CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

PWS100

Present Weather Sensor

Advanced Technology

Identifies size, type, and velocity of precipitation droplets

Overview

The PWS100 is a laser-based sensor that measures precipitation and visibility by accurately determining the size and velocity of water droplets in the air. It can be used in weather stations for road and airport applications.* The PWS100 uses advanced measurement techniques and algorithms to calculate individual precipitation particle type.

Benefits and Features

- Identifies many precipitation types, including drizzle, rain, snow, hail, and graupel
- Designed for continuous, long term, unattended operation in adverse conditions
- Compatible with most of our contemporary dataloggers

Technical Description

Due to the PWS100's advanced measurement technique and fuzzy logic algorithms,it can determine individual precipitation particle type from accurate size and velocity measurements and the structure of the received signal. Auxiliary measurements of temperature and relative humidity (RH) provide improved particle classification.

The PWS100 consists of a Digital Signal Processor (DSP) housing unit connected to a sensor arm that contains one laser head and two sensor heads. Each sensor head is 20° off axis to the laser unit axis—one in the horizontal plane and the other in the vertical plane. The PWS100 ships with a mounting bracket that attaches the DSP housing to a mast or pole.

24 Vdc/12 Vdc Power Supply

Campbell Scientific offers the 25295 power supply that supplies both 24 Vdc and 12 Vdc power. The hood heater uses 24 Vdc, and the sensor uses 12 Vdc. The 25295 consists of a 24 Vdc, 10 A din rail mounted power supply and a Morning Star SunSaver 10 A, 12 Vdc Regulator housed in an environmental enclosure. Access to ac power is required. The 12 Vdc battery is ordered separately.

Optional Temperature/RH Sensor

The CS215-PWS accurately measures temperature and relative humidity. Its cable is fitted with a connector that attaches to the PWS100. The CS215-PWS needs to be housed in the 41303-5A radiation shield that mounts to a mast, tower leg, or crossarm.

**Currently not recommended for marine applications.*

Sensor Calibration

Accurate calibration of the sensor can easily be done in the field with the PWC100 Calibrator. This calibrator simulates particle and visibility data for the PWS100, allowing verification of the calibration constants held within the system.

Ordering Information

Present Weather Sensor

PWS100 Present Weather Sensor (select a Temperature Range).

Temperature Range Options (Choose One)

-ST Tested -25° to +50°C
-XT Tested -40° to +70°C

Temperature/RH Probe and Radiation Shield

CS215-PWS Optional Temperature and Relative Humidity Sensor for PWS100. Requires the 41303-5A radiation shield (see below).

41303-5A R. M. Young 6-Plate Gill Solar Radiation Shield for optional CS215-PWS Temperature and Relative Humidity Sensor.

Calibrator

PWC100 Field calibrator for the PWS100.

24 Vdc/12 Vdc Power Supply

25295 PWS100 24 Vdc /12 Vdc Power Supply. Must choose an enclosure option and a 12 Vdc battery (see below).

Enclosure Options (Choose One)

-12 12/14 inch Enclosure with One Conduit
-16 16/18 inch Enclosure with One Conduit

Enclosure Mount Options

-MM Tripod Mast Mounting
-TM Tower Mounting
-PM Large Diameter (4 to 10 in) Pole Mounting

12 Vdc Battery Choices for 25295

BP7 7 A h Sealed Rechargeable Battery with mounts.
BP12 12 A h Sealed Rechargeable Battery with mounts.
BP24 24 A h Sealed Rechargeable Battery with mounts.

Specifications

- Measuring Area: 40 cm^2 per light sheet
- IP Rating: IP 66 (NEMA 4X)
- Housing Materials: Iridite NCP conversion coated aluminium (RoHS compliant) and hard anodised aluminium. Outer parts also coated with paint.
- Communication: RS-232, RS-422, or RS-485
- Baud Rate: Selectable from 300 bps to 115.2 kbps
- Control Unit: Custom DSP Board
- EMC Compliance: Tested and conforms to BS EN61326:1998
- Dimensions: 115 × 70 × 40 cm (45.28 x 27.56 x 15.75 in)
- Weight: 8 kg (17.6 lb)
- Shipping Weight: 20.4 kg (45 lb)

Power Requirements

- DSP Power: 9 to 24 Vdc, or 9 to 16 Vdc with CS215-PWS Temperature and RH sensor
- Current Consumption: 200 mA to 1 A
- Hood Heater: 24 Vac or dc, 7 A

Optical

- Laser Source: Near-infrared diode, eye safe Class 1M unit output
- Peak Wavelength: 830 nm
- Modulation Frequency: 96 kHz
- Receivers: Photodiode with band pass filters
- Spectral Response: Maximum spectral sensitivity at 850 nm, 0.62 A/W (0.6 A/W at 830 nm)
- Lens Check Light Source: Near-infrared LED

Measurement

- Particle Size: 0.1 to 30 mm
- Size Accuracy: ±5% for particles greater than 0.3 mm
- Particle Velocity: 0.16 to 30 m s^{-1}
- Velocity Accuracy: ±5% for particles >0.3 mm
- Types Of Precipitation Detected: Drizzle, Rain, Snow Grains, Snow Flakes, Hail, Ice Pellets, Graupel, Mixed (combination of types above)
- Rain Rate Intensity Range: 0 to 400 mm h^{-1}
- Rainfall Resolution: 0.0001 mm
- Rain Total Accuracy: typically ±10% (accuracy figures are for laboratory conditions with reference particles and standards; accuracy will be degraded for windy conditions, frozen precipitation, and very high rainfall rates)
- Visibility Range: 0 to 20,000 m
- Visibility Accuracy: ±10% to 10,000 m
- Visibility measurement interval: User-selectable from 10 s to 2 hr
- Data Output: Raw parameter output (particle size, particle velocity, signal peak value, signal pedestal value), WMO SYNOP codes (4680, Wa Wa - precipitation and obscurant type), WMO METAR codes (4678, Wa Wa - precipitation and obscurant type), NWS code, drop size distribution (DSD) statistics, particle type distribution, size / velocity intensity maps, precipitation rate, precipitation accumulation, visibility range and internal checks (temperatures, lens contamination, processing limits).
- External Sensors: SDI-12 compatible sensors supported such as the CS215-PWS Temperature and RH Probe