

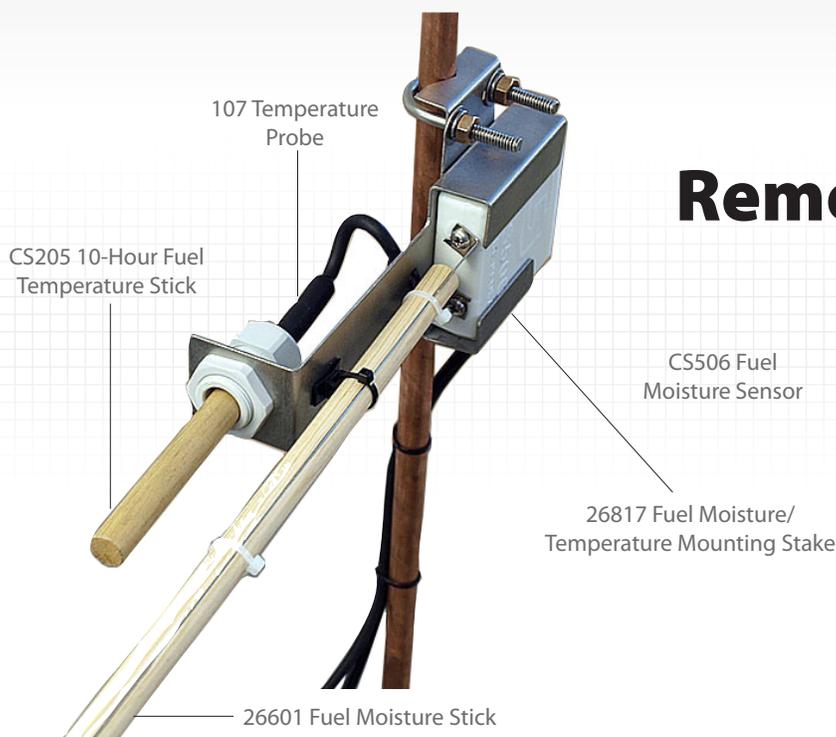


CS205/107, CS506, CS516

10-Hour Fuel Temperature/ Moisture Sensors

Remote Measurements

Monitors forest-fire factor;
ideal for use with RAWS



Overview

Campbell Scientific offers sensors that emulate and measure the moisture content and temperature of similarly-sized twigs on the forest floor. These 10-hour fuel moisture and fuel temperature sensors are often incorporated in our pre-configured or custom

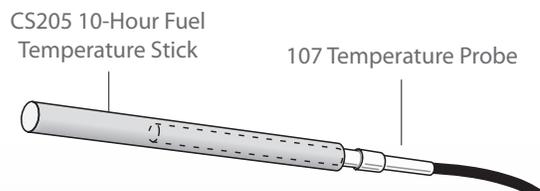
fire-weather stations. When connected to a datalogger with telemetry capability, the user can automatically monitor changing fuel conditions without having to visit the measurement site.

Benefits and Features

- Compatible telemetry options include spread spectrum radios, narrow-band radios, cellular phones, and satellite transmitters
- Can automatically monitor changing fuel conditions without having to visit the measurement site
- Compatible with most Campbell Scientific dataloggers*

CS205/107 Fuel Temperature

To measure fuel temperature, both the CS205 Fuel Temperature Stick and a 107 Temperature Probe are required. The CS205 provides a ponderosa pine dowel that is fabricated to USFS specifications. A hole is bored into one end of the dowel, where our thermistor-based 107 probe is inserted. The 107 measures the temperature inside of the dowel. The CS205 and the 107 are sold separately.



A transparent view shows a 107 temperature probe inserted inside of the CS205 10-hour Fuel Temperature Stick.

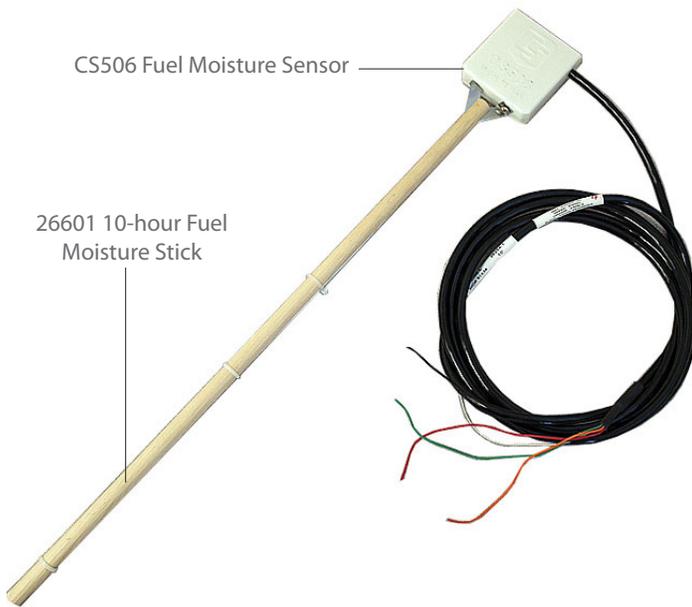
*Our fuel moisture sensors are not compatible with the CR200(X)-series dataloggers.

questions & quotes: 435.227.9120

campbellsci.com/fuel-moisture-temperature



Fuel Moisture



The CS506 Fuel Moisture Sensor requires the purchase of a 26601 10-hour Fuel Moisture Stick.

CS506 Fuel Moisture Sensor

Our fuel moisture sensor, the CS506, reports the status of small-diameter (10-hour) forest fire fuels as percent moisture by weight (1%=1 g water/100 g dry fuel). It consists of an epoxy-encapsulated electronics package that uses time-domain reflectometry (TDR) technology to measure the moisture content of the 26601 10-hour Fuel Moisture Stick. The sensor produces a ± 0.7 Vdc square-wave frequency that is read using an analog or pulse channel on a Campbell Scientific datalogger. The datalogger then converts the frequency measurement to percent fuel moisture via a quadratic calibration.

26601 10-Hour Fuel Moisture Stick

The 26601 10-hour Fuel Moisture Stick consists of a ponderosa-pine dowel fabricated to USFS specifications. It has a 0.5 in. diameter and a 20 in. length—the same dimensions as those used on the traditional weighing fuel moisture racks. Each dowel has undergone two additional sorts to optimize probe-to-probe repeatability and to allow probe interchangeability without individual calibration. The response of the CS506 sensor is similar to the traditional weighing racks because the entire dowel surface is exposed for moisture exchange.

26817 Fuel Moisture/Temperature Mounting Stake

The 26817 Mounting Stake is often used to mount the sensors in the field. This stake places the CS506/26601 and the CS205/107 probes twelve inches above the forest floor. Because the probes

are mounted parallel to each other, shadowing is minimized. Cable ties are included for securing the cables to the side of the stake.

CS516 Fuel Sensors for RAWS Stations

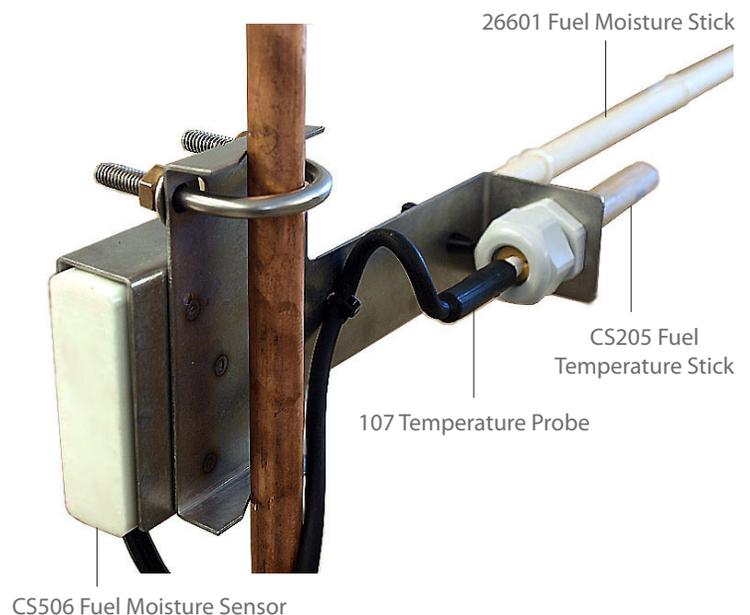
The CS516-QD and CS516-LQ are intended for our Remote Automated Weather Stations (RAWS). They consist of a CS506 Fuel Moisture Sensor, a 26601 10-hour Fuel Moisture Stick, a CS205 Fuel Temperature Stick, and a 107 Thermistor mounted on a 26817 Fuel Moisture/Temperature Mounting Stake.

CS516-QD

With the CS516-QD, the cables for the CS506 and 107 sensors have a 12 ft length and are fitted with a military-style connector. The connector attaches to the enclosure of a RAWS-F Quick Deployment Fire Weather Station.

CS516-LQ

With the CS516-LQ, the cables for the CS506 and 107 sensors are also fitted with a military-style connector, but the cables have a user-specified length. The CS516-LQ is intended to be used with the RAWS-P Permanently Mounted Station.



This view shows how the instruments fit into the 26817 Fuel Moisture/Temperature Mounting Stake.

Replacement Dowels

The dowels of the fuel moisture stick (p/n 26601) and fuel temperature stick (model CS205) are easily replaced in the field with a Phillips screwdriver and an adjustable wrench. Customers should replace the dowels each spring; more frequent replacements may be required in some environments. The more wet/dry cycles the dowels experience, the more frequently they will need to be replaced.



The dowels can be easily replaced using a Phillips screwdriver and an adjustable wrench. The CS205 is shown at left.

Ordering Information

Fuel Temperature

Must order both a fuel temperature stick and a temperature probe. Typically the fuel temperature stick/sensor is measured along side a fuel moisture sensor/stick. The sensors can be mounted side-by-side on a Fuel Moisture & Temperature Mounting Stake.

CS205 10-hour Fuel Temperature Stick (requires a 107 temperature probe; see below)

Temperature Probe

107 Temperature Probe (-35° to +50°C) Must choose a cable length option and cable termination option (see below).

Cable Length Options (choose one)

- 10 10 ft (3 m) cable length.
- 17 17 ft (5 m) cable length.
- 33 33 ft (10 m) cable length (recommended)
- 50 50 ft (15 m) cable length
- U-L User-defined cable length. Enter length, in ft, after the -L.

Cable Termination Options for 107 (choose one)

- PT Cable terminates in stripped and tinned leads for direct connection to datalogger's terminals.
- PW Cable terminates in a connector for attachment to a prewired enclosure.
- C Cable terminates in a connector for attachment to a ET107 station or CS110 electric field meter.

Fuel Moisture

Must order both a fuel moisture stick and a moisture probe. Typically the fuel moisture stick/sensor is measured along side a fuel temperature sensor/stick. The sensors can be mounted side-by-side on a Fuel Moisture & Temperature Mounting Stake.

26601 10-hour Fuel Moisture Stick (requires a CS506-L Fuel Moisture Sensor; see below)

Fuel Moisture Probes (choose one)

CS506-L Fuel Moisture Sensor/10-hour Fuel Moisture Stick with user-specified cable length. Enter cable length, in feet, after the -L; standard length is 25 ft. Must choose a cable termination option (see below).

Cable Termination Options for CS506-L (choose one)

- PT Cable terminates in stripped and tinned leads for direct connection to datalogger's terminals.
- PW Cable terminates in a connector for attachment to a prewired enclosure.

Mounting Stake

10974 Fuel Moisture & Temperature Mounting Stake

Replacement Dowels

26601 10-hour Fuel Moisture Stick
CS205 10-hour Fuel Temperature Stick

RAWS Station Products



The CS516 attaches to the connectors labeled FM/FT on the RAWS connector panel.

Fuel Sensors for RAWS Stations

CS516-QD Fuel Moisture & Temperature Sensor for the RAWS-F Quick Deployment Fire Weather Station. Sensors have a 12-ft cable length and are mounted on the 10974 mounting stake.
CS516-LQ Fuel Moisture & Temperature Sensor for the RAWS-P Permanently Mounted Station; must specify a fuel moisture sensor cable length and a temperature sensor cable length (see below). The sensors are mounted on the 10974 mounting stake.

Cable lengths for the CS516-LQ

Recommended cable lengths are 25, 50, 75, or 100 ft (8, 15, 23, or 31 m).

- LQ Fuel moisture sensor cable length. Enter the cable length, in feet, after the -LQ.
- LT Temperature sensor cable length. Enter the cable length, in feet, after the -LT.

Specifications

CS506 Fuel Moisture Sensor

- › Operating Range: 0 to 70% moisture content
- › Fuel Moisture Accuracy:

Range	Worst Case	RMS Error
0 to 10%	±1.25%	±0.74%
10 to 20%	±2%	±0.9%
20 to 30%	±3.4%	±1.94%
30 to 50%	±4.11%	±2.27%

- › Power Supply: 5 to 18 Vdc

- › Enable Voltage: off at 0 Vdc (< 1 Vdc); on at 5 Vdc (> 4 Vdc; maximum 18 Vdc)
- › Current Consumption
Active: 65 mA
Quiescent: 45 μ A
- › Output Signal: ± 0.7 Vdc square wave with an output frequency of approximately 31 to 58 kHz
- › View EU Declaration of Conformity documentation at: www.campbellsci.com/cs506-l
- › Dimensions: 10.16 x 6.35 x 1.91 cm (4 x 2.5 x 0.75 in)

26601 10-Hour Fuel Moisture Stick

- › Material: Ponderosa Pine
- › View EU Declaration of Conformity documentation at: www.campbellsci.com/pn26601
- › Diameter: 1.3 cm (0.5 in)
- › Length: 50.8 cm (20 in)
- › Weight: 45 g (0.1 lb)

107 Fuel Temperature Sensor

- › Tolerance: $\pm 0.2^{\circ}\text{C}$ over 0° to 50°C range
- › Temperature Measurement Range: -35° to $+50^{\circ}\text{C}$
- › Steinhart-Hart Equation Error (CRBasic loggers only): $\leq \pm 0.01^{\circ}\text{C}$ over measurement range
- › Polynomial Linearization Error (Edlog loggers only):
107: Typically $< \pm 0.5^{\circ}\text{C}$ over measurement range
108: Typically $< \pm 0.5^{\circ}\text{C}$ over -5° to $+90^{\circ}\text{C}$ range
- › Time Constant in Air: 30 to 60 s in a wind speed of 5 m s^{-1}
- › Maximum Cable Length: 305 m (1000 ft)
- › Length: 10.4 cm (4.1 in)
- › Diameter: 0.76 cm (0.3 in)
- › Weight with 10-ft cable: 136 g (5 oz)

CS205 10-Hour Temperature Stick

- › Material: Ponderosa Pine
- › Diameter: 1.3 cm (0.5 in)
- › Length: 11.4 cm (4.5 in)
- › Weight of stick only: 9.07 g (0.32 oz)