Product Material temperature sensor
Serial number 30G803
Date of calibration 20th September 2024

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Calibration certificate

Specification ***Material temperature sensor accuracy*** ±0.1 °C

Measured values and uncertainties of calibration

Reference sensor mean temp.(°C)	-0.32	10.14	19.98	29.82	39.87	50.05
Sensor mean temperature (°C)	-0.32	10.15	19.99	29.82	39.87	50.05
Mean temperature error (°C)	0.00	0.01	0.01	0.00	0.00	0.00

	Max error	Uncertainty (k=2)
Material temperature sensor error	0.01 °C	±0.04 °C

Reference standards	Ref. no.	Lab. Ref.	Certificate no.	Calibration date
Data acquisition unit	RUK35595	0152	U390799	22nd April 2024
Reference Thermistor	RUK35596	200348-0	4500035724	13th November 2023

Authorised signature	Signatory	Position	Issue date
	Dave Wall	Director & General Manager	20th September 2024

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Certificate number 30G803-240920-00

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Calibration notes

1. ***Lasers (XM, XL, ML, HS and RLU)*** are calibrated by comparison to a reference HeNe laser using an optical beat frequency technique. Reference lasers are routinely calibrated against an iodine-stabilised HeNe laser supplied by the National Physical Laboratory (NPL), or by a national standards laboratory. All frequency measurements are taken over a 1 hour period.

2. **Air pressure and relative humidity (RH) sensors are installed in a compensator (XC and RCU).** The air pressure sensors are calibrated over 650 mbar to 1150 mbar range in a temperature controlled oven by direct comparison with a reference pressure meter. The RH sensors (where fitted) are certified by the manufacturer to be within specification. They are calibrated by comparison of the readings with those from a reference RH meter at a single applied humidity.

3. ***Air and material temperature sensors (XC and RCU)*** are calibrated by direct comparison with transfer platinum resistance thermometers (PRTs) in a temperature controlled water bath over 0 °C to 40 °C (50 °C for material sensor). The transfer PRTs are routinely calibrated against reference PRTs.

4. ***Rotary axis calibrators (XR20)*** are calibrated using a HeNe laser angular interferometer.

5. ***Ballbar transducers (QC20 and QC10)*** are calibrated using a HeNe laser interferometer. The scale factor (QC10 only) is calculated and must be entered into the Renishaw application software prior to use.

6. ***Ballbar calibrators*** are calibrated by direct comparison with a reference ballbar calibrator (calibrated by a national standards laboratory) using a reference ballbar as a transfer standard. The measured values for the ballbar calibrator must be entered into the Renishaw application software prior to use.

7. ***Traceability.*** All the reference standards (listed overleaf) used in these calibrations are traceable either directly to major international metrology institutes who have signed the CIPM Mutual Recognition Agreement (e.g. NPL: UK; LNE: France; NIST: USA; PTB: Germany; NMIJ: Japan) or to a national accreditation body (e.g. UKAS: UK; A2LA: USA).

8. ***Environment.*** The equipment used for calibration is in a facility held between 15 °C and 25 °C.

9. ***Uncertainty calculations.*** The uncertainty calculations have been carried out according to the European Co-operation for Accreditation document EA-4/02.

10. ***Quality accreditation.*** All calibrations above are covered by Renishaw's ISO 9001 quality assurance system. The system is audited and certified by an accredited agency.

11. ***Re-calibration.*** Customers may wish to confirm that systems are performing within published specifications over time. If so, it is recommended that they should be periodically re-calibrated. Please note that compensators and temperature sensors are re-calibrated only at a single applied temperature, air pressure and humidity. Please refer to the appropriate system manual for further details.