

# FW05, FW1, and FW3

## Type E, Fine Wire Thermocouples



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.

### 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 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

Please note that our CR200-series and CR510 dataloggers are not compatible with thermocouples. The thermocouples connect to the datalogger via the FWC-L cable.



The FW/ENC Carrying Case is required to ship our FW05, FW1, and FW3 thermocouples. It holds up to four 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.

The FW05, FW1, and FW3 thermocouples terminate in a connector that attaches to the FWC-L cable. The FWC-L cable then attaches to the datalogger.

### Ordering Information

#### Fine-Wire Thermocouples

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|-------------|--|
| <b>FW05</b> | Type E Fine Wire Thermocouple with a 0.0005-inch diameter; requires the FWC-L (see below). |
| <b>FW1</b>  | Type E Fine Wire Thermocouple with a 0.001-inch diameter; requires the FWC-L (see below).  |
| <b>FW3</b>  | Type E Fine Wire Thermocouple with a 0.003-inch diameter; requires the FWC-L (see below).  |

#### Accessories

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|---------------|---|
| <b>FWC-L</b>  | Connector cable for Fine Wire thermocouples. Enter the cable length, in feet, after the L. A 20 ft length (FWC-L20) is recommended. |
| <b>FW/ENC</b> | Carrying Case for shipping fine-wire thermocouples.   |

## Specifications

<b>Weight:</b>	2 oz (45 g)	<b>Typical Output:</b>	60 $\mu\text{V}/^\circ\text{C}$
<b>Diameter</b>		<b>Accuracy:</b>	Refer to the "Thermocouple Measurement" section in your datalogger manual.
FW05:	0.0005 inch (0.0127 mm)		
FW1:	0.001 inch (0.0254 mm)		
FW3:	0.003 inch (0.0762 mm)		
<b>Total Length:</b>	14.5 inch (36.8 cm)	<i>FW/ENC</i>	
<b>Plug Dimensions:</b>	0.7 inch x 1.3 inch x 0.4 inch (1.8 cm x 3.3 cm x 1.0 cm)	<b>Weight:</b>	0.8 lbs (0.36 kg)
<b>Type:</b>	Chromel-Constantan	<b>Capacity:</b>	up to 4 thermocouples

