



## FW05, FW1, and FW3

Type E, Fine Wire Thermocouples

# Research Grade

## High accuracy for eddy-covariance applications



### Overview

Campbell Scientific's FW05, FW1, and FW3 thermocouples\* measure atmospheric temperature gradients or fluctuations with research-grade accuracy.

The models differ in their diameters:

- › FW05 has a 0.0005-in diameter
- › FW1 has a 0.001-in diameter
- › FW3 has a 0.003-in diameter

The FW05, having the smallest diameter, experiences the least amount of solar loading but is the most fragile. For all of these thermocouples, solar loading is small enough that a radiation shield is not required.

### Benefits and Features

- › High frequency response suitable for eddy-covariance applications
- › Extremely small diameter virtually eliminates solar loading
- › Well-suited for measuring atmospheric temperature flux

### Specifications

- › Weight: 45 g (2 oz)
- › Diameter
  - FW05: 0.0127 mm (0.0005 in)
  - FW1: 0.0254 mm (0.001 in)
  - FW3: 0.0762 mm (0.003 in)
- › Total Length: 36.8 cm (14.5 in)
- › Plug Dimensions: 1.8 x 3.3 x 1.0 cm (0.7 x 1.3 x 0.4 in)
- › Type: Chromel-Constantan

### Type E Thermocouples

Type E thermocouples are comprised of a chromel wire and a constantan wire joined at a measurement junction. A voltage potential is generated when the measurement end of the thermocouple is at a different temperature than the "reference end" of the thermocouple. The magnitude of the voltage potential is related to the temperature difference. Therefore, temperature can be 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 CR300, CR6, 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

Please note that our CR200X-series dataloggers are not compatible with thermocouples. The thermocouples connect to the datalogger via the FWC-L cable.

- › Typical Output: 60  $\mu\text{V}/^\circ\text{C}$
- › Accuracy: *Refer to the "Thermocouple Measurement" section in your datalogger manual*

### FW/ENC

- › Weight: 0.36 kg (0.8 lb)
- › Capacity: up to 4 thermocouples

\*The FW/ENC Carrying Case is required to ship our FW05, FW1, and FW3 thermocouples. Thermocouples returned to Campbell Scientific for repair without this case will be shipped to the customer in a new case and the account charged accordingly.

