RENISHAW
apply innovation™

Advancing robotic automation

Realise full robot potential with integrated probing



RCS P-series

Who are we?

Renishaw offers an unrivalled breadth of metrology technologies that support the manufacture of parts, sub-assemblies, and final products. With decades of experience in automated manufacturing and process control, Renishaw has helped thousands of customers in a variety of sectors to develop smarter processes.

As an industry-leading innovator, Renishaw consistently reinvests into engineering, research and development. This results in ground-breaking new solutions for our customers that demonstrate our commitment to creating unique technologies.

Renishaw in the robotics industry

The automation of manufacturing operations is now accepted industry practice. However, companies are facing up to the challenges associated with the act of automating, including inefficient installation of equipment, process-drift and longer-term maintenance considerations.

To design automation cells offline and then physically set-up, with no need to reprogram, there must be a complete understanding of the critical components in the cell. The targeted inclusion of Renishaw probes and sensors achieves this – unlocking the full potential of automation cells. These Renishaw technologies have performed a critical role in baselining and providing process control in the manufacturing and quality sectors for the past 50 years.

At present, it is not easy to monitor the performance of robots over time, and recovery after collision or component failure is reliant on the availability of skilled staff – costing production both time and money. To enable consistent, easy, fast and traceable installation, Renishaw have produced the RCS P-series, designed specifically for the industrial automation market.

Why probe in automation?

The performance of industrial robotic installations has been limited by the costly intervention from skilled engineers to set up and recover systems. By introducing an integrated Renishaw RCS P-series probing solution, key elements of the industrial cell can be located within six-degrees of freedom (DoF) relative to each other – completely changing the autonomy of industrial automation. This ties the end-effector tool centre point (TCP), the probe stylus TCP, and the part frames of workpieces together, meaning offline programming can be achieved with zero touch-ups and fast implementation.

A wide range of applications benefit from RCS P-series probing, including:

- Datuming and finding variable parts
- Locating mobile stations relative to work positions
- Accurate assembly operations and applications requiring high 3D path precision, such as dispensing, welding, machining, 3D printing and composite lay-up.

With the in-process probing solution, monitoring can be automatically carried out, updating part frames and offsets as needed. In the event of system failure automatic recovery routines can be performed.

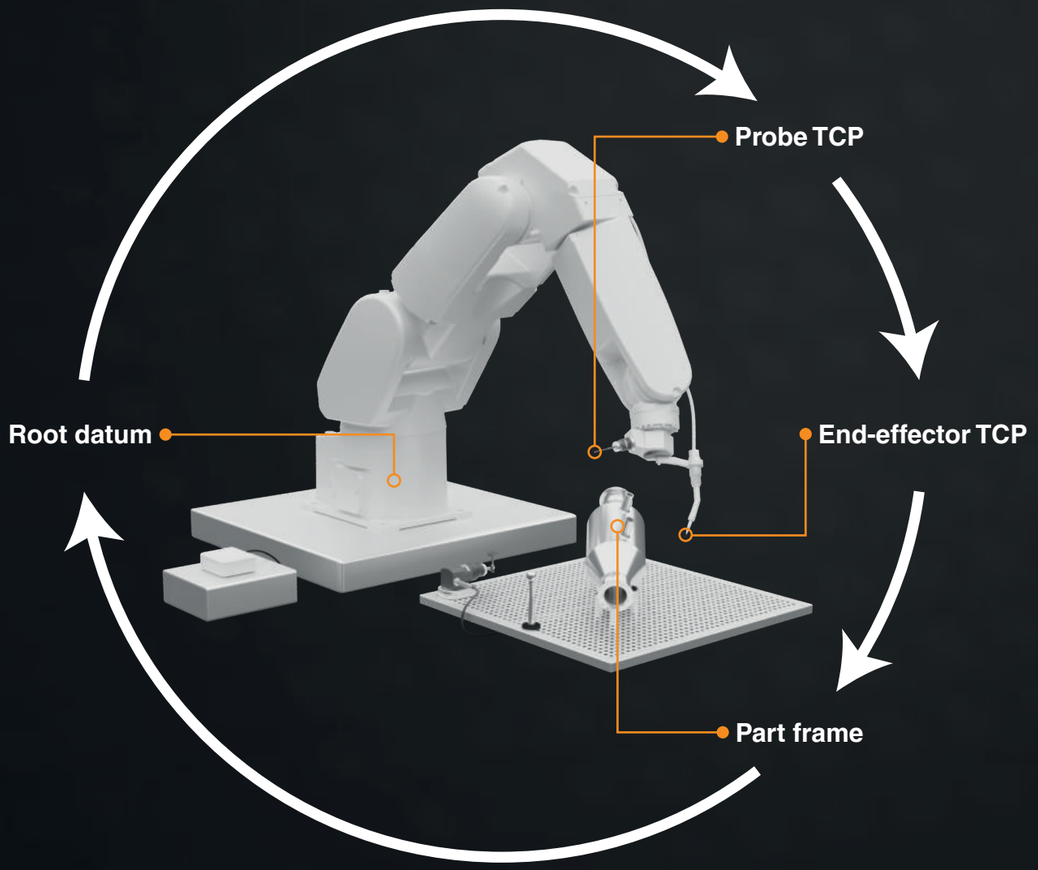
The RCS P-series is designed to be easy to integrate. Straightforward wiring, pre-scripted probing macros and teach pendant applications have been developed to get systems running quickly and without the need for extensive metrology knowledge.

Closing the metrology loop with automation

Automation cells are designed to be operated with minimal intervention, but to truly run autonomously a closed loop approach must be applied.

By introducing metrology equipment, such as kinematic probes, all critical parts of the system are understood relative to each other.

Linking the end-effector TCP, probe TCP and part frame in 6 DoF forms a metrology loop in the cell.



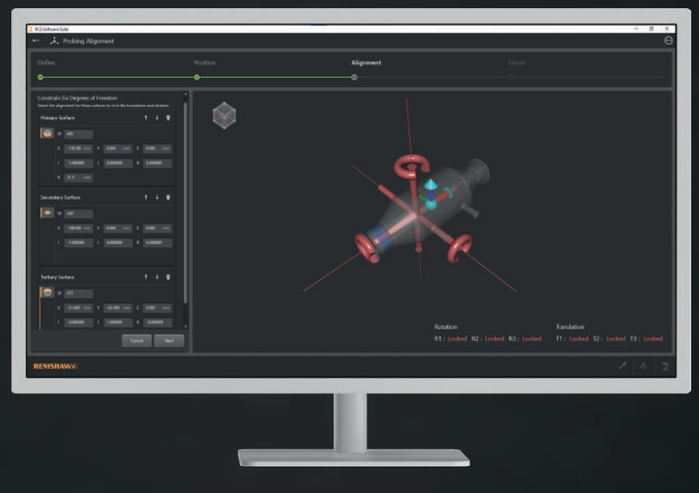
By forming the metrology loop with RCS P-series, advanced autonomous activities can be run. Cells can be designed with confidence offline, with the knowledge that a simple alignment routine will tie the digital world to the physical set-up. This removes the need for time-consuming touch-ups and reprogramming, both at cell prove out and during final deployment at the end user's site.

Probing routines enable difficult assembly operations, verify part location, and trigger automatic recovery routines, preventing unplanned downtime.

Set up your alignment in three simple clicks

With the supporting RCS Software Suite, a part datum can be easily created by either using an imported CAD model, or nominal dimensions. View which degrees of freedom remain unconstrained and quickly reorder features.

Output a template file for the inspection program, allowing metrology commands to be called from predefined Renishaw inspection macros.



A probe for all situations

Probing kits are available for hard-wired and wireless options. Renishaw's extensive catalogue of probes offers radio and optical technologies. Coupled with a tool setter, the full metrology loop can be set in cell.

The accompanying Robot Processing Unit (RPU) communicates directly with the robot controller, allowing metrology macros and datum programs to run seamlessly.



Hard-wired **Radio** **Optical**

Benefits of RCS P-series

Save time and money

Minimise downtime by automatically recovering after collisions and tracking trends in the cell over time.

Improve robot system accuracy

Understand all components of the cell relative to each other. Automatically find and update part frame and tool frame as often as needed.

Customisable set-up for any robot cell

A range of probes and tool setters (hard-wired and wireless) to suit any cell. Direct integration of macros compatible with major robot OEMs.

Simplify steps to integrate

Intuitively set up a datum through RCS Software Suite. Make probe installation accessible to all system integrators.

In-process path correction

Follow accurate 3D paths on variable parts. Align components relative to each other to achieve complex assembly operations.

Offline programming

Tie the digital world to the physical world using a simple alignment routine, reducing the need to reprogram and touch-up.

Spindle calibration

Quickly and automatically find the TCP and vector (5 DoF) of a robot-mounted spindle using a dedicated tool setter, disc stylus and advanced spindle calibration software module.

Advanced calibrated probing

By understanding where a probe is in relation to all components of a robotic cell, part datums can be set up and real-time corrections can be made - all within the certainty of a known metrology loop.

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Applying innovation since 1973

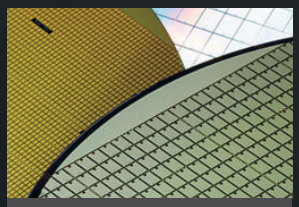
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www.renishaw.com/industrial-automation

#renishaw

+44 (0) 1453 524524 industrialautomation@renishaw.com

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