

# **CALIBRATION CERTIFICATE**

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### **TEMPERATURE SENSOR CALIBRATION REPORT**

**Certificate Number: CAL-2023-1284-TS**

**Issue Date: December 15, 2023**

**Expiration Date: December 15, 2024**

#### **1. DEVICE INFORMATION**

**Manufacturer: Polar Dynamics Robotics, Inc.**

**Device Model: BlueCore(TM) TS-4000 Temperature Sensor Array**

**Serial Numbers:** TS4-23-0584 through TS4-23-0599 (Batch of 16 units)

**Sensor Type:** Platinum Resistance Temperature Detector (RTD)

**Operating Range:** -65 C to +25 C

**Resolution:** 0.01 C

**Application:** AMR Environmental Monitoring System

## **2. CALIBRATION SPECIFICATIONS**

### **2.1 Calibration Standards**

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Primary Reference: NIST-traceable Platinum Resistance Thermometer

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Reference Number: PRT-2023-089

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Calibration performed in accordance with ISO/IEC 17025:2017

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Measurement uncertainty calculated per GUM guidelines

## **2.2 Environmental Conditions**

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Ambient Temperature: 20 C ± 1 C

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Relative Humidity: 45% ± 5%

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Atmospheric Pressure: 101.3 kPa ± 0.1 kPa

## **2.3 Calibration Method**

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Five-point calibration performed at: -60 C, -40 C, -20 C, 0 C, +20 C

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Minimum stabilization period: 30 minutes per point

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Three measurement cycles per calibration point

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Statistical analysis performed on measurement data

3. MEASUREMENT RESULTS

3.1 Calibration Data

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Temperature Point | Mean Reading | Standard Deviation | Uncertainty

-60 C | -60.02 C | 0.03 C | 0.05 C

-40 C | -39.98 C | 0.02 C | 0.04 C

-20 C | -20.01 C | 0.02 C | 0.04 C

0 C	- 4 -	+0.01 C	0.01 C	0.03 C
+20 C		+20.00 C	0.02 C	0.04 C
...				

### 3.2 Conformity Statement

All sensors in this batch have been tested and found to perform within the manufacturer's specified accuracy of 0.1 C across the full operating range. All measured values fall within the acceptance criteria defined in Polar Dynamics Robotics Quality Standard PDR-QS-2023-05.

## 4. CERTIFICATION

### 4.1 Quality Assurance

This calibration was performed using measuring equipment that is traceable to international standards and follows procedures documented in Polar Dynamics ISO 9001:2015 certified quality management system.

#### **4.2 Calibration Laboratory**

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Facility: Polar Dynamics Robotics Metrology Laboratory

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Location: 4200 Arctic Way, Minneapolis, MN 55403

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Accreditation: ISO/IEC 17025:2017 (Cert. #AL-12458)

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Laboratory Temperature: 20 C ± 1 C (controlled environment)

#### **5. TERMS AND CONDITIONS**

**5.1 This certificate is valid for one year from the issue date unless**

**5.2 Recalibration is recommended if:**

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Physical damage occurs to the sensor

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Readings drift beyond specified tolerances

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Environmental conditions exceed operating specifications

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Required by regulatory compliance protocols

**5.3 This certificate shall not be reproduced, except in full, without**

## **6. AUTHORIZATION**

Calibrated by:

—

David Thompson

Senior Calibration Technician

ID: CT-0584

Reviewed and Approved by:

—

Dr. Maria Rodriguez, Ph.D.

Metrology Laboratory Director

ID: ML-0023

## 7. LEGAL DISCLAIMER

This calibration certificate represents measurements made at the time of calibration. Polar Dynamics Robotics, Inc. makes no warranty, expressed or implied, regarding the future performance or continued accuracy of the



The user assumes full responsibility for maintaining proper operating  
and periodic verification of calibration status.

[SEAL OF CALIBRATION LABORATORY]

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