



Plant Physiology

Measurement Instruments for Plant Physiology



Campbell Scientific provides professional- and research-grade measurement systems for many plant-related markets. Our systems measure environmental parameters related to evapotranspiration,

plant growth and development, and disease modeling. This data is useful for scheduling planting, irrigation, and harvesting; supporting automated weather alerts; and timing for pesticide applications.

MAJOR SYSTEMS

| | | Measurements | Datalogger | Power | Communications |
|---|--|---|--|--|---|
| <p>MesaPRO Research-Grade Mesonet Station Reliable Weather Monitoring</p>  | | wind speed (2 heights), wind direction (2 heights), air temperature, precipitation, relative humidity, barometric pressure, solar radiation, soil water content | CR6 | BP84 12 Vdc, 84 Ah battery recharged with 50 W solar panel | cellular, Wi-Fi, radio |
| <p>MetPRO Research-Grade Meteorological Station Reliable Weather Monitoring</p>  | | wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, solar radiation, soil water content | CR6 | BP12 12 Vdc, 12 Ah battery recharged with 20 W solar panel | Wi-Fi, radio |
| <p>WxPRO Entry-Level, Research-Grade Weather Station For budget-conscious researchers</p>  | | wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, solar radiation, soil water content | CR300, CR310 | BP7 12 Vdc, 7 Ah battery recharged with 10 W solar panel | Wi-Fi, Ethernet |
| <p>ET107 Evapotranspiration Monitoring Station For commercial agriculture, irrigation, scheduling, and meteorological applications</p>  | | <p><u>Standard</u> wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, solar radiation</p> <p><u>Optional</u> soil volumetric water content, soil electrical conductivity, soil temperature</p> | CR1000 | <p><u>Standard</u> 12 Vdc, 7 Ah battery recharged with 10 W solar panel or ac power</p> <p><u>Optional</u> PS24 24 Ah, 12 Vdc Power Supply</p> | <p><u>Standard</u> short haul modem, phone modem</p> <p><u>Optional</u> cellular, spread spectrum radio, Ethernet interfaces, voice synthesized modem</p> |
| <p>TDR200-Based Time-Domain Reflectometry Non-destructive in-situ soil measurements</p>  | | soil water content, soil electrical conductivity, rock mass deformation, cable integrity, water level detection | CR1000X, CR1000, CR3000, CR800, CR850, CR6 | Typically datalogger's sealed rechargeable 12 Vdc battery recharged by a 10 W solar panel. | cellular, DNP3, email, fiber optic, field display, FTP, Modbus, NTCIP, radio, satellite, serial, TCP/IP, Wi-Fi |
| <p>HS2 & HS2P HydroSense II Soil Moisture Measurement System Fast and Portable</p>  | | soil water content | NA (stand alone system) | 6 Vdc, 4 AA batteries | display, bluetooth |

More info: 435.227.9120

campbellsci.com/agriculture-systems



MAJOR SYSTEMS CONTINUED

CPEC200 | Closed-Path Eddy-Covariance System



| | Measurements | Datalogger | Power | Communications |
|--|---|------------|--|--|
| CPEC200 Closed-Path Eddy-Covariance System | Surface-atmosphere exchange of carbon dioxide, water vapor, heat, and momentum | CR3000 | User-supplied 12 Vdc battery and solar panel or ac power | CompactFlash cards, wired remote data collection (Ethernet, RS-232, short haul modem, landline), wireless remote data collection (RF, cellular, satellite) |
| AP200 CO ₂ /H ₂ O Atmospheric Profile System | carbon dioxide (CO ₂) and water vapor (H ₂ O) concentration from up to eight intakes | CR1000 | User-supplied 12 Vdc battery and solar panel or ac power | CompactFlash cards, keyboard display, wired remote data collection (Ethernet, RS-232, short haul modem, landline), wireless remote data collection (RF, cellular, satellite) |

AP200 | CO₂/H₂O Atmospheric Profile System



Weather/Evapotranspiration Measurements

Our weather stations provide long-term, stand-alone monitoring of meteorological parameters for all types of agricultural research applications. Programmable dataloggers allow multiple options for station configuration, measurement and output intervals, and data retrieval. Almost any meteorological sensor can be used including: wind speed and direction, solar radiation, temperature (air, water, soil), relative humidity, dew point, precipitation, leaf wetness, and barometric pressure. Wind vector, vapor pressure, histogram, and sample on maxima or minima are standard in the datalogger instruction sets. Data are typically viewed and stored in the

units of your choice (e.g., wind speed in mph, m s⁻¹, knots). Pre-programmed stations calculate potential evapotranspiration using the Penman-Monteith equation; other evapotranspiration algorithms can be entered if preferred.

This viticulture site in Australia integrates meteorological, soil, and crop measurements.



Surface Flux Measurements

Our flux systems can measure atmospheric gradients or vertical turbulent transport directly. Our open path eddy covariance systems measure sonic sensible heat flux, momentum flux, and the flux of other scalars between the atmosphere and earth's surface.

Campbell Scientific also offers a closed-path eddy-covariance system and an atmospheric profile system. Measurements of trace gas fluxes, such as CO₂ isotopes, N₂O, or CH₄ are obtained with our TGA200A Trace-Gas Analyzer.

Trace Gas Measurements

The TGA200A Trace-Gas Analyzer measures trace-gas concentrations in an air sample using tunable-diode laser absorption spectroscopy (TDLAS). This technique provides high sensitivity, speed, and selectivity. Its simple design allows it to measure CO₂

isotopes, N₂O, or CH₄ by choosing an appropriate laser source. The TGA200A features a 1.5 m single-pass optical measurement system that uses a thermoelectrically cooled laser.

Soil Measurements

We can measure nearly every commercially available soil sensor, including tensiometers, heat flux plates, thermocouples, psychrometers, lysimeters, and gypsum blocks. Our soil water instrumentation is used extensively to monitor water content and matric potential. Our time-domain reflectometry (TDR) systems provide accurate, reliable measurements of soil volumetric water

content and bulk electrical conductivity in soils over a wide range of textures and soluble salt concentrations. We offer both long-term, multi-point (up to 512 probes) systems and a portable system for instantaneous soil water content readings. Our sensors that measure soil water matric potential use heat dissipation and electrical resistance methods.

