



Weather Stations

for Solar Panel Monitoring

Temperatures | Solar Radiation | Relative Humidity | Barometric Pressure | Wind



Environmental monitoring is critical to the optimizing the efficiency of solar panels.

Columbia Weather Systems offers three weather station options, all of which include key parameters of panel temperature, air temperature and solar radiation. These weather stations interface with industrial monitoring and automation systems as well as web-based weather networks through the Weather MicroServer.

See reverse for specifications or visit our website for more information:
www.columbiaweather.com

Solar 1 Weather Station includes:

- Orion Weather Station all-in-one sensor package (shown above) with
 - Ultrasonic wind sensors
 - Temperature, Pressure, Humidity
 - Rainfall
- Panel Temperature
- Solar Radiation

Solar 2 Weather Station includes:

- Capricorn FLX Weather Station modular sensor package with
 - Proven mechanical wind sensors
 - Temperature, Pressure, Humidity
 - Optional Rainfall
- Panel Temperature
- Solar Radiation

Solar 3 Weather Station includes:

- Air Temp
- Panel Temp
- Solar Radiation

Solar 1 Specifications

Air Temperature

Range: -60 to 140°F (-52 to +60°C)
Accuracy: $\pm 0.5^\circ\text{F}$ ($\pm 0.3^\circ\text{C}$) at 68°F (+20°C)
Resolution: 0.1°F (0.1°C)
Units Available: °F, °C

Barometric Pressure

Range: 17.50 to 32.50 InHg (600 to 1100 mbar)
Accuracy: ± 0.015 InHg (0.5 mbar) at +32 to 86°F (0 to 30°C)
Resolution: 0.01 InHg (0.1 mbar)
Units Available: KPa, mbar, InHg, hPa

Wind Speed

Range: 0 - 135 mph (0 - 60 m/s)
Accuracy: ± 0.7 mph (± 0.3 m/s)
Resolution: 1 mph (1 m/s)
Units Available: knots, mph, km/hr, m/s

Wind Direction

Azimuth: 0 - 360°
Accuracy: $\pm 2^\circ$
Resolution: 1°

Relative Humidity

Range: 0 - 100%RH
Accuracy: $\pm 3\%$ RH (0-90%), $\pm 5\%$ (90-100%)
Resolution: 1%RH
Units Available: %RH

Rainfall

Range: cumulative
Collection Area: 60 cm²
Accuracy: $\pm 5\%$ (spatial variations may exist)
Resolution 0.01 in. (0.254mm)
Units Available: mm, inches

Solar Radiation*

Cosine Response: 45° zenith angle $\pm 1\%$
75° zenith angle $\pm 5\%$
Absolute Accuracy: $\pm 5\%$
Uniformity: $\pm 3\%$
Resolution: 1 w/m²

Panel Temperature

Range: -40 to +125 °C (-40 to +257°F)
Accuracy: $\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$)
Resolution: 0.1° C ($\pm 0.1^\circ\text{F}$)

* Higher category pyranometers are available. Please contact us or visit our website for additional information.

Solar 2 Specifications

Air/Panel Temperature

Accuracy: $\pm 0.9^\circ\text{F}$ from +14° to 185°F
 $\pm 3.6^\circ\text{F}$ from -67° to 257°F
Resolution: 0.1°F

Barometric Pressure

Range: 14.8 to 32.5 in. Hg (500 to 1100 hPa)
Accuracy: ± 0.03 in. Hg (1 hPa)
Resolution: 0.001 in. Hg (0.01 hPa)

Wind Speed

Range: 0 to 160 mph (139 knots)
Accuracy: ± 0.25 mph from 0 to 23 mph, $\pm 1\%$ from 24 to 160 mph
Starting Threshold: 0.9 mph
Resolution: 1 mph

Wind Direction

Range: 0 - 360°
Accuracy: $\pm 4^\circ$
Resolution: 2°

Relative Humidity

Accuracy: $\pm 3\%$ (or better) from 10 - 90% RH
Temperature Effect: less than $<\pm 1.5\%$ RH
Stability: $\pm 2\%$ RH over 2 years
Reporting Resolution: 1% RH

Solar Radiation*

Cosine Response: 45° zenith angle $\pm 1\%$
75° zenith angle $\pm 5\%$
Absolute Accuracy: $\pm 5\%$
Uniformity: $\pm 3\%$
Resolution: 1 w/m²

Optional Tipping Bucket Rain Gauge

Accuracy: $\pm 1\%$ at 2 in/hr or less
Resolution: 0.01 inch

Solar 3 Specifications

Air Temperature

Range -40 to +125 °C (-40 to +257°F)
Accuracy $\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$)
Resolution 0.1° C ($\pm 0.1^\circ\text{F}$)

Solar Radiation*

Cosine Response: 45° zenith angle $\pm 1\%$
75° zenith angle $\pm 5\%$
Absolute Accuracy $\pm 5\%$
Uniformity: $\pm 3\%$
Resolution 1 w/m²

Panel Temperature

Range -40 to +125 °C (-40 to +257°F)
Accuracy $\pm 0.5^\circ\text{C}$ ($\pm 0.9^\circ\text{F}$)
Resolution 0.1° C ($\pm 0.1^\circ\text{F}$)

The weather station installation below shows two radiation sensors, one at plane of array and one at GHI, as well as the Orion weather sensor module on the mast at right. This utility-scale Ontario, Canada solar energy project required our highest accuracy pyranometers. Photo courtesy of Industrial Electrical Contactors Ltd.



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