RENISHAW
apply innovation™

Setting the benchmark for non-contact tool setting

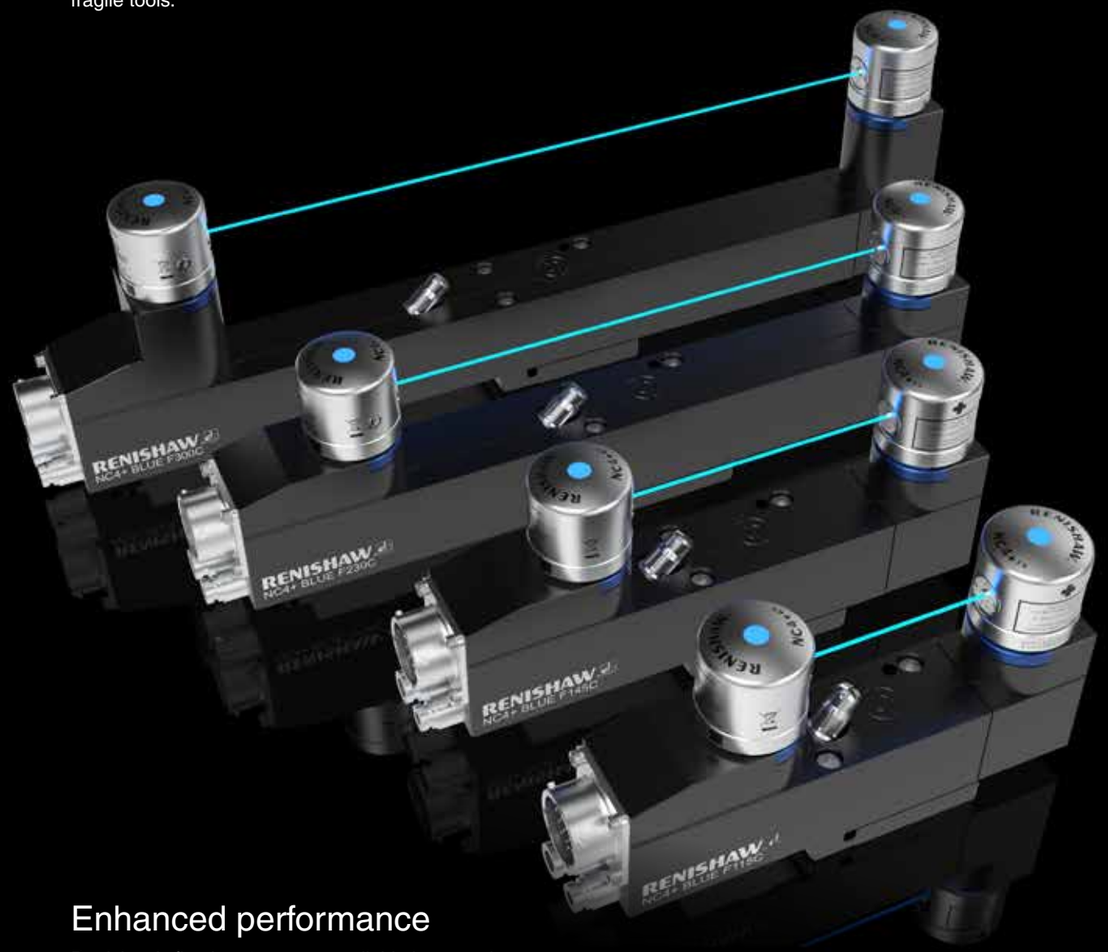
High-accuracy laser tool setting systems

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

Renishaw's range of NC4+ Blue 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 dependent upon several variables, including tool size deviation, tool run-out and tool breakage.

Renishaw's NC4+ Blue 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.



Enhanced performance

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.

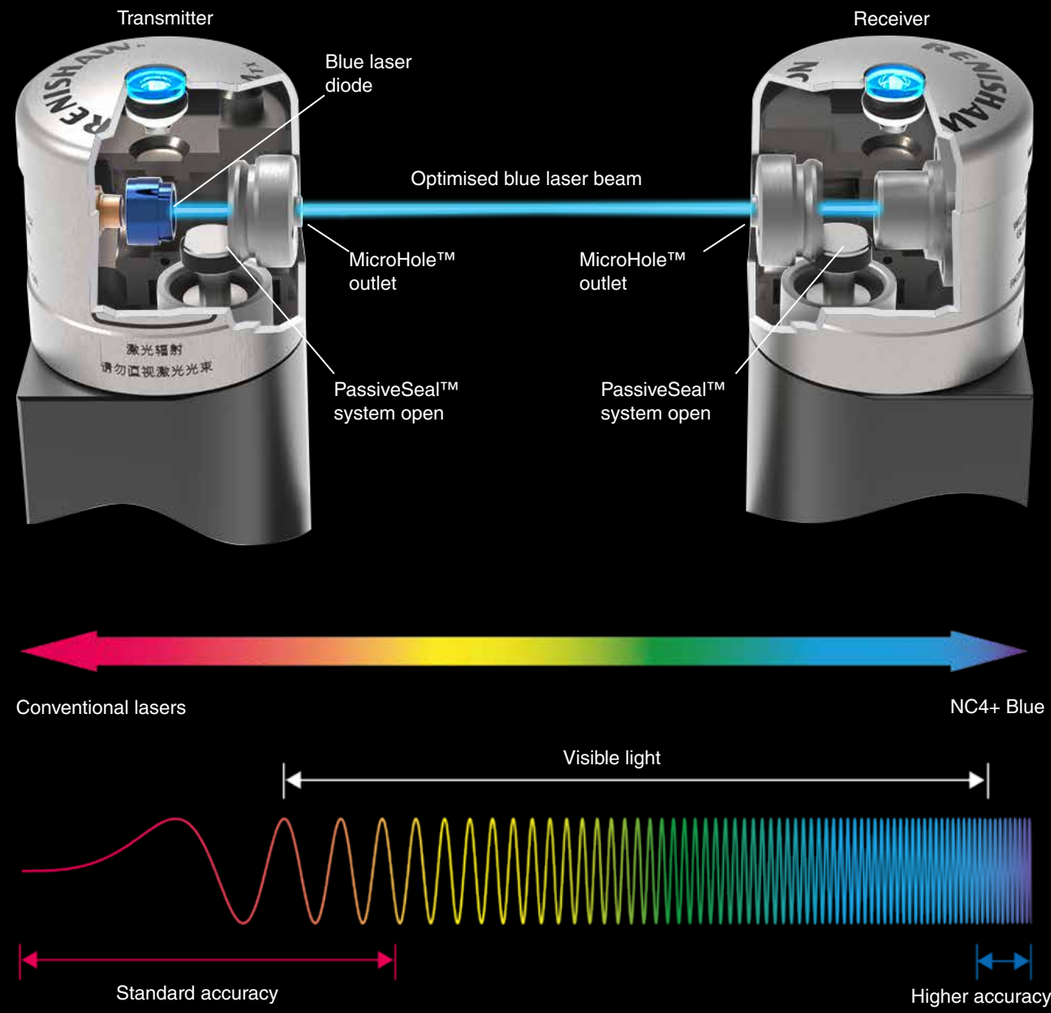
Smaller F115 and F145 units have an enhanced measurement repeatability of ±0.5 µm 2σ, with larger F230 and F300 units capable of ±0.75 µm 2σ.

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.



Built 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

Optimised measurement cycles

All Renishaw non-contact tool setters are supported by optimised on-machine software. This software features:

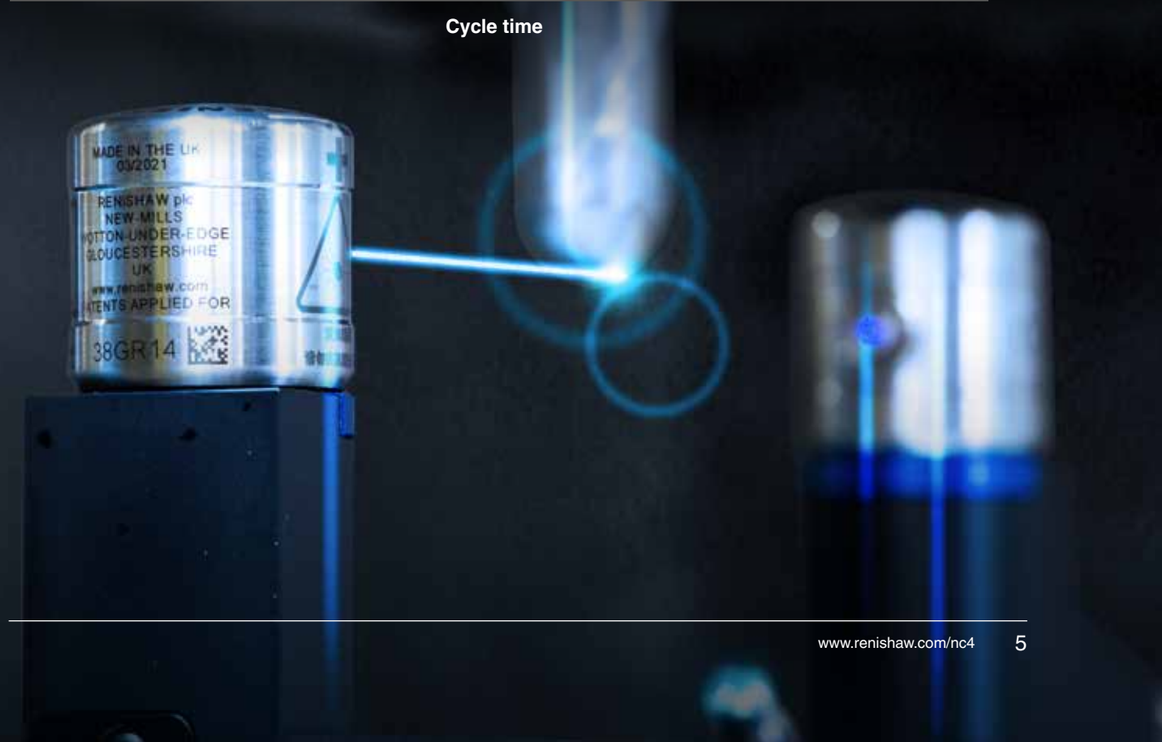
Tool Set Mode 2

Renishaw's new Tool Set Mode 2 significantly improves out-of-the-box cycle time and robustness of measurements in wet conditions. Measurement moves are made as the tool is brought out of the beam, reducing the opportunity for coolant or swarf (or other environmental factors) to interfere with the measurement.

Auto-optimisation technology

Renishaw non-contact tool setting macros feature a self-optimisation cycle. This user-selectable cycle adjusts the movement of the tool in and out of the beam, minimising wasted movement. This allows users to enhance their measurement performance without any engineering support.

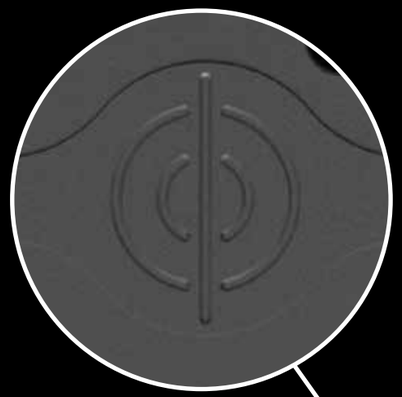
In testing, Renishaw non-contact tool setting cycles have been found to be up to 60% faster than competitor systems.



NC4+ Blue product features

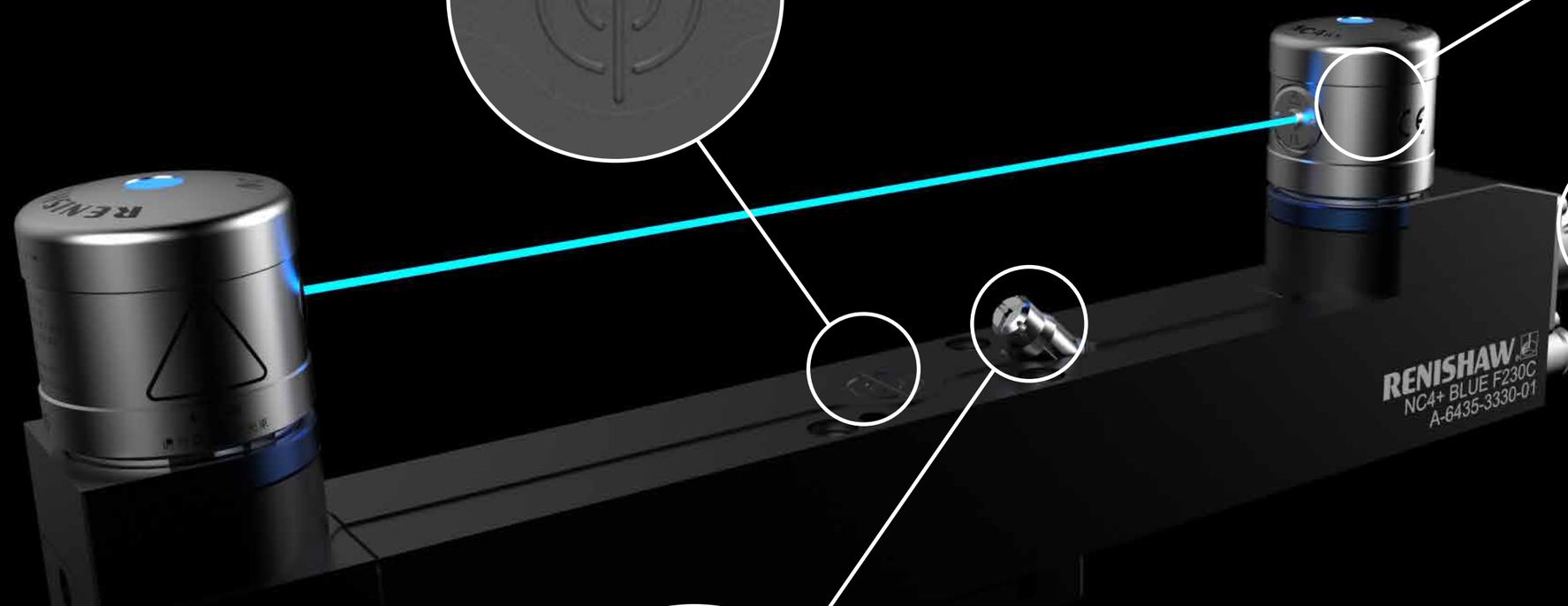
Wide calibration area

Calibrating the NC4+ Blue is simple due to the system's wide calibration area.



Environmental protection

NC4+ Blue systems use a proven and patented environmental protection system which ensures their precision optics are protected at all times.



Efficient removal of debris and coolant

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

Ease of installation

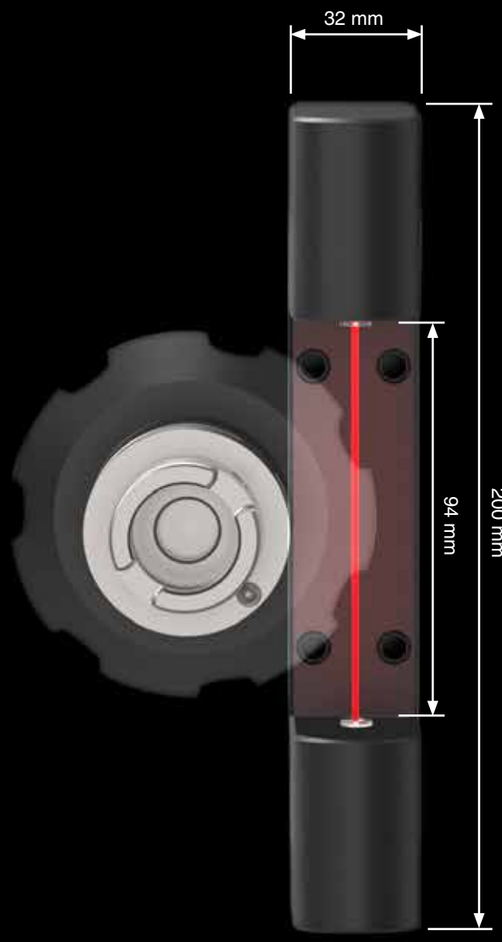
A connector and versatile mounting options enable fast and simple installation, set-up and maintenance.

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

Separate, custom and hybrid solutions

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.

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

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 systems to suit specific applications – including a range of sizes, mounting configurations and additional integrated probing systems; for example, contact tool setters for turning tools.

Powerful, flexible and intuitive software

Easy-to-use apps

Our comprehensive range of on-machine and smartphone apps ensures that NC4 systems are easy to install, configure, use and maintain.

Whether you're programming measurement cycles, reporting on feature measurements or maintaining the product, we can provide an easy-to-use solution.

GoProbe app

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

Set and Inspect

Set and Inspect is a simple, 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 control automatically.

Reporter

Reporter is an on-machine app designed to display measurement data and production trends in a quick and easy way. View live and historical measurement results from Set and Inspect-generated programs as well as non-contact tool setting macro routines. The app is installed onto a Windows®-based CNC control or a Windows tablet connected to the control via Ethernet.

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.

For more information including machine tool controller compatibility, refer to the *Probe software for machine tools-programs and features* data sheet (Renishaw part no. H-2000-2298) or visit **www.renishaw.com/machinetoolapps**

Download on the App Store

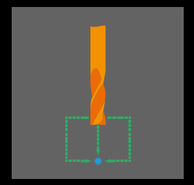
GET IT ON Google Play

Powerful macro software

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:



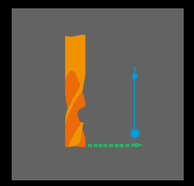
Length and diameter measurement

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

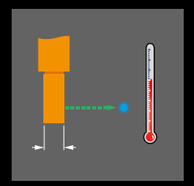
Chip detection is used to check for missing or damaged teeth, or for excessive run-out of the cutter.

For more complex tools, a profile check is used to verify the specified form of a profiled cutting tool. This cycle is particularly suitable for ball nose cutters, cutters with a corner radius, and cutters with linear profiles.

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

Used to calibrate the system, this cycle should be run 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**

System components

NCi-6 interface

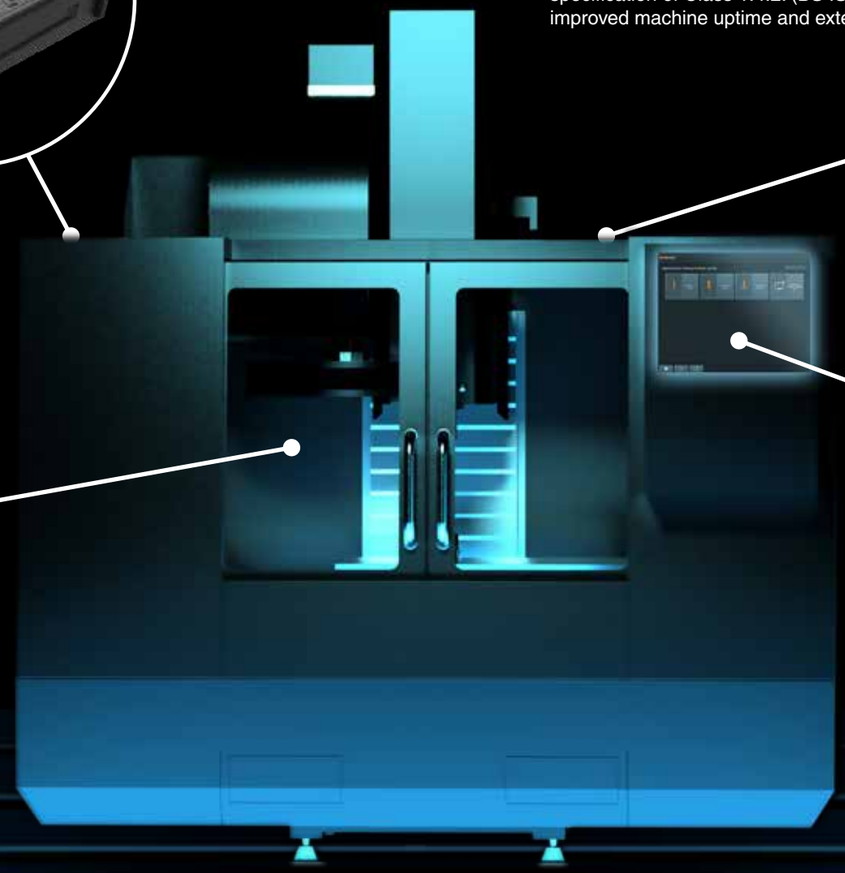
The NCi-6 interface processes signals from the non-contact unit and converts them into solid-state relay (SSR) outputs, for transmission to the CNC machine controller. The interface facilitates flexible operation of NC4 systems providing a multitude of benefits:

- Installation is simple. The interface uses simple wiring schemes, suitable for a wide variety of machines and controllers.
- Full backwards compatibility with legacy NC4 systems and applications, allowing for ease of upgrades or new installations.
- Few M-Codes required for installation.
- Dual measurement mode improving performance and robustness in wet machining environments.

Air preparation kit

Provides NC4 systems with clean, dry air to protect the optics from coolant and swarf. Simple to install and no M-codes are required for standard operation.

This high-performing air preparation kit provides superior air quality specification of Class 1.4.2. (BS ISO 8573-1: 2010), facilitating improved machine uptime and extending maintenance intervals.



NC4+ Blue non-contact tool setter

NC4+ Blue systems are ultra-compact tool setters optimised for use on a variety of machine tools. This tool setting system offers a number of key benefits:

- Industry-first blue laser technology delivers a step change in tool measurement accuracy.
- A unique slimline profile maximises the usable area of the tool setter.
- Custom and hybrid options available to suit your specific machine design.

On-machine software

Our range of machine tool apps and macro cycles deliver a number of key benefits:

- Wide range of measurement cycles, with programming options for both novice and experienced operators.
- Compatible with all major CNC controller brands.
- Single point of reference for configuration, maintenance and troubleshooting tasks via the NC4 app.

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's range of NC4 non-contact tool setters can facilitate the following measures for enhanced management of your production, leading to an increase in your 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

Renishaw offers a range of other systems which enable users to check their processes and finished parts against their specifications, as well as log process routes and outcomes.

For more information, visit **www.renishaw.com/postprocessmonitoring**

In-process control

Automated tool condition monitoring.

- Improve process capability and traceability
- Detect broken tools in-process
- Compensate for environmental and machine conditions
- Measure tool profiles
- Reduce non-productive time and scrap
- Increase productivity and profits

Process setting

Automated on-machine tool setting eliminates manual setting operations.

- Establish height offsets and check tool length is within tolerance
- Determine diameter when spinning to establish tool size offsets
- Compensate for dynamic effects on the machine tool
- Eliminate manual setting errors and data entry
- Set up faster, improve quality and reduce scrap

Process foundation

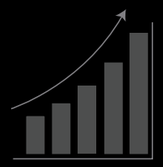
Renishaw offers a range of other systems which enable users to gain a greater understanding of their machines' capabilities and keep control of their performance.

For more information, visit **www.renishaw.com/processfoundation**

> **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)

Probing pays with Renishaw

Optimise your cutting process



Ensure parts are machined “right first time”.

Reduce scrap and rework

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

Save time and money

Produce more parts reliably and accurately.

The Renishaw advantage

At Renishaw, we enjoy an excellent reputation for offering strong support to our customers through a network of over 70 service and support offices worldwide.

Technical assistance

We supply technical assistance to all our global customers.

Support and upgrades

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

Training

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

Spares and accessories

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

RENISHAW

Applying innovation since 1973

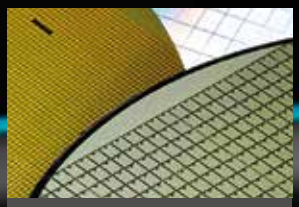
Renishaw is one of the world's leading engineering and scientific technology companies, with expertise in precision measurement and healthcare.

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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