Ultraviolet Sensor

Owners Manual

Model: UVS

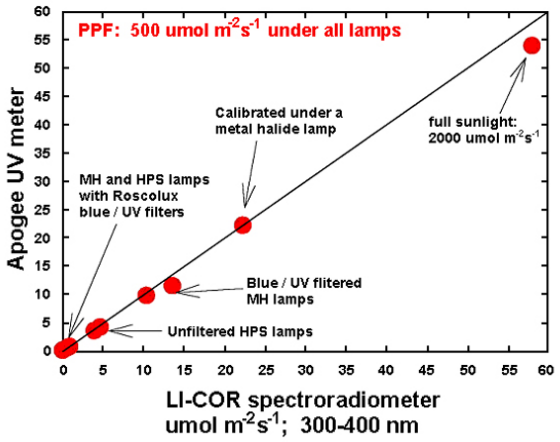
apogee instruments inc.

Ultraviolet Sensor

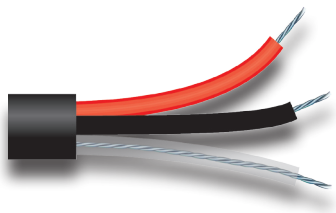
This sensor measures the ultraviolet radiation between 250 and 400 namometers in µmol m^{-2} s^{-1} (micromoles of photons per sqare meter second).

Although the relative wavelengths of UV radiation differ among sunlight and electric lights, our measurements, shown in the graph below, indicate that this sensor provides a close estimate of the UV radiation coming from electric lamps. This sensor is particularly useful for determining the UV filtering capacity of the transparent plastic and glass barriers that are commonly used below electric lamps.

Apogee UV meter vs. LI-COR spectroradiometer under metal halide and high-pressure sodium lamps.



Setup Instructions



Red: positive (signal from sensor)

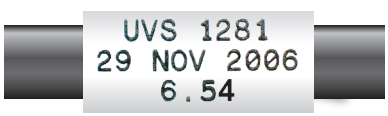
Black: negative (signal from sensor)

Clear: shield/ground

Never attach a power source to the sensor

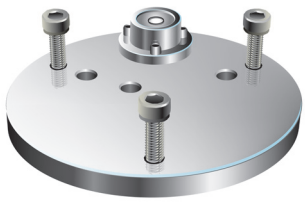
Attach the sensor to a meter or datalogger capable of displaying or recording a mV output.

The model, serial number, production date, and conversion factor are located on the sensor cable.



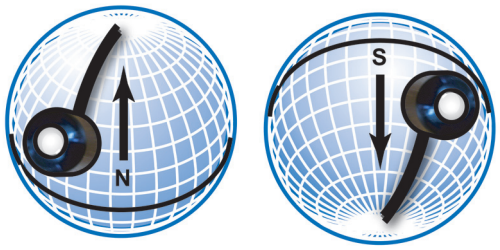
Mounting the UVS

Mount the sensor as level as possible. Small changes in level can cause measurement errors. We recommend using our leveling plate (model LEV) for the most accurate measurements.



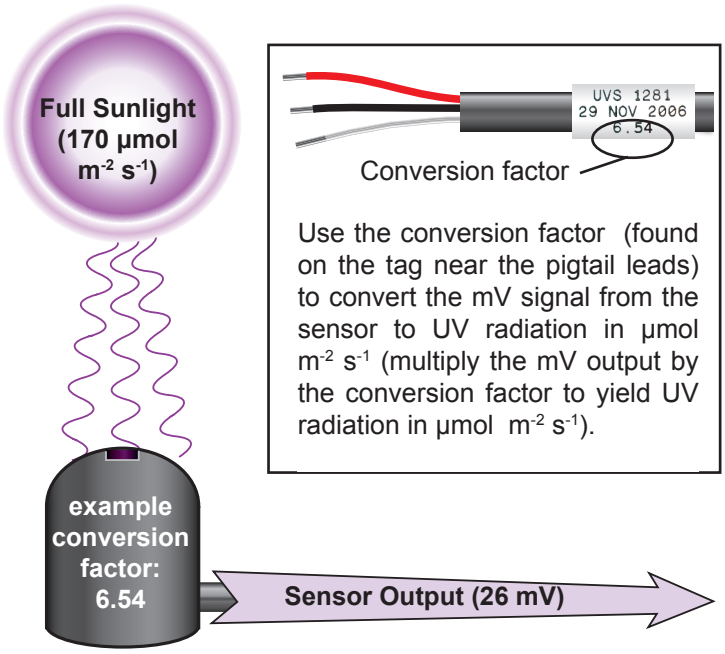
Model LEV
$29 USA, $31 Intl.

The sensor should be mounted with the cable pointing toward the nearest magnetic pole to minimize azimuth error.



Calibration

UV sensors are calibrated to ouput approximately 0.15 mV per µmol m^{-2} s^{-1}.

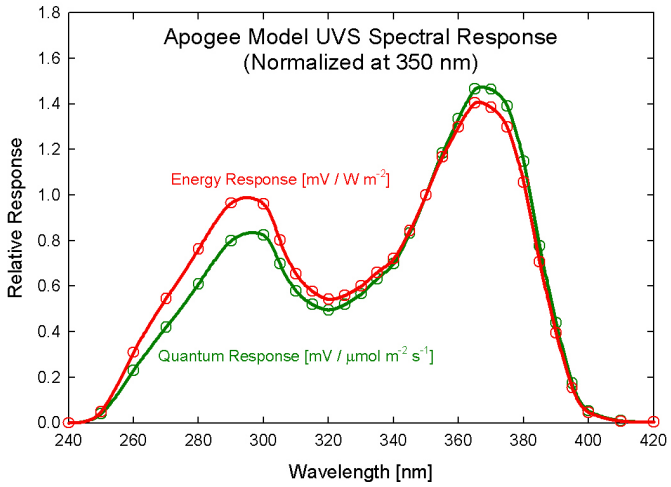


Use the conversion factor (found on the tag near the pigtail leads) to convert the mV signal from the sensor to UV radiation in µmol m^{-2} s^{-1} (multiply the mV output by the conversion factor to yield UV radiation in µmol m^{-2} s^{-1}).

UV radiation = sensor output x conversion factor
= 26 mV x 6.54 **= 170 µmol m^{-2} s^{-1}**

Why this sensor cannot selectively measure UV-B Radiation (280-320 nm)

Our measurements confirm those of others and indicate that less than 0.4 % of the photon flux from sunlight falls below 320 nm; 2.3 % falls between 320 and 350 nm, and 6 % falls between 350 and 400 nm. Although the UV radiation between 250 and 320 nm is critically important in photochemical and photobiological reactions, only about 5 % of the UV photons are in this range. Because only a small fraction of the photons are in the UV-B range, this meter cannot be used to selectively measure UV-B radiation. The sensor is sensitive to UV-B radiation, but it is included with the UV-A radiation to provide a total measurement of UV radiation.



Effects on Output

Level
The sensor must be exactly horizontal for the most accurate measurement. The largest error is often caused by small changes in the position of the sensor. The sensor should be mounted with the cable pointing toward the nearest magnetic pole.

Cosine response
Some of the radiation coming into a sensor at low angles is reflected, which causes the reading to be less than it should be. The cosine-corrected head helps to capture radiation at low angles. The cosine error for typical applications is less than 10 %.

Temperature response
The temperature response is about 0.1 % per degree celsius. This temperature error is insignificant for most applications.

Long-term stability
The output of all radiation sensors tends to decrease over time as the detector ages. Our measurements indicate that the average decrease of the sensor is about 1 % per year. We recommend returning the sensor for recalibration every 3 years.

Specifications

Absolute accuracy		± 10 %
Uniformity		± 5 %
Repeatability		± 1 %
Output	Responsivity	Approximately 0.15 mV per µmol m^{-2} s^{-1}
	In full sunlight	Approximately 26 mV (170 µmol m^{-2} s^{-1})
	Linear range	0 to 400 µmol m^{-2} s^{-1}
Sensitivity		Calibrated to approximately 6.5 µmol m^{-2} s^{-1} per mV
Input power		None, self-powered
Operating environment		Can be submerged underwater (with or without mounting bolt).
Materials		PVC head, potted solid
Cable		3 meters of shielded, twisted-pair wire with Santoprene casing, ending in pigtail leads. Additional cable $1.95/meter.
Dimensions		2.4 cm diameter, 2.75 cm high
Mass		70 g (with 3 m lead wire)
Warranty		1 year parts and labor

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