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

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
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<tbody>
<tr>
<td>Measurement Uncertainty</td>
<td>±0.3°C</td>
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<tr>
<td>Element Stem Material</td>
<td>316L stainless steel sheathed</td>
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</table>
### 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.)

### 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 (PT1000)
- **Accuracy**: ±(0.15 + 0.002t)°C
- **Long-Term Stability**: Maximum R<sub>0</sub> 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.)