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3D feature measurement

Scanning capability for CNC machine tools

The Renishaw OSP60 on-machine scanning probe with SPRINT™ technology provides a rapid and highly-accurate solution for a wide range of measurement applications Automated part setting, in-process verification, and adaptive machining, can all benefit from the adoption of on-machine scanning. This capability note looks at using the OSP60 probe for high-speed inspection of 3D features such as spheres, cylinders and cones.

Accurate measurement of 3D features can be a difficult and time-consuming process using a touch-trigger probe. Collecting the vast quantity of data required for accurate form determination can be cycle-time prohibitive for all but the most high-value materials and workpieces. Minor defects can easily be missed, interrupted features (such as incomplete circles) can be difficult to program, and combining the information from such features can be challenging.

As a scanning solution, the OSP60 is uniquely positioned to capture the high volume of data required to accurately model full 3D features. Up to 1,000 3D data points per second at feedrates of 15 m/min (590 in/min) are possible. This provides significant cycle time advantages and a uniquely accurate, detailed understanding of true part form.

The Productivity+™ 3D Feature Toolkit is a dedicated software application for use with the OSP60. It allows 3D features such as cones, cylinders, spheres and circular sections to be programmed and inspected with ease. Simply select wire geometry from a component solid model (or program manually using supplied custom macros) to generate the required scanning toolpaths. Data obtained can be referenced in reporting statements or written to variables for machine update operations.

Resulting geometric information can also be used to perform a fitting operation before machining commences. For example, data from two circular scans can be fitted to a cylinder which can then be used to align the component to a specified machine axis.

The software contains several flexible scanning strategies allowing even interrupted or incomplete features to be scanned. Using these strategies, the results of multiple partial feature scans can be used to ‘construct’ a complete feature. For example, a series of arc features which together form an interrupted circle, can be scanned, and their individual results combined to ‘construct’ a complete circle or sphere.

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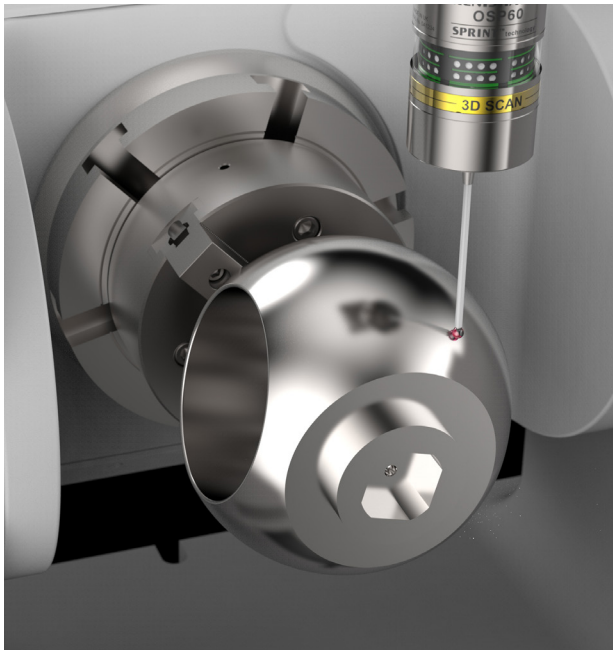
Benefits of on-machine scanning

On-machine scanning is an intelligent, automated, enabling technology that offers numerous operational benefits.

- Significant reductions in part setting, inspection cycle times and scrap.
- Data-dense inspection results. The OSP60 captures up to 1,000 3D data points every second.
- Automated setting and updating of machine parameters.
- Comprehensive feature information including dimensional data, geometric data, positional offset, angular offset and true feature form.
- Perform multiple applications such as part setting, on-machine component verification, surface condition monitoring, and machine performance verification, with a single probe and stylus configuration.
- Absolute confidence in measurement results due to continual communication between the scanning system and machine tool position data.
- Improved manufacturing capability, productivity and process optimisation.
- Complementary software solutions providing application-specific inspection capability.

Adoption of on-machine scanning solutions can introduce game-changing capability for companies in high-value manufacturing sectors. These include automotive, consumer electronics, medical, mould and die, and power generation.

The OSP60 is just one of Renishaw's many products that help you to achieve the factory of the future today.



www.renishaw.com/sprint **#renishaw**

+44 (0) 1453 524 524 **uk@renishaw.com**

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