ASPTC

Aspirated Thermocouple with Radiation Shield

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Campbell Scientific's ASPTC uses a fine-wire thermocouple mounted in an aspirated radiation shield to provide air temperature measurements. One ASPTC can measure absolute air temperature, or two ASPTCs can make delta temperature measurements. Often, the ASPTC replaces, or is measured in addition to, the TCBR thermocouples in a Bowen ratio system.

These Bowen ratio systems at a sorghum field near Lincoln, Nebraska include ASPTCs attached to the upper and lower Bowen ratio arms.

Thermocouple

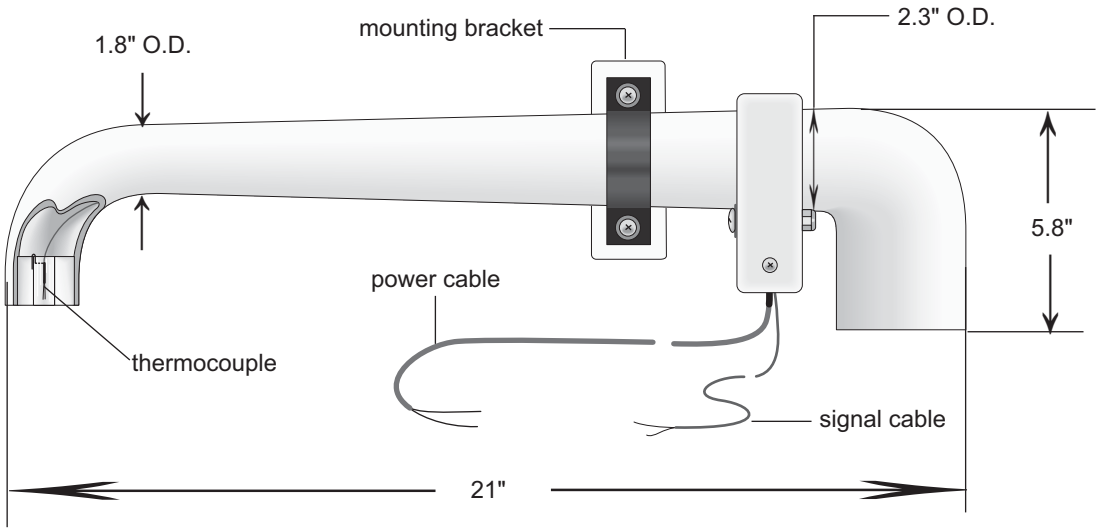
The fine-wire thermocouple consists of a chromel wire and a constantan wire joined at a measurement junction. Temperature is determined by measuring the differences in potential created at the junction of the two wires. A reference temperature measurement (typically measured at the datalogger wiring panel) is required. Options for measuring the reference temperature include:

- Thermistor built into the CR800, CR850, CR1000, CR3000, or CR5000 wiring panel
- PRT built into the wiring panel of the CR9050 or CR9051E input module for the CR9000X Measurement and Control System
- PRT built into the wiring panel of the CR723T input card for the CR7 Measurement and Control System
- CR10XTCR thermistor that connects to the CR10X wiring panel

Note that our CR200(X)-series, CR510, and CR500 dataloggers are not compatible with thermocouples, and therefore cannot be used to measure the ASPTC.

Aspirated Radiation Shield

The aspirated radiation shield consists of an elongated tube constructed from white UV stabilized polyethylene that provides low thermal conductivity and heat retention. A fan draws air across the measurement junction, which reduces solar loading on the thermocouple. The radiation shield also protects the thermocouple, increasing the thermocouple's durability.



Mounting Options

The ASPTC can be mounted to a tripod or tower via a Bowen ratio arm, the UT018-5 crossarm, or a user-supplied crossarm that has a square cross section of 1.5 in x 1.5 in. When using a Bowen ratio arm, the ASPTC intake should be mounted at the same height as the water vapor intake.

Power Considerations

The ASPTC is typically powered with a user-supplied deep cycle battery that is recharged with an SP20R or SP70 solar panel; for high current drain systems two SP70 solar panels may be used to provide 140 W of power. The datalogger's rechargeable battery can only be used if it is connected to ac power. For help on analyzing your system's power requirements, refer to our Power Supply brochure or application note.

Ordering Information

Aspirated Thermocouple

ASPTC	Aspirated Thermocouple with Radiation Shield.. Must specify signal and power cable lengths (see below).

Cable Lengths

-L	After the -L, enter the signal cable length in feet. A 15-ft length is typically used.
-LP	After the -LP, enter the power cable length in feet. A 15-ft length is typically used.

Mounts

BRA/UPR	Upper Bowen Ratio Arm with 7 ft Tubing
BRA/LWR	Lower Bowen Ratio Arm with 3.5-ft Tubing
UT018 -5	Tower Mounting Bracket with 5-ft Crossarm

Specifications

Weight: 1.9 lbs (0.86 kg)

Shield

Material: UV stabilized polyethylene

Dimensions

Length:	21 inch (53.3 cm)
Height:	5.8 inch (14.7 cm)
Large Outer Diameter:	2.3 inch (5.8 cm)
Small Outer Diameter:	1.8 inch (4.6 cm)

Fan

Air Velocity at Thermocouple: 5.5 m/s @ 12 Vdc

Life Expectancy: 65,000 hrs @ 30°C

Current Drain: 260 mA @ 12 Vdc

Operating Voltage: 9 to 13 Vdc

Operating Temperature: -10° to 70°C

Reverse Polarity Protected

Thermocouple

Type: Chromel-Constantan

Diameter: 0.003 inch (0.0762 mm)

Typical Output: 60 µV/°C

Accuracy: *Refer to the "Thermocouple Measurement" section in your datalogger manual.*

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