CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

Solar Energy Sensors & Components

Pyranometers, pyrheliometers, radiometers, reference cells & sun trackers

RELIABLE SINCE 1974 MONITORING

Campbell Scientific offers pyranometers, pyrheliometers, radiometers, reference cells, and sun trackers, all designed to measure various aspects of the energy imparted by the sun on the Earth's surface.

SILICON PYRANOMETERS

		Features	Spectral Range	Sensitivity	Operating Temperature
LI200X | Silicon Pyranometer		• Long record of performance at NREL • Cosine corrected miniature head • Calibrated against Eppley PSP	400 to 1100 nm	0.2 kW m^{-2} mV^{-1}	-40° to +65°C
CS300 | Silicon Pyranometer		• Patented dome-shape does not trap water or debris • Excellent cosine response (silicon-cell pyranometer) • Four year warranty	360 to 1120 nm	5 mV/Wm^{-2}	-40° to +70°C

ISO SECOND-CLASS STANDARD

		Features	Spectral Range	Sensitivity	Operating Temperature
CMP3 | ISO-Second-Class Pyranometer		• ISO 9060 Second Class • Designed for continuous indoor and outdoor use	310 to 2800 nm	5 to 20 µV/W/m^2	-40° to +80°C

ISO FIRST-CLASS STANDARD

		Features	Spectral Range	Sensitivity	Operating Temperature
CMP6 | ISO-First-Class Pyranometer		• Fully compliant with ISO 9060:1990 • Fast response time • Long term stability characteristics	285 to 2800 nm	5 to 20 µV/W/m^2	-40° to +80°C

ISO SECONDARY STANDARD

		Features	Spectral Range	Sensitivity	Operating Temperature
CMP10 | ISO-Secondary Standard Pyranometer		• Based on CMP11 technology • Internal drying cartridge • 5-year warranty	285 to 3000 nm	15 x 10^{-6} V/W/m^2	-40° to +80°C
CMP11 | ISO-Secondary Standard Pyranometer		• Temperature compensated detector • Fast response time • Low tilt error • Excellent linearity	285 to 2800 nm	7 to 14 µV/W/m^2	-40° to +80°C
CMP21 | ISO-Secondary Standard Pyranometer		• Verified cosine response • Verified temperature dependence • Low dome IR offset error • Excellent linearity • Fast response time	285 to 2800 nm	7 to 14 µV/W/m^2	-40° to +80°C
CMP22 | ISO-Secondary Standard Pyranometer		• Most accurate pyranometer currently available • Negligible thermal gradient zero-offset • Lowest zero-offset due to FIR radiation • Low directional error • Wide spectral range	285 to 2800 nm	7 to 14 µV/W/m^2	-40° to +80°C

ISO FIRST CLASS PYRHELIOMETER

		Features	Spectral Range	Sensitivity	Operating Temperature
CHP1 | First Class Pyrheliometer		• ISO First Class • Built on legacy CH 1 • Built-in temperature sensors • Excellent temperature dependence of sensitivity	(200 to 4000) nm	7 to 14 µV/W/m^2	-40º to +80°C

VENTILATION UNIT

		Features	Sensitivity	Operating Temperature
CVF4-L[a] | Ventilation Unit		• Improved flow over the top of the dome • Integrated 5.5 W heater • New heater position and cover material reduce power requirement • Replaces CVF3 ventilation unit	Heater: 5.5 W at 12 Vdc Vent: 7.8 W at 12 Vdc	-40º to +70°C

SUN TRACKER

		Sensor	Measurement Description	Sensitivity	Operating Temperature
SOLYS 2[a] | Sun Tracker		Fully automatic sun tracker	BSRN level performance. Can be interfaced for status information over IP	< 0.1° passive tracking <0.02° active tracking (with optional sun sensor)	-20º to +50°C

REFERENCE CELL

		Sensor	Measurement Description	Spectral Range	Sensitivity	Operating Temperature
Si-01TC-T-K[a] | Reference Cell		General purpose mono-crystalline solar cell	Reference Cell	varies	1 mV/W/m^2	-20º to +70°C

BACK OF MODULE TEMPERATURE

		Sensor	Measurement Description	Sensitivity	Operating Temperature
110PV-L | Surface-Mount Thermistor Rugged, Accurate		Thermistor with specially designed protective aluminum disk	Back of Module Temperature	+1°C	-40° to +135°C
CS220-L | Surface-Mount Type E Thermocouple		Type E Thermocouple meets ASTM E230-ANSI MC 96.1	Back of Module Temperature	+1°C	up to 260 °C
CS223-L | Surface-Mount Class A RTD		100 Ω DIN Class A RTD	Back of Module Temperature	±0.06 Ω or ±0.15 °C	-73° to +260 °C

WIND SPEED & WIND DIRECTION

		Sensor	Measurement Description	Output Range	Operating Temperature
034B-L | Wind Set Good all purpose wind set		3-cup anemometer and wind vane	wind speed and direction	Wind Speed 0 to 50 m s^{-1} Direction 0° to 360°	-30° to +70°C
03002-L | Wind Sentry Set Good all purpose wind set		3-cup anemometer and wind vane	wind speed and direction	Wind Speed 0 to 50 m s^{-1} Direction 0° to 360°	-50° to 50°C
05103-L | Helicoid Wind Monitor Designed to prevent ice buildup Rugged, Reliable Wind Measurements		heliocoid anemometer and wind vane	wind speed and direction	Wind Speed 0 to 75 m s^{-1} Direction 0° to 360°	-50° to 50°C
RM Young 85004[a] | Heated Ultrasonic for Extended Cold Weather Use		heated, 2-D sonic anemometer	wind speed and direction	Wind Speed 0 to 70 m s^{-1} Direction 0° to 360°	-50° to 50°C

BAROMETRIC PRESSURE SENSORS

		Signal Type/Output	Measurement Description	Output Range	Operating Temperature
CS100 (Setra 278) | Standard Barometer Reliable and accurate		analog voltage	barometric pressure	600 to 1100 mb[b]	-40° to 60°C

TEMPERATURE & RELATIVE HUMIDITY

		Signal Type/Output	Measurement Description	Output Range	Operating Temperature
CS215-L | Reliable and easy to maintain		SDI-12	temperature relative humidity	Temperature -40° to 70°C Relative Humidity 0 to 100%	-40° to 70°C
HC2S3-L | Accurate and rugged		analog voltage	temperature relative humidity	Temperature -40° to 60°C Relative Humidity 0 to 100%	-40° to 100°C
43347-L | Highly accurate RTD for atmospheric stability monitoring ±0.1°C accuracy with NIST calibration		analog voltage	temperature	±50°C	±50°C
43502-L | Aspirated Shield, provides more accurate measurement		NA	Delta T: <0.05°C RMS with like shields	5 to 11 m s^{-1}	-50° to 60°C

OTHER

		Signal Type/Output	Measurement Description	Measurement Range	Operating Temperature
CS120A | Visibility Sensor High Performance Visibility Measurements		RS-232, RS-485	Meteorological Observable Range (MOR)	12 m to 32 km	-25° to 60°C
SR50A-L | Sonic Ranging Sensor used to measure snow depth		SDI-12, RS-232, RS-485	Snow depth	0.5 to 10 m (1.6 to 32.8 ft)	-45° to +50°C
LWS-L | Surface Wetness Sensor Dielectric sensor to determine presence of water and ice		analog voltage	dry, frosted, wet	250 mV to 1500 mV, millivolt reading relates to moisture state	-20° to 60°C
CS135 | LIDAR Ceilometer Sensitive, Long Range Cloud Measurement		RS-232, RS-485	cloud height and vertical visibility	5 m to 10 km: up to four cloud layers reported	-40° to 60°C
CS616-L | Soil Water Content Reflectometer		±0.7 V square wave with frequency dependent on water content	Soil Volumetric Water Content	0% to saturation	0° to 70°C

NOTES:

[a] Item is special ordered and cabled by Campbell Scientific.

[b] The CS100 is available in special ranges of 500 to 1100 and 800 to 1110 mb; contact Campbell Scientific for more information.