CERTIFICATE OF CALIBRATION

ISSUED BY: **Torus Measurement Systems Ltd.**

DATE OF ISSUE: **28 September 2026** SERIAL No: **027332**

0773

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Customer	Shape Machining Ltd	PO No.	PO542220
Address	Unit 19 Witney Industrial Estate, Witney	Job No. (Ref)	K260235
Location of Equipment	in the Inspection Room (Temperature Controlled)	Reverification Date	28 September 2026

Manufacturer/Model	Faro Edge Arm	Machine Type	Non Cartesian CMM
M/C Serial Number	E09-05-14-30481	Plant Number	N/A
Machine Size	9 Ft	Resolution	1
Software	Autodesk PowerInspect 2018	Probe Head	N/A
Probe & Extension	N/A	Stylus	6 mm
Reference Sphere Dia	24.99977 mm		

Method

This Part of the Arm has been reverified by mutual agreement from the customer to a measurement procedure in accordance with ISO10360-12:2016, using a set of material standards of size and environmental measurement equipment having traceability to National Standards by evidence of UKAS certificates of calibration. Dispositions used include 7 orientations distributed in the verified hemisphere, as described in the contract review.

Result
(Based on the worst result from the table below)

The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on 95% level of confidence. However, the result indicates that compliance is more probable than non-compliance with the specification limit.

Note: ISO 14253-1:2017 has been considered when calculating the conformance zones.

(units expressed in µm)

		MPE	MME	Result
Probing size error - $P_{size.Sph.1x25}$		29	9.5	1
Probing form error - $P_{form.Sph.1x25}$		29	12.3	1
Articulated location error, tactile - $L_{Dia.5x5:Art}$	*(Customer specified)*	140	98.2	1
Length measurement error - E_{bi}		A=29		
Where L is the measured size in mm and	+/- (A+ L/K)	K=1000/41	39.2	2
		MPL	**MME**	**Result**
Repeatability range - $R_{Bi.0::Tact}$	*(Customer specified)*	29	10.0	1

MPE=Maximum permisible error
MPL= Maximum permissible limit
MME=Maximum measured error
Results graded 1-4 See page 2

Estimated uncertainty of a single point to point measurement of length	+/- 2.9	+ (1.3 per m)
Estimated uncertainty for Probing size error test	+/- 2.2	
Estimated uncertainty for Probing form error test	+/- 2.2	
Estimated uncertainty for Articulation error test	+/- 2.2	

Certified: A.Harrison

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of approximately k = 2, which for a normal distribution corresponds to a coverage probability of 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

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Environmental Conditions:
No measurements of humidity were taken. There were no signs of vibration or its related effects during the period of verification and the environment of the ARM was considered satisfactory. The electrical parameters and characteristics were not measured. No electrical supply problems were experienced during the period of the machine verification.

General:
This arm was verified in the Inspection Room (Temperature Controlled)

Thermal:
The air temperature and material standard of size temperature were recorded at the beginning and end of each measuring line test. Two sensors were used and a thermometer used to record the temperature readings.

Air temperature range over the period of test:
Min temp (°C): 20.35 Max temp (°C): 20.58

Statements:

1	Achieved specification
2	The measured result is below the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on 95% level of confidence. However, the result indicates that compliance is more probable than non-compliance with the specification limit.
3	The measured result is above the specification limit by a margin less than the measurement uncertainty; it is therefore not possible to state compliance based on 95% level of confidence. However, the result indicates that non-compliance is more probable than compliance with the specification limit.
4	Not achieved specification

Interim checks:
ISO 10360-12 annex D recommends carrying out interim checks between reverifications using a Trihydral or Conical Location

Reference gauges used during verification:

Description	Type/cert No:	Serial No:	Calibrated:
Koba step gauge	2025010017/1/SG2/1060	201111 MB132(LAB107)	26/02/2025
Temperature Gauge	573851	IZ164/093 (LAB166)	02/04/2026
Qualification sphere	20519-01	173054 (LAB169)	20/06/2024

Note: Koba bar linear thermal expansion coefficient (CTE) of 11.5 x 10-6 x K-1 with the expanded uncertainty (k=2 Approx) of U= 1.0 x 10-6 x K-1.

Measured values only relate to the equipment identified on page 1

End of Report

Certified: .....