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Pt-1000 Class A, Precision Air Temperature Sensor with Digital Modbus RS-485 Output with 6 Plate Shield

Overview

The CS250DM is a Pt-1000 Class-A air temperature sensor for temperature gradient and stability analysis. This sensor delivers extremely accurate and precise air temperature data that is necessary for IEC 61724 Class-A solar monitoring applications and Delta Temperature (ΔT) calculations. It also includes a digital Modbus RS-485 output, ensuring data quality over long cable lengths.

Benefits and Features

- High accuracy and precision
- Exceeds IEC 61724-1 standards for ambient air temperature measurements
- Exceeds EPA standards for ΔT measurements
- Digital Modbus RS-485 output ensuring data quality over long cable lengths
- Best-in-class noise protection and isolation meet IEC Class 4 standards
- NIST-traceable, serialized calibration certificate supplied with every sensor

Detailed Description

The CS250DM uses a precision Pt-1000 Class A platinum resistor thermometer (PRT) to provide the highest level of accuracy. The cable includes a Campbell Scientific precision analog-to-digital, smart-sensor module for making the measurements. The module design is optimized for the class A PRT that minimizes self-heating and lead-wire resistance.

Measurement electronics are surge protected with 1200 V isolation and environmentally protected with a rugged overmolding with an IP65 rating.

When exposed to sunlight, the CS250DM should be housed in the RAD06 6-plate radiation shield.

Specifications

Measurement Uncertainty	±0.3°C
Element Stem Material	316L stainless steel sheathed

Surge Protection	1200 V isolation
Supply Voltage	5 to 30 Vdc
Power Draw	15 mA
Temperature Coefficient	TCR = 3850 ppm/K
Stem Diameter	0.32 cm (0.125 in.)
Overall Stem Length	6.35 cm (2.5 in>0
Sensor Dimensions	17.15 x 11.13 x 6.05 cm (6.75 x 4.38 x 2.38 in.)
Sensor Weight	90.7 g (0.2 lb)

Sensing Element

Precision	1000 ohm Class A platinum (Pt 1000)
Accuracy	±(0.15 + 0.002T)°C
Long-Term Stability	Maximum R_0 drift = 0.04% after 1000 hours at 400°C
Measurement Temperature Range	–75° to +250°C
Time Constant	15 seconds in 5 m/s wind

Communications

Protocol	Modbus RTU protocol (over RS-485)
Format	8 data bits, 1 stop bit, even parity as default (user-configurable)
Baud Rate	19,200 bps as default (user-configurable)
Modbus ID	Last two digits of serial number as default (user-configurable)

Cable (Sensor Head to DM Board)

Wire Size and Type	24 AWG (7/32,RT38) copper
Insulation Type	PFA insulated (Teflon®)
Insulation Rating	–75° to +250°C
Sheath	Thin PFA sheathed overall
Number of Cores	3
Physical Properties	Good abrasion and moisture resistance
Overall Diameter	2.1 mm (0.08 in.)

Cable (DM Board to PT)

Wire Size and Type	24 AWG (7/32) tinned copper
Insulation Type	PVC
UL	AWM 10012 1000V 105°C
Filler	Fibrillated polypropylene as required for uniform round construction
Drain	24 AWG (7/32) tinned copper (cabled, touching foil)
Shield	Aluminum/Mylar (100% coverage, 25% minimum overlap, foil facing in)
Nominal Wire Diameter	0.61 mm (0.024 in.)

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