Calibration of a Temperature Sensor

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August 29, 2026

Report status: preliminary results — replace all example values before submission.

1 Requirements and objective

☐ establish a traceable reference-temperature series;

☐ fit the sensor response and quantify residual error;

☐ record calibration conditions and instrument identifiers.

2 Setup

Sensor	Pt100 probe, ID PT-07
Reference	stirred water bath and calibrated thermometer
Acquisition	1 Hz sampling, 16-bit analogue input
Ambient conditions	22.1 °C, 45 % RH

3 Method

Allow the bath to equilibrate at each set point. Record five readings from the reference and sensor, wait for the standard deviation to fall below 0.05 °C, then move to the next set point. Do not immerse the electrical connector.

4 Results

Table 1: Calibration observations.

T_{ref} (°C)	T_{sensor} (°C)	Error (°C)	SD
10	10.31	0.31	0.04
25	25.18	0.18	0.03
40	40.26	0.26	0.05
55	55.42	0.42	0.06

5 Analysis and corrective action

Fit $T_{\text{sensor}} = a + bT_{\text{ref}}$ and report a, b, confidence intervals and the maximum absolute residual. If the result fails the 0.5 °C acceptance limit, identify whether the cause is wiring, thermal lag or model mismatch and propose a retest.

6 Conclusion

Fit $a =$ _____, $b =$ _____

Maximum error _____

Disposition _____