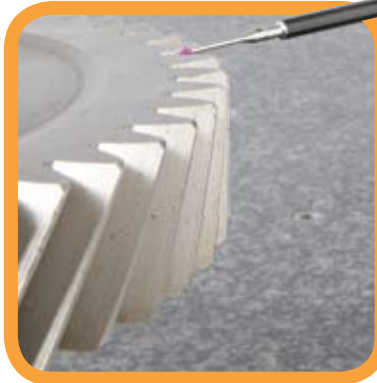


Transform your CMM  
with a Renishaw retrofit

**RENISHAW**   
apply innovation™

# RENISHAW® retrofit™

**MODUS™**



# Transform your CMM with a complete retrofit solution, supplied and supported by Renishaw

## Why retrofit?

Most CMM structures are not subject to high levels of wear and so remain serviceable for many years. BUT, software, control systems and sensors can become outdated as new, faster and more capable ones are introduced.

**Upgrading your CMM can give it a new lease of life...**

- **More capability** with simple, fast and intuitive CAD-driven programming and graphical reports that are easier to interpret
- **More throughput** using the latest sensors and motion control technologies
- **More profitability** with reduced maintenance and support costs
- **More information** about your parts with automated multi-sensor measurement
- **More confidence** that your CMM is equipped to meet your future measurement needs

The award-winning REVO® 5-axis measurement system provides unprecedented speed, accuracy and flexibility



## A complete solution direct from Renishaw

Users of all brands of CMM now have the opportunity to transform their measurement performance with an upgrade to Renishaw's innovative metrology systems.

Renishaw can now provide a comprehensive CMM retrofit solution, based around the proven UCC2 universal CMM controller and its MODUS™ CMM metrology software. Combined with an unrivalled range of touch-trigger, 3 axis scanning and 5-axis measurement sensors, as well as global support and UKAS and A2LA-accredited machine calibration, Renishaw has assembled all the elements to deliver a professional, state-of-the-art CMM retrofit solution.

## Join the measurement revolution!

Recent advances in measurement, such as Renishaw's innovative 5-axis measurement technology, have made upgrading the capability of existing machines more attractive than ever.



## A solution for all brands of CMM

The operational benefits of increased productivity, reduced inspection lead times and greater automation of measurement tasks are now available to all CMM users.

A Renishaw retrofit gives users of all brands of CMM access to state-of-the-art technology, with the security of global service and support direct from the manufacturer

*"We can now offer customers of all brands of CMM, including Hexagon and Zeiss, a complete solution that features leading-edge technology in every aspect, backed up by the security of service and support direct from Renishaw."*

# State-of-the-art head technology – PH20

## PH20 – 5-axis touch trigger measurement

- Index head compatibility – no requirement to modify existing programs in the majority of cases
- Renishaw CMM controller – I++DME communication, wide selection of metrology software
- Integral TP20 probe – allows re-use of existing equipment
- Compact design – suitable for a wide range of CMMs using shank or quill mounting

## Increased throughput

Using only the rapid rotary motion of the head, points can be taken faster, and with improved accuracy and repeatability.

PH20's unique 'head touches' allow measurement points to be taken by moving only the head rather than the CMM structure. Furthermore, 5-axis motion eliminates time spent indexing the head.

Together these speed increases typically result in a 3-fold improvement in throughput over conventional systems.

## Easy access to features at any angle

5-axis simultaneous motion allows larger parts to be measured on the CMM by minimising the space required around the part for head rotation.

PH20's infinite positioning capability guarantees optimal feature access, minimising stylus changes.

PH20 automatically aligns itself with the part coordinate system, avoiding stylus collisions and the requirement for accurate fixtures.

## Novel calibration

Novel calibration, Renishaw's 5-axis measurement tip-sensing probe heads only require a single tip calibration to be accurate at all angles of rotation, typically saving several hours in the set-up routine.

## A measurement revolution



The 5-axis technology pioneered by Renishaw's award-winning REVO® is now available for touch-trigger applications with dramatic impact on inspection timescales, costs and capability on all sizes of CMM.



## PH20 – integral TP20 sensor

### Integral industry standard TP20 probe

Users of the PH20 probe head will immediately have access to the range of proven TP20 probe modules, providing a wide selection of trigger forces, directional sensing options and extensions to meet application requirements\*. The detachable modules provide crash protection and can be automatically changed using the MCR20 change rack.

\*Excepting the extended force module

### TP20 probe system

The TP20 is a touch-trigger probe that gives its users the ability to change stylus configurations manually or automatically, without re-qualification.

### The range of modules

A range of application specific stylus modules is available:



- The low force module (LF) for high accuracy with short styli and delicate materials.
- The standard force module (SF) is suitable for most applications.\*
- The medium force module (MF) is suitable for vibration resistance when using longer styli.
- The 6-way module (6W) for measuring grooves and undercuts.

\* Two standard force extension modules (EM1 and EM2) improve reach and offer better metrology performance that using equivalent length styli.

### Touch trigger 3-axis retrofits

Renishaw's industry-standard range of touch-trigger sensors is also available for applications where discrete point measurement is all that is required.



TP20 touch-trigger probe system provides flexible feature access with indexing and module changing.

### Upgrade path

All Renishaw retrofits are based on a common controller and software platform. This means that customers who choose touch-trigger or 3-axis scanning solutions retain a cost-effective upgrade path towards leading-edge PH10M / SP25M featuring head indexing combined with automated module and stylus changing.



# REVO® – high speed, high accuracy multi-sensor scanning system

## Measure faster

- up to 50 times faster surface speed than 3-axis scanning

## Measure more points

- 4000 points per second acquisition rate

## Measure more features

- infinite positioning for unparalleled flexibility

## Measure surface finish

- passive C-axis rotation for maximised feature access

## Measure more accurately

- with the REVO® tip-sensing probe

## REVO® dynamic scanning head

The REVO® measuring head features spherical air bearing technology in each of its two axes, driven by brushless motors linked to high-resolution encoders to provide fast, ultra-high accuracy positioning.

## A measurement revolution



REVO® is a revolutionary measuring head and multi-sensor probe system.

Every process and feature in a REVO® system has been designed to enable users to achieve previously unobtainable levels of inspection throughput:

- 5-axis scanning of complex forms, REVO®'s ability to gather very large quantities of accurate inspection data at ultra-high scanning speeds is invaluable.
- Very high speed gathering of touch points using the servo head's infinitely variable 2-axis motion.
- Innovative, patented tip-sensing probe technology allowing the sensing to be very close to the surface measured, yielding better accuracy.
- Novel calibration, Renishaw's 5-axis measurement tip-sensing probe heads only require a single tip calibration to be accurate at all angles of rotation, typically saving several hours in the set-up routine.
- Infinite positioning and 5-axis synchronised motion, which facilitates access to features.



# REVO® probes

## RSP2

RSP2 is a dedicated lightweight tip-sensing probe for use on REVO® systems, capable of 2D-scanning (x,y) and 3D-touch trigger measurement.

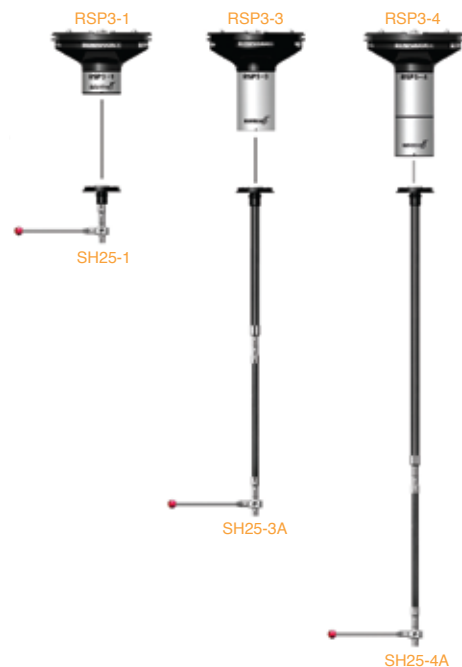
The RSP2 has a universal body to which a number of different length stylus holders, with a maximum reach of 500mm, can be fitted. Stylus wear is minimised by the low scanning forces that are required.



## RSP3

RSP3 range of probes complement the RSP2 probe, providing the REVO® system with 3D-scanning (x,y,z) and crank stylus capabilities.

The RSP3 is used for 3-axis scanning, such as with a fixed REVO® head angle during measurement. The range of probes allows different lengths of stylus to be used whilst maintaining optimum metrology performance.





## REVO® probe calibration

Calibration on traditional CMM systems consumes a considerable amount of time that could otherwise be used for part measurement. Using a table mounted sphere, the simple and practical calibration technique for REVO® determines the actual head and probe geometry, allowing measurement in any position from a single operation.

## REVO® surface finish probe (SFP1)

Surface finish measuring has traditionally required using hand-held sensors or moving the part onto a dedicated measuring machine.

The REVO® SFP1 probe however, makes surface finish inspection an integral part of your CMM measurement, enabling you to automatically switch from scanning to surface finish measurement.

## The REVO® probe changer system

The REVO® probe changer system allows automatic REVO® probe and stylus holder changing, enhancing flexibility through the use of a range of stylus configurations.

The RCP<sup>TC</sup> is a specially designed thermally controlled port for changing RSP2, RSP3 and SFP1 probes.

Key features of the RCP<sup>TC</sup> are:

- Maintains the probe at the operating temperature when not in use, for optimum metrology.
- For RSP2, RSP3 and SFP1 probe changing.
- Compatible with MRS

The RCP2 is configured to change RSP2 and SFP1 stylus holders, whereas FCR25 is used for RSP3 stylus holders.



Transform your measurement capability and productivity

## Always in control

Renishaw provides everything you need to transform the performance of your old CMMs.

### Universal control

Renishaw's UCC universal CMM controller is at the heart of a Renishaw CMM retrofit. Combined with a Renishaw servo power amplifier, it enables precise motion control of up to 5 axes of simultaneous motion on machines of all sizes and also supports rotary tables. It also provides a single-box interface to all Renishaw sensors and can gather surface data at up to 4,000 points per second.

Sophisticated machine error mapping is provided in an open format, allowing users to perform their own recalibration, whilst temperature compensation is also available. Crucially, the UCC also complies with the I++ DME protocol, giving users the freedom to use any metrology software that features an I++ DME client.

- Full support for all Renishaw sensors
- I++ DME compliant
- Cost-effective UCC*lite* suitable for touch-trigger applications

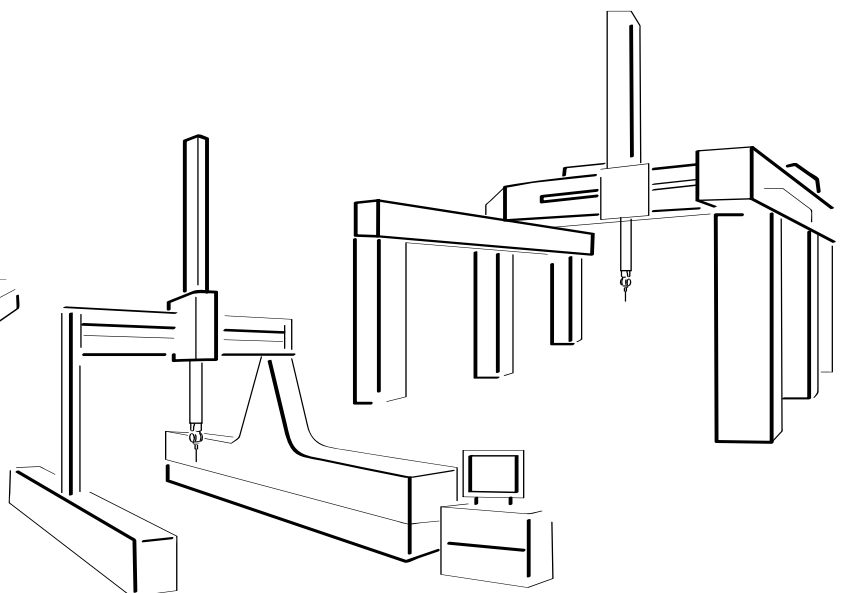


UCC CMM controllers support multiple temperature sensors for improved measurement accuracy on the shop floor.

The I++ DME protocol is a common interface that supports interoperability between any compliant software and hardware.



Renishaw's UCC universal CMM controllers and servo power amplifiers can drive CMMs of all configurations and sizes





## Making sophisticated measurement simple

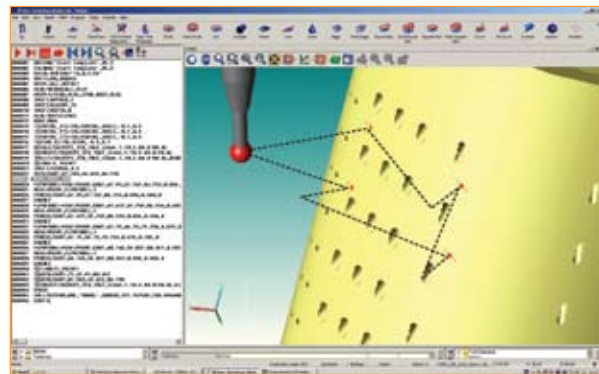
### Powerful metrology software

Renishaw's new MODUS™ software provides a powerful platform for 5-axis measurement.

A configurable user interface allows native DMIS programs to be developed offline, drawing geometry, embedded dimensions and tolerance data from CAD, with full simulation and collision detection. The software includes certified algorithms for feature measurement, feature construction and part alignment.

Building on a foundation of industry standards such as DMIS, I++ DME, DML and Microsoft® SQL Server, MODUS maximises compatibility with your existing programs and reports. Flexible reporting options include text-based and graphical reports, and results data that can be exported in a wide range of file formats, including certified Q-DAS for comprehensive SPC analysis.

MODUS metrology software is a future-proof investment, ensuring guaranteed availability of the latest sensor and controller technology advancements from Renishaw.



Programs can be created offline directly from CAD with on-screen probe path verification. The CMM environment, the fixture and the location of the part on the machine can all be defined, enabling full simulation and crash detection of 5-axis measurement programs. This minimises CMM down-time as programs arrive at the machine ready to run, with little or no prove-out time required.

Feature	Min	Max	Target	Mean	Std	Min	Max	Range
Max_x_pos_1	0.000	0.010	-0.010	0.000	0.010	0.000	0.020	0.020
Max_x_pos_2	0.000	0.010	-0.010	0.000	0.010	0.000	0.020	0.020
Max_x_pos_3	0.000	0.010	-0.010	0.000	0.010	0.000	0.020	0.020
Max_x_pos_4	0.000	0.010	-0.010	0.000	0.010	0.000	0.020	0.020
Max_x_pos_5	0.000	0.010	-0.010	0.000	0.010	0.000	0.020	0.020

The reporting capability of MODUS is extensive, including traditional CMM 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.

## Responsive service and support

### Maintaining performance

Renishaw offers retrofit customers a flexible range of maintenance contract options, including software maintenance; visits for calibration, preventative maintenance and emergency support; out-of-hours support and top-up software training.

Each contract is bespoke, so you can select the combination of services that suits your needs, with the flexibility to carry over unused days to the next period.



Customers can tailor a maintenance contract to suit their needs, ensuring that they get the best return on their investment.

### Rapid service & support

Renishaw recognises that CMM users will require high levels of machine uptime and so responsive service and knowledgeable support are both vital. A rapid 'repair by exchange' service is available on all system elements, including the UCC controller, backed by local inventories.

A range of online resources is also available via [www.renishaw.com](http://www.renishaw.com), including a searchable Knowledgebase of help topics, frequently asked questions, user documentation and software downloads, plus the facility to log help requests.



*"It's all about managing the details to provide the level of service that Renishaw customers have come to expect."*



## A professional approach to minimise risk

Renishaw believes that CMM retrofit customers have the right to expect the same level of professionalism and quality from a CMM upgrade as they get when they buy a new CMM. Its retrofit service is designed to deliver just that.

### A performance guarantee

The first step is a rigorous machine survey designed to assess the mechanical and electrical components of each CMM. Combined with Renishaw's extensive experience with all brands of CMMs, this enables Renishaw to commit to a level of system performance. You will know exactly what to expect from your upgraded CMM before you make any commitment.



Renishaw staff perform an extensive survey to determine the status of all performance-critical CMM components.

This rigorous approach ensures that the proposed solution will reliably meet your requirements.

### 'Plug and play' installation

Renishaw has built up a comprehensive knowledge base of CMM installations, so it can provide a 'plug and play' solution using its UCC universal CMM controller for most models of CMM.



Renishaw has developed a range of interface panels for common CMMs, enabling the existing 'umbilical' cable to be plugged straight into UCC controller cabinet, saving many hours of on-site rewiring.

### Certified calibration

Renishaw is certified by UKAS to ISO 17025, giving customers confidence in the accuracy of their upgraded machine.



Your upgraded machine will be supplied with a UKAS calibration certificate to ISO 10360-2.



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## Renishaw applies innovation to provide solutions to your problems

Renishaw is an established world leader in metrology, providing high performance, cost-effective solutions for measurement and increased productivity. A worldwide network of subsidiary companies and distributors provides exceptional service and support for its customers.

Renishaw designs, develops and manufactures products which conform to ISO 9001 standards

**Renishaw provides innovative solutions using the following products:**

- **Probe systems for inspection on CMMs (co-ordinate measuring machines).**
- **Systems for job set-up, tool setting and inspection on machine tools.**
- **Scanning, digitising and dental systems.**
- **Laser and automated ballbar systems for performance measurement and calibration of machines.**
- **Encoder systems for high accuracy position feedback.**
- **Spectroscopy systems for non-destructive material analysis in laboratory and process environments.**
- **Styli for inspection and tool setting probes.**
- **Customised solutions for your applications.**

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