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CARTO
Ballbar Connect

Snapshot of machine performance



What is a QC20 ballbar?

The QC20 ballbar is a highly precise, telescopic linear sensor featuring precision balls at both ends.

During operation, these balls are kinematically positioned between precision magnetic cups, one attached to the machine table and the other to the machine spindle or spindle housing. This set-up allows the ballbar to detect minute variations in radius as it rotates around a fixed point. For larger machines, extension bars of 50, 150, and 300 mm can be combined to conduct tests up to a radius of 1,350 mm.

The ballbar includes an LED status indicator that displays battery, communication, and fault statuses. Signal processing occurs within the ballbar, with data transmitted to a mobile device using Bluetooth® Low Energy technology. This robust wireless connection eliminates wire handling issues, supports closed-door operation, and reduces the risk of system damage.

Renishaw's QC20 ballbar delivers the fastest and most efficient health check and diagnosis for machine tool performance.

Ballbar tests are globally recognised. By regularly assessing your machines and identifying error sources, you can minimise reactive maintenance and concentrate on valuable preventative measures.

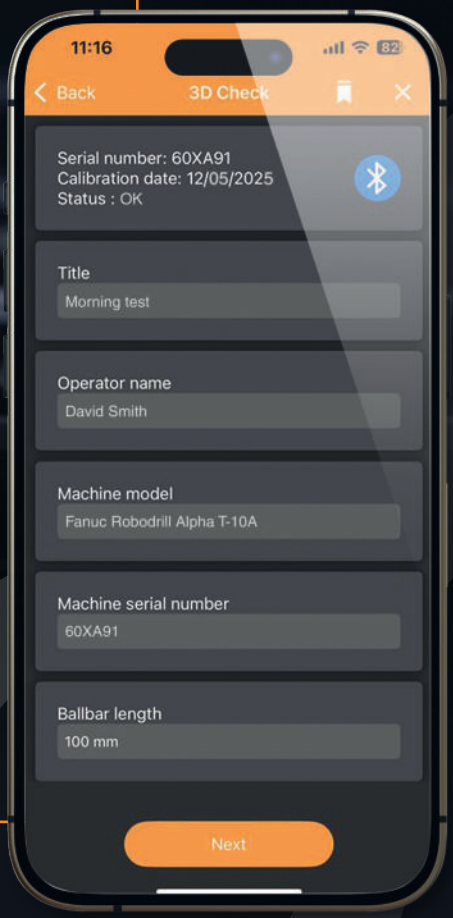
Combining the QC20 ballbar with the CARTO Ballbar Connect App offers a simplified testing process. The app provides streamlined in-app guidance to assist users throughout the test. The 3D Check test sequence produces a single quantitative result and visualisation for easy assessment of the machine's geometric positioning performance.

CARTO Ballbar Connect is Renishaw's first smartphone app for the QC20 ballbar, designed for swift and intuitive testing. It features a primary test sequence 3D Check, which performs a quick static performance check for machine tools.

Simple test process

The 3D Check test sequence moves the ballbar to 29 target points around a spherical volume, measuring the radius at each point. By using a single test sequence to capture static data for the entire sphere, it significantly reduces both the measurement time and user interaction required with the QC20 ballbar. The simplified workflow uses straightforward single-line commands, removing the need for extensive G-code knowledge.



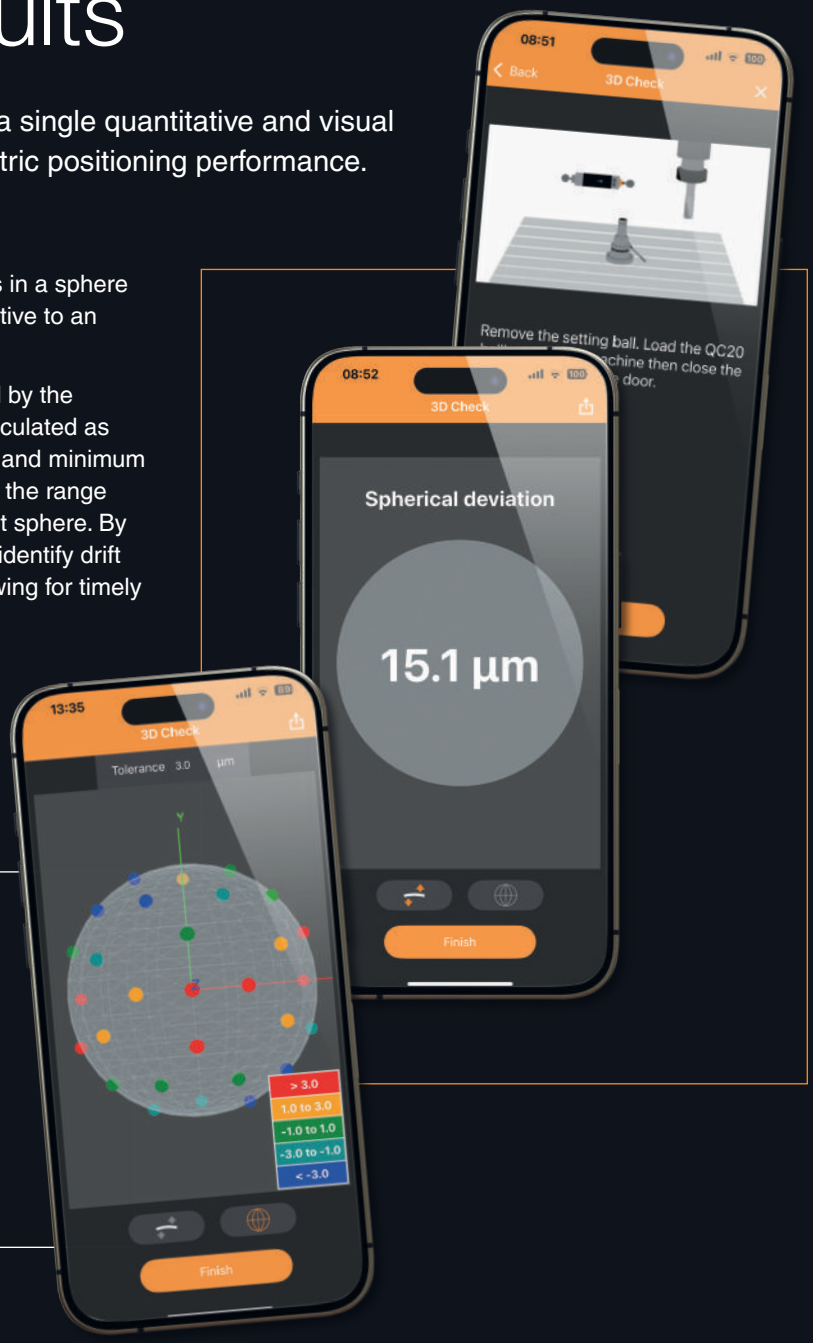


For new users, the app quickly builds knowledge and confidence of the QC20 ballbar. The intuitive user interface and in-app animations help to guide users through the test process, making ballbar an accessible and easy-to-use machine health tool.

Intuitive results

Machine results are presented as a single quantitative and visual indication of the machine's volumetric positioning performance.

- The test sequence captures 29 points in a sphere which are displayed with a colour relative to an inputted tolerance value.
- The machine tool's health is indicated by the spherical deviation value, which is calculated as the difference between the maximum and minimum radial readings. This value represents the range of all twenty-nine points from a perfect sphere. By monitoring this health value, you can identify drift over time or significant changes, allowing for timely preventative actions.
- Spherical deviation provides a clear and simple output, allowing 3D Check to work as a 'go/no-go gauge' for confirming machine health.



The CARTO Ballbar Connect app is available for both mobile and tablet for Android and iOS users.

Download on the App Store

GET IT ON Google Play



On-machine macros

The CARTO Ballbar Connect app uses macro-based programs, providing users with a straightforward way to customise a single-line machine instruction for configuring and running a QC20 ballbar test.

This approach eliminates the need to edit and transfer machine part programs when running tests, ensuring maximum simplicity and efficiency.

Macros are available for Fanuc, Haas, Heidenhain, Mazak, Okuma, and Siemens machine tool controllers.

QC20 ballbar specification

QC20 ballbar	
Sensor resolution	0.1 µm
Measurement accuracy* (radial variation)	± (0.7 + 0.3% L) µm
Measurement range	±1.0 mm
Sensor stroke	-1.25 mm to +1.75 mm
Maximum sample rate	1000 hz
Test radii supported**	100 mm to 600 mm
Battery type	CR2 (3v) photo lithium prime
Battery life	>200 typical 3 minute tests (12 hour continuous live display and data capture)
Operating temperature	0 °C to 40 °C

* Valid 15 °C to 25 °C
** Maximum range for 3D Check test sequence
L = length over which error is measured
Specification if measuring 10 µm error on machine ±0.73 µm;
specification if measuring 100 µm error on machine ±1.00 µm.

Radio communication	
Class	Class 2 Bluetooth Low Energy 5.0 device
Bluetooth transmission range	10 m typical
Output power	0 dBm nominal 4 dBm maximum
Frequency band	2.402 GHz to 2.480 GHz

Key features and benefits

Repeatable

Kinematic ball mounts provide secure and repeatable position location of the ballbar.

Flexible

Centre pivot and tool cup extension provide versatile mounting in the machine tool environment.

Accurate

Calibrated precision linear sensor.
All QC20 ballbars include a detailed calibration certificate, ensuring their accuracy.

Portable

The QC20 ballbar comes in a durable case, ensuring robust protection and enhanced portability.



Service, quality and support

Our products are designed to enhance both quality and productivity. We are committed to achieving total customer satisfaction through exceptional customer service and deep expertise in product applications. When you purchase a QC20 ballbar from Renishaw, you gain access to a global support network that excels in machine metrology and the maintenance of production equipment.

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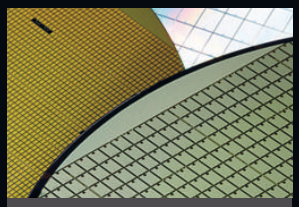
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