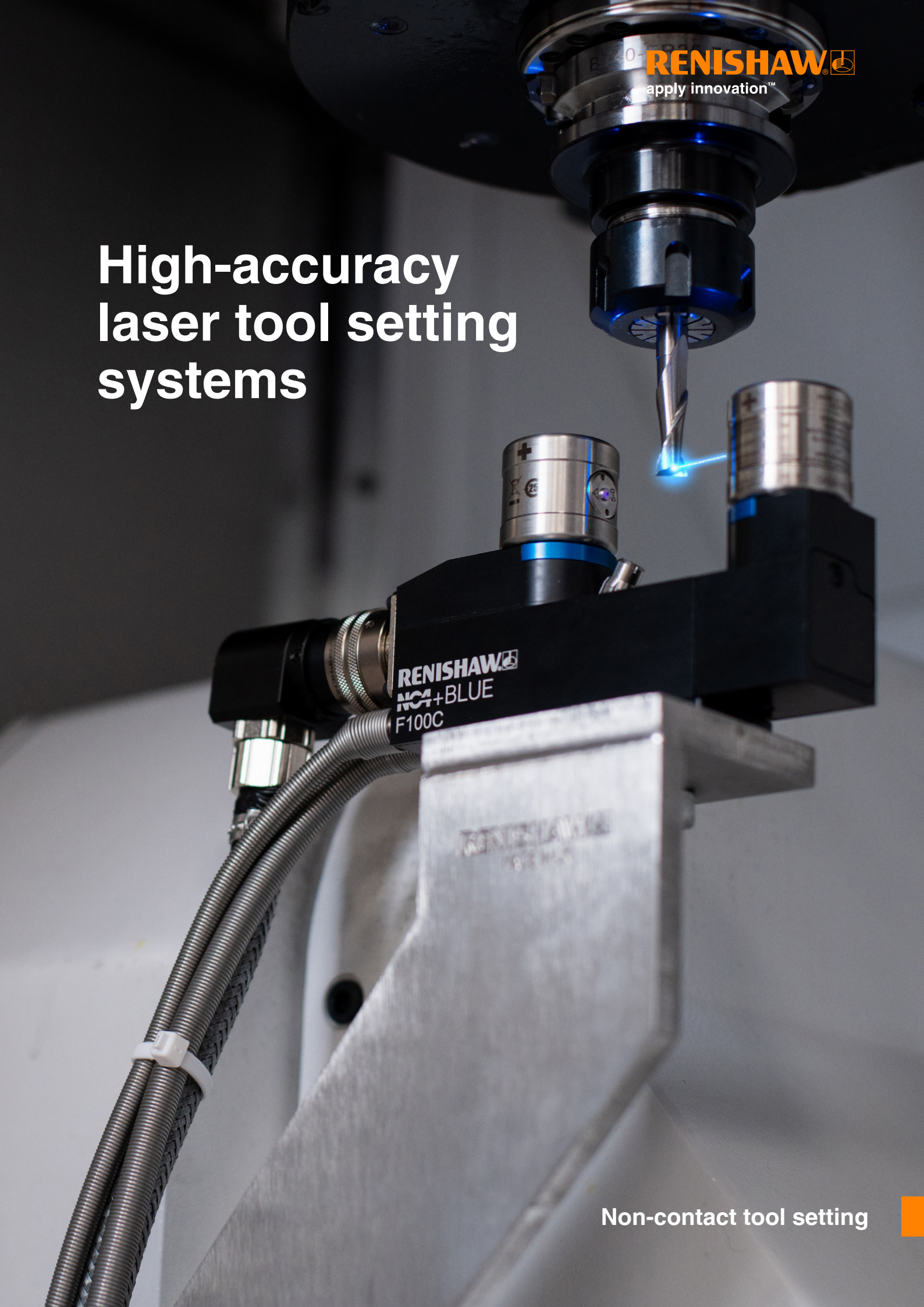
RENISHAW
apply innovation™

High-accuracy laser tool setting systems



Non-contact tool setting

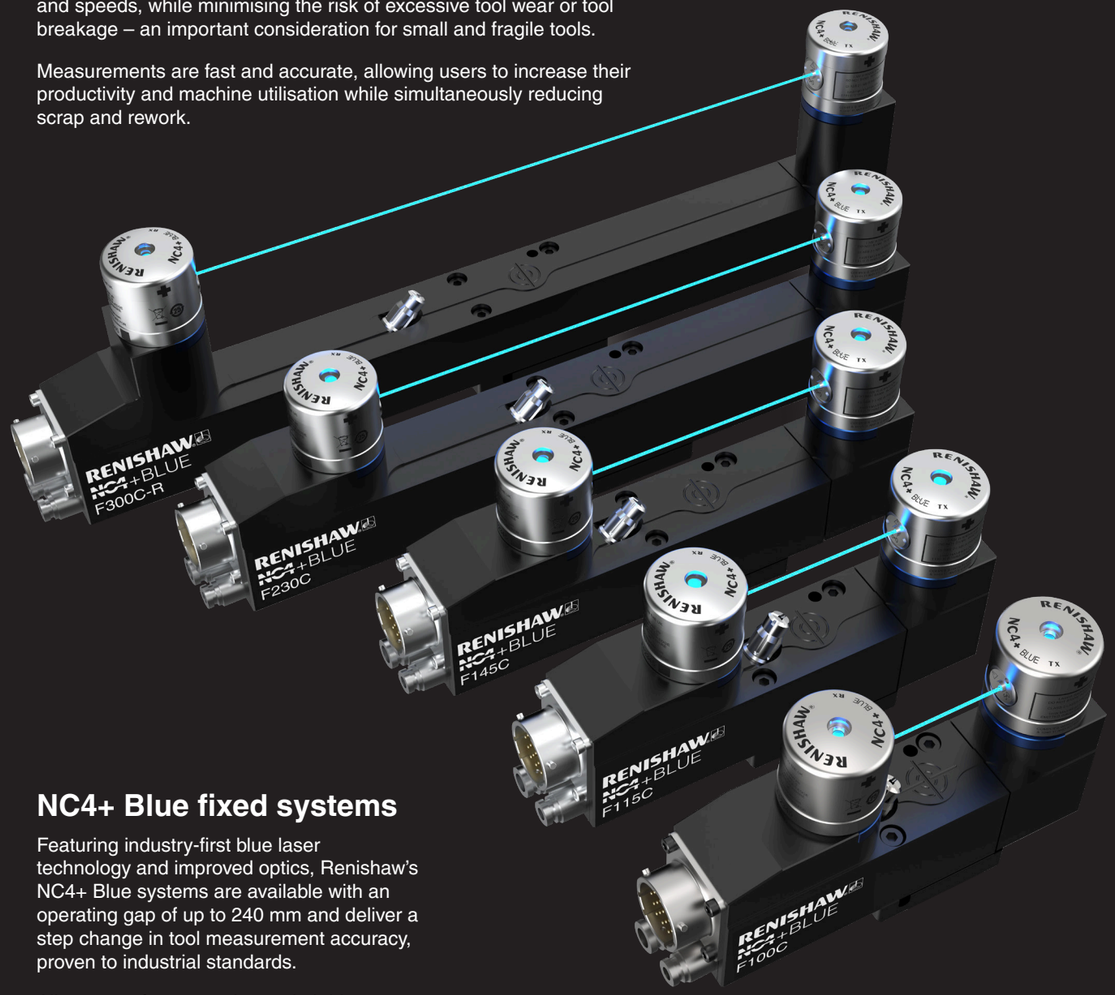
Flexible family of high-accuracy non-contact tool setting systems

Renishaw's range of NC4 non-contact tool setters provides high-precision, high-speed tool measurement and broken tool detection, allowing process control on all sizes and types of machine tools.

During machining processes, dimensional accuracy is dependant upon several variables, including tool size deviation, tool run-out and tool breakage.

Renishaw's NC4 systems allow users to control these variables, enabling measurement of a wide variety of tools at production feeds and speeds, while minimising the risk of excessive tool wear or tool breakage – an important consideration for small and fragile tools.

Measurements are fast and accurate, allowing users to increase their productivity and machine utilisation while simultaneously reducing scrap and rework.



NC4+ Blue fixed systems

Featuring industry-first blue laser technology and improved optics, Renishaw's NC4+ Blue systems are available with an operating gap of up to 240 mm and deliver a step change in tool measurement accuracy, proven to industrial standards.

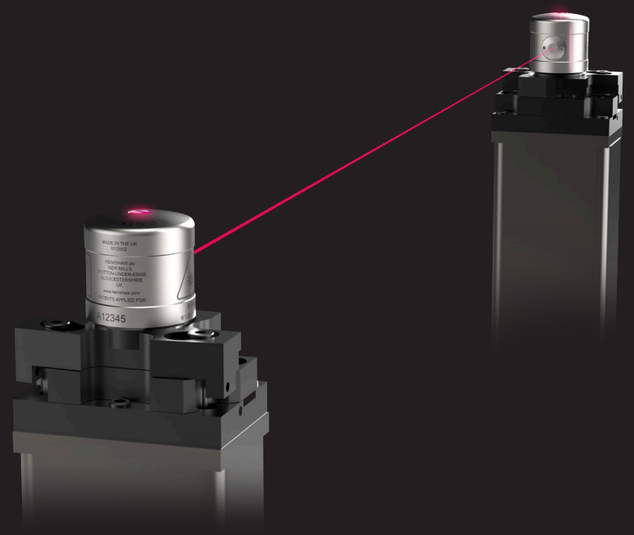
All systems feature an integral air blast as standard to enable accurate and reliable tool measurement.

NC4 separate systems

Separate systems offer a flexible and configurable alternative to fixed versions, enabling installations in machines where space on the table is limited.

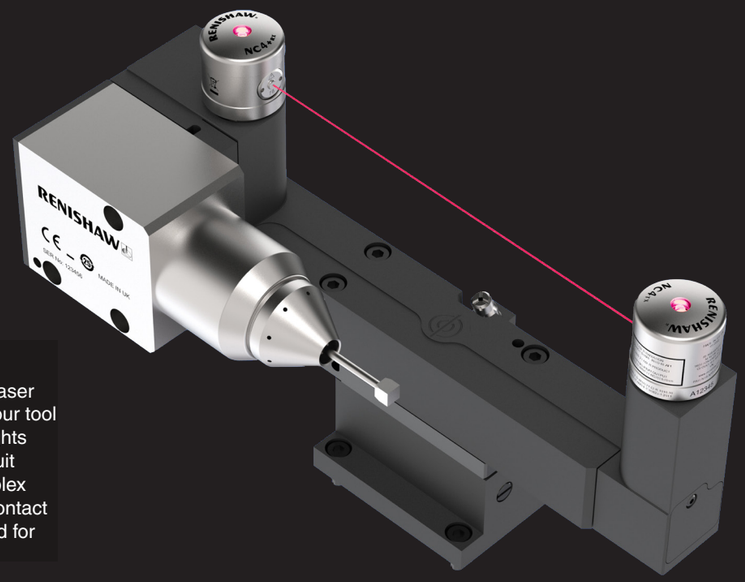
Renishaw's separate systems can be installed in various orientations and separations, for a wide variety of applications – including broken tool detection and accurate in-cycle tool measurement. This gives users the ability to set up the NC4 to suit their specific process control needs.

Separate systems can be set up at separations between 0.3 m and 5 m and can be supplied with brackets and fittings to suit each machine installation. These separate systems feature proven red laser technology, and the same optical protection systems as their fixed counterparts, ensuring accurate, robust performance, whatever the application.



Custom solutions

Renishaw provides bespoke NC4 laser systems can be designed to suit your tool setting requirements. Different heights or separations can be created to suit different tool sizes, and more complex hybrid designs with incorporated contact tool setting probes can be designed for use in multi-tasking machines.

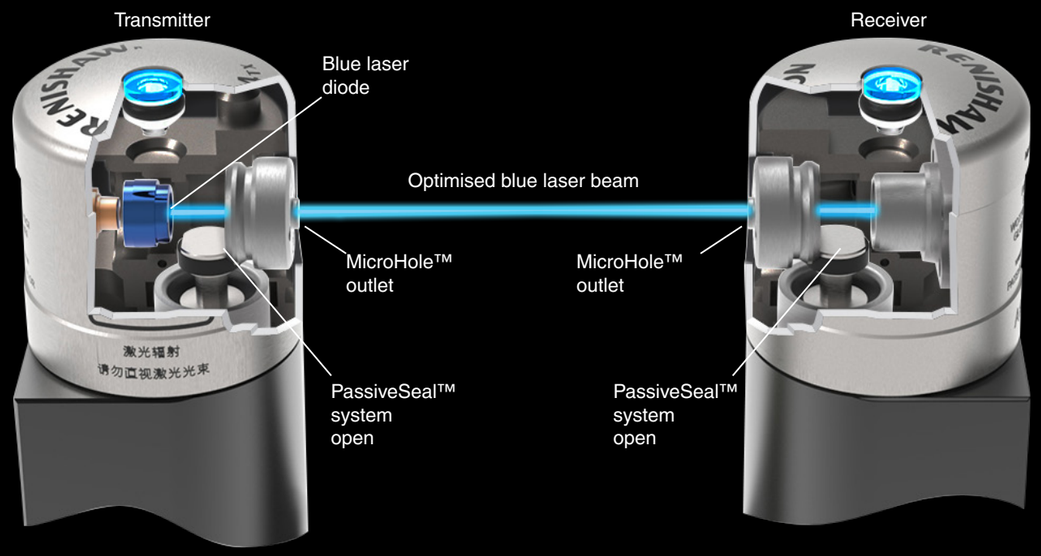


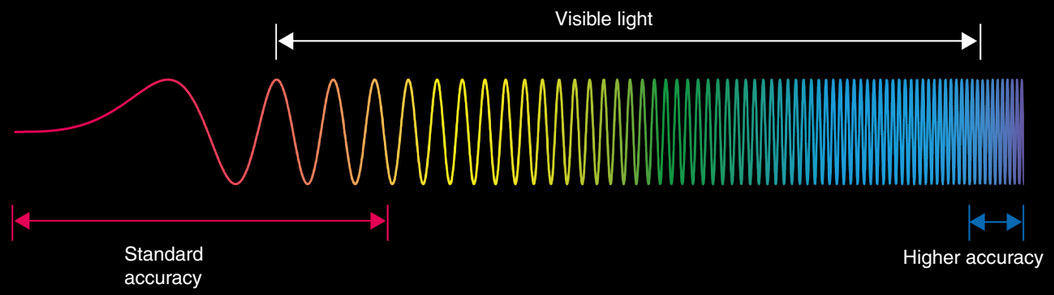
High-accuracy tool setting with blue laser technology

Non-contact laser tool setting systems use a beam of laser light, passing between a transmitter and a receiver, positioned within the machine tool so the cutting tools can be passed through the beam.

The passage of a tool into the beam causes a reduction in the amount of laser light being acquired by the receiver, and a trigger signal is generated. This records the machine position at that instant, providing the information to determine a tool's dimension.

With approaches from several directions, tool geometry can also be accurately determined. These systems can also be used to detect broken tools by rapidly moving the tool into a position where it should intersect the laser beam. If light reaches the receiver, the tool tip must be missing.





Optimised for production environments

Superior measurement accuracy

The improved measurement performance associated with blue lasers enables the measurement of very small tools, whilst minimising tool-to-tool measurement errors. Minimising these errors is also a critical consideration when machining with a wide range of cutting tools.

Tool measurements taken on NC4+ Blue systems closely reflect the true dimensions of the tool, giving users confidence in their manufacturing capabilities.

These factors enable users to manufacture complex components more accurately and efficiently than ever before.

Small tool accuracy
Enabling the measurement of very small tools

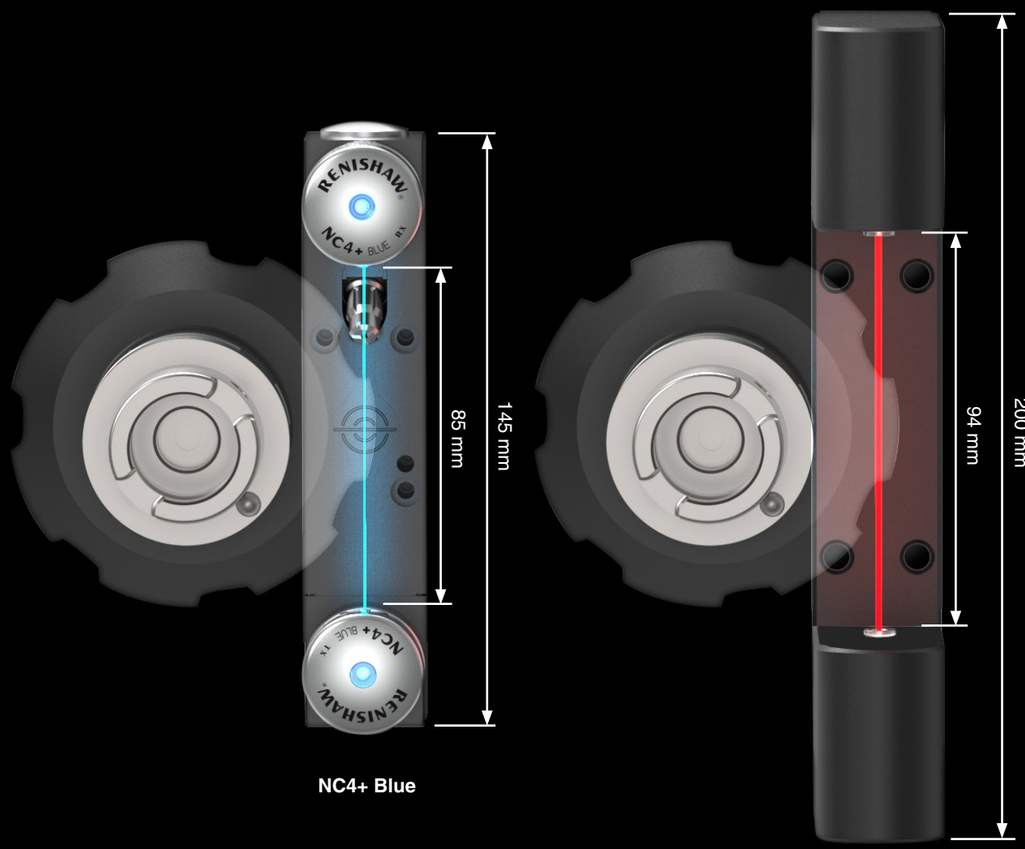
Tool-to-tool performance
Minimising tool-to-tool measurement variation across all types of tools

Absolute accuracy
Ensuring measurements reflect the true dimensions

Ultra-compact design

Miniaturised electronics, and a compact protection system without a bulky shutter mechanism, makes the NC4+ Blue suitable for machines with limited space for tool setter fitment.

The NC4+ Blue system has a significantly smaller footprint than its competitors, yet can still measure the same categories of tooling.



NC4+ Blue

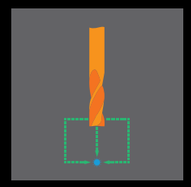
Competitor system

Advanced cycles for advanced machining

Our non-contact tool setting macro software is compatible with all major CNC controller brands and underpins many of our easy-to-use apps, like Set and Inspect.

However, for more experienced operators, this comprehensive macro software package also allows for the creation and execution of measurement cycles using traditional G-code techniques.

A small selection of our cycles can be seen below:



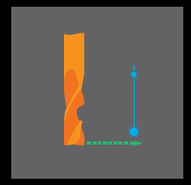
Length and diameter measurement

Used to measure the effective length and radius or diameter of a tool, this cycle is suitable for a wide variety of tools, including drills, taps, reamers and form tools.

Broken tool detection

Used to check for broken cutting tools, this cycle uses a plunge check to move the tool in and out of the laser beam in the axis used for length setting.

For solid tools, a high-speed broken tool mode is available; this cycle is particularly suited to wet conditions.



Cutting edge and profile checking

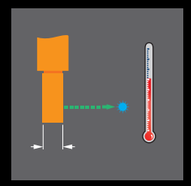
The chip detection cycle is used to check for tool flute defects or missing cutter inserts.

For more complex tools, a profile check is used to verify the specified form of a profiled cutting tool.

Cutter radius measurement

This cycle measures the effective ball nose or corner radius of a tool whilst it is rotating.

This is particularly important for high-end part manufacture, where the positioning of the tool, relative to its profile, is critical to accurate machining.



Temperature compensation tracking

Run this cycle on a regular basis during machining operations to compensate for growth in the spindle axis and or radial measuring axis caused by temperature changes in the machine tool.

To learn more about our extensive range of macro cycles, visit **www.renishaw.com/toolsettingsoftware**

Superior optical protection system

Renishaw NC4 systems use a combination of smart environmental protection technologies to protect their precision optics. This ensures that systems remain functional, accurate and repeatable.

The NC4 systems use a simplified electrical and pneumatic installation, without mechanically moving parts or M-code requirements.

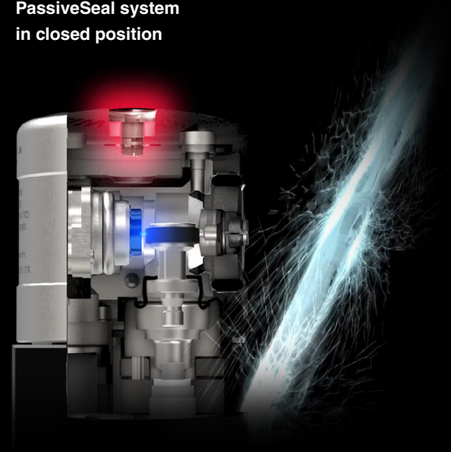
Renishaw's MicroHole™ technology features a continuous stream of compressed air through a very small and precise laser-drilled hole.

Air flows out of the MicroHole at over 250 m/s to counteract any potential ingress of coolant or debris, providing a protection system that operates under real machining conditions.

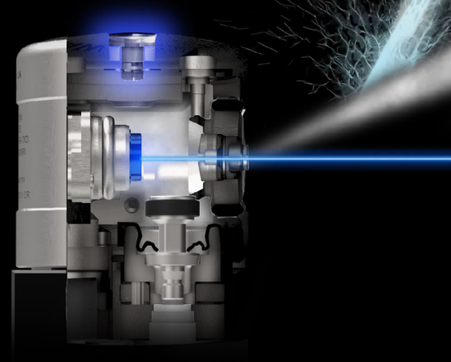
Renishaw's PassiveSeal™ system provides an additional layer of protection, preventing the contamination of optics if the air supply is shut off.

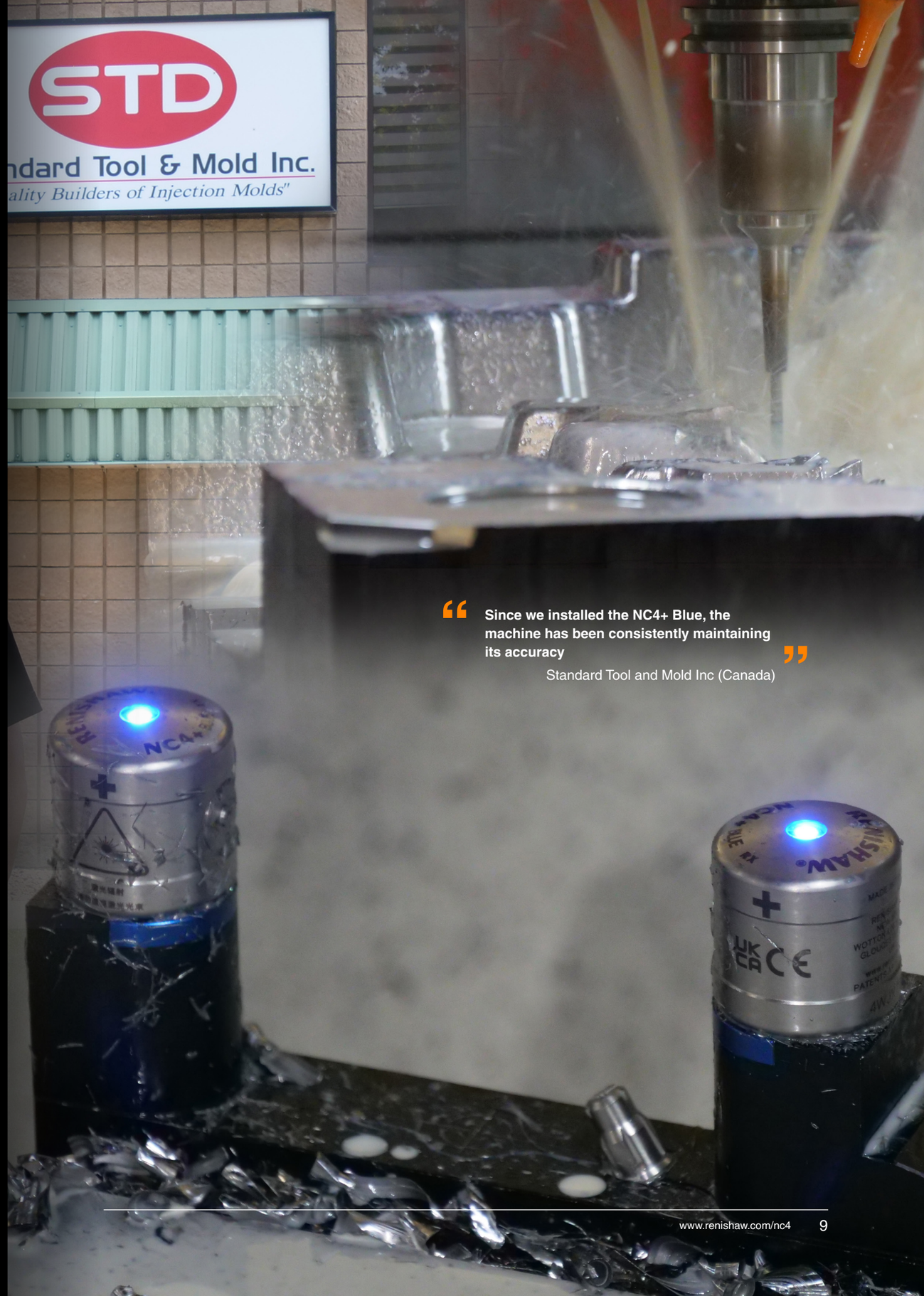
This combination ensures that NC4 systems are protected at all times.

PassiveSeal system in closed position



PassiveSeal system in open position





> **Since we installed the NC4+ Blue, the machine has been consistently maintaining its accuracy**
>
> Standard Tool and Mold Inc (Canada)

NC4+ Blue fixed systems

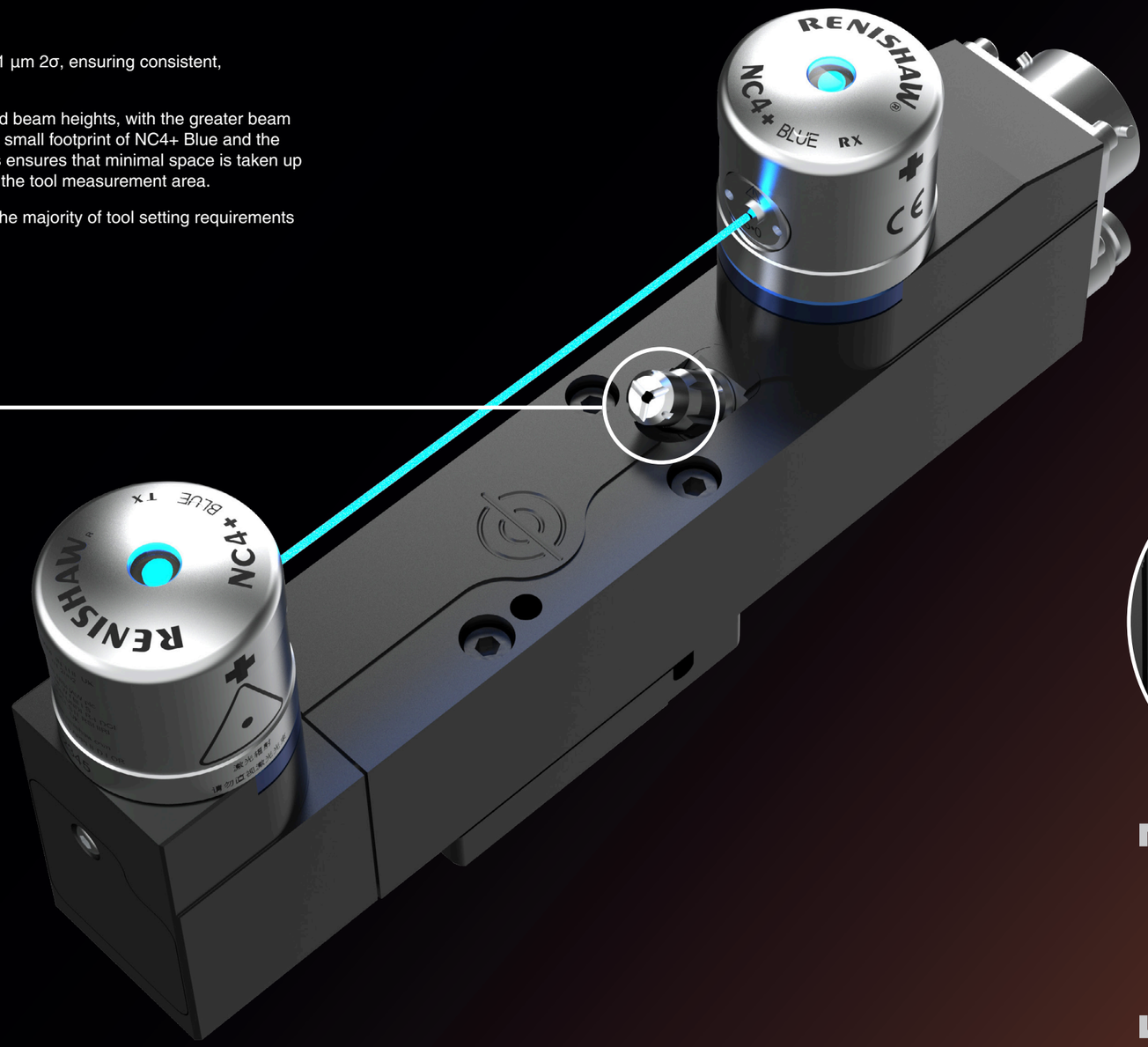
Fixed systems offer the best tool setting and measurement performance and are suitable for all sizes and types of machine tools.

Enhanced performance

NC4+ Blue fixed systems deliver repeatability down to ±0.1 µm 2σ, ensuring consistent, high-precision results.

Renishaw's fixed systems are available in several sizes and beam heights, with the greater beam height providing better access and mounting flexibility. The small footprint of NC4+ Blue and the ultra-compact design of the transmitter and receiver heads ensures that minimal space is taken up by the system in the machining volume, whilst maximising the tool measurement area.

The fixed system range offers users a proven solution for the majority of tool setting requirements for milling operations.



Efficient removal of debris and coolant

An integrated air blast enables swift and efficient removal of machining debris and coolant from the tool prior to measurement, ensuring accurate results.

Ease of installation

A secure connector and push-fit pneumatic fittings facilitate quick and simple retrofit of NC4 hardware, especially on complex machines.

Powerful tool setting software

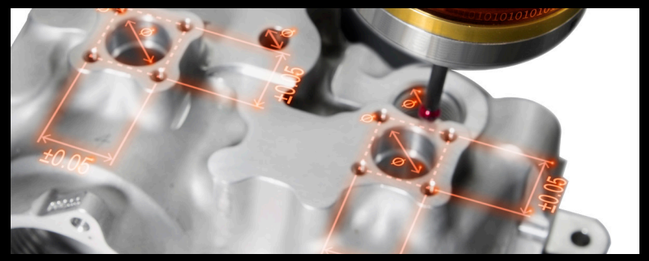
A comprehensive range of software applications with diverse programming, analysis, and reporting options.

From traditional macro-based solutions to graphical CAD/CAM-style applications, the choice of programming, analysis, and reporting options makes on-machine probing an easily accessible solution irrespective of your experience level.

Inspection Plus

Inspection Plus is the industry standard macro package for machine tools, offering solutions for part setting, inspection and in-process measurement.

Compatible with all major machine tool controller platforms, this machine-resident package is simple to program.



GoProbe app

The GoProbe smartphone app creates a probing or tool setting routine with just a few quick taps. Select the required cycle and populate the data entry fields. The result is a single-line command that is entered into the CNC controller.

Download on the App Store | GET IT ON Google Play

Set and Inspect

Set and Inspect is a an intuitive, on-machine probing app for machine tool users who require an easy-to-use probing solution. Use the app to easily create probing and tool setting routines. These routines can be manually run, run as single cycles or executed as fully automated probing routines. Set and Inspect can upload probing routines to the CNC controller automatically.

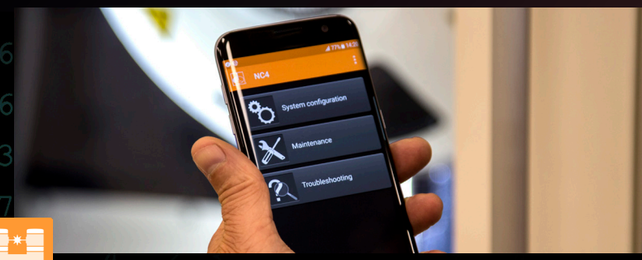
AxiSet™ Check-Up

A cost-effective solution for checking the alignment and positioning performance of rotary axes. In just a few minutes, you can identify poor machine alignments and geometry in your multi-axis machining centers and multitasking mill-turn machines. This helps reduce extended process setting times and non-conforming parts.

NC4 app

The NC4 app makes configuring and supporting the range of NC4 non-contact tool setters simple. Engineers have a single point of reference for configuration, maintenance and troubleshooting tasks at their fingertips.

Download on the App Store | GET IT ON Google Play



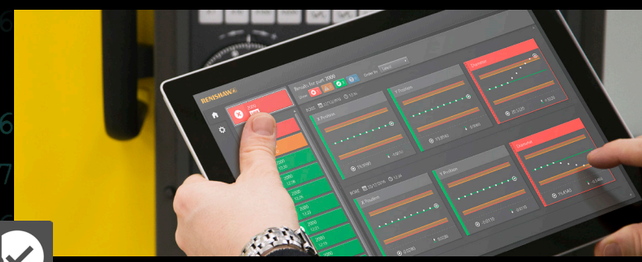
Probe Setup app

The Probe Setup app helps you easily customise your Renishaw probe settings. New Opti-Logic™ technology uses pulses of light to send and receive probe settings from a smartphone to a machine tool probe, simplifying the configuration process.

Download on the App Store | GET IT ON Google Play

Reporter

Reporter is an on-machine app designed to display measurement data and production trends quickly and easily. You can view live and historical measurement results as well as non-contact tool setting macro routines. The app is installed onto a Windows®-based CNC controller or a Windows tablet connected to the controller via Ethernet.



Renishaw Central

Renishaw Central is a smart manufacturing data platform that collects and presents process and metrology data from the shop floor. It connects to measurement devices across the manufacturing process and provides invaluable insights. Manufacturers can use these insights to analyse, identify, predict, and correct process errors before they occur.

The Productive Process Pyramid™

Tackle process variation at source, and reap the rewards

The higher the degree of human involvement in the manufacturing process, the higher the risk of error. Automated in-process measurement using Renishaw probes can help eliminate the risk. Renishaw probes facilitate the following controls for enhanced management of production processes, leading to an increase in profits.

For further details regarding the benefits of all levels of process control within the Productive Process Pyramid™, visit **www.renishaw.com/processcontrol.**

Post-process monitoring

Analyse and report on measurement data obtained.

- Determine surface condition characteristics
- Rapid, traceable reporting of part conformance to specification
- Reduce off-machine inspection time and costs

In-process control

Automated, on-machine component verification.

- Compensate for environmental and machine conditions.
- Implement adaptive machining processes.
- Reduce non-productive time and scrap.

Process setting

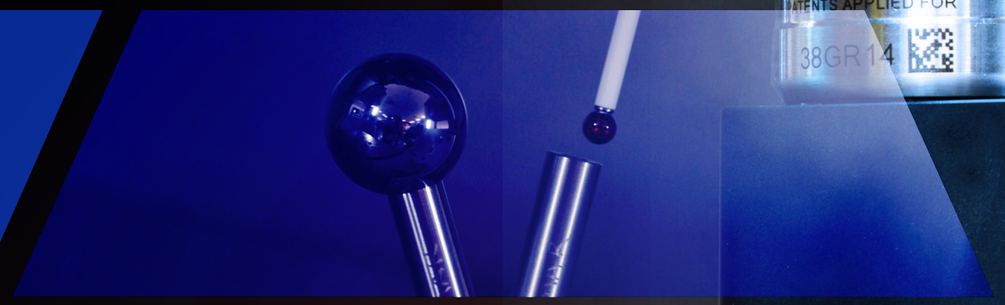
Automated on-machine part setting eliminates costly fixtures and manual setting operations.

- Automatically update machine offsets for accurate positioning and alignment.
- Introduce new processes quickly and respond to new customer needs.
- Faster set-up, improved quality, and reduced scrap.

Process foundation

Determine machine capability before manufacturing.

- Benchmark machine performance
- Schedule in-cycle checks as part of the production process
- Reduce machine downtime



> **The Renishaw NC4 system ensures product integrity, eliminates costly scrap, and also the possibility of a broken spindle, which would be hugely expensive to replace in such high-end machines.**
>
> Hope Technology (UK)

Renishaw's manufacturing solutions

Renishaw produces metrology and manufacturing equipment used in machine shops around the world.

We develop systems for manufacturers and users of CNC machine tools that are designed to maximise machine performance. Automating the set-up and process control activities ensures high-quality, highly productive manufacturing, across all industrial sectors.

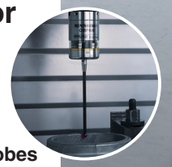
Our experience, flexibility, knowledge and close working relationships with machine tool builders ensures that our latest – and even custom-designed – technologies are easily integrated into new machine designs. These technologies can also be used during the manufacturing and commissioning of new machine tools to make machines the best they can be.

Metal 3D printing

For more information, visit
www.renishaw.com/am

Machine tool probes for component setting and inspection

For more information, visit
www.renishaw.com/machinetoolprobes

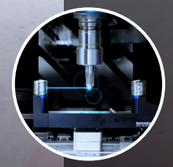


3D touch-trigger tool setters and broken tool detection

For more information, visit
www.renishaw.com/tool-setting

High-accuracy laser tool setting systems

For more information, visit
www.renishaw.com/nc4



Tool setting arms for lathes and grinding machines

For more information, visit
www.renishaw.com/tool-setting-arms

Machine calibration and optimisation

For more information, visit
www.renishaw.com/calibration

Encoders for position and motion control

For more information, visit
www.renishaw.com/encoders

CMM inspection machines

For more information, visit
www.renishaw.com/agility

Multi-sensor 5-axis measurement system

For more information, visit
www.renishaw.com/revo

Shop floor gauging

For more information, visit
www.renishaw.com/equator

The Renishaw advantage

At Renishaw, we enjoy an excellent reputation for offering strong support to our customers through a network of over 67 service and support offices worldwide.

Reduce scrap and rework

Set tools up to ten times faster than when using manual methods.

Optimise your cutting process

Ensure parts are machined "right first time".

Save time and money

Produce more parts reliably and accurately.

Probing pays

Service and support

Technical assistance

We supply technical assistance to all our global customers.

Spares and accessories

Buy spares and accessories online or obtain quotes for Renishaw parts 24/7.

Training

We offer standard and bespoke training courses to meet your requirements.

Support and upgrades

We provide a variety of support agreements bespoke to your individual needs.

RENISHAW
apply innovation™

Applying innovation since 1973

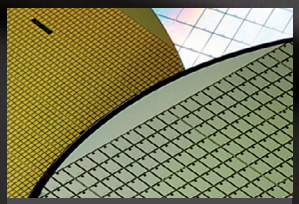
Renishaw is one of the world's leading engineering and scientific technology companies, with expertise in precision measurement and healthcare.

Our worldwide network of subsidiary companies and distributors provides dedicated global customer support, wherever you are.

Our principal markets include:


Aerospace


Automotive


Electronics


Energy


Heavy industry


Medical and healthcare


Precision manufacturing


Scientific

www.renishaw.com/nc4

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