



CR1000Xe

Measurement and Control Datalogger



Extraordinary Performance

Enhanced with additional serial I/O, power control, and MQTTs to Meteorological Data Management Systems like CampbellCloud™

Overview

The CR1000Xe provides measurement and control for a wide variety of applications. Its reliability and ruggedness make it an excellent choice for remote environmental applications including stations for hydrology and meteorology (HydroMet), solar resource assessment and monitoring (SRA/SRM), dams and mines (geotech), and broad research objectives for environmental systems.

The CR1000Xe is a low-powered device that measures analog and digital sensors, processes and stores measurements, and adapts to any communications link. It stores data and programs in non-volatile flash memory. The onboard programming language—common to all Campbell Scientific data loggers—allows users to create solutions perfectly tailored to the application.

Benefits and Features

- ▶ Operates in extreme environments with a standard operating range of -40° to $+70^{\circ}\text{C}$ and an extended operating range of -55° to $+85^{\circ}\text{C}$
- ▶ Connects directly to a computer's USB port
- ▶ Captures quickly changing data values with fast analog measurement capabilities (300+ Hz)
- ▶ Differentiates even slight changes in data values with higher-resolution measurements (24 bit Adc)
- ▶ Includes two non-isolated current input channels for directly connecting sensors with 0-to-20 mA or 4-to-20 mA current outputs
- ▶ Contains an onboard CPI port for hosting Campbell Scientific high-speed sensors and distributed modules (such as the GRANITE™ Series)
- ▶ Directly connects to Ethernet
- ▶ Includes microSD card drive for extended memory requirements
- ▶ Provides simple serial sensor integration and measurement with SDI-12, RS-232, RS-422, and/or RS-485
- ▶ Supports full PakBus networking
- ▶ Includes embedded web page for direct connection via web browser
- ▶ Offers a broad input voltage range of 10 to 36 Vdc
- ▶ Provides regulated 12 Vdc power output
- ▶ Controls CS I/O power to external modems

Detailed Description

The CR1000Xe electronics are shielded from radio frequency by a unique, sealed, stainless-steel canister. It includes a low-drift, battery-backed clock that can be updated by NTP, GPS, and Campbell Scientific's PakBus®. The canister and wiring panel seal together through stainless-steel connectors. The CPI

and Ethernet pins are gold coated to resist corrosion. The CR1000Xe is compatible with 12 V- and 24 V-nominal systems. The data logger's wiring panel regulates 12 V outputs and includes two switchable 12 V outputs on removable terminal blocks and a switchable 12 V output on CS I/O.

Specifications

Operating Temperature Range	<ul style="list-style-type: none"> › -40° to +70°C (standard) › -55° to +85°C (extended) › Non-condensing environment
Maximum Scan Rate	1000 Hz
Case Material	Anodized aluminum
Analog Inputs	16 single-ended or 8 differential (individually configured). Two analog inputs can measure 4 to 20 mA or 0 to 20 mA natively. Four analog inputs can provide pulse/digital I/O functions.
Pulse Counters	10 (P1 to P2 and C1 to C8)
Voltage Excitation Terminals	4 (VX1 to VX4)
Maximum Source/Sink Current	<ul style="list-style-type: none"> › ±40 mA (voltage excitation) › 50 mA (regulated 3.3 or 5 V)
Communications Ports	<ul style="list-style-type: none"> › Ethernet › RS-232 › RS-485 › RS-422 › CS I/O › CPI › USB-C
Data Storage Slots	microSD
Switched 12 Volt	2 terminals, plus CS I/O pin 8
Digital I/O	8 terminals (C1 to C8) configurable for digital input and output. Includes status high/low, pulse width modulation, external interrupt, edge timing, switch closure pulse counting, high-frequency pulse counting, plus UART, RS-232, RS-485, SDM, SDI-12, I2C, and SPI serial-communications functions. Terminals are configurable in pairs for 5 V or 3.3 V logic for some functions.
Input Limits	±5 V
Analog Voltage Accuracy	› Accuracy specifications do not include sensor or measurement noise.

	<ul style="list-style-type: none"> › ±(0.08% of measurement + offset) at -55° to +85°C (extended temperature range) › ±(0.06% of measurement + offset) at -40° to +70°C › ±(0.04% of measurement + offset) at 0° to 40°C
ADC	24-bit
Power Requirements	10 to 36 Vdc input
Real-Time Clock Accuracy	±3 min. per year (optional GPS correction to ±10 µs)
Internet Protocols	Ethernet, PPP, RNDIS, ICMP/Ping, Auto-IP (APIPA), IPv4, IPv6, UDP, TCP, TLS (v1.2), DNS, DHCP, SLAAC, Telnet, HTTP(S), SFTP, FTP(S), POP3/TLS, NTP, SMTP/TLS, SNMPv3, CS I/O IP, MQTT(S)
Communications Protocols	CPI, PakBus, SDM, SDI-12, Modbus, TCP, DNP3, UDP, NTCIP, NMEA 0183, I2C, SPI, CampbellCloud HTTPS/MQTTS, and others
Battery-Backed SRAM for CPU Usage and Final Storage	4 MB
Data Storage	4 MB SRAM + 72 MB flash (storage expansion of up to 16 GB with removable microSD flash memory card)
Idle Current Drain, Average	< 1.5 mA (@ 12 Vdc)
Active Current Drain, Average	1.1 mA (1 Hz scan @ 24 Vdc)
Active Current Drain, Average	<ul style="list-style-type: none"> › 1.7 mA (1 Hz scan @ 12 Vdc) › 57 mA (20 Hz scan @ 12 Vdc)
Dimensions	23.8 x 10.1 x 6.2 cm (9.4 x 4.0 x 2.4 in.) Additional clearance required for cables and wires
Weight	0.86 kg (1.9 lb)

For comprehensive details, visit: www.campbellsci.ca/cr1000xe



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