Ultraviolet Meter

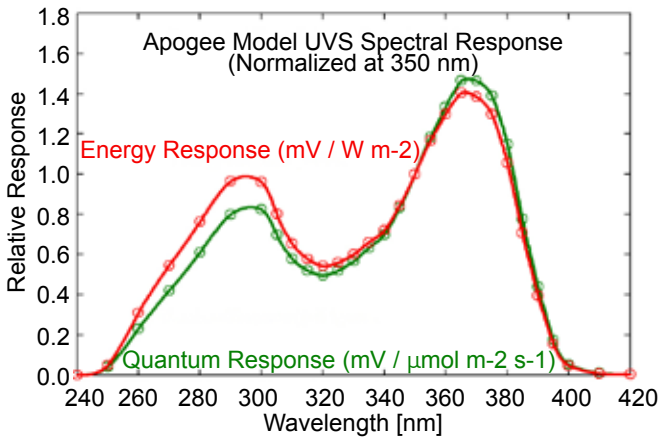
Model MU-100 & 200 Series

Ultraviolet Meter

The ultraviolet meter measures and displays instantaneous readings of the ultraviolet radiation between 250 and 400 nanometers (nm) in micromols (μmol) per meters per second or Watts per meters squared.

Measuring Radiation

Measurements 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.



Characteristics

Level

The meter or sensor must be exactly horizontal for the most accurate measurement. The most prominent error is caused by small changes in the position of the sensor.

Cosine Response

The convex disc is designed to capture radiation at low angles and minimize cosine errors. The cosine error for integrated daily total measurements is less than 2%.

Temperature Response

Temperature response is less than 0.1% per degree Celsius.

Error Codes

Err 1	Battery voltage out of range.
Err 2	Sensor voltage out of range.
Err 3	Not calibrated.
Err 4	CPU voltage below minimum.

Using the Meter

1) Press the power button to start. The meter will turn itself off 2 minutes after button is pushed to conserve battery.

2) **Choose Calibration**: To select between μmol and Watts calibration, push mode once and up/down to make choice. Once desired calibration is blinking, press mode three more times to begin.

3) **Choose Mode**: To choose between SMPL and LOG modes push mode twice and up/down to make choice. Once desired mode is blinking, press mode two more times to begin.

For Automatic Measurements: Use LOG mode. Meter will power on/off to record a measurement every thirty seconds.

For Manual Measurements: Use SMPL mode. Press sample to take a measurement. Store up to 99 SMPL measurements.

4) **Reset Meter**: From LOG or SMPL mode, press mode twice (RUN should be blinking), then while pressing down, press mode once.

CAUTION: Resetting will erase ALL measurements.

5) **Review Data**: Press up/down. To exit and return to present conditions and the capability to take measurements, press sample.

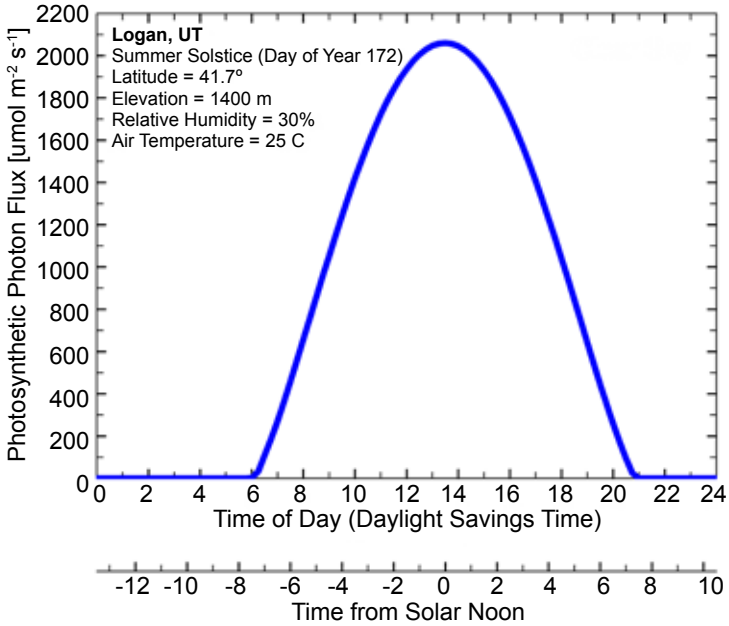
6) In LOG mode, every 30 minutes the meter will average the sixty 30-second measurements taken and store the average. Ninety-nine 30-minute averaged measurements can be stored. Every 48 measurements (making a 24-hour period) the meter will also store a daily total. In addition, 99 daily averages can be stored and are available for download only. These measurements are not viewable on the meter LCD. All measurements taken in LOG mode will continue to be stored eliminating the oldest measurement. To keep data, switch out of log mode.

Clear Sky CALCULATOR

The Clear Sky Calculator was designed to determine the need for radiation sensor recalibration. It determines the intensity of radiation falling on a horizontal surface at any time of the day in any location in the world. It is most accurate when used near solar noon in the summer months.

The calculator is found at www.clearskycalculator.com and is used by typing conditions into the Clear Sky model and comparing measured values with the calculated value for a clear sky. If the output of the sensor over multiple days at solar noon is consistently less than the model value (by more than 8%), the sensor should be cleaned and re-leveled. If the output is still low after a second test, email calibration@apogee-inst.com to discuss test results and the possible return of sensors. When used near solar noon over multiple clear, unpolluted days during the spring and summer months, it is estimated that the accuracy of the model can be ±4% in all climates and locations around the world.

Example of Model Output



Mounting the Sensor

Bolt: 10-32x5/8

Mount the sensor to a solid surface with the stainless steel mounting bolt.

Photon Flux is most accurately measured when the sensor is mounted level. We recommend using our leveling plate (AL-100) for the most accurate measurements. The sensor should be mounted with the cable pointing toward the nearest magnetic pole to minimize azimuth error.

Cleaning

Debris on the sensor head is a common cause of low readings. The sensor has a domed head for improved self-cleaning from rainfall, but salt deposits can accumulate from evaporation of sprinkler irrigation water and dust can accumulate during periods of low rainfall. Salt deposits should be dissolved and removed with vinegar and a soft cloth or q-tip. Dust and other organic deposits are best removed with water, rubbing alcohol or window cleaner. *Never use an abrasive cleaner on the lens.*

Specifications

Memory
- 99 manually stored data points
- Automatically store 99 consecutive 30 minute averages
- 99 daily averages

Range
- 0 - 199.9 μmol m^{-2} s^{-1} (full UV in sunlight; 170 μmol m^{-2} s^{-1})

Absolute Accuracy
- ± 10%

Input Power
- Standard 3 V coin cell battery

Operating Environment
- 0 to 50° C
- Less than 90% non-condensing, relative humidity up to 30° C
- Less than 70% relative humidity from 30 to 50° C

Display
- 4.2 by 2.8 cm

Long-Term Drift
- Less than 3% per year

Cable (MU-200 Series)
- 2 meters of twisted-pair wire
- Shielded w/ Santoprene casing
- Longer cable lengths are available in multiples of 5 meters

Dimensions
- 12.6 by 7 by 2.4 cm

Mass
- MU-100: 150 g
- MU-200: 180 g

Warranty
- 1 year against defects in materials and workmanship

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