



SWP-Series

**Automated Data Acquisition Systems for
Small Wind Turbine Performance Monitoring**

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The SWP-series systems include cable entry seals that are compressed around one cable. The seals fit cables with an 0.118-in. to 0.275-in. outer diameter.



The SWP850 measures wind, environmental, and generated power sensors, and then transmits the data via spread spectrum radios, digital cellular modems, or Ethernet. Data can also be stored on the SC115 SC I/O-to-USB Flash Drive.



Besides providing all of the capabilities of the SWP850, the SWP1000 can measure more sensors, and use the NL115 module/interface to store data on one CompactFlash card or communicate via Ethernet.

Campbell Scientific's SWP850 and SWP1000 are turn-key systems, specifically designed for small wind turbine performance monitoring. They measure and record both wind and environmental data, as well as generated electrical power. The SWP series can conform to the data acquisition requirements of IEC 61400-12-1. The stations communicate with a PC via Ethernet, spread spectrum radios or digital cellular modems. Data can also be stored on a Flash drive or CompactFlash card (SWP1000 only).

Though offered as a turn-key package, the SWP-series systems retain the powerful, modular nature of the Campbell Scientific product line. A choice of accessories for nearly every aspect of the station allows you to customize the station to fit your application's specific requirements. Additional sensors, communications devices, mounting options, and accessories can also be added to your system.

Prior to shipment, Campbell Scientific mounts the equipment to the enclosure backplate, programs the datalogger, and configures the data retrieval peripherals. This minimizes installation and startup time.

Features/Benefits

- System configurations available that make measurements in conformance with IEC 61400-12-1
- Provides a modular, programmable, and customizable system
- Measures wind speed and direction, barometric pressure, temperature, relative humidity, wild AC voltage, wild AC current, wild AC power, wild AC frequency, 60/50 Hz AC voltage, 60/50 Hz AC current, 60/50 Hz AC power, DC Voltage, DC Current
- Contains a preprogrammed Campbell Scientific CR850 or CR1000 datalogger
- Includes a 14-in. x 16-in. environmental enclosure with cable entry seals that provide a water tight seal
- Reduces installation and startup time by using a preprogrammed datalogger, preconfigured peripherals, and premounted equipment.
- Provides a battery backup system that allows data collection during power outages and network failure
- Enables real-time performance data to be shared via an internet browser when optional communications and RTMC Web Server software is used

Ordering Information

The components of the SWP850 and SWP1000 Automated Data Acquisition Systems are configurable based on the standard options in the table below. To configure an SWP850 and SWP1000 system to your specific needs, please contact a Campbell Scientific Renewable Energy Application Engineer.

Standard Components	SWP850	SWP1000
Datalogger	CR850 Measurement and Control Datalogger (programmed at the factory)	CR1000 Measurement and Control Datalogger (programmed at the factory)
Enclosure	ENC14/16 14-in x 16-in Environmental Enclosure with individual compression fittings for cable entry. The number of compression fittings provided depends on the number of sensors ordered. Campbell Scientific mounts the datalogger, power supply, and data retrieval peripheral to the enclosure backplate, minimizing installation time.	
Power Supply	PS100 12 Vdc Power Supply with Charging Regulator and 7 Ahr Sealed Rechargeable Battery. Requires a charging source; two charging source options are provided (see below).	
Charging Source	Choose one of the following options: <ul style="list-style-type: none"> • SP20 20 W Solar Panel • 9591 Wall Charger (AC power must be available on site) 	

Standard Measurements	Typical Sensors*
Wind Speed	03101 RM Young Wind Sentry Anemometer**
Wind Direction	03301 RM Young Wind Sentry Vane**
Barometric Pressure	CS106 Vaisala PTB110 Barometer
Temperature/ Relative Humidity (RH)	CS215 Temperature and RH Probe (includes 41303-5A 6-Plate Solar Radiation Shield)
AC Voltage	SPT-0375 Magnelab Potential Transformer
AC Current	SCT-0750 Magnelab Split-Core AC Current Transformer
AC Power	DMT Ohio Semitronics Multifunction Transducer DWV Ohio Semitronics AC Watt/VAR Transducer
DC Voltage	CR5300 CR Magnetics DC Voltage Transducer
DC Current	CR5200 CR Magnetics Split-Core Hall Effect DC Current Transducer
Shaft Speed	427016-00 Magnetic Sensors Corporation Hall Effect Zero Speed Sensor

Accessories	SWP850	SWP1000
Communications / External Data Storage	Options include: <ul style="list-style-type: none"> • NL100 Network Link • SC115 CS I/O 2G Flash Memory Drive w/USB Interface • RF401 900 MHz Spread Spectrum Radio • RF416 2.4 GHz Spread Spectrum Radio • RF450 900 MHz 1 W Spread Spectrum Radio • RAVENXTG Airlink GPRS Cellular Digital Modem • RAVENXTV Airlink CDMA Cellular Digital Modem 	Options include: <ul style="list-style-type: none"> • NL115 Ethernet Interface and CompactFlash Module • SC115 CS I/O 2G Flash Memory Drive w/USB Interface • RF401 900 MHz Spread Spectrum Radio • RF416 2.4 GHz Spread Spectrum Radio • RF450 900 MHz 1 W Spread Spectrum Radio • RAVENXTG Airlink GPRS Cellular Digital Modem • RAVENXTV Airlink CDMA Cellular Digital Modem
Software	Options include: <ul style="list-style-type: none"> • PC400 Midlevel Datalogger Support Software • LoggerNet Advanced Datalogger Support Software • RTMC Web Server that allows real-time data display to be shared via an internet browser (requires LoggerNet Datalogger Support Software) 	

Notes:

*The SWP850 and SWP1000 sensors are selected based on the application. Additional sensor options are available and may be substituted if desired.

**Also available are first class wind measurement sensors such as Vector, Windsensor (Riso), and Thies.

Specifications¹

Measurement & Control Datalogger

Maximum Scan Rate:	100 Hz
Channels Available	
CR850:	6 single-ended (3 diff.) analog inputs, 2 pulse counters, 4 digital control ports
CR1000:	16 single-ended (8 diff.) analog inputs, 2 pulse counters, 8 digital control ports
Temperature Range	
Standard:	-25° to +50°C
Extended:	-55° to +85°C
Analog Voltage Accuracy:	±(0.06% of reading + offset), 0° to +40°C
Memory:	2 Mbytes Flash for operating system (OS) 4 Mbytes for CPU usage, program storage, and data storage
Power Requirements:	9.6 to 16 Vdc
Typical Current Drain:	~0.6 mA (sleep mode); up to 28 mA (active)

03101 RM Young Anemometer

Sensor:	12-cm diameter cup wheel assembly, 40 mm diameter hemispherical cups
Range:	0 to 112 mph (0 to 50 m/s) with starting threshold of 1.1 mph (0.5 m/s)
Accuracy:	±1.1 mph (0.5 m/s)

03301 RM Young Wind Vane

Sensor:	Balanced vane; 16 cm turning radius
Range	
Mechanical:	0° to 360°
Electrical:	0° to 352°
Accuracy:	±5°

CS215 Temperature and Relative Humidity Probe²

Measurement Range	
Relative Humidity (RH):	0 to 100% RH
Temperature:	-40° to +70°C
RH Sensing Element:	Sensirion SHT75
RH Accuracy:	±2% (10% to 90% RH) ±4% (0 to 100% RH)
Temperature Accuracy:	±0.3°C at 25°C ±0.4°C over +5° to +40°C ±0.9°C over -40° to +70°C

CS106 Vaisala PTB110 Barometer

Operating Temperature:	-40° to 60°C
Accuracy:	±0.3 mb @ +20°C ±0.6 mb @ 0° to 40°C ±1.0 mb @ -20° to +45°C ±1.5 mb @ -40° to +60°C

SCT-0750 Magnelab Split Core AC Current Sensor

Operating Range:	50 to 400 Hz
Rated Input:	10 A
Accuracy:	±1% at 10% to 130% of rated current
Phase Angle:	< 2 degrees at 50% rated current

SPT-0375 Magnelab Potential Transformer

Input Voltage Range:	0 to 600 V
Accuracy:	±1%
Phase Angle:	< 1 degree
Withstand Voltage:	2,500 Vrms primary to secondary

DMT Ohio Semitronics Multifunction Transducer

Accuracy	
Voltage and Current:	0.2% f.s.
Power:	0.25% f.s.
Reactive and Apparent:	0.5% f.s.

DWV Ohio Semitronics AC Watt/VAR Transducer

Accuracy:	0.5% f.s.
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CR5300-Series CR Magnetics DC Voltage Transducer

Basic Accuracy:	1.0%
Thermal Drift:	500 PPM/°C
Operating Temperature:	0° to 50°C
Insulation Voltage:	2500 Vdc

CR5200 CR Magnetics Split-Core Hall Effect DC Current Transducer

Basic Accuracy:	1.0%
Thermal Drift:	≤500 PPM/°C
Operating Temperature:	-10° to 60°C
Rated Input Current:	30 A

427016-00 Magnetic Sensors Corporation Hall Effect Zero Speed Sensor

Operating Temperature:	-20° to 150°C
Operating Voltage:	4.5 to 24 Vdc
Air Gap:	0.020 maximum

¹Additional specifications are provided on the brochures for the individual products.

²The 41303-5A 6-Plate Radiation Shield is included with the CS215 Temperature and RH Sensor.

