PRODUCT INFORMATION

CR1000Xe

Measurement and Control Datalogger

Flagship Data Logger

Accurate, Rugged, Reliable

Overview

The CR1000Xe is our flagship data logger that provides measurement and control for a wide variety of applications. Its reliability and ruggedness make it an excellent choice for remote environmental applications, including weather stations, mesonet systems, wind profiling, air quality monitoring, hydrological systems, water quality monitoring, and hydrometeorological stations. The CR1000Xe is a low-powered device that measures sensors; drives direct communications and telecommunications; analyzes data; controls external devices; and stores data and programs in onboard, non-volatile storage. The electronics are RF-shielded by a unique, sealed, stainless-steel canister. A battery-backed clock assures accurate timekeeping. The onboard, BASIC-like programming language—common to all Campbell Scientific data loggers—supports data processing and analysis routines.

Benefits and Features

- Operational in extreme environments with a standard operating range of -40° to +70°C and an extended operating range of -55° to +85°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 microSD card drive for extended memory requirements
- Directly connects to Ethernet
- Supports full PakBus networking
- Controls CS I/O power to external modems
- 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)
- Includes embedded web page for direct connection via web browser
- Provides simple serial sensor integration and measurement with SDI-12, RS-232, RS-422, and/or RS-485
- Offers a broad input voltage range of 10 to 36 Vdc
- Provides regulated 12 Vdc power output

Specifications

Operating Temperature Range	-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	±40 mA (voltage excitation) 50 mA (regulated 3.3 or 5 V)
Communications Ports	USB-C Ethernet RS-232 RS-485 RS-422 CS I/O CPI
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
ADC	24-bit
Analog Voltage Accuracy	Accuracy specifications do not include sensor or measurement noise. ±(0.04% of measurement + offset) at 0° to 40°C ±(0.06% of measurement + offset) at -40° to +70°C ±(0.08% of measurement + offset) at -55° to +85°C (extended temperature range)
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
Real-Time Clock Accuracy	±3 min. per year (optional GPS correction to ±10 µs)
Power Requirements	10 to 36 Vdc input
Communications Protocols	CPI, PakBus, SDM, SDI-12, Modbus, TCP, DNP3, UDP, NTCIP, NMEA 0183, I2C, SPI, 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) 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 is required for cables and wires.
Weight	0.86 kg (1.9 lb)

Campbell SCIENTIFIC

PRODUCT COMPARISON

CR1000X vs CR1000Xe

Measurement and Control Dataloggers

CR1000X Features	CR1000Xe Features	Benefits
RS-232/RS-485 capabilities on C5–C8	RS-232 / RS-485 capabilities on C1–C8	Future-proofs your system with additional digital sensor support
Input supply voltage: 10V to 18V	Input power supply voltage: 10V to 36V	No extra cost requirements for additional power supplies, such as 24V, in systems that require higher power
12V, SW12-1, SW12-2 provide 12V power directly from the battery; 12V outputs allow up to ~1A per channel, up to 3A per system	12V, SW12-1, SW12-2 provide regulated 12 Vdc power; 12V outputs allow up to 2A per channel at 3.5A per system	Guaranteeing 12V output to power sensors and peripherals even when a 24V power supply is used
12V power over CS I/O via battery for simpler wiring of CS measurement peripherals and radios	12V Power is now regulated and controllable via SW12 capability through CS I/O port	Allows for a hard power reset on external CS modems without the requirement for an inline device, negating extra site visits and reducing costs
Micro-USB device port	USB-C device port	Provides standardized USB-C physical interface in compliance with EU directives
Remote communications and data collection rely on standard telemetry (cellular, satellite, direct) and legacy software	Cloud-enabled IOT device through MQTT. Includes enhanced security measures in default device settings (secure by default)	Takes advantage of station, network, and data management with CampbellCloud plus additional security measures out of the box.
Fully CE compliant for surge and ESD protection	Enhanced ESD and surge protection on ethernet port	Added protection
Robust mechanical and electrical product design for long-term environmental monitoring station use	Upgraded with SS connectors between main board and wiring panel; gold dipped pins on RJ45 connector	Reliable performance for data logger deployments in the harshest of environmental conditions

For comprehensive details, **visit: www.campbellsci.com/cr1000xe**.

PRODUCT INFORMATION

CR1000Xe

Measurement and Control Datalogger

Flagship Data Logger

Accurate, Rugged, Reliable

Overview

The CR1000Xe is our flagship data logger that provides measurement and control for a wide variety of applications. Its reliability and ruggedness make it an excellent choice for remote environmental applications, including weather stations, mesonet systems, wind profiling, air quality monitoring, hydrological systems, water quality monitoring, and hydrometeorological stations. The CR1000Xe is a low-powered device that measures sensors; drives direct communications and telecommunications; analyzes data; controls external devices; and stores data and programs in onboard, non-volatile storage. The electronics are RF-shielded by a unique, sealed, stainless-steel canister. A battery-backed clock assures accurate timekeeping. The onboard, BASIC-like programming language—common to all Campbell Scientific data loggers—supports data processing and analysis routines.

Benefits and Features

- Operational in extreme environments with a standard operating range of -40° to +70°C and an extended operating range of -55° to +85°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 microSD card drive for extended memory requirements
- Directly connects to Ethernet
- Supports full PakBus networking
- Controls CS I/O power to external modems
- 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)
- Includes embedded web page for direct connection via web browser
- Provides simple serial sensor integration and measurement with SDI-12, RS-232, RS-422, and/or RS-485
- Offers a broad input voltage range of 10 to 36 Vdc
- Provides regulated 12 Vdc power output

For comprehensive details, **visit: www.campbellsci.com/cr1000xe**.

Specifications

Operating Temperature Range	-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	±40 mA (voltage excitation) 50 mA (regulated 3.3 or 5 V)
Communications Ports	USB-C Ethernet RS-232 RS-485 RS-422 CS I/O CPI
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
Adc	24-bit
Analog Voltage Accuracy	Accuracy specifications do not include sensor or measurement noise. ±(0.04% of measurement + offset) at 0° to 40°C ±(0.06% of measurement + offset) at -40° to +70°C ±(0.08% of measurement + offset) at -55° to +85°C (extended temperature range)
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
Real-Time Clock Accuracy	±3 min. per year (optional GPS correction to ±10 µs)
Power Requirements	10 to 36 Vdc input
Communications Protocols	CPI, PakBus, SDM, SDI-12, Modbus, TCP, DNP3, UDP, NTCIP, NMEA 0183, I2C, SPI, 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) 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 is required for cables and wires.
Weight	0.86 kg (1.9 lb)

Campbell SCIENTIFIC

PRODUCT COMPARISON

CR1000X vs CR1000Xe

Measurement and Control Dataloggers

CR1000X Features	CR1000Xe Features	Benefits
RS-232/RS-485 capabilities on C5–C8	RS-232/RS-485 capabilities on C1–C8	Future-proofs your system with additional digital sensor support
Input power supply voltage: 10V to 18V	Input power supply voltage: 10V to 36V	No extra cost requirements for additional power supplies, such as 24V, in systems that require higher power
12V, SW12-1, SW12-2 provide 12V power directly from the battery; 12V outputs allow up to ~1A per channel, up to 3A per system	12V, SW12-1, SW12-2 provide regulated 12 Vdc power; 12V outputs allow up to 2A per channel at 3.5A per system	Guaranteeing 12V output to power sensors and peripherals even when a 24V power supply is used
12V power over CS I/O via battery for simpler wiring of CS measurement peripherals and radios	12V power now regulated and controllable via SW12 capability through CS I/O port	Allows for a hard power reset on external CS modems without the requirement for an inline device, negating extra site visits and reducing costs
Micro-USB device port	USB-C device port	Provides standardized USB-C physical interface in compliance with EU directives
Remote communications and data collection rely on standard telemetry (cellular, satellite, direct) and legacy software	Cloud-enabled IOT device through MQTT; includes enhanced security measures in default device settings (secure by default)	Takes advantage of station, network, and data management with CampbellCloud™ plus additional security measures out of the box
Fully CE compliant for surge and ESD protection	Enhanced ESD and surge protection on Ethernet port	Added protection
Robust mechanical and electrical product design for long-term environmental monitoring station use	Upgraded with SS connectors between main board and wiring panel; gold dipped pins on RJ45 connector	Reliable performance for data logger deployments in the harshest of environmental conditions

For comprehensive details, **visit: www.campbellsci.com/cr1000xe**.