CAMPBELL SCIENTIFIC®
WHEN MEASUREMENTS MATTER

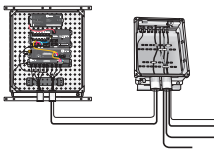
AGRICULTURE AND SOIL MONITORING

Measurement Instruments for Agriculture and Soil Applications

Campbell Scientific provides professional- and research-grade measurement systems for many applications within agriculture and soil moisture markets. Our systems measure both soil water and environmental parameters related to evapotranspiration, plant growth and development, and disease modeling. Multiple sensors can be networked in hard-wired or wireless systems, while portable, hand-held systems can make point measurements to verify irrigation scheduling or to perform site surveys.

Campbell products are key to agricultural research, irrigation and planting scheduling, harvesting, watershed studies, frost prediction, and timing for pesticide and fertilizer applications.

MAJOR SYSTEMS

	Measurements	*Datalogger*	*Power*	*Communications*
GRWS100 | General Research-Grade Weather Station Reliable Weather Monitoring 	wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, solar radiation (sun-plus-sky radiation)	CR1000	PS100 12 Vdc Power Supply recharged with 10 W solar panel	cellular, DNP3, email, fiber optic, field display, FTP, Modbus, NTCIP, radio, satellite, serial, TCP/IP, Wi-Fi
ET107 | Evapotranspiration Monitoring Station For commercial agriculture, irrigation, scheduling, and meteorological applications 	Standard wind speed, wind direction, air temperature, precipitation, relative humidity, barometric pressure, solar radiation Optional soil volumetric water content, soil electrical conductivity, soil temperature	CR1000	Standard 12 Vdc, 7 A h battery recharged with 10 W solar panel or ac power Optional PS24 24 A h, 12 Vdc Power Supply	Standard short haul modem, phone modem Optional cellular, spread spectrum radio, Ethernet interfaces, voice synthesized modem
TDR100-Based | Time-Domain Reflectometry Non-destructive in-situ soil measurements 	soil water content, soil electrical conductivity, rock mass deformation, cable integrity, water level detection	CR1000, CR3000, CR800, CR850	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
HS2 HydroSense II | Soil Moisture Measurement System Fast and Portable 	soil water content	NA (stand alone system)	6 Vdc, 4 AA batteries	handheld display, bluetooth

Custom Systems

Most of the systems we sell are customized. Tell us what you need and we'll help you configure a system that meets your exact needs.

Dataloggers

All of our measurement systems are based around a programmable datalogger (typically a CR800, CR1000 or CR3000) that measures the sensors, then processes, stores, and transmits the data. Our low-power dataloggers have wide operating temperature ranges, programmable execution intervals, onboard instructions, and ample input channels for commonly used sensors. Our dataloggers interface directly to most sensors, eliminating external signal conditioning.

Data are typically output in the units of your choice (e.g., wind speed in mph, knots, m/s). Measurement rates and data recording intervals are independently programmable, allowing calculation of 15-minute, hourly, and daily data values from 1-minute or 1-second measurements. Atypical events can trigger alarms and cause additional data to be recorded. Channel capacity can be expanded using multiplexers.

Sensors

Almost any sensor can be measured by our dataloggers, allowing stations to be customized for each site. Typical sensors used on our stations include, but are not limited to: wind speed, wind direction, solar radiation, air and soil temperature, relative humidity, precipitation, soil moisture, barometric pressure, and leaf wetness.

Data Retrieval

We offer multiple communications options for data retrieval, which can be mixed within the same network. Telecommunications options include short-haul, telephone (land line, voice-synthesized, cellular), radio frequency, multidrop, and satellite. On-site options include storage module and laptop computer.

Software

Our PC-based support software simplifies the entire monitoring process, from programming to data retrieval to data display and analysis. Our software automatically manages data retrieval from networks or single stations. Robust error-checking ensures data integrity. We can even help you post your data to the Internet.

Agriculture and Soil Monitoring Case Studies

Our agriculture and soil monitoring systems have helped a variety of organizations reach their goals. The following are just a few of these:

In California, an automated system for alfalfa flood irrigation research included three water sensors buried and spaced in a row (following the direction of the water flow) toward the lower end of a long bay, known as a check. As the water sheet proceeded down the field, a Campbell Scientific CR3000 Micrologger® recorded the arrival of water at each sensor, and used a cellular modem to transmit that information to the irrigators.

www.campbellsci.com/ca-irrigation

Forty-nine Campbell Scientific weather stations make up North Dakota's Agricultural Weather Network (NDAWN). Data from the network is used for irrigation scheduling, pesticide application scheduling, and various research projects. The standard stations monitor air temperature, relative humidity, wind speed and direction, solar radiation, rainfall, and soil temperature.

www.campbellsci.com/north-dakota-network

The West Texas Mesonet (WTM) project was initiated by Texas Tech University in 1999 to provide free real-time weather and agricultural information for residents of the South Plains region of western Texas. The WTM uses Campbell Scientific dataloggers, towers, enclosures, communication devices, and sensors that measure wind, air temperature and humidity, sunlight, soil temperature and water content at multiple depths, precipitation, and barometric pressure.

www.campbellsci.com/wtmeso

In Colombia, Campbell gear is used to study greenhouse conditions for the purpose of battling fungus growth on roses. To set up the study, researchers built two measurement stations. The stations, powered by solar panels, included several LWS Leaf Wetness Sensors and SI-111 Infrared Radiometers positioned at a variety of locations among the plants. These sensors were connected to Campbell CR1000 dataloggers via our AM16/32 multiplexers.

www.campbellsci.com/fungus-roses-colombia

Data gathered from the Colombian study on fungus growth allow rose farmers to curtail fungus growth while being less dependent on pesticides. The study's LWS leaf wetness sensors are shown above.