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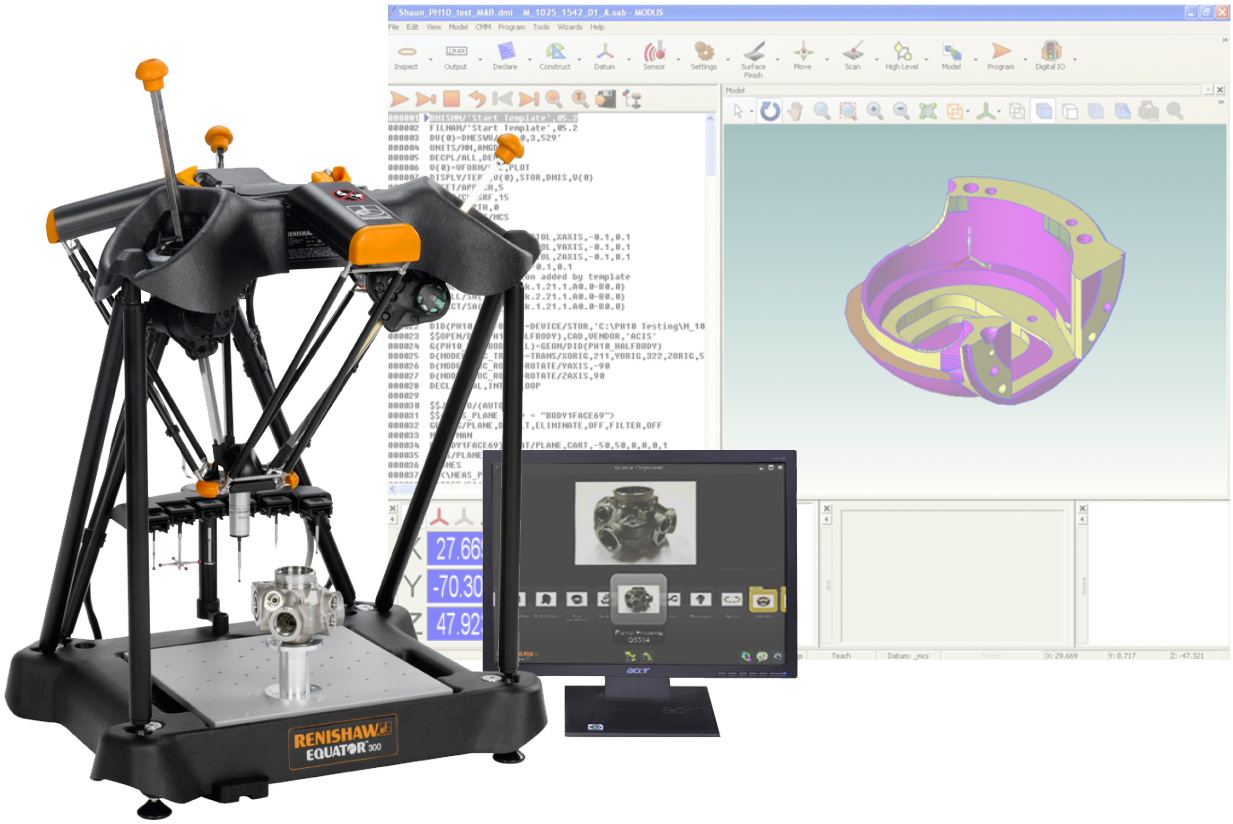
EQUATOR™ the versatile gauge™
SP25 with MODUS™ programming software



Equator – the versatile gauge

The Renishaw Equator is a versatile alternative to custom gauging, offering inspection of an unprecedented variety of manufactured parts. The Equator gauge is:

- a comparator for medium to high volume gauging;
- robust – proven on the shop-floor and thermally 'insensitive' – re-zeroed using the principle of mastering;
- able to switch between multiple parts and capable of rapid re-programming for design changes;
- capable of form measurement for full feature analysis using the SP25 probe, with rapid repeatable scanning;
- plug and play – rapid set-up requiring only single phase power and no air supply.

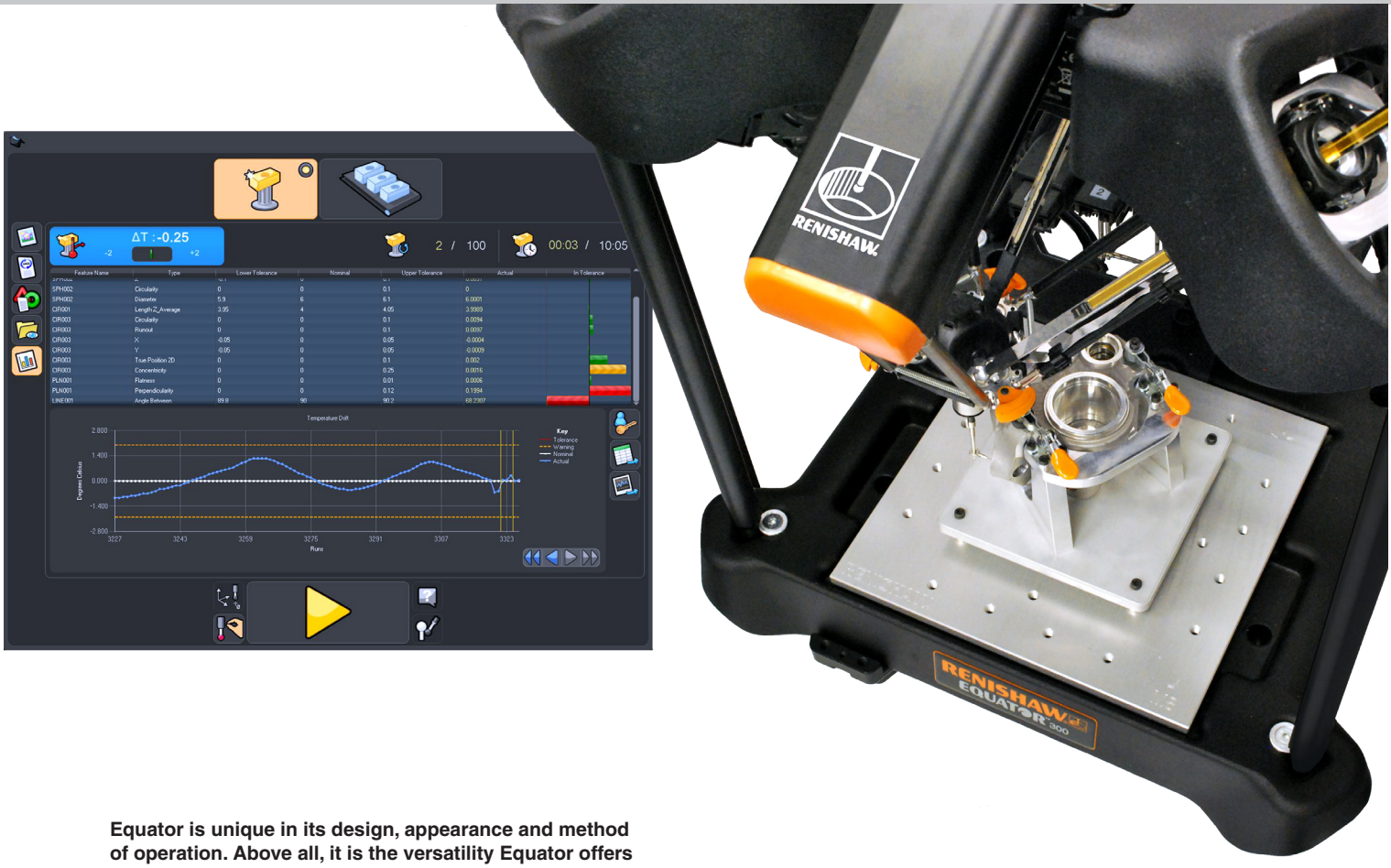
System features

Working volume	XY	Ø300 mm
	Z	150 mm
Comparison uncertainty*	±0.002 mm	
Maximum scanning speed	100 mm/s	
Fixturing requirement*	±1 mm	
Air supply	No air required	
Electrical supply	Single phase 100-240 V	

* Please refer to the specifications on the back page of this document.

EQUATOR™ the versatile gauge™

SP25 with MODUS™ programming software



Equator is unique in its design, appearance and method of operation. Above all, it is the versatility Equator offers which has re-defined the world of gauging and led to Equator becoming the new gauge of choice for multiple manufacturing applications.

High data capture rates for rapid form measurement

The thousands of points collected during 3D scanning with the industry standard SP25 probe results in better metrology than conventional gauging and enables effective form measurement. Every data point can be used for comparative measurement. One Equator can perform the same function as thousands of DTIs, LVDTs or handheld instruments.

Outstanding results in any climate

The Equator's innovative gauging technology is based on the traditional comparison of production parts to a reference master part. Re-mastering is as swift as measuring a production part and immediately compensates for any thermal effects, returning data collected on the shop floor equivalent to that collected in a temperature controlled quality room.

Cost-effective

Replacing manual measurement with an automated Equator gauging system can greatly increase throughput and reduce scrap rates, at a fraction of the cost of a custom gauging system and related fixturing.

Plug and play

The gauge weighs between 25 kg and 27 kg, dependent on the model, and requires single phase power. Equator does not need a costly compressed air supply. The intuitive operator front-end software, Organiser, requires little or no training and the optimised ratio of working envelope to machine footprint means Equator can be set to work in even the most crowded of factory spaces.

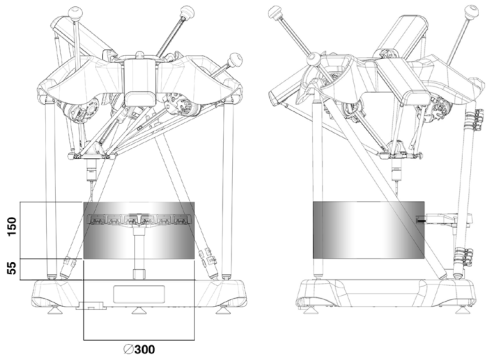
Better process feed-back and control

- With its small size and ease of installation, the Equator is prepared for integration into automated lines and production cells.
- Using third-party software, data from Equator can be used to update machine offsets, compensating for the effects of tool wear and thermal drift.
- When combined with robotic part handling, Equator supports fully automated in-line process control.

Equator 300 with SP25

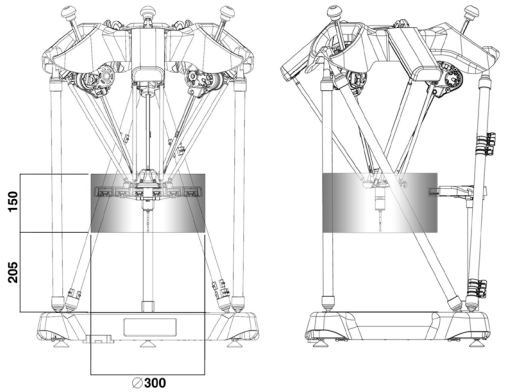
Equator 300 with SP25 Extended Height

Equator 300 working volume



Working volume	XY	Ø300 mm
	Z	150 mm
Height from base	55 mm	
Machine weight	25 kg	
Dimensions (W×D×H)	570 mm × 500 mm × 700 mm	

Equator 300 Extended Height working volume



Working volume	XY	Ø300 mm
	Z	150 mm
Height from base	205 mm	
Machine weight	27 kg	
Dimensions (W×D×H)	570 mm × 500 mm × 850 mm	

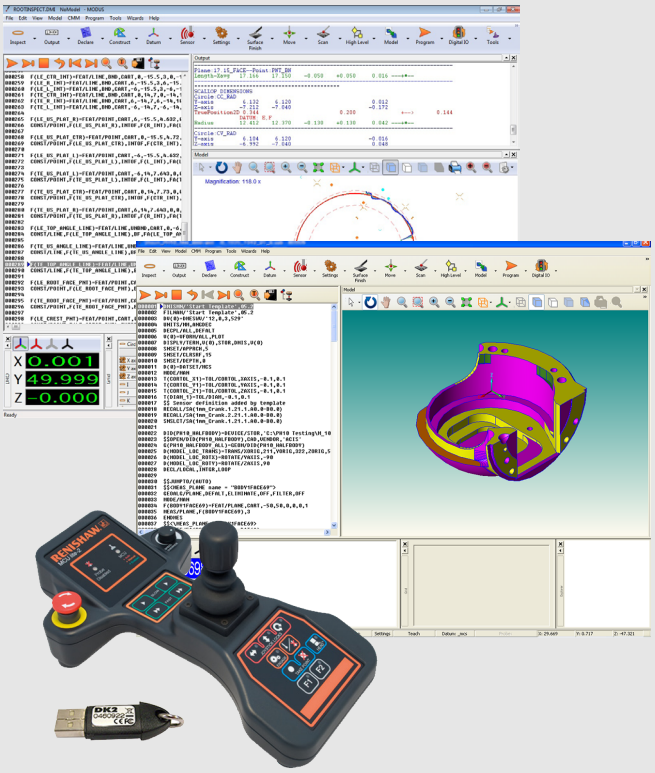
Programming software

Automation

MODUS™ – programmer system 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.

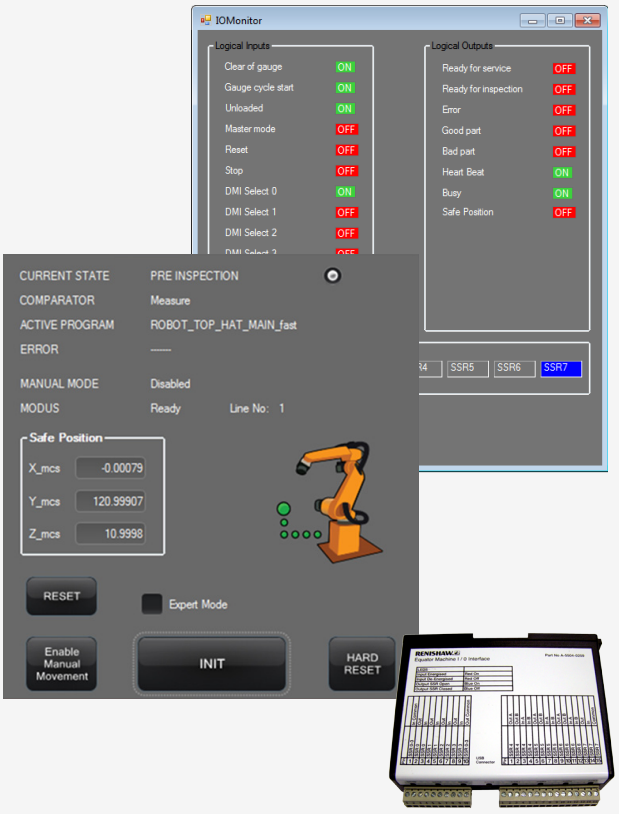
EZ-IO kit

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 Equator Machine I/O (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.

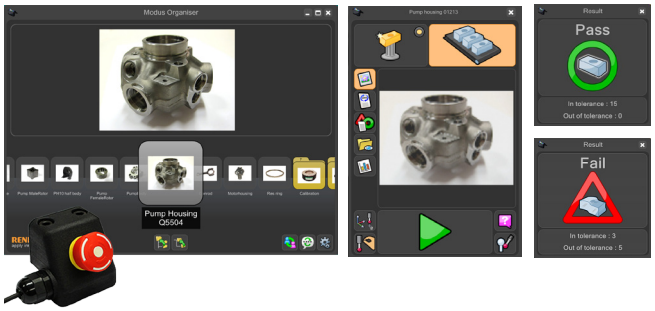
An additional I/O interface can be purchased for each installation if a larger number of DMIS programs need to be selected.



Operator software

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 from which the inspection is started with one operation. The DMIS program file is easily accessible for review.



Process Monitor

Process Monitor includes an instant status monitor bar graph of last measured parts, historical results for feature selected, and three status displays allowing management of re-mastering.

The limit for re-mastering can be set on the basis of temperature drift, time since last master, or by number of parts measured. Process Monitor then prompts the operator when re-mastering is due.

The historic data per feature can also be exported, either as a .csv file or as an image, to enable easy sharing of results.

System elements

SP25 probing system

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

EQR-6 stylus changing rack

The Equator is supplied with an EQR-6 auto change rack with six positions, for the ability to automatically change tools while retaining full repeatability. The EQR-6 increases the versatility of the Equator in order to gauge complex parts with multiple tool tips, mounted on SH25 stylus modules. It is possible to gauge different parts in sequence without the need for probe calibration between jobs.

The Equator 300 Extended Height gauging system is supplied with a taller changing rack which has been designed for the added height of the machine.

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

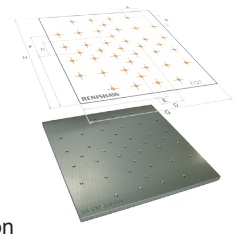
The stop button is an alternative configuration to the joystick. It is easily attached to the front of the Equator.

Cleaning kit

The Equator 300 cleaning kit provides everything needed to ensure the clean and reliable running of an Equator machine. The cleaning kit includes replacement dust filters and cleaning products which have been tested and proven as non-abrasive and non-corrosive.

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 mastering or calibration can be ordered as accessories.



Accessories

Equator Enclosure:

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

Enclosure modules are:

- standard top unit – with high level access door for cleaning;
- standard base unit – with levelling feet and shelf for controller;
- full height doors – allows locking of gauging station;
- keyboard shelf and joystick bracket;
- monitor bracket – height adjustable on left or right side of top unit.

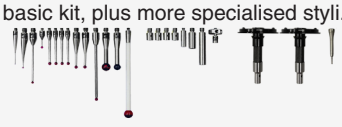
Styli/storage kits

Equator styli/storage kits contain styli most commonly used by Equator users and are available in three versions, at package prices lower than the sum of the contents. The kits have been designed to provide a storage solution for up to six assembled stylus tools. With all the kits contained within the same box, extra styli can be stored in the spare locations. All styli are also available separately.

M3 styli are intended for use in straight configurations, while lighter M2 styli and adaptors are included for cranked and star styli applications.

Basic kit: Contains 15 most commonly used styli.

Intermediate kit: Contains 22 styli and includes all the styli in the basic kit, plus more specialised styli.

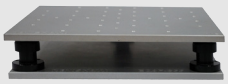


Advanced kit: Contains 33 styli, including all the styli in the intermediate kit.

Fixturing accessories

Fixture plate spacer

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

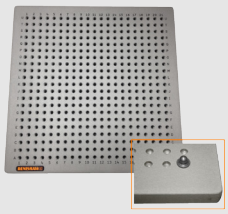


Extended Height fixture plate spacer

The Extended Height fixture plate spacer raises the kinematic location of the fixture plate by 150 mm. It enables smaller parts to be gauged on the Extended Height Equator, and can be combined with the 55 mm high fixture plate spacer.

Modular fixture kits

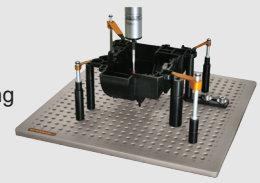
The modular fixturing range for Equator offers specifically designed grid fixture plates with a 3-point kinematic system for quick part loading and unloading. The positive engagement of the fixture plates ensures each fixture is repeatedly located and securely held in place.



Using modular fixtures can improve the throughput, reproducibility and accuracy of your inspection process with quick and repeatable fixturing set-ups that are easy to configure:

- grid fixture plates are alpha-numerically labelled so set-ups can be documented and repeated quickly and accurately;
- all components are hand-tightened and require no special tools.

Fixturing components can be easily positioned for minimal contact on and around the part, providing an unobstructed probe path for inspecting every detail.



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Equator 300 specifications - SP25/MODUS

Comparison uncertainty*	±0.002 mm
Maximum scanning speed	100 mm/s
Maximum movement speed	500 mm/s
Scanning rate	1000 points/s
Scale resolution	0.0002 mm
Fixturing requirement*	±1 mm
Machine air supply requirement	No air required
Operating temperature	+10 °C to +40 °C
Storage temperature	-25 °C to +70 °C
Relative humidity operating range	Maximum 80 %RH at 40 °C, non-condensing
Machine electrical supply requirements	100-240 V AC ±10 %, 50-60 Hz
Maximum power consumption**	190 W
Typical power consumption***	80-100 W
Probe type	Renishaw 3-axis SP25 analogue scanning
Fixture plate	305 mm × 305 mm aluminium
Maximum workpiece weight	25 kg

* The process of measuring on an Equator involves defining a series of gauge points on the component surface. Periodic calibration of a master part on a CMM establishes datum values for each gauge point. The same gauge points on the same master part are measured on Equator, 'mastering', to establish a correlation with the certified CMM. Subsequently, a regular 're-mastering' process is used to account for changing environmental conditions. Size and position measurements made immediately following re-mastering will have a comparison uncertainty of ±0.002 mm relative to the certified measurements of the master part. This specification applies where each part is fixtured to within 1 mm relative to the master part.

** Peak consumption at power up

*** 3 axis system typical consumption based on taking touch points under DCC control

Equator 300 ordering

A - EQ 3 3 - 1 S 1 1 A

Part number type
A = Assembly

Series
EQ = Equator with SP25
EH = Equator Extended Height with SP25

Working volume
3 = 300 mm diameter

Number of axes
3 = 3 axes

Controller standard
1 = Controller kit with MODUS Organiser
2 = Controller kit with MODUS Organiser and MODUS Equator

Manual functions
S = Stop button
J = Joystick kit

Fixture plate hole size
1 = M6
2 = M8
3 = Imperial ¼ in.

Premium support cover
0 = Without cover
1 = With cover

Power cables (× 2 per system)
A = UK; B = EU & Korea; C = USA, Mexico, Canada, Japan and Taiwan; D = China; E = South Africa and India;
F = Switzerland; G = Denmark; H = Australia; I = Israel; J = Italy and Chile; K = Brazil

For worldwide contact details, please visit our main website at
www.renishaw.com/contact

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