

Reduce setting times by up to 90% and improve your process control



**Set tools on your
machines in seconds**



**Detect broken tools on
your machine in seconds**



**Save time and reduce
operations with accurate
inspection on your machines**

Reduce setting times by up to 90% and improve your process control

Use probes . . . cut more metal and save money

Why probe?

Your turning 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. **But** your machines are only profitable when they are cutting metal. Then why are they **idle** for hours?

Simple. Many companies are still setting tools and parts **manually**, and inspecting parts off the machine - both result in an expensive piece of equipment lying idle.

Every day you have **unprofitable** downtime.

Reduced downtime/scrap

Manual tool setting, job set-up and inspection are time consuming, non-repeatable processes and prone to operator errors. Probing eliminates the need for tool pre-setters, expensive fixtures and time-consuming test cuts. The probing software automatically compensates for tool length and diameter, workpiece position and dimensional errors. Therefore, by using probes, you **reduce** downtime and scrap.

Inspect on your machine

Do your machines usually sit idle during 1st off inspection? Manual gauges rely on operator skill, whilst removal of parts to CMMs or other off-line inspection stations can take considerable time. Probes can inspect parts on the machine in less time and offsets are adjusted automatically (removing the possibility for keying errors).

You will see **increased** uptime and accuracy.

Renishaw probes are used by companies worldwide to increase productivity and improve part quality. They can be specified as standard equipment from most leading turning centre manufacturers. Ease of fitting allows probes to be retrofitted to many machines.

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

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



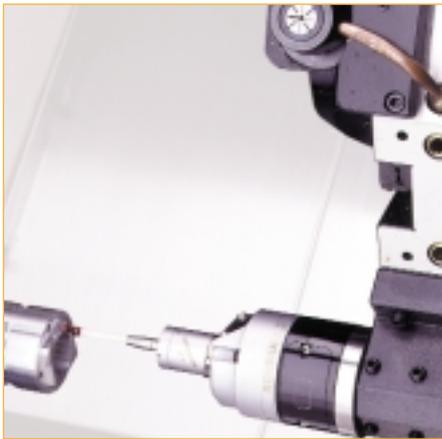
“Setting and change over times have been reduced by 35%. The success of the probing system has now enabled overnight and unmanned operations to be carried out with confidence”

Helander Precision Engineering (user of lathe tool setting system)

“The Renishaw probe has cut actual setting times from an average of 3½ hours to just 1 hour. In future we would not consider a machine that did not include probing”

Solartron Group (user of lathe tool setting system)

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



“The Renishaw probe allows our customer to machine and finish to size, cutting out the previous manual finishing operation”

Audit Machining Systems (CNC lathe rebuilder)

“The Renishaw probing system has not only led to set-up time being reduced by 60 minutes and a 90% reduction in scrap, but has also increased the capacity of the machine, showing an annual saving of £34,000”

RHP Aerospace (user of tool setting and turret-mounted probes)

Reduce tool setting and job set-up times

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

Reduce scrap due to setting errors

- Your set-up becomes highly repeatable. Scrap, due to inconsistent setting, is eliminated.
- Accurately detect component position.
- Detect component misloads.

Improve your process

- Check components on the machine and reduce down time associated with off-line control, both in-process and post-process.
- Inspect key features on high value parts, essential for unmanned machining.
- Identify excess material, saving on ‘fresh air’ cutting, giving cycle time improvement.
- Record part dimensions for statistical process control (SPC).

Detect broken tools

- Rapidly check for broken tools with automated setting arms, essential for unmanned machining.

Improve safety

- Fully automatic operation allows machine guarding to remain closed during setting or inspection.

Reduce setting times by up to 90% and improve your process control

Tool setting and breakage detection

The 'HP' arm series – Cost-effective tool setting for all turning centres

Renishaw's high precision (HP) range of tool setting arms offer highly repeatable operation on all types of turning centre. The HP range is continuously being developed and currently offers three powerful solutions.

Both arm systems can be used with standard tool setting inputs on CNC controls, macro software with high-speed, single-touch probing routines, or double-touch routines for controllers without high-speed-skip option.

HPRA – High precision removable arm

The HPRA is a 'plug-in' arm which is manually located in the machine when tool setting is performed, and then removed once the process is completed.

The arm is locked into a repeatable kinematic location on a mounting base during operation, enabling the probe stylus to be re-located to within 5 μm (2σ). When not in use, the HPRA is stored on a stand located on or near the machine.



Key features

- Removable arm with highly repeatable mounting
- Available in a wide range of sizes to suit most requirements
- Uses the robust RP3 probe, allowing setting on 'Y' axis machines
- Bi-colour LED for continuous feedback on system status
- Uses minimal machine space when stored
- Retrofittable to existing machines

HPPA – High precision pull-down arm

The HPPA is a simple, manually operated 'pull-down, push-up' system, which is permanently located within the turning centre, and readily available for tool setting operations.

An innovative, patented rotary device automatically locks the arm into a kinematic location, with no additional adjustment or locking device required. This enables the probe stylus to be re-located to within 5 μm (2σ).



Key features

- Pull-down arm with highly repeatable operation
- Available in a wide range of sizes to suit most requirements
- Available in a range of standard configurations – customised sizes can be specified
- Long-life rotary device durability
- Low thermal growth steel arm
- Uses robust RP3 probe
- Bi-colour LED for continuous feedback on system status
- Uses minimal machine space when stowed

HPMA – Fully automatic tool setting and broken tool detection

The HPMA is an electrically powered tool setting arm allowing precision automated tool setting. Rapid arm actuation allows in-process tool setting and broken tool detection without the need for operator intervention.

The HPMA arm swings down (under full program control) and locks into position. After tools are set, or checked for breakage, a program command returns the arm to a safe position away from the machining operation.

Key features

- Fully automatic arm with highly repeatable positioning
- Rapid actuation
- Full program control of tool setting and broken tool detection
- Available in a range of standard configurations – customised sizes can be specified
- Uses 3-axis probe module allowing setting on 'Y' axis machines
- Bi-colour LED for continuous feedback on system status
- Uses minimal machine space when stowed



How can a 'repeatable' tool setting system help you?

In tool setting, accuracy is dependent on the machine tool. The main difference between arms is the level of repeatability offered i.e. the ability of the arm to provide a consistent point of reference. This gives major user benefits:

- **Tools are set relative to each other AND the machine datum**
- **For a new job, tools need only be set against the probe stylus**
- **The need for trial cuts by the operator is reduced**
- **If a tool insert breaks then the new insert need only be datumed against the probe stylus - the existing workshift offset will be correct**

Tool setting solutions for every application

Tool setting systems save up to 90% of the time taken for manual setting on your turning centre and can give feedback on broken tools (with an automated tool setting arm). Renishaw offers three powerful tool setting arms for turning centres.

HPRA
Manually located removable arm



HPPA
Manually operated 'pull-down' arm



HPMA
Fully automated arm



The probe stylus is effectively a reference point on your machine. Tools are driven against the probe stylus with the tool either static or rotating; when the probe triggers the machine's axis positions are captured and the position of the tool edge is recorded. Further points are taken, as necessary, to determine tool dimensions.

Repeatability

Within 5 µm (2σ)

Rugged

Arms sealed to IP68, resistant to coolant and swarf

Reliable

Proven probe mechanism

Easy-to-use

Industry-standard software, simple arm mechanisms and minimal probe maintenance

Reduce setting times by up to 90% and improve your process control

In-cycle gauging/post-process inspection

LP2 and LP2H inspection probes

The LP2 and LP2H are three-axis, high performance compact probes. The LP2H has a higher spring force, allowing the use of larger styli and giving greater resistance to machine vibration.

Both probes can be fitted to the 'LT' family of optical transmission systems, and with a standard M4 stylus mount, allow operators to easily fit a wide range of styli to suit most common applications.

Key features

- 5-way sensing for maximum flexibility
- Compact, robust designs
- Support a wide range of inspection styli
- Large overtravel ($\pm 12.5^\circ$) for added probe protection
- Highly repeatable operation ($1 \mu\text{m } 2\sigma$ LP2 and $2 \mu\text{m } 2\sigma$ LP2H)
- Steel construction
- Can be used in conjunction with MA4 90° adaptor and LPE extension bar



Optical transmission systems for inspection probes

Inspection probes require a remote transmission system to relay probe signals to the machine controller. The Renishaw range of optical transmission probes use infra-red signalling to enable simple installation and provide low-maintenance. Renishaw's own machining experience has led to real-world features such as full diagnostic feedback on system status and a robust design that is sealed to IPX8.

LTO2S

Suitable for most applications, LTO2S allows turret mounting using a variety of shanks. It has a robust swarf resistant steel front, whilst easy access to the battery compartment permits in-situ exchange without the need for recalibration.

LTO2T and LTO3T

Using the same swarf resistant steel front design as LTO2S these products are specifically designed with an integral parallel shank mounting. LTO3T offers extended battery life for high usage conditions.

LTO2

The smaller size of LTO2 offers benefits for space restricted applications.

Key features

- Flexibility of mounting options
- Easy to retrofit
- Range of extension bars/adaptors and styli available for special applications
- Visible LEDs for full diagnostic feedback on system status
- Robust and reliable, sealed to IPX8



LTO2S



LTO2T/LTO3T



LTO2

Renishaw software – comprehensive and easy to use

Inspection probing for CNC turning centres

Renishaw probes for set-up and inspection are in use on thousands of CNC machines throughout the manufacturing industry, improving machine output and process consistency. A proven range of probes has been developed to suit a wide range of machine applications, yet all sharing certain key features.

The operation of a turret-mounted probe is straightforward - the software routine drives the probe stylus against the surface to be measured. On contact, a trigger signal is sent to the CNC control (via the optical transmission system), taking a 'snapshot' of the machine's scale positions. The probe moves back from the surface and this process is repeated to take further points as required to assess feature dimensions and positions.

Renishaw probes provide rapid, automatic and consistently accurate results:

Rugged

High resistance to shock and vibration. Sealed for use inside machine tools and resistant to coolant and swarf

Reliable

Probe mechanism proven to be accurate over millions of operations

Easy-to-use

Industry-standard software, minimal probe maintenance, with long battery life

Tool setting software

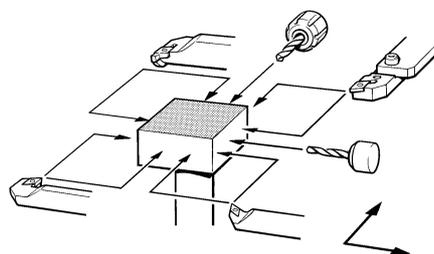
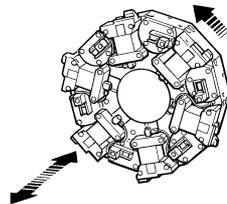
Cycle features

- **Tool length setting with automatic offset correction**
- **Tool diameter, centre line and length offset setting of static and powered tools**
- **Broken tool detection**
- **Complete turret of tools can be set for length, centre line and diameter with automatic offset correction**

Inspection software

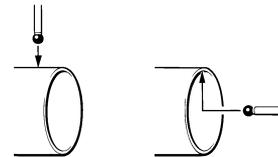
Cycle features

- **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 out through the RS232 to a printer or computer**

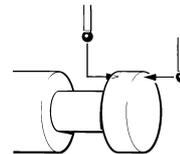


Calibration or inspection

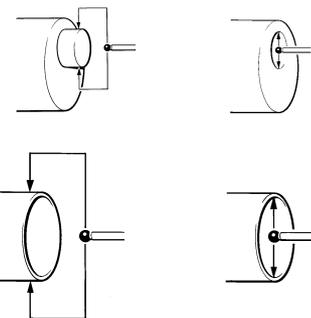
Single point radius calibration or inspection



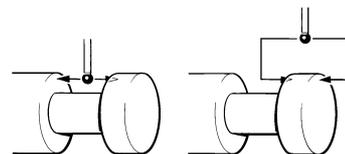
Z surface/datum position calibration or inspection



Two point diameter calibration or inspection



Rib/groove inspection



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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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