



METER
ENVIRONMENT

ENVIRONMENTAL/ CLIMATE MONITORING



ATMOS 41

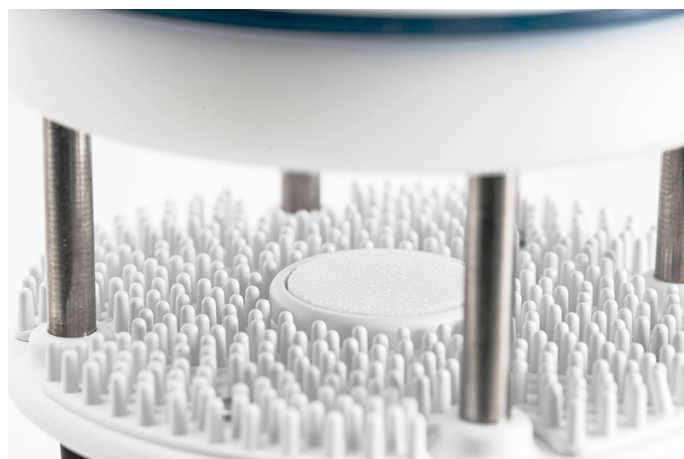
The ATMOS 41 weather station packages 12 weather sensors into a single, compact all-in-one device. It was designed for continuous deployment in harsh climates such as Africa, which means there are no moving parts to fail. Installation and maintenance have been simplified to the maximum because there's never any mechanical wear.

KEY FEATURES

- Measures air temperature, relative humidity, vapor pressure, barometric pressure, wind speed, gust and direction, solar radiation, precipitation, lightning strike counter and distance
- No moving parts
- All data transmitted over a single wire
- Detects fine-scale wind speed variations with 0.01 m/s resolution

KEY SPECS

- SOLAR RADIATION Range: 0 to 1750 W/m² Resolution: 1 W/m² Accuracy: $\pm 5\%$ of measurement typical
- PRECIPITATION Range: 0 to 400 mm/h Resolution: 0.017 mm Accuracy: $\pm 5\%$ of measurement from 0 to 50 mm/h
- HORIZONTAL WIND SPEED: Range: 0 to 30 m/s, Resolution: 0.01 m/s, Accuracy: the greater of 0.3 m/s or 3% of measurement
- RELATIVE HUMIDITY Range: 0 to 100% RH Resolution: 0.1% RH Accuracy: Varies with temperature and humidity, $\pm 3\%$ RH typical
AIR TEMP Range: -50 to 60 °C Resolution: 0.1 °C Accuracy: ± 0.6 °C
- OPERATING TEMP RANGE Minimum -50 °C Maximum: 60 °C
- BAROMETRIC PRESSURE Range: 50 to 110 kPa Resolution: 0.01 kPa Accuracy: ± 0.1 kPa from -10 to 50 °C, ± 0.5 kPa from -40 to 60 °C



ATMOS 22

Measuring wind has always involved tradeoffs. Cup anemometers can't measure both wind speed and wind direction (or low wind speeds). And they're prone to malfunction since they contain moving parts. Meanwhile, sonic anemometers have always been too costly. Until now.

The wind-tunnel-tested ATMOS 22 ultrasonic anemometer delivers the best of both worlds. It's accurate at low wind speeds because there aren't any moving parts that cause friction or fail. And it's inexpensive, especially when you consider the low-energy design. Accuracy. Dependability. Affordability. You get all three with the ATMOS 22.

SPECIFICATIONS

- **Horizontal wind speed**
Range: 0–30 m/s
Resolution: 0.01 m/s
Accuracy: the greater of 0.3 m/s or 3% of measurement
- **Wind gust**
Range: 0–30 m/s
Resolution: 0.01 m/s
Accuracy: the greater of 0.3 m/s or 3% of measurement
- **Wind direction**
Range: 0°–359°
Resolution: 1°
Accuracy: $\pm 5^\circ$
- **Tilt**
Range: -90° to 90°
Resolution: 0.1°
Accuracy: $\pm 1^\circ$



ATMOS 14

We engineered the ATMOS 14 to be four sensors in one—air temperature, relative humidity, barometric pressure, and vapor pressure. And best of all, it's plug and play with our ZL6 data logger. While other sensors require wiring and programming, the ATMOS 14 simply plugs into the ZL6 (It's also compatible with third-party data loggers). There's no having to figure out complicated instructions. Just mount the sensor on your data logger mast, plug it in, and walk away.

KEY FEATURES

- Four measurements in one sensor
- Plug and play capability
- Compact
- Teflon screen protects the sensor from weather
- Fast response

KEY SPECIFICATIONS

- RELATIVE HUMIDITY (RH)
Range: 0 to 100% RH (0.00-1.00)
Resolution: 0.10% RH
- TEMPERATURE
Range: -40 to 80 °C
Resolution: 0.1 °C
Accuracy: ± 0.2 °C
- VAPOR PRESSURE
Range: 0 to 47 kPa
Resolution: 0.01 kPa
- BAROMETRIC PRESSURE
Range: 1–120 kPa
Resolution: 0.01 kPa
Accuracy: ± 0.05 kPa at 25 °C



PHYTOS 31

The PHYTOS 31 measures both the onset and duration of wetness on a simulated leaf, which in turn predicts when the onset of certain diseases or infections may occur. It's not only a more accurate instrument, it's also the easiest to set up, making it a simple and straightforward solution to several problems.

KEY FEATURES

- Accurate
- Detects leaf wetness and ice formation
- High sensitivity without false positives
- Mimics a real leaf, so moisture will condense/evaporate as it would on a normal leaf
- Plug and play capability
- Use with the ZL6 data logger for remote data collection
- No painting required

SPECIFICATIONS

- DIMENSIONS
12.0 cm L x 5.8 cm W x 0.8 cm H
- OPERATING TEMPERATURE
-40 °C to +60 °C
- SUPPLY VOLTAGE
2.5 VDC to 5.0 VDC
Settling time: 10 ms
- OUTPUT
300–1,250 mV (depends on excitation voltage)
- DATALOGGER COMPATIBILITY
Data acquisition systems capable of switched 2.5–5.0 VDC excitation and single-ended voltage measurement at greater than or equal to 12-bit resolution.



SRS Sensors (NDVI and PRI)

The Apogee NDVI and PRI sensors are plug-and-play with the ZL6 loggers, and are designed for long-term monitoring of NDVI or PRI in the plant canopy. Each sensor measures the two relevant wavelengths needed to make the measurement. They are built for long-term exposure to the elements, encased in a durable housing with an epoxy fill, making them watertight, weatherproof, and with fully sealed optics. Mount them on a fence post, tripod, or a meteorological tower. They're rugged enough to leave in the field for an entire growing season or longer.

KEY FEATURES

- Fraction of the cost of a spectroradiometer.
- Inexpensive to maximize spatial coverage
- Built for long-term exposure to the elements
- Radiometrically calibrated to a NIST-traceable standard

SPECIFICATIONS

PRI SENSOR SPECIFICATIONS

- Wavelength ranges:
 - Green detector = $532 \text{ nm} \pm 5 \%$
 - Yellow detector = $570 \text{ nm} \pm 5 \%$
 - 10 nm full-width half-maximum
- Response time: Less than 0.6 s
- Field of view
 - S2-421 (upward-looking): 180°
 - S2-422 (downward-looking): 35°
- Directional (cosine) response: $\pm 2\%$ at 45° , $\pm 5\%$ at 75° zenith angle

NDVI SENSOR SPECIFICATIONS

- Wavelength ranges
 - Red detector = $650 \text{ nm} \pm 5\%$
 - NIR detector = $810 \text{ nm} \pm 5\%$
 - 65 nm full-width half-maximum
- Response time: Less than 0.6 s
- Field of view
 - S2-411 (upward-looking): 180°
 - S2-412 (downward-looking): 30°
- Directional (cosine) response: $\pm 2\%$ at 45° ; $\pm 5\%$ at 75° zenith angle



INFRARED TEMPERATURE SENSORS (IRT)

The IRT monitors surface temperature by measuring the thermal energy radiated from any surface within its field of view, and is compatible with the ZL6 data logger and ZENTRA Cloud for easy, remote access to data on the cloud.

For better accuracy, the IRT measures both the target temperature and the temperature of the sensor itself to correct for the temperature sensitivity of the detector. A tough germanium window makes the sensor durable without decreasing its accuracy. A weatherproof aluminum body withstands harsh weather conditions.

KEY FEATURES:

- Includes a radiation shield and mounting bracket
- Highly accurate factory calibration
- Research-grade accuracy at low cost
- Plug-and-play with ZL6 logger

SPECIFICATIONS

- Range: -30 to 65 °C
- Accuracy:
 - Research-grade models (SI-421, SI-431, SI-4H1): ± 0.2 °C when sensor body is within 20 °C of target temperature
 - Commercial-grade model (SI-411): ± 0.5 °C when sensor body is within 20 °C of target temperature
- Field-of-View Options
 - Research-grade models (SI-421, SI-431, SI-4H1): circular aperture with half-angles of 14, 18, or 22°, or horizontal aperture with 13° vertical half-angle and 32° horizontal half-angle
 - Commercial-grade model (SI-411): 22° half-angle



SPECIFICATIONS

- **Spectral range**
380 – 1120 nm
- **Accuracy**
± 5%
- **Resolution**
N/A
- **Field of view**
Hemispherical, 180°
- **Measurement range**
0 to 1,750 W m⁻² (0 – 350 mV)
- **Calibrations and conversions**
Sensors are calibrated for outside use
5.0 W m⁻² per mV
- **Operating environment**
-40 to +60 °C

PYR (PYRANOMETER) SENSOR

The PYR total solar radiation sensor (pyranometer) measures the solar radiation flux density (in watts per meter squared) from a field of view of 180 degrees.

The sensor is designed for continuous outdoor use and is completely waterproof and submersible.

Accurate measurement depends on the cleanliness of the lens and installation of the sensor at horizontal (180°). The sensor head has a domed diffusion disk to reduce the need for frequent cleaning. A leveling plate is included for accurate installation.



FULL-SPECTRUM PAR SENSOR

The Apogee SQ-521 is a full-spectrum quantum sensor that measures the Photosynthetic Photon Flux Density (PPFD) in $\mu\text{mol m}^{-2} \text{s}^{-1}$ from a field of view of 180 degrees. It can be used in outdoor environments, greenhouses, and growth chambers..

The SQ-521 PAR Sensor is so accurate, it's considered the best sensor on the market for difficult-to-measure indoor environments. It has an incredible spectral range of 389 to 692 nm $\pm$ 5 nm, which means superior performance under variable sky conditions and increased accuracy under LED and other artificial light sources. Sensors are cosine-corrected to maintain their accuracy even when radiation comes from low zenith angles. Each sensor is carefully pre-calibrated for all light sources in controlled conditions and traceable to NIST reference standards.

KEY FEATURES

- Best spectral range on the market
- Rugged, self-cleaning housing
- NIST-traceable
- Plug-and-play with ZL6 for easy setup

SPECIFICATIONS

- Measurement range: 0 to 4000 $\mu\text{mol m}^{-2} \text{s}^{-1}$
- Response time: 0.6s
- Field of view: 180°
- Spectral range
389 to 692 nm $\pm$ 5 nm (wavelengths where response is greater than 50%)
- Spectral selectivity
Less than 10% from 412 to 682 $\pm$ 5 nm
- Directional (Cosine) response: $\pm$ 2% at 45 ° zenith angle, $\pm$ 5% at 75 ° zenith angle
- Detector: Blue-enhanced silicon photodiode
- Housing: Anodized aluminum body with acrylic diffuser
- IP rating: IP68
- Operating environment: -40 to 70 °C; 0 to 100% relative humidity; can be submerged in water up to depths of 30 m