WeatherHawk™

Weather Station for Home Weather, Education, Home Automation, Recreational, Environmental, and Industrial Applications

The WeatherHawk weather station is designed for easy installation and use by consumers, educators, students, and resource managers. WeatherHawk is ideal for applications where ease of installation and use are key factors. WeatherHawk is preprogrammed to provide simple meteorological data, including the complex calculation of ETo (evapotranspiration) typically used for landscape and crop management. WeatherHawk also conforms to many existing home automation protocols.

The WeatherHawk weather station uses Internet-compatible Virtual Weather Station software. It is supplied fully assembled. The assembly includes meteorological sensors, and a protective case that houses the on-board microprocessor, rechargeable battery pack and spread spectrum radio transceiver. The battery is recharged via AC power or a solar panel. The WeatherHawk weather station and solar panel are easily attached to a 1¼" to 2" O.D. pole (optional or user-supplied).

The WeatherHawk on-board microprocessor automatically measures the sensors, then stores the data in an on-board data logger before transmitting the data to a user-supplied remote PC. A spread spectrum radio is supplied to connect to the PC and receive transmissions from the WeatherHawk weather station. With typical line-of-sight conditions the WeatherHawk spread spectrum radio can transmit over distances of up to one-half a mile.

User installation is as simple as 1-2-3-4:

1- Remove the WeatherHawk from the shipping box (no assembly required).

2- Install the WeatherHawk and solar panel on the user-supplied pole.

3- Attach the RF400 Spread Spectrum Radio to a serial port on the user-supplied Host PC.

4- Install Virtual Weather Software and turn on the WeatherHawk weather station switch.

Within minutes, a typical user can begin monitoring weather information directly on the Host PC, and remotely over the Internet.

WeatherHawk provides real-time weather measurements and calculates ET_o on an hourly and daily basis.

WeatherHawk measures:

- · Air Temperature
- · Relative Humidity
- · Barometric Pressure
- · Rainfall
- · Solar Radiation
- · Wind Direction
- · Wind Speed

WeatherHawk calculates:

ETo using the Industry Standard (ASCE Standardized reference)

WeatherHawk Virtual Weather Station software is:

- · PC compatible with 32-bit Windows operating system
- · Internet compatible with optional Internet edition software upgrade (requires an ISP provided Internet connection to the Host PC)

Virtual Weather Station Software calculates:

- · Heat Index
- · Dew Point
- · Wind Chill

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Specifications

WeatherHawk 232: serial data (wired) communications

WeatherHawk 916: on-board 916 MHz spread spectrum radio communications, US/Canada

WeatherHawk 922: on-board 922 MHz spread spectrum radio communications, Australia/Israel

WeatherHawk 240: on-board 2.4 GHz spread spectrum radio communications, worldwide

Weather Station

Temperature Range: -40° to +122°F (-40° to +50ºC)

Storage:	128 kbytes of nonvolatile Flash RAM (~32,000 data points)
Power Requirements:	16 to 22 Vdc
Radio Type:	Spread Spectrum
Frequencies:	916 MHz (WeatherHawk 916) 922 MHz (WeatherHawk 922) 2.4 GHz (WeatherHawk 240)

PC Wireless Radio—Campbell Scientific RF400

Radio Type:	Spread Spectrum
Frequencies:	916 MHz (WeatherHawk 916) 922 MHz (WeatherHawk 922) 2.4 GHz (WeatherHawk 240)
I/O Data Rate:	9600 bps
Average Current Drain:	<1 mA stand-by (power-saving options used), 24 mA receiving, <75 mA transmitting

Power Supply (optional)

Battery:	On-board, 0.8 Ahr lead-acid
Solar Panel:	1.6 W or 5 W

Antenna

Description:	Omnidirectional, ¼ wave, whip (fully enclosed in weatherproof housing)
Gain:	0 dBd
Transmission Range:	½ mile (0.8 km) line of sight

Sensors

Air Temperature

Sensor:	Thermistor
Operating Range:	-40º to +122ºF (-40º to +50ºC); 0 to 100% RH
Temperature Accuracy:	±0.9°F (±0.5ºC)
Temperature Interchangeability:	±0.36°F (±0.2ºC)

Relative Humidity

Sensor:	Precision, temperature corrected, bulk polymer
RH Accuracy:	±5% for 90% to 100% RH; ±3% for 10% to 95% RH

Barometric Pressure

Sensor:	Piezoresistive transducer
Range:	15 to 115 kPa (4.43 to 33.96 inches of Mercury)
Accuracy:	< ±1.5% of Full Scale Reading
	±1.5 kPa (0° to +85°C)
	±0.443 Hg

Rain Gauge

Sensor:	Tipping bucket
Orifice:	7.75 in^2 (50 cm^2)
Resolution:	0.04" (1 mm)

Note: Optional high accuracy (0.01″/tip), external tipping bucket available

Solar Radiation

Sensor:	Silicon pyranometer
Spectral Range:	300 to 1100 nm
Accuracy:	±2.5%
Output:	~0.25 mV per W m^{-2}
Operational Range:	0 to 2000 W m^{-2}
Temperature Range:	-40° to +130°F (-40° to +55°C)

Wind Direction

Sensor:	Vane
Range:	360º mechanical, 352º electrical
Linearity:	1%
Sensitivity:	~1 m s^{-1} (2.2 mph)

Wind Speed

Sensor:	Cup anemometer
Starting Threshold:	0.78 m s^{-1} (1.75 mph)

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