



## Agriculture Research

Measurement Instruments for Agriculture Research








RELIABLE  
SINCE 1974  
MONITORING

Campbell Scientific measurement systems are used extensively by agronomists, crop scientists, and soil scientists in agricultural research applications. Our measurement systems feature reliability, accuracy,

and the flexibility to measure nearly any parameter. Typical systems include weather/evapotranspiration stations, CO<sub>2</sub> and water vapor flux measurement systems, and systems for monitoring soil parameters.

### MAJOR SYSTEMS

		Measurements	Datalogger	Power	Communications
<b>MesaPRO</b>   Research-Grade Mesonet Station Reliable Weather Monitoring		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
<b>MetPRO</b>   Research-Grade Meteorological Station Reliable Weather Monitoring		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
<b>WxPRO</b>   Entry-Level, Research-Grade Weather Station For budget-conscious researchers		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
<b>ET107</b>   Evapotranspiration Monitoring Station For commercial agriculture, irrigation, scheduling, and meteorological applications		<u>Standard</u> wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, solar radiation  <u>Optional</u> soil volumetric water content, soil electrical conductivity, soil temperature	CR1000	<u>Standard</u> 12 Vdc, 7 Ah battery recharged with 10 W solar panel or ac power  <u>Optional</u> PS24 24 Ah, 12 Vdc Power Supply	<u>Standard</u> short haul modem, phone modem  <u>Optional</u> cellular, spread spectrum radio, Ethernet interfaces, voice synthesized modem
<b>TDR200-Based</b>   Time-Domain Reflectometry Non-destructive in-situ soil measurements		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

More info: 435.227.9120

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## MAJOR SYSTEMS CONTINUED

**HS2 & HS2P HydroSense II** | Soil  
Moisture Measurement System  
Fast and Portable



### Measurements

soil water content

### Datalogger

NA  
(stand  
alone  
system)

### Power

6 Vdc, 4 AA batteries

### Communications

display, bluetooth

**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 collec-  
tion (Ethernet, RS-232, short  
haul modem, landline),  
wireless remote data collec-  
tion (RF, cellular, satellite)

**AP200** | CO<sub>2</sub>/H<sub>2</sub>O  
Atmospheric Profile System



carbon dioxide (CO<sub>2</sub>) and water  
vapor (H<sub>2</sub>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 (Eth-  
ernet, RS-232, short haul  
modem, landline), wireless  
remote data collection (RF,  
cellular, satellite)

## 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<sup>-1</sup>, knots). Pre-programmed stations calculate potential evapotranspiration using the Penman-Monteith equation; other evapotranspiration algorithms can be entered if preferred.



Many researchers place a weather station adjacent to test plots for a continuous record of meteorological conditions that could impact their research.

## 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 CO<sub>2</sub> isotopes, N<sub>2</sub>O, or CH<sub>4</sub> are obtained with our TGA200A Trace-Gas Analyzer.

## 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.



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