Probes for machining centres,
tool setting, job set-up and inspection

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Reduce set times by up to 90% and inspect on your machines

Accurate

Set tools and detect broken tools on your machine in seconds

Flexible

Locate work pieces and set offsets in seconds, even on small high-speed machines

Cost effective

Save time and reduce operations by accurate inspection on your machines

Your setting time could be productive time...

Why probe?

Time is money. Time spent manually setting work piece positions and inspecting finished product is better invested in machining. Renishaw's probing systems eliminate costly machine down-time and the scrapping of components associated with manual setting and inspection.

Your machining centres represent a large capital investment – fast metal removal and the ability to produce intricate parts are just some of the machine's many assets. Your machines are only profitable when they are producing good parts.

Do you have unprofitable downtime?

Why are most of your machines IDLE for hours?
SIMPLE. Many companies are still setting tools and parts MANUALLY, and inspecting parts REMOTE from the machine – both result in an expensive piece of equipment lying idle.

REDUCE your downtime and scrap – INCREASE uptime and accuracy

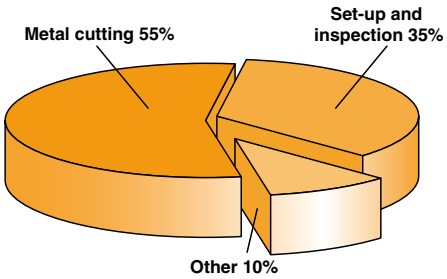
Manual tool-setting, job set-up and inspection are time consuming, and prone to operator errors. Probing eliminates the need for tool presetters, expensive fixtures and manual setting with dial indicators. The probing software automatically compensates for tool length and diameter, work piece position and dimensional errors.

Do your machines usually sit idle during 1st-off inspection? Manual gauges rely on operator skill, removal of parts to CMMs or other off-line inspection systems, all of which can take considerable time. Probes can inspect parts on the machine in less time and offsets can be adjusted automatically.

Renishaw probes are used by companies worldwide to increase productivity and improve part quality. They can be specified as standard equipment from most leading manufacturers. Simple installation allows probes to be retrofitted to machines already installed.

Powerful software packages are available from Renishaw using easily programmable macros for tool setting, workpiece set-up and measurement. These probing cycles, viewed as industry-standard, are simply incorporated into part programs and automatically called with standard machine codes.

How much time do you spend manually setting your CNC machining centre?



Typical available production time without probing systems

RMP60 - Radio transmission probe

Don't take our word for it listen to our customers

"The use of probes has reduced set up times by an average 90% and we wouldn't be without one now"

Kenard Engineering (user of machining centre tool setting and spindle probes)

"For less than 10% of the basic cost of an 'off machine' tool pre-setter, Renishaw provided a tool setting system that has transformed our production"

Haigh Engineering (user of machining centre tool setting systems)

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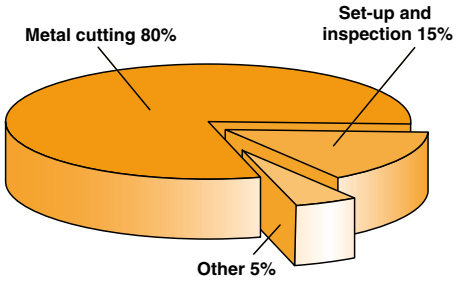
Cut that time by up to 90% with probing AND cut more metal



Typical available production time with probing systems

OMP60 - Optical transmission probe

"Probing is one of the biggest cost savers in the entire operation"
Komatsu (UK) Ltd

"The success of the probing system has now enabled overnight and unmanned operations to be carried out with confidence"
Helander Precision Engineering

"Inspection is rarely sending parts back – the probing gets it right first time"
Deloro Stellite

"With the probe, the machine operator has more confidence and the work is consistently accurate"
BIS valves

Reduce tool setting and job set-up times

- Cut non-productive setting to a fraction of the time you take now.
- Reduce your machine downtime and cut more metal.
- Let the probing software automatically update the machine faster and with no errors.

Reduce scrap due to setting errors

- The spindle-mounted probe accurately locates components and detects misloads.
- Your set-up becomes highly repeatable – scrap due to inconsistent setting is eliminated.

Reduce expensive fixture costs

- No need for expensive alignment fixtures – use simple clamping and the spindle-mounted probe will locate your parts.

Reduce operating costs

- Operator to machine ratio is reduced.

Improve process control

- Check components and reduce downtime associated with off-machine control.
- Inspect key features on high value parts – essential for unmanned machining.

Detect broken or incorrect tools

- Perform tool verification and broken-tool detection, allowing corrective action e.g. Call operator or change for 'sister' tooling automatically.

Improve safety

- Fully automatic operation so that all machine guarding remains closed during setting or inspection.

Job set-up/in-cycle gauging/post-process inspection

Optical probes from Renishaw

Renishaw's wide range of optical probing systems cater for high-speed machines fitted with HSK and small taper spindles, right up to high accuracy measurement for complex and contoured part inspection. All feature a robust optical transmission system - in most cases featuring 360° transmission and turn on capability for ease of installation and calibration. Included in the range are high power transmission systems for larger machine tools.

Renishaw probes are engineered to withstand harsh machine tool environments and are highly resistant to false triggering.

OMP40 – ultra compact probe

The OMP40 from Renishaw meets the demand for probing on small machining centres and the growing family of high-speed machines fitted with HSK and small taper spindles. The length of the OMP40 matches typical tooling lengths, bringing the significant advantage of probing to such small machines for the very first time.

- **Compact design - Ø40 mm x 50 mm in length**
- **Miniaturised electronics without compromising performance**
- **Industry leading continuous battery life of over 200 hrs**
- **Probe transmits through a full 360° at 90° angle to the spindle with a range of over 4 m**
- **Fully compatible with existing Renishaw optical systems & can be used with high-speed, single touch or double touch probing routines**
- **Simple probe configuration via Renishaw trigger logic**

OMP60 with OMI-2 - optical transmission system

The OMP60 spindle probe is ideal for medium and large machining and mill-turn centres. When combined with the new OMI-2 integrated interface/receiver, the system benefits from the state-of-the-art modulated optical transmission method to provide the highest level of resistance to light interference.

The probe is compatible with existing OMM/MI12 and OMI receivers, enabling current MP7, 8, 9 and 10 users to benefit from some of its innovative features.

- **Compact size Ø63mm x 76mm in length**
- **Probe transmits through a full 360° at 90° angle to the spindle with a range of over 6m**
- **User selectable switch-on/switch off methods**
- **Simple probe configuration via Renishaw trigger logic**
- **Improved resistance to shock and vibration**

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MP700 – high accuracy measurement

The MP700 features strain-gauge sensing technology, providing the most accurate machine tool probe available.

With a low and consistent trigger force in all sensing directions, the MP700 is ideal for complex and contoured part inspection.

- **Superior 3D measurement performance probe repeatability of 0.25 µm (2σ)**
- **Simplified calibration allows measurement in all directions**
- **Stylus diameter as small as Ø0.25 mm and a maximum stylus length of 200 mm (7.87 in) can be used**
- **Significantly longer life due to proven solid state technology**
- **In-process measurement of complex, contoured parts and inspection of large components with deep through holes**
- **Probe transmits through a full 360° at 90° angle to the spindle with a range of over 6 m**

MP700E

An alternative to MP700, allowing high accuracy measurement on large/multi-axis machines - transmission range up to 9.5 m.

RMP60 radio transmission system

Radio signal transmission enables inspection probes to be used on larger machines or 5 axis machines where line of sight between the probe and the receiver cannot be guaranteed.

Renishaw has developed a radio system which works in the 2.4 GHz frequency band, enabling signal systems for world-wide use.

The RMP60 radio probe, paired with the RMI integral interface and receiver, is the first to use frequency hopping spread spectrum (FHSS) transmission. The system offers rapid part set-up and part verification on machining centres of all sizes.

- **2.4 GHz radio transmission, allows single system for world-wide use**
- **Simple setting - no channel selection required**
- **Compact in size, the RMP60 can access surfaces cut with short tools**
- **Spherical transmission with 15 m range**
- **Partner RMP60 and RMI systems allow interference free multiple probe installations**
- **The RMI eliminates the need for a separate interface, saving room in the control cabinet**

Probing for the whole range of CNC machining centres

Renishaw job set-up/inspection probes are in use on tens of thousands of CNC machines throughout the manufacturing industry, improving machine output and process consistency. Renishaw has perfected and proven a range of probes appropriate to all the different CNC machines now available, all sharing certain key features.

Renishaw probes provide rapid, automatic and consistently accurate results

Repeatable

Probe repeatability of 1.0 µm (2σ), sensing in ±X, ±Y, +Z.

Rugged

High resistance to shock and vibration. Sealed to IPX8, resistant to coolant and swarf.

Reliable

Renishaw probe mechanism with proven accuracy over millions of operations.

Easy-to-use

Industry-standard software and minimal probe maintenance, including long battery life.

Tool setting/tool breakage detection

Tool setting solutions for every application

Tool setting systems save up to 90% of the time taken for manual setting on your machine and can give feedback on broken tools. Renishaw offers the TS27R contact system for tool setting and broken tool detection as well as a variety of non-contact systems. Detailed information on these non-contact systems can be found in the 'Non-contact solutions brochure'. Visit www.renishaw.com/mtp

The laser beam or probe stylus is effectively a reference point on your machine. When the tool triggers the system, the machine's axes positions are captured and the position of the tool edge is recorded. Further points are taken as necessary to determine tool dimensions.

Rugged
Sealed to IPX8; resistant to coolant and swarf.

Reliable
Solid-state optics or proven probe mechanism.

Easy-to-use
Industry-standard software and minimal probe maintenance.

Non-contact solutions

NC4 compact high-speed tool setting and breakage detection

The NC4 is a flexible laser system with ultra-compact laser tool setting transmitter and receiver units that can be mounted on separate brackets, or as a single fixed system. The F95, F115 and F230 additions to the series, set new performance standards in small packages.

- **Ideal for machines previously unsuitable for large non-contact systems**
- **New PassiveSeal™ protection device**
- **Specified repeatability ±1.0 µm (2σ) at 1 m separation. Typical repeatability of ±0.1 µm (2σ)***
- **Measure and detects tools of Ø0.03 mm* or larger**

Contact solution

TS27R – cost-effective tool setting for all machining centres

The TS27R is the standard tool setting probe for machining centre applications. A compact, robust design allows simple fitment to the machine bed or bracket mounting where appropriate.

- **Tool length and diameter precisely measured on the machine – no pre-setting of tools required**
- **Rotating tools can be checked for length or diameter without wear to tool or stylus**
- **Automatically set a complete suite of tools in minutes**
- **Verification of tools, by checking length and diameter, detects accidental mis-selection.**
- **Stylus protected by a weak link, preventing probe damage in the event of a collision**

Non-contact tool recognition

TRS1 tool recognition

The TRS1 is the new, single-sided tool recognition system from Renishaw. Conventional non-contact broken tool detection systems depend on the laser beam being blocked (tool OK) or not blocked (tool broken).

The TRS1 is different. It offers benefits beyond other tool breakage systems, as it does not merely look for a change in light levels. The new tool recognition technology distinguishes between the tool and coolant or swarf, whilst it is also fast and reliable under real machining conditions.

FEATURES:

- **Cost effective, fast and reliable tool breakage detection device**
- **Detection of tools as small as Ø0.5 mm* with the tool typically spending about 1 second in the laser beam**
- **Inexpensive and easy to install, as all the components are housed in a single unit**
- **Ability to detect tools from 0.3 m to 2 m away**

* Dependent on separation and mounting

Detailed information on ALL non-contact laser systems can be found in Renishaw's 'Non-contact solutions' brochure.

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Renishaw software – comprehensive and easy to use

Renishaw has experience of all applications for probing on machining centres and has developed several software packages to suit. PC software with easy to use GUI's (graphical user interfaces) simplify the creation of probing cycles and remove the reliance on key individuals.

PC software uses post-processors to produce the output, which can automatically combine the metal cutting and the probing cycles, limiting the risk of typing errors.

Renishaw also produce a range of traditional machine resident software routines. These have easy to use commands (often just single line) which are written into the CNC program.

Renishaw software packages are available for all the major CNC controls.

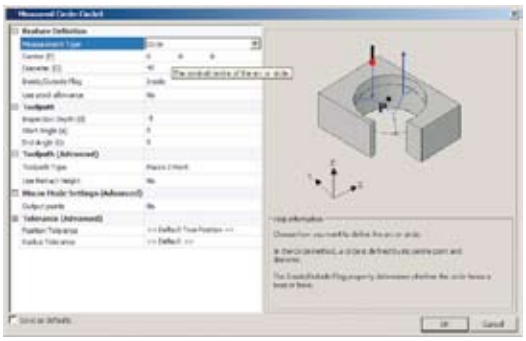
Job set-up and inspection routines

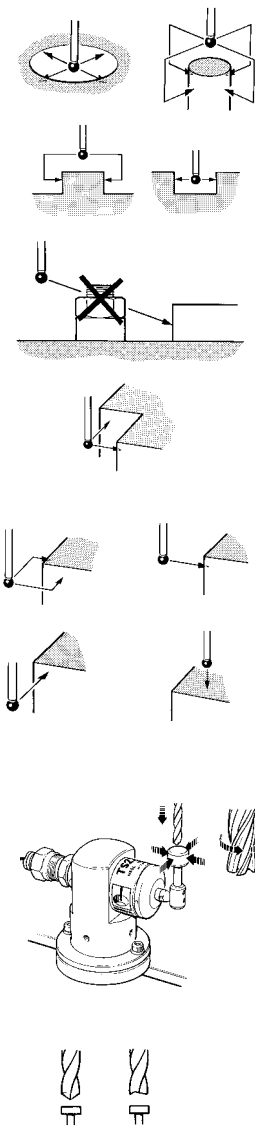
Job set-up/inspection software is used for:

- Size control – tool offsets can be corrected automatically.
- Position control – work offsets can be updated for accurate component positioning.
- Measurement error – can be stored in a spare tool offset.
- Tolerance band – can be set to give an alarm if the material is out of tolerance.
- Measurement results – can be printed through the RS232 port to a printer or computer.

Typical cycles include:

- XYZ single surface measure
- Bore/boss measure
- Web/pocket measure
- Angle measure
- Protected positioning





Tool setting and tool breakage detection routines

Tool setting / tool breakage detection software is used for:

- Static tool length setting (taps, drills etc).
- Rotating tool length setting of single point and multiple tip tools (face mills, large cutters etc).
- Rotating tool diameter setting of single point and multiple tip tools (slot drills, boring bars etc).
- Fully automated measurement cycle with tool change, positioning and offset correction.
- High speed tool breakage detection by length or diameter measurement.
- Cutting edge checking – check each facet of a multi-faceted tool for damage (NC4 only).
- Form checking of tool radii (NC4 only).

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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 and digitising 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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