CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

ClimaVue 50 G2

Compact, Digital, SDI-12 Weather Sensor

Digital, All-in-One Weather Sensor Measuring Typical Weather Parameters

Featuring a compact, easy-to-deploy design

Overview

The ClimaVue™50 G2 is the next-generation all-in-one meteorological sensor from Campbell Scientific that combines all the typical weather parameters into one compact and rugged design. It improves on its predecessor with enhanced precipitation measurements, a redesigned wind sensor (0 to 60 m/s), and better UV resistance. The sensor has also been updated to use the new eight-pin M12 connector, seamlessly integrating with the Aspen™10 Edge Device for a plug-and-play installation.

The affordable ClimaVue 50 G2 reports various weather parameters via SDI-12, sips approximately 1 mA of power at 12 Vdc, and includes an integrated leveling base and tilt sensor for easy maintenance and monitoring. Perfect for quick deployment, remote locations, large networks, or simple setups, the ClimaVue 50 G2 is a superior and reliable choice.

Benefits and Features

- All the common meteorological measurements with one simple digital (SDI-12) output
- Improved wind speed measurements up to 60 m/s
- Dual precipitation sensors for improved reliability and accuracy
- Lowest power consumption (1 mA at 12 Vdc) of any all-in-one weather sensor
- Integrated leveling base and tilt sensor
- Low maintenance—only one moving part
- Improved UV and corrosion resistance
- No sensor configuration required
- Compact design for quick, low-impact installation
- Compatible with all modern Campbell Scientific data loggers
- Detachable cable facilitates field replacement

Detailed Description

Sensors

All sensors are integrated into a single, small form-factor unit, requiring minimal installation effort. With only one moving

part, the design requires minimal maintenance and is ideal for long-term, remote installations.

Pyranometer

Solar radiation is measured by a pyranometer that is integrated into the lip of the rain gauge funnel at the top of the ClimaVue 50 G2. The miniature pyranometer uses a silicon-cell sensor to measure the total incoming (direct and diffuse) solar radiation. Silicon-cell sensors have an excellent response time to changing radiation conditions and acceptable sensitivity across the solar spectrum, which make them well-suited for use on the ClimaVue 50 G2.

A carefully developed cosine-correcting head ensures accurate readings regardless of sun angle, while the carefully researched optical filter material balances cost and performance to ensure the silicon-cell provides the ClimaVue 50 G2 with high accuracy regardless of temperature or sensor age.

Anemometer

The ClimaVue50 G2 measures wind speed in the space beneath the rain gauge. Ultrasonic signals emitted from transducers positioned at right angles to each other reflect off a curved plate and return to the opposite sensor. Wind affects the speed of sound, and the wind speed is calculated by measuring differences in the travel time for the sound waves.

Significant enhancements have been made to the wind sensor on the ClimaVue50 G2. The redesigned transducer geometry doubles the measurable wind speed. The hydrophobic coating on the transducers and the improved reflector plate design help prevent moisture accumulation, enhancing reliability in various weather conditions and contributing to the sensor's robustness. These improvements enable the ClimaVue50 G2 to measure wind speeds up to twice the range of its predecessor, making it a highly efficient and durable tool for meteorological observations.

Temperature Sensor

The ClimaVue 50 G2 temperature measurement is made in the center of the anemometer area where a small, stainless-steel needle containing a tiny temperature sensor (thermistor) extends from the middle of the four sonic transducers in the center of the anemometer.

Unlike most air temperature measurements, the temperature sensor is not covered with louvered plates to protect it from solar heating. Instead, it sits in open air, susceptible to solar heating of the instrument body. However, the ClimaVue 50 G2 accurately corrects the measured air temperature because solar radiation and the wind speed are known. These two are the main variables that determine the error between measured air temperature and the actual air temperature. An energy balance equation is then used to calculate what the actual temperature should be to an accuracy of ±0.6°C.

For more information, see the "ClimaVUE™50—Correction of air temperature measurements from a radiation-exposed sensor" technical paper.

Relative Humidity Sensor

The relative humidity sensor on the ClimaVue 50 G2 is located behind the circular Teflon™ screen close to the sonic transducers. The Teflon screen protects the sensor from liquid water and dust while allowing water vapor to freely pass to the sensor. The ClimaVue 50 G2 measures relative humidity and temperature and computes vapor pressure.

Rain Gauge

The ClimaVue50 G2 features a redesigned precipitation sensor with dual-sensing technologies that significantly improve the reliability and range of the sensor.

Drop Counter

Gold-plated pins are positioned directly below the collection funnel and precisely count each drop of rain as it falls through the funnel, providing an impressive 0.017 mm resolution for dew and rain.

Tipping Spoon

In addition to counting drops, a tipping spoon has been added below the drop counter, extending the precipitation range up to 1,500 mm/h for heavy rain events and providing redundant measurements to improve reliability.

Note: This non-heated sensor is not suitable for solid precipitation measurements or riming environments.

Tilt Sensor

The ClimaVue 50 G2 is also equipped with a tilt sensor. The primary use of the tilt sensor data is to ensure the ClimaVue 50 G2 remains level at all times. Regularly check X and Y tilt data to ensure the ClimaVue 50 G2 is level; if it has tilted, return to the site and level again. Three degrees off level can cause errors in the rain and solar radiation measurements. Although this sensor's readings may be used to level the instrument during installation, it is much easier to use the small bubble level on the bottom of the anemometer plate.

Mounting

The ClimaVue 50 G2 includes a V-bolt for mounting to a pipe with a nominal outer diameter of 31.8 to 50.8 mm (1.25 to 2.0 in.). This allows the sensor to mount directly to a tripod mast or CM300-series mounting pole, or to a crossarm using the 17387 mounting pipe kit. An integrated accelerometer, leveling base, and bubble level make for trouble-free installation and assurance that the sensor is always properly sited with valid measurements.

Specifications

Measurements Made	Air temperature, barometric pressure, lightning average distance, lightning strike count, precipitation, precipitation electrical conductivity (EC), relative humidity, solar radiation, tilt, wind direction, and wind speed
Output	SDI-12
Operating Temperature Range	❱ 0° to +60°C (precipitation sensor, but will not measure solid precipitation) ❱ -50° to +60°C (generally) ❱ -40° to +60°C (barometer and RH sensors)
Minimum Supply Voltage	3.6 Vdc continuous
Maximum Supply Voltage	15.0 Vdc continuous
Typical Current Drain @ 12 Vdc	< 1 mA (average)
Typical Measurement Duration	110 ms
Maximum Measurement Duration	3,000 ms
Maximum Polling Frequency	10 s
Application of Council Directive(s)	❱ 2015/863/EU: Amending Annex II of RoHS Directive 2011/65/EU: Phthalates Restrictions (EU) ❱ 2014/30/EU: Electromagnetic Compatibility Directive (EMC) ❱ 2011/65/EU: Restrictions of Hazardous Substances Directive (RoHS2)
Standards to Which Conformity Is Declared	❱ EN 63000:2018: Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances ❱ EN 61326-1:2013: Electrical equipment for measurement, control, and laboratory use—EMC requirements—for use in industrial locations
Connection Description	1.25 m (4 ft) pigtail with 8-pin M12 (male) connector; marine-grade 316 stainless-steel knurl
Diameter	10 cm (4 in.) including rain gauge funnel
Height	28 cm (11 in.) including rain gauge funnel
Weight	850 g (1.87 lb)

Power Consumption

Quiescent	0.3 mA
Maximum Peak Current	33 mA
Average Using the *R7!* Command every 10 s	1.0 mA
Average Using the *R7!* Command every 60 s (or slower)	0.4 mA

Air Temperature

Measurement Range	-50° to +60°C
Resolution	0.1°C
Accuracy	±0.6°C

Relative Humidity

Measurement Range	0 to 100%
Resolution	0.1%
Accuracy	±2.5% RH typical (varies with temperature and humidity)

Barometric Pressure

Barometer Operating Temperature Range	-40° to +60°C
Measurement Range	10 to 1200 hPa
Resolution	0.1 hPa
Accuracy	❱ ±0.1 hPa (over the range of -10° to +50°C) ❱ ±0.5 hPa (over the range of -40° to +60°C)
Long-Term Drift	< 1 hPa/year

Vapor Pressure

Measurement Range	0 to 47 kPa
Resolution	0.01 kPa
Accuracy or Repeatability	Varies with temperature and humidity; ±0.2 kPa typical below 40°C

Wind Speed

Wind Speed Maximum	3 s gust
Measurement Range	0 to 60 m/s (0 to 135 mph)

Resolution	0.01 m/s (0.02 mph)
Accuracy or Repeatability	0.3 m/s (0.67 mph) or 6%, whichever is greater

Wind Direction

Measurement Range	0° to 359°
Resolution	1°
Accuracy	±5°

Solar Radiation

Measurement Range	0 to 1750 W m^{-2}
Resolution	1 W m^{-2}
Accuracy	±5% of measurement (typical)
Spectral Range	300 to 1150 nm

Precipitation

Measurement Range	0 to 1,500 mm/h (60 in./h)
Resolution	0.017 mm
Accuracy	±5% of measurement (from 0 to 1,000 mm/h or 0 to 40 in./h)

Tilt

Measurement Range	0° to 180°
Resolution	0.1°
Accuracy	±1°

Lightning Strike Count

Measurement Range	0 to 65,535 strikes
Resolution	1 strike
Accuracy	> 25% detection at < 10 km typical (variable with distance)

Lightning Average Distance

Measurement Range	0 to 40 km (0 to 24.9 mi)
Resolution	3 km (1.86 mi)
Accuracy	Variable

For comprehensive details, visit: www.campbellsci.ca/climavue50-g2

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