



## HC2S3

Temperature and Relative Humidity Sensor



# Accurate and Rugged

Superior performance and reliability

## Overview

The HC2S3 is a rugged, accurate temperature/RH probe that is ideal for long-term, unattended applications. It uses a Rotronic's IN1 capacitive sensor to measure RH and a 100  $\Omega$  PRT to measure temperature. For optimum results, the HC2S3 should be recalibrated annually.

The HC2S3 comes with a polyethylene filter that protects its sensor from fine dust and particles and minimizes water absorption and retention. Alternatively, a Teflon filter is available for marine environments. The response time is slower when using the Teflon filter.

## Benefits and Features

- › Well-suited for long-term, unattended applications
- › Accurate and rugged
- › Compatible with all Campbell Scientific dataloggers (including the CR200(X) series)

## Ordering Information

### Air Temperature and Relative Humidity Probe

**HC2S3-L** Rotronics Temperature/RH Probe with user-specified cable length. Enter cable length, in feet, after the -L; recommended cable lengths are shown on page 2. Maximum cable length is 1000 ft (300 m) with 12 V power, or 10 ft (3 m) with 5 V power. Must choose a cable termination option (see below).

### Cable Termination Options (choose one)

- PT** Cable terminates in stripped and tinned leads for direct connection to a datalogger's terminals.
- PW** Cable terminates in connector that attaches to a prewired enclosure.
- CWS** Cable terminates in a connector that attaches to a CWS900-series interface, which allows it to be used in a wireless sensor network.
- C** Cable terminates in a connector for attachment to a CS110 Electric Field Meter or ET107 weather station.
- RQ** Cable terminates in a connector for attachment to a RAWS-P Permanent Remote Automated Weather Station.

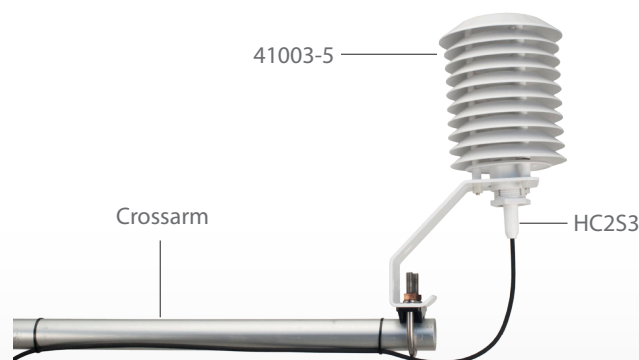
### Accessories

- 41003-5** 10-Plate R. M. Young Radiation Shield with U bolts for attachment to a Campbell Scientific crossarm or mast.
- 41003-5A** 10-Plate R. M. Young Radiation Shield with Band Clamp for attachment to a CM500-series or similar pole.
- RAD10** 10-Plate MetSpec Radiation Shield with U bolts for attachment to a Campbell Scientific crossarm or mast.
- 27755** Teflon Filter for marine environments.

## Sensor Mounts

When exposed to sunlight, the HC2S3 must be housed in a 41003-5, 41003-5A, or RAD10 10-plate naturally aspirated radiation shield. The 41003-5 and RAD10 attaches to a crossarm, mast, or user-supplied pipe with a 2.5 to 5.3 cm (1.0 to 2.1 in) outer diameter. The 41003-5A attaches to a CM500-series pole or a user-supplied pole with a 5.1 cm (2.4 in) outer diameter.

The RAD10 uses a double-louvered design that offers improved sensor protection from driving rain, snow, insect intrusion and has lower self-heating in bright sunlight combined with higher temperatures ( $> 24^{\circ}\text{C}$  ( $\sim 75^{\circ}\text{F}$ )) and low wind speeds ( $< 2 \text{ m s}^{-1}$  ( $\sim 4.5 \text{ mph}$ )) giving a better measurement.



questions & quotes: 435.227.9120

[www.campbellsci.com/hc2s3](http://www.campbellsci.com/hc2s3)



## Cable Length Recommendations<sup>1</sup>

2 m Height	CM106B <sup>2</sup>	CM110 <sup>2</sup>	CM115 <sup>2</sup>	CM120 <sup>2</sup>	UT10	UT20	UT30
3.4 m (11 ft)	4.3 m (14 ft)	4.3 m (14 ft)	5.8 m (19 ft)	7.3 m (24 ft)	4.3 m (14 ft)	7.3 m (24 ft)	11.3 m (37 ft)

### Notes:

- The lengths assume the sensor is mounted at the end of a 2 ft crossarm.
- The lengths assume the enclosure is mounted to the tripod mast. If it is mounted to the leg base, add 0.6 m (2 ft) to the cable length.

## Specifications

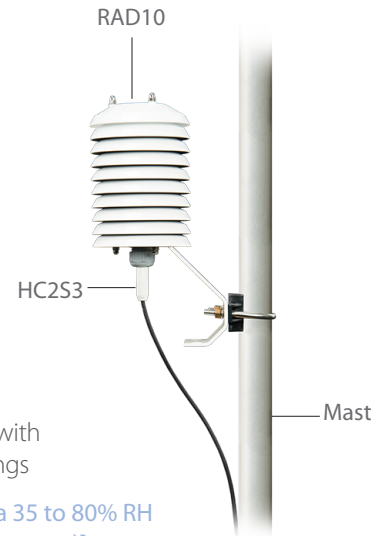
- Electronics Operating Limits: -40° to +100°
- Storage Temperature: -50° to +100°C
- Diameter: 15 mm (0.6 in)
- Length without connector: 85 mm (3.3 in)
- Length with connector: 183 mm (7.25 in)
- Weight: 10 g (0.35 oz)
- Filter: Polyethylene (standard) or Teflon (optional)
- Current Consumption: < 4.3 mA @ 5 Vdc; < 2.0 mA @ 12 Vdc
- Supply Voltage: 5 to 24 Vdc
- Startup Time: 1.5 s typical<sup>a</sup>
- Maximum Startup Current: < 50 mA for 2  $\mu$ s
- Analog Outputs
  - Offset at 0 V:  $\pm 3$  mV (maximum)
  - Deviation for Digital Signal:  $\leq \pm 1$  mV (0.1°C, 0.1% RH)

### Sensor Time Constant [63% of step change (1 m s<sup>-1</sup> air flow at sensor)]

- Standard PE Filter:  $\leq 22$  s
- Optional Teflon Filter:  $\leq 30$  s (typical 4 s)

### Relative Humidity (RH)

- Sensor: ROTRONIC® Hygromer IN-1
- Measurement Range: 0 to 100% RH, non-condensing
- Output Signal Range: 0 to 1 Vdc
- Long-Term Stability: < 1% RH per year
- Accuracy at 23°C:  $\pm 0.8\%$  RH with standard configuration settings

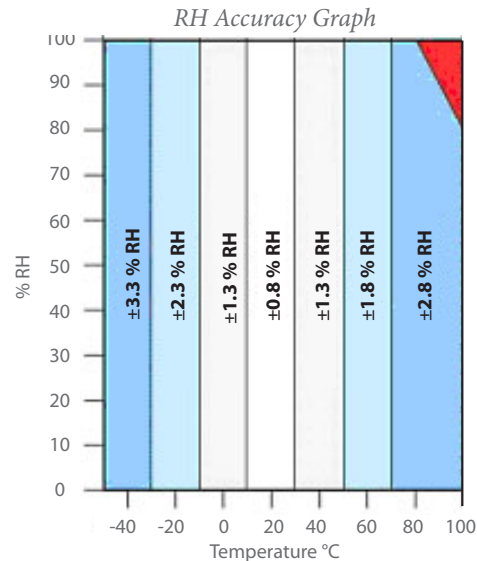
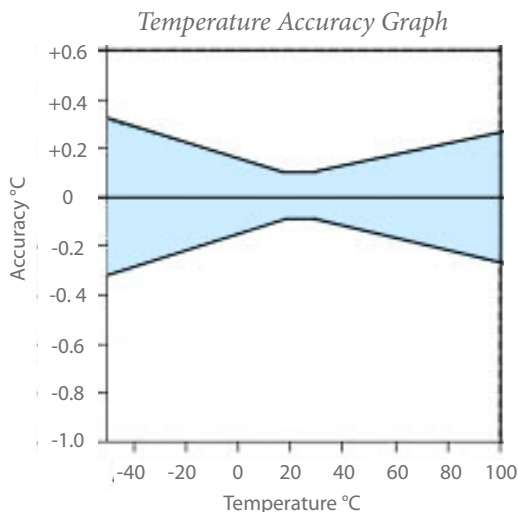


### Sensor Time Constant [63% of a 35 to 80% RH step change (1 m s<sup>-1</sup> air flow at sensor)]

- Standard PE Filter:  $\leq 22$  s
- Optional Teflon Filter:  $\leq 30$  s (typical 10 s)

### Air Temperature

- Temperature Sensor: PT100 RTD, IEC 751 1/3 Class B
- Measurement Range: -40° to +60°C (default)<sup>b</sup>
- Output Signal Range: 0 to 1 V
- Accuracy at 23°C:  $\pm 0.1^\circ\text{C}$  with standard configuration settings
- Long Term Stability: < 0.1°C per year



### Notes:

<sup>a</sup>The startup time is Rotronics specification. Campbell Scientific recommends 2 s at 60°C, 3 s at 0°C, and 4 s at -40°C.

<sup>b</sup>The black outer jacket of the cable is Santoprene® rubber. This compound was chosen for its resistance to temperature extremes, moisture, and UV degradation. However, this jacket will support combustion in air. It is rated as slow burning when tested according to U.L. 94 H.B. and will pass FM-VSS302. Local fire codes may preclude its use inside buildings.



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