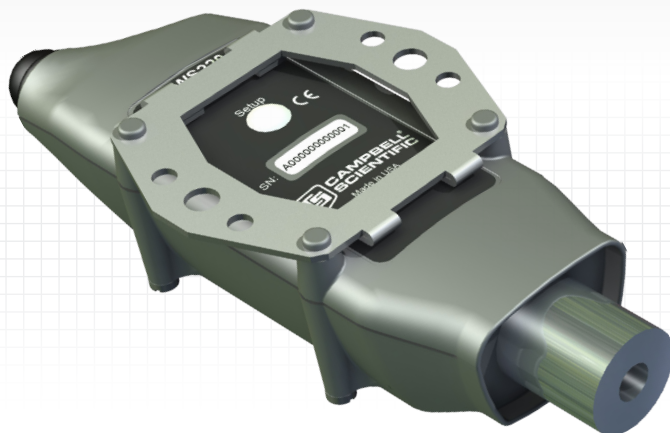




CWS220, CWS220A, CWS220E

Wireless Infrared Radiometers



Cable-Free Sensors

Wireless network means flexibility,
cost savings, time savings

Overview

The CWS220, CWS220A, and CWS220E are wireless versions of our SI-111 infrared radiometer. They measure the surface temperature of an object without physical contact. These radiometers

have an internal spread spectrum radio* that transmits data to a CWB100-series wireless base station or to another wireless sensor.

Benefits and Features

- › Provides road surface, plant canopy, soil surface, snow surface, and water surface temperature measurements
- › Measures surface temperature continuously in the field
- › Internal frequency-hopping, spread spectrum radio provides longer range and less interference
- › Battery-powered using either alkaline batteries or a rechargeable battery and a solar cell
- › A reliable, low maintenance, low power method for making measurements in applications where cabled sensors are impractical or otherwise undesirable
- › Transmissions can be routed through up to three other wireless sensors
- › Ideal for providing spatial averages
- › Compatible with Campbell Scientific's CR6, CR800, CR850, CR1000, and CR3000 dataloggers

Models

Model	Where Used	Frequency (MHz)	Compatible Base Stations	Compatible Wireless Sensors
CWS220	U.S., Canada	910 to 918	CWB100	CWS900, CWS655
CWS220A	Australia, New Zealand	920 to 928	CWB100A	CWS900A, CWS655A
CWS220E	Europe	868	CWB100E	CWS900E, CWS655E

Why Wireless?

- › Require less installation time and labor than running cables through conduit or burying them in trenches
- › Can be used in buildings where local fire codes preclude the use of Santaprene-jacketed cables
- › Ideal for applications that would require long cable lengths, which often decrease the quality of the measurement
- › Use fewer datalogger channels

**The internal radio in the wireless sensor is not meant to move a lot of data quickly. It takes 15 to 30 seconds per hop when moving data from a sensor, through a sensor used as a repeater, and ending up at the base radio. Going through three repeaters could take a data packet anywhere from 45 to 90 seconds to get to the base radio.*

questions & quotes: 435.227.9120

campbellsci.com/cws220



Technical Description

The CWS220 series includes a thermopile, which measures surface temperature, and a thermistor, which measures sensor body temperature. The two temperature sensors are housed in a rugged body that contains a germanium window.

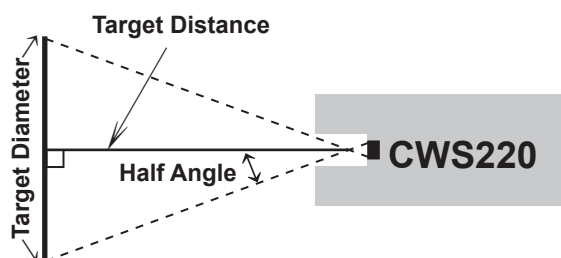
The radiometer can route its transmissions through up to three other wireless sensors. A datalogger is connected to a CWB100-series base station for processing and storing the data. The radi-

ometer interfaces with a PC for configuration via the A205 CWS Sensor to PC Interface.

The calibration coefficients used for determining the target temperature by means of the Stefan-Boltzman equation are stored in the radiometer at the time of calibration.

Field of View (FOV)

The CWS220 series has a 22 degree half angle field of view (FOV). The FOV is reported as the half-angle of the apex of the cone formed by the target (cone base) and the detector (cone apex). The target is a circle from which 98% of the radiation viewed by the detector is being emitted.



Ordering Information

Wireless Infrared Radiometers

- CWS220** Wireless Infrared Radiometer, 900 MHz
- CWS220A** Wireless Infrared Radiometer for Australia, 922 MHz
- CWS220E** Wireless Infrared Radiometer for Europe, 868 MHz

Power Options (choose one)

- ALK** Alkaline Battery with Lid
- RC** Battery with Solar Panels

Common Accessories

- A205** CWS Sensor to PC Interface. Allows sensor to be configured via Campbell Scientific's Wireless Sensor Planner, Network Planner, or Device Configuration (DevConfig) Utility software. One A205 is required per wireless system.
- 26054** Pole Mounting Kit for attaching the sensor to a mast or pole.

Specifications

Accuracy

	-10° to +65°C	-40° to +70°C
Absolute Accuracy	±0.2°C	±0.5°C
Uniformity	±0.1°C	±0.3°C
Repeatability	±0.05°C	±0.1°C

- Power: 2 AA batteries with a battery life of 1 year assuming sensor samples taken every 10 minutes. Optional solar charging available.
- Average Current Drain: 300 µA with 15 minute polling
- Response Time: < 1 s to changes in target temperature
- Target Temperature Output Signal: 60 µV per °C difference from sensor body
- Body Temperature Output Signal: 0 to 2500 mV
- Optics: Germanium lens
- Wavelength Range: 8 to 14 µm (corresponds to atmospheric window)
- Field of View (FOV): 22° half angle
- Operating Temperature Range: -25° to +50°C

- Operating Relative Humidity Range: 0 to 100% RH
- Weather Resistance: IP67 rating for sensor and battery pack (battery pack must be properly installed); each sensor is leak tested
- Dimensions: 15 x 6 x 4.5 cm (5.9 x 2.4 x 1.77 in)
- Weight: 270 g (9.6 oz)

Internal 25 mW FHSS Radio

- FHSS Channel
CWS220, CWS220A: 50
CWS220E: 16
- Transmitter Power Output: 25 mW (+14 dBm)
- Receiver Sensitivity: -110 dBm (0.1% frame error rate)
- Typical Current Drain
Standby: 3 µA
Receive: 18 mA (full run)
Transmit: 45 mA
Average Operating Current with 1 s Access Time: 15 µA
- Quality of Service Management: RSSI
- Additional Features: GFSK modulation, data interleaving, forward error correction, BCH (31,21), data scrambling