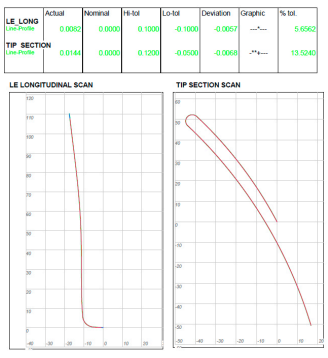
CAD import

MODUS provides a comprehensive suite of 3-dimensional metrology functions, delivered via an intuitive user interface that features full graphical display of measurement routines. It uses CAD-driven offline programming, with support for neutral formats of IGES, STEP, Parasolid® and VDA-FS - programs arrive at the machine ready to run, with little or no prove-out required.



Profile scanning

MODUS enables scanning using the SP25 probe, to capture vast quantities of surface data, defining the profiles of both lines and surfaces. This is ideal for gauging applications where complex surfaces with associated tolerances must be inspected. Typical components with complex profiles that can be gauged using MODUS on Equator include surfaces on gears, blades, pistons, camshafts and bearings.



Reporting

The reporting capability of MODUS is extensive, including traditional text reports with comprehensive user-defined formatting. Graphical reporting enables results to be displayed against the CAD model, including whisker charts or 3D form plotting for many features.

Gauging designed for the shop floor

MODUS measurement types - GD&Ts

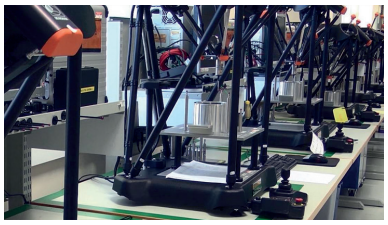
Equator with MODUS is perfectly suited to gauging a range of GD&T features with high levels of repeatability. These include:

- Ø Diameter
- Cylindricity
- Flatness
- Angularity
- Position
- Profile of a line
- Profile of a surface
- // Parallelism
- — Straightness
- ○ Circularity
- ◎ Concentricity
- ⊥ Perpendicularity
- ↗ Runout
- ⌰ Total runout
- ≡ Symmetry

Production, end of line tests and life testing

Equator is manufactured in state of the art production facilities. The assembly process is carefully structured with quality control built in at every stage, including a comprehensive final test on every machine. Renishaw has also conducted extensive life testing to verify Equator's ability to run in full 24/7 operation for many years.

Production



End of line tests

Life testing

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System elements

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.

SP25 probe kit

Equator 300 scanning systems are supplied with the industry standard SP25 3-axis analogue scanning probe.

TP20 probe kit

Equator 300 touch-trigger systems are supplied with the industry standard TP20 3-axis kinematic touch-trigger probe.

EQR-6 stylus changing rack

The Equator is supplied with an EQR-6 auto change rack with six positions, for the ability to change tools automatically while retaining full repeatability.

MCUlite-2 joystick

Easily moves the probe within the working volume. Functionality includes speed override and the ability to lock movement in x, y or z directions.

Stop button

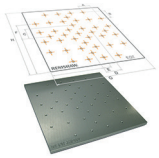
The stop button is an alternative configuration to the joystick. It is easily attached to the front of the Equator.

Cleaning kit

The Equator 300 cleaning kit helps ensure the clean and reliable running of an Equator system, and includes replacement dust filters and tested cleaning products.

Fixture plates

The Equator 300 and Equator 300 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.



Fixture plate spacer

The fixture plate spacer raises the kinematic location of the fixture plate by 55 mm or 150 mm – ideal if gauging small parts or using short styli.

Modular fixture kits

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

Equator enclosure

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

Enclosure modules available:

- top unit – with high level access door for cleaning;
- base unit – with levelling feet and controller shelf;
- joystick bracket;
- monitor bracket – height adjustable on left or right.

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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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