

# CERTIFICATE OF CALIBRATION

ISSUED BY: LAMBDA CALIBRATION LTD

DATE OF ISSUE: 28<sup>th</sup> June 2022

CERTIFICATE No: 722817



**Lambda**  
CALIBRATION LTD

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APPROVED SIGNATORY

C Reed E Santos R Armitage  
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Customer: DJB Labcare Ltd, Milton Keynes, MK16 9QS  
Item No: 1632  
Description: Calibrator  
Model/Range: TC303  
Manufacturer: Beamex  
Date of Cal: 28/06/2022  
Basis: E-2000  
Equipment Used: Multifunction Calibrator (LMMC-04), Longscale Multimeter (LVD-33), Thermocouple Thermometer (LTHE-22), Thermocouple Probe (LTP-18)  
Temp/Humidity: 20°C ± 2°C, <80%rh

## Visual /Operational Checks:

|                                 |                      |
|---------------------------------|----------------------|
| Unit Under Test (UUT) Condition | Functional           |
| Condition of Supplied Leads     | Functional           |
| Battery                         | Does not hold charge |

## Summary of Results:

|                         |                           |
|-------------------------|---------------------------|
| Pre Calibration Status  | Results reported as found |
| Post Calibration Status | Results reported as found |
| Adjustments             | No                        |
| Repairs                 | No                        |
| Other Comments          | -                         |

Measured results and measurement uncertainties are detailed on the following pages.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor  $k=2$ , providing a coverage probability of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements. Unless otherwise stated: [1] The 'Compliance Statement' is based on 'simple acceptance' (result vs tolerance) with the relevant calibration uncertainty being no greater than the tolerance. [2] Reported activities were carried out at the address detailed in the header. [3] The results relate only to the items calibrated. 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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## Reference Temperature Error

The UUT was left overnight to equilibrate. The UUT reading from a calibrated thermocouple probe was compared to that from a laboratory reference probe.

UUT reported temperature: 20.9°C

Reference probe reported temperature: 20.76°C

UUT reference temperature error: -0.14°C

## Measurement Mode:

The UUT was set to T-Type thermocouple, reference temperature set to 0°C, and voltages equivalent to the set point temperatures were applied.

| Simulation Temperature (°C) | Applied Voltage (mV) | UUT Indication (°C) |
|-----------------------------|----------------------|---------------------|
| -190.0                      | -5.439               | -190.4              |
| -80.0                       | -2.788               | -80.2               |
| -50.0                       | -1.819               | -50.1               |
| -30.0                       | -1.121               | -30.1               |
| -10.0                       | -0.388               | -10.3               |
| 0.0                         | 0.000                | -0.1                |
| 4.0                         | 0.156                | 3.9                 |
| 37.0                        | 1.486                | 36.9                |
| 50.0                        | 2.036                | 49.9                |
| 100.0                       | 4.279                | 99.9                |
| 150.0                       | 6.704                | 149.9               |
| 200.0                       | 9.288                | 200.0               |
| 250.0                       | 12.013               | 249.9               |
| 300.0                       | 14.862               | 299.9               |
| 390.0                       | 20.255               | 390.0               |

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## Simulation Mode

The UUT was set to T Type thermocouple simulate, with reference temperature set to 0°C. The UUT output voltage was measured.

| UUT Setting (°C) | Nominal Output (mV) | Measured Output (mV) | Equivalent Temperature (°C) |
|------------------|---------------------|----------------------|-----------------------------|
| -190.0           | -5.439              | -5.4383              | -189.99                     |
| -80.0            | -2.788              | -2.7878              | -79.99                      |
| -50.0            | -1.819              | -1.8195              | -50.02                      |
| -30.0            | -1.121              | -1.1211              | -30.00                      |
| -10.0            | -0.383              | -0.3839              | -10.03                      |
| 0.0              | 0.000               | -0.0014              | -0.04                       |
| 4.0              | 0.156               | 0.1542               | 3.98                        |
| 37.0             | 1.486               | 1.4862               | 37.00                       |
| 50.0             | 2.036               | 2.0352               | 49.98                       |
| 100.0            | 4.279               | 4.2772               | 99.98                       |
| 150.0            | 6.704               | 6.7012               | 149.95                      |
| 200.0            | 9.288               | 9.2855               | 199.94                      |
| 250.0            | 12.013              | 12.0106              | 249.95                      |
| 300.0            | 14.862              | 14.8598              | 299.97                      |
| 390.0            | 20.255              | 20.2519              | 389.95                      |

## Estimated Uncertainty of Measurement:

Simulated Temperature:  $\pm 0.13^{\circ}\text{C}$

Reference Junction Measurement:  $\pm 0.12^{\circ}\text{C}$