RENISHAW
apply innovation™

Advancing robotic automation

Faster, easier and more accurate commissioning and verification of robots



RCS L-90 and RCS T-90

Who are we?

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

As an industry-leading innovator, Renishaw re-invests each year between 13% and 18% of turnover 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 and longer term maintenance considerations.

The potential of automating the use of industrial robots is constrained by the time taken to commission and verify installations, which remains a laborious manual activity. In addition, the performance of robots over time is not easily monitored 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, we have produced the RCS product series, built upon established and trusted Renishaw technology. The series provides a toolkit utilising a ballbar designed specifically for the industrial automation market, which simplifies robot set-up, health checks and recovery of robotic applications.

Perform simple routines for automation set-up

To remove the bottlenecks holding up deployment of industrial robots, the time consuming and inaccurate manual methods used to set up a cell today need to be replaced with a faster and easier approach. The RCS series of equipment, allows the location of the tool centre point (TCP) and part frame to be set in a rapid series of intuitive steps – it has never been faster or easier to achieve this.

The RCS product series includes the RCS L-90, a 90 mm stroke ballbar, which provides accurate and repeatable linear measurements between the robot and its surroundings. The RCS T-90 is a tripod configuration of three RCS L-90 struts, which enables more advanced tests to be conducted.

Using a comprehensive range of tests, the RCS Software Suite steers the user through a short sequence of guided actions, unlocking the full potential of the RCS L-90 ballbar product and enabling the swift setup of tool and part frames. This allows offline programming of robot cells with minimal reteaching of programs, and seamless transfer of complete cells between build facilities and final production locations.

The flexibility of the RCS series caters for multiple arrangements of single, dual and triple struts. When configured with the included accessories, this gives users versatile mounting options for a range of end-of-arm-tooling (EOAT) and for direct mounting to the robot flange. By either using a threaded ball or a hollow ball, which can be mounted directly over the TCP, the actual point of interest of the robot can be found. A user can easily connect the hardware and run tests in a multitude of cell arrangements.

Set-up tests

Tool Frame



Rapid and traceable set up of tool frame TCP, fully reported

Part Frame

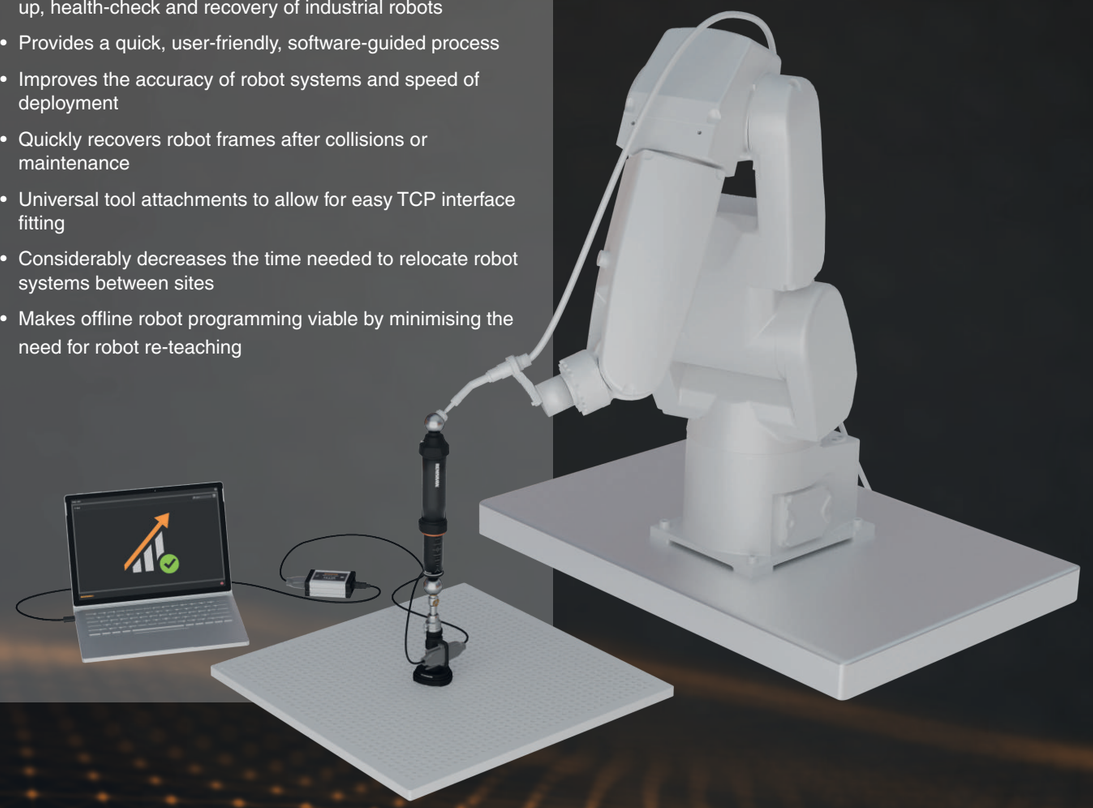


Easily locate part frames using standard fixturing reference holes

The RCS Software Suite enables the user to undertake a series of tests that assists the user to set-up their tool and part frames.

Key benefits

- A single, or configuration of three, 90 mm ballbars for set-up, health-check and recovery of industrial robots
- Provides a quick, user-friendly, software-guided process
- Improves the accuracy of robot systems and speed of deployment
- Quickly recovers robot frames after collisions or maintenance
- Universal tool attachments to allow for easy TCP interface fitting
- Considerably decreases the time needed to relocate robot systems between sites
- Makes offline robot programming viable by minimising the need for robot re-teaching



“This is going to save me time and money, as I can get more of my staff to program offline and not worry about endless reteaching when physically set-up, and then again after it’s moved to the final site”

Early adopter (USA)



Capture and apply critical diagnostic information about your system

The RCS L-90 and T-90 provide a range of easy-to-use tests, allowing for the capture of key diagnostic information, including the repeatability, backlash and motion performance of the robot system. The RCS T-90 offers a dedicated test to quickly identify any deviations in the stored joint offsets. This allows a straightforward in-field remastering of the robot, zeroing errors introduced through incorrect joint angles.

By using the range of RCS diagnostic tools before cell set-up commences, the baseline performance of the system can be understood and interventions made if appropriate. This also sets a known level of the system, which can be returned to if changes to the cell are made in the future. Performance reports on the overall repeatability of the robot, or the repeatability of individual joints can be produced, along with the path-following capability of the robot. This provides traceability of robot performance at the point of installation at an integrator's facility and within the end user's site.

Through periodic health-checks and preventative maintenance using the RCS L-90 and RCS T-90, deterioration of the cell can be monitored and issues which arise over time can be identified. Downtime is minimised, as repairs and maintenance can be scheduled. The RCS series of tools makes it easy to keep automation cells in top condition.

Verification tests

Tool Frame Verification



Rapid and traceable verification of tool frame TCP, with report of residual error

Volumetric Test



Identification of volumetric performance including 3D path and velocity accuracy

Single Joint Repeatability



Verification of robot repeatability exercising one joint individually

Global Repeatability



Verification of global robot repeatability exercising all joints simultaneously

The RCS Software Suite enables the user to undertake a series of easy-to-run tests that assists the user to capture critical information about their system. This ensures industrial robots operate at peak performance and can be easily refurbished and maintained.

Identify root causes of poor performance

- Levels of backlash
- Deviation of joint offsets
- System repeatability
- Deviation from expected path

The RCS product series provides the means to avoid unplanned downtime by recording deterioration in robot performance.

Issues highlighted can be quantified and attributed to joints and other elements. Refurbishing robots has never been easier with a comprehensive set of tools providing robot mastering to true zero offset values.



RCS specifications

Attributes	L-90	T-90
Length (ball-ball)	240 to 330 mm	-
Recommended robot size	Any	-
Calibrated robot volume	-	60 cm × 50 cm × 30 cm^3
Repeatability (U95)	±2 µm	
Measuring speed	1 m/s	
Data frequency	1 kHz	
Case dimensions	56 cm × 40 cm × 13 cm – 9 kg	

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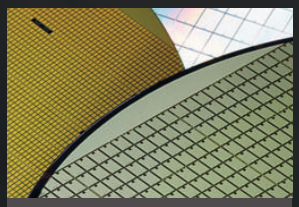
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