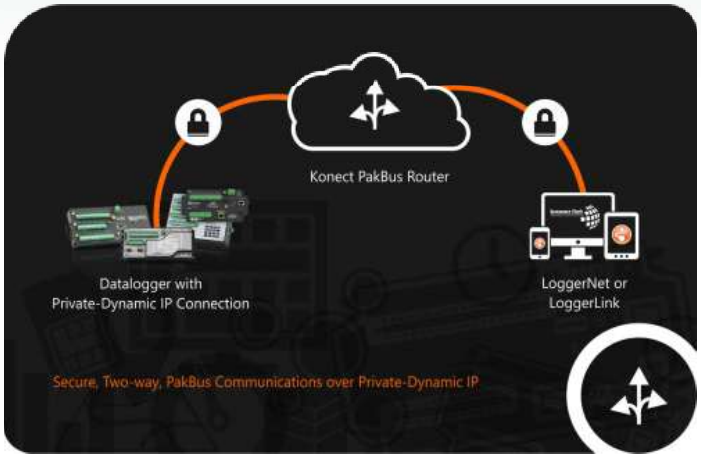
PRODUCT

CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

KonectPBRouter

PakBus Routing Service



Secure Two-way Communication

Overview

Konect PakBus Router overcomes the barriers of private, dynamic cellular connections or wired network installations. This cloud-based service enables secure, two-way communication between a PakBus data logger and LoggerNet or LoggerLink.

Cellular carriers offer private, dynamic IP address data plans to secure communication. These plans block inbound connections. Konect PakBus Router routes inbound communication to a data logger from LoggerNet or LoggerLink.

Konect PakBus Routing Service allows you to route a range of PakBus addresses through our cloud-based router, which behaves like a fixed connection using the URL and port combination we provide.

Benefits and Features

- Simplifies communication to data loggers with dynamic, private IP addresses
- Compatible with all methods of PakBus security
- Scalable to address expanding data logger network needs
- Lifetime complimentary service with the purchase of cellular-enabled hardware
- Can be purchased as a low-cost, two-year subscription
- Provides secure communication

Detailed Description

Konect PakBus Router is a cloud-based service that supports all Campbell Scientific's PakBus data loggers*. The router acts as a bridge between a data logger configured to connect to the router and our LoggerNet Datalogger Support Software. The data logger connection to the router is most easily implemented by entering the router URL into the data logger's PakBus/TCP Client Connections setting.

Konect PakBus Router is offered as a two-year subscription (two years of service, paid in advance). Subscription fees are based on a per-data-logger basis. You provide us with the unique PakBus address(es) of the data logger(s) to which you want to connect, and we provide you with a URL/Port combination to use in the data logger(s) and in the LoggerNet software. As your network of data loggers grows, simply

request that new PakBus addresses be added to your Konect PakBus Router service.

**Some PakBus data loggers do not have an internal IP stack and must rely on the capabilities of an IP modem to initiate the connection back to the Konect Router. This includes the CR200(X) and the CR10X, CR510, and CR23X dataloggers with a PakBus operating system.*

Note: Konect PakBus Router is also provided as a complimentary service with the purchase of any cellular-enabled device (stand-alone cellular modem or data logger with embedded cellular modem).

CAMPBELL SCIENTIFIC
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Leaftron®

LTG12-20

Valve-regulated lead-acid battery

Cyclic | AGM Gel | Solar & Wind | EV | Mobility | Railway

DEEP CYCLE GEL SERIES

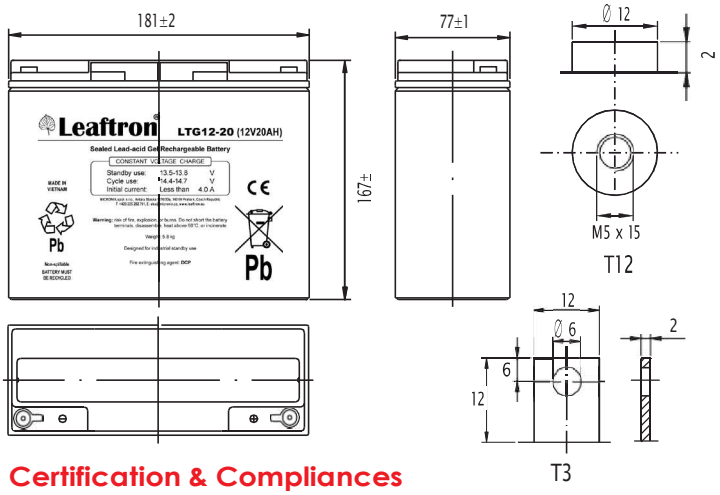
Characteristics

Nominal voltage		12V (6 cells per unit)
Nominal capacity at 20 hours rate/10.5V (25°C)		20Ah
Capacity (25°C)	10 Hours rate/10.8V	17.9Ah
	5 Hours rate/10.8V	16Ah
Terminal type		T12/T3
Torque		3.0±0.6N.m
Approx. internal resistance (25°C)		13.0mΩ
Dimensions	Length	181±2mm (7.13inch)
	Width	77±1mm (3.03inch)
	Height	167±2mm (6.57inch)
	Total height	167±2mm (6.57inch)
Design Life (stand-by)	JIS at 25°C	12 years
	Eurobat at 20°C	10/12 years
Weight		5.80kg (12.79lbs)±4%
Nominal operating temperature		25±3°C (77°F±5)
Operating temperature range	Discharge	-15°C~50°C (5°F~122°F)
	Charge	-10°C~50°C (14°F~122°F)
	Storage	-20°C~50°C (-4°F~122°F)
Float charging voltage at 25°C		13.5V~13.8V
Cyclic charging voltage at 25°C		14.4V~14.7V
Temperature compensation	Float charge	-18 mV/°C/Block
	Cycle charge	-30 mV/°C/Block
Max. charging current (A)		4.0A
Max. discharge current for 5 seconds		300A
Self discharge rate (25°C)		≤3%/month
Battery container ABS UL94-HB		V-0 optional

Overview

Leaftron AGM GEL Series are manufactured following the highest demands in the deep cycle and renew-able energy applications. The batteries use colloidal or foamed silica gel to immobilize the electrolyte, which further enhances the cycling stability. Available in top and front terminal types.

Dimensions & Terminal Type (mm)



Certification & Compliances

ISO 9001 | ISO 14001 | ISO 45001 | UL | IEC | CQC | TLC

Compliant to: EUROBAT, RoHS, WEEE's and Reach.
Manufactured according to IEC 60896-21 / 22

Construction

Component	Positive Plate	Negative plate	Container	Separator	Electrolyte	Safety valve	Terminal
Raw material	Lead dioxide	Lead	ABS (V-0 opt.)	AGM	Sulfuric Acid Gel	Rubber	Copper

Constant current discharge characteristics at 25°C

(Ampere/battery)

F.V/Time	5min	10min	15min	30min	60min	2h	3h	4h	5h	10h	20h
9.60V	61.6	42.0	35.0	20.4	12.4	7.00	4.94	4.00	3.37	1.86	1.02
9.90V	59.8	40.7	34.2	20.0	12.2	6.96	4.91	3.97	3.35	1.85	1.01
10.2V	57.3	39.1	32.9	19.4	11.9	6.90	4.87	3.95	3.32	1.84	1.01
10.5V	54.8	37.4	31.8	18.9	11.7	6.80	4.84	3.92	3.30	1.83	1.00
10.8V	51.7	35.3	30.1	18.2	11.3	6.62	4.69	3.80	3.20	1.79	0.98

Constant power discharge characteristics at 25°C

(Watts/battery)

F.V/Time	5min	10min	15min	30min	60min	2h	3h	4h	5h	10h	20h
9.60V	687	474	399	234	144	81.9	58.6	47.6	40.2	22.3	12.2
9.90V	667	460	389	229	141	81.5	58.3	47.3	40.0	22.2	12.1
10.2V	639	441	375	222	138	80.7	57.9	47.0	39.7	22.1	12.1
10.5V	612	422	362	217	135	79.5	57.5	46.7	39.4	22.0	12.0
10.8V	577	398	343	209	131	77.5	55.8	45.3	38.2	21.5	11.8

The above characteristics represent average values and can be obtained within three charge and discharge cycles. The batteries must be fully charged before testing. The data in this document is subject to change without notice and become contractual only after written confirmation.

BlueSolar Polykrystalické panely

www.victronenergy.com

BlueSolar Polykrytalický panel 175W

- Nízký teplotní koeficient zlepšuje provoz při vysokých teplotách.
- Výjimečný výkon při slabém osvitu a vysoká citlivost na světlo v celém slunečním spektru.
- 25letá omezená záruka na výkon a výkon.
- 5letá omezená záruka na materiál a zpracování
- Utěsněná, vodotěsná, multifunkční propojovací krabice poskytuje vysokou úroveň bezpečnosti.
- Vysoce výkonné bypass diody minimalizují pokles výkonu způsobený stínem.
- Pokročilý systém zapouzdření EVA (Ethylene Vinyl Acetate) s třívrstvou zadní vrstvou splňuje nejpřísnější bezpečnostní požadavky pro vysokonapěťový provoz.
- Robustní rám z eloxovaného hliníku umožňuje snadnou montáž modulů na střechu s různými druhy standarních montážních systémů.
- Vysoce kvalitní tvrzené sklo s vysokou propustností poskytuje zvýšenou tuhost a odolnost proti nárazu.
- Vysoce výkonné modely s předem zapojeným systémem rychlého připojení s konektory MC4 (PV-ST01).

MC4 konektory

Artikl	Popis	Čistá hmotnost	Elektrická data STC (1)				
			Jmenovitý výkon	Maximální napětí	Maximální proud	Napětí naprázdno	Zkratový proud
			P_{MPP}	V_{MPP}	I_{MPP}	Voc	Isc
		Kg	W	V	A	V	A
SPP040201200	20W-12VPoly 440 x 350 x 25mm series4a	1.9	20	18.4	1.09	21.96	1.18
SPP040301200	30W-12VPoly 655 x 350 x 25mm series4a	2.8	30	18.2	1.66	21.80	1.80
SPP040451200	45W-12VPoly 425 x 668 x 25mm series4a	3.1	45	19.1	2.36	22.90	2.55
SPP040601200	60W-12VPoly 545 x 668 x 25mm series4a	4	60	19.3	3.12	23.10	3.37
SPP040901200	90W-12VPoly 780 x 668 x 30mm series4a	6.1	90	19.5	4.61	23.44	4.98
SPP041151200	115W-12VPoly 1015 x 668 x 30mm series 4a	8	115	18.9	6.08	22.73	6.56
SPP041151202*	115W-12VPoly 1030 x 668 x 30mm series 4b	8	115	18.9	6.08	22.73	6.56
SPP041751200	175W-12VPoly 1485 x 668 x 30mm series 4a	12	175	18,3	9.56	21.9	10.24
SPP042702000	270W-20VPoly 1640 x 992 x 35mm series 4a	18.4	270	31.7	8.52	38.04	9.21
SPP043302400	330W-24VPoly 1956 x 992 x 40mm series 4a	22.5	330	37.3	8.86	44.72	9.57
SPP043302402*	330W-24VPoly 1980 x 1002 x 40mm series 4b	23	330	37.3	8.86	44.72	9.57

Modul	SPP 040201200	SPP 040301200	SPP 040451200	SPP 040601200	SPP 040901200	SPP 041151200	SPP 041151202	SPP 041751200	SPP 042702000	SPP 043302400	SPP 043302402
Jmenovitý výkon (± 3% tolerance)	20W	30W	45W	60W	90W	115W	115W	175W	270W	330W	330W
Typ buňky	Polykrystalický										
Počet buněk v sérii	36								60	72	
Maximální systémové napětí (V)	1000V										
Teplotní koeficient PMPP(%)	-0.45/°C	-0.45/°C	-0.45/°C	-0.45/°C	-0.45/°C	-0.45/°C	-0.45/°C	-0.45/°C	-0.47/°C	-0.45/°C	-0.45/°C
Teplotní koeficient Voc(%)	-0.35/°C	-0.35/°C	-0.35/°C	-0.35/°C	-0.35/°C	-0.35/°C	-0.35/°C	-0.35/°C	-0.34/°C	-0.35/°C	-0.35/°C
Teplotní koeficient Isc(%)	+0.04/°C	+0.04/°C	+0.04/°C	+0.04/°C	+0.04/°C	+0.04/°C	+0.04/°C	+0.04/°C	+0.045/°C	+0.04/°C	+0.04/°C
Teplotní rozsah	-40°C až +85°C										
Maximální nosnost povrchu	200 kg/m²										
Povolené zatížení při krupobití	23 m/s,7.53 g										
Typ řídícího boxu	PV-LH0805	PV-LH0806		PV-LH0801		PV-LH0808			PV-JB002		
Délka kabelu / konektoru	bez kabelu				900 mm / MC4						
Výstupní tolerance	+/-3%										
Rám	Hliník										
Záruka	5 let										
Záruka na pokles výkonu	10 let 90%, 25 let 80% výkonu										
Nejmenší jednotka	1 panel										
Množství na paletě	380	240	200	140	72	72	72	48	42	37	37
Třída ochrany	Třída II										

*Nový rozměr: náhrada 4amodelu

1) STC(standardní testovací podmínky): 1000W/m², 25ºC, AM (vzduch)1.5

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CR350

Measurement and Control Datalogger

Compact Data Logger with RS-485

Ideal for small applications

Overview

The CR350 is a multi-purpose, extremely low-power, compact measurement and control data logger. This entry-level data logger, with its rich instruction set, can measure most hydrological, meteorological, environmental, and industrial sensors. The CR350 concentrates and makes data available over varied networks, with delivery using your preferred protocol. The CR350 also performs automated on-site or remote decision-making for control and M2M communications. This data logger is ideal for small applications requiring long-term, remote monitoring and control.

The following outlines the primary differences between the CR310 and CR350 dataloggers:

- The CR310 and CR350 offer removable connectors.
- The CR310 includes a 10/100 Ethernet connection.
- The CR350 has two independent RS-232/RS-485 ports and USB-C.

The CR350 includes Wi-Fi, cellular, or the following radio options for different regions:

- CR350-RF407: US and Canada
- CR350-RF412: Australia and New Zealand
- CR350-RF422: UK and EU
- CR350-RF427: Brazil

Note: Campbell Scientific does not recommend the CR350 for use as a PakBus router in networks with more than 50 devices. Large arrays or string variables may also reach memory limits. For such applications, a CR1000Xe Measurement and Control Datalogger is recommended.

Benefits and Features

- Two dedicated SDI-12 terminals to expand SDI-12 sensor use
- Extremely low current requirements
- Two dedicated RS-232/RS-485 terminals to support smart sensors or modems
- Easy setup with PC software and USB-C connectivity
- Ability to measure analog and digital sensors with confidence
- Trusted Campbell Scientific quality, including integral surge and ESD protection
- Integrated radio option to network wirelessly to another node or internet gateway
- CR350-WIFI ideal for short-range, wireless IP communications
- Removable terminal block for easy wiring
- Ability to communicate anywhere using built-in cellular or satellite peripherals
- Integrated 12 V battery solar charge regulator to charge batteries
- Flexibility to connect with PakBus, Modbus, DNP3, GOES, and other standard communications protocols
- Multiple general-purpose I/O and programmability to analyze and control measurement acquisition
- Event-driven communications and physical outputs for notifications

Detailed Description

The CR350 is a low-powered data logger designed to measure sensors, analyze data, and store data and programs. A battery-backed clock assures accurate timekeeping. The on-board, BASIC-like programming language—common to all Campbell Scientific data loggers—supports data processing and analysis routines.

Terminal Descriptions

- Two switched 12 V terminals (SW12V) for powering sensors or communications devices, 2100 mA
- Two sensor excitation or continuous 0.15 to 5 V terminals (VX1, VX2) for sensor excitation or output control
- Four multipurpose analog input terminals (SE1–SE4)
  - Analog functions (SE1–SE4)
    - Analog inputs: 4 single-ended or 2 differential inputs with -100 to +2500 mV and ±34 mV ranges 24 bit ADC
    - 4 to 20 mA or 0 to 20 mA inputs (SE1, SE2 only)
  - Digital I/O functions (SE1–SE4) consist of 3.3 V logic levels for:
    - High frequency counter (35 kHz)
    - Pulse width modulation
    - Interrupts and timer input
    - Period average (200 kHz, amplitude dependent)
- Two pulse counting terminals (P_SW, P_LL)
  - P_SW
    - Switch closure (150 Hz)
    - High frequency counter (35 kHz)
  - P_LL
    - Low level ac (20 kHz)
    - High frequency counter (20 kHz)
- Two control terminals (C1, C2): C terminals are software configurable for digital functions.
  - Digital I/O functions consist of 5 V output and 3.3 V input logic levels for:
    - SDI-12
    - High frequency counter (3 kHz)
    - Switch closure (150 Hz)
    - General status/control voltage source 5 V; 10 mA @ 3.5 V
    - Interrupts
    - Serial asynchronous communications Tx/Rx pair

Specifications

Operating Temperature Range	-40° to +70°C *Non-condensing environment*
Maximum Scan Rate	10 Hz
Case Material	High-impact-resistant polycarbonate, recycle code 7
Analog Inputs	4 single-ended or 2 differential (individually configured)
Pulse Counters	8 (P_SW, P_LL, C1, C2, and SE1 to SE4)
Voltage Excitation Terminals	2 (VX1, VX2)
Communications Ports	USB Type C 2.0 RS-232 RS-485

Switched 12 Volt	2 terminals
Digital I/O	7 terminals (C1, C2, P_SW, and SE1 to SE4) configurable for digital input and output. Includes status high/low, pulse width modulation, external interrupt, and communications functions. Exception: C2 and P_SW don't do pulse-width modulation.
Analog Input Limits	-100 to +2500 mV
Analog Voltage Accuracy	Accuracy specifications do not include sensor or measurement noise. ±(0.04% of measurement + offset) at 0° to 40°C ±(0.1% of measurement + offset) at -40° to +70°C

Specifications

ADC	24-bit
Charge Terminal Characteristics (CHG+ and CHG-)	■ Input from power converter or solar panel ■ ES1 PS2 energy sources only (Energy Source Class 1 [ES1] and Power Source Class 2 [PS2], as defined in Clauses 5 and 7 of IEC/AS/NZS 62368-1:2022) ■ 16 to 32 Vdc ■ Hold current limit 1.1 A @ 20°C
Battery Terminal Characteristics (BAT+ and BAT-)	■ Input from external battery, 7 Ah lead-acid typical ■ Voltage input 12 Vdc only ■ Hold current limit 3.7 A @ 20°C
Internal Lithium Battery	■ 3 V coin cell CR2032X for battery-backed clock ■ 6-year life with no external power source
Real-Time Clock Accuracy	±3 min. per year
Internet Protocols	Ethernet, PPP, RNDIS, ICMP/Ping, Auto-IP (APIPA), IPv4, IPv6, UDP, TCP, TLS (v1.2), DNS, DHCP, SLAAC, NTP, Telnet, HTTP(S), FTP(S), SMTP/TLS, POP3/TLS, MQTT(S)
Communications Protocols	PakBus, PakBus Encryption, Modbus RTU/ASCII/TCP, DNP3, SDI-12, and others
CPU Drive/Programs	50 MB serial flash
Data Storage	50 MB serial flash
Idle Current Drain, Average	0.5 mA (@ 12 Vdc)
Active Current Drain, Average	■ < 1.5 mA (@ 12 Vdc for 1 Hz scan with 1 analog measurement) ■ 8 mA (@ 12 Vdc with processor always on)
Dimensions	16.3 x 8.4 x 5.6 cm (6.4 x 3.3 x 2.2 in.) Additional clearance required for cables and leads
Weight	288 to 306 g (0.64 to 0.68 lb) depending on communications option selected

CR350-RF407 Option

Radio Type	Frequency Hopping Spread Spectrum (FHSS)
Output Power	5 to 250 mW (user-selectable)
Frequency	902 to 928 MHz (US, Canada)
RF Data Rate	200 kbps
Receive Sensitivity	-101 dBm
Antenna Connector	RPSMA (external antenna required; see www.campbellsci.com/order/rf407 for Campbell Scientific antennas)
Idle Current Drain, Average	12 mA (@ 12 Vdc)
Active Current Drain, Average	< 80 mA (@ 12 Vdc)

CR350-RF412 Option

Radio Type	Frequency Hopping Spread Spectrum (FHSS)
Output Power	5 to 250 mW (user-selectable)
Frequency	915 to 928 MHz (Australia, New Zealand)
RF Data Rate	200 kbps
Receive Sensitivity	-101 dBm

Specifications

CR350-RF412 Option (continued)

Antenna Connector	RPSMA (external antenna required; see www.campbellsci.com/order/rf412 for Campbell Scientific antennas)
Idle Current Drain, Average	12 mA (@ 12 Vdc)
Active Current Drain, Average	< 80 mA (@ 12 Vdc)

CR350-RF422 Option

Radio Type	868 MHz SRD 860 with Listen Before Talk (LBT) and Automatic Frequency Agility (AFA)
Output Power	2 to 25 mW (user-selectable)
Frequency	863 to 870 MHz (European Union)
RF Data Rate	10 kbps
Receive Sensitivity	-106 dBm
Antenna Connector	RPSMA (External antenna required; see www.campbellsci.com/order/rf422 for Campbell Scientific antennas)
Idle Current Drain, Average	9.5 mA
Active Current Drain, Average	20 mA

CR350-RF427 Option

Radio Type	Frequency Hopping Spread Spectrum (FHSS)
Output Power	5 to 250 mW (user-selectable)
Frequency	■ 902 to 907.5 MHz ■ 915 to 928 MHz (Brazil)
RF Data Rate	200 kbps
Receive Sensitivity	-101 dBm
Antenna Connector	RPSMA (External antenna required)
Idle Current Drain, Average	12 mA (@ 12 Vdc)
Active Current Drain, Average	< 80 mA (@ 12 Vdc)

CR350-RF452 Option

Radio Type	Frequency Hopping Spread Spectrum (FHSS)
Output Power	10 mW to 1,000 mW (user-selectable)
Frequency	902 to 928 MHz
RF Data Rate	115.2 or 153.6 kbps
Receive Sensitivity	■ -108 dBm (@ 115.2 kbps for 10^{-4} BER) ■ -103 dBm (@ 153.6 kbps for 10^{-4} BER)
Antenna Connector	RPSMA (External antenna required)
Idle Current Drain, Average	< 29 mA (maximum @ 12 Vdc)
Active Current Drain, Average	< 84 mA (maximum @ 12 Vdc)

CR350-WIFI Option

Operational Modes	Client or Access Point
Operating Frequency	2.4 GHz, 20 MHz bandwidth

Specifications

CR350-WIFI Option (continued)

Antenna Connector	Reverse Polarity SMA (RPSMA)
Antenna	pn 16005 unity gain (0 dBd), 1/2 wave whip, omnidirectional with articulating knuckle joint for vertical or horizontal orientation
Transmit Power	7 to 18 dBm (5 to 63 mW)

CR350-CELL205 Option

-NOTE-	***The CR350-CELL205 option is not compatible with a Verizon cellular network.***
Certifications	IC (Industry Canada) 10224A-201611EC21A
Cell Technologies	■ 3G (UMTS/HSPA+) ■ 4G (LTE CAT-1)
3G Frequency Bands	850, 1700/2100 (AWS), and 1900
4G Frequency Bands	700, 850, 1700/2100 (AWS-1), 1900
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr350 for Campbell Scientific antennas)
Power Consumption - Idle	14 mA (average)
Power Consumption - Active	75 mA (average)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V
Radio Output Power	■ 23 dBm on LTE ■ 24 dBm on UMTS ■ 27 dBm on EDGE ■ 33 dBm on GSM
Radio Sensitivity Range	-99.5 to 110.5 dBm (10 M)

CR350-CELL210 Option

-NOTE-	***The CR350-CELL210 option is only compatible with a Verizon cellular network.***
Cell Technologies	4G (LTE CAT-1)
4G Frequency Bands	700, 850, 1700, 1900, 2100
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr350 for Campbell Scientific antennas)
Power Consumption - Low Power Mode	5 mA
Power Consumption - Idle	28 mA (average)
Power Consumption - Active	90 mA (average)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V
Radio Output Power	23 dBm on LTE
Radio Sensitivity Range	-99.5 to 110.5 dBm (10 M)

CR350-CELL215 Option

-NOTE-	***The CR350-CELL215 option is intended for use in EMEA countries.***
Cell Technologies	■ 2G (GSM/GPRS/EDGE) ■ 3G (UMTS/HSPA+) ■ 4G (LTE CAT-1)
2G Frequency Bands	900 and 1800 MHz
3G Frequency Bands	850, 900, and 2100 MHz

Specifications

CR350-CELL215 Option (continued)

4G Frequency Bands	800, 850, 900, 1800, 2100, and 2600 MHz
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr350 for Campbell Scientific antennas)
Power Consumption - Idle	14 mA (average)
Power Consumption - Active	75 mA (average)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V
Radio Output Power	■ 23 dBm on LTE ■ 24 dBm on UMTS ■ 27 dBm on EDGE ■ 33 dBm on GSM
Radio Sensitivity Range	-99.5 to 110.5 dBm (10 M)

CR350-CELL220 Option

-NOTE-	***The CR350-CELL220 option is intended for use in Australia and New Zealand.***
Cell Technologies	■ 3G (UMTS/HSPA+) ■ 4G (LTE CAT-1)
3G Frequency Bands	■ 850 and 2100 MHz (EC-21AUT) ■ 850, 900, 1900, and 2100 MHz (EC-21AU)
4G Frequency Bands	■ 700, 850, 1800, 2100, and 2600 MHz (EC-21AUT) ■ 700, 900, 1700, 1800, 1900, 2100, and 2600 MHz (EC-21AU)
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr350 for Campbell Scientific antennas)
Power Consumption - Idle	14 mA (average)
Power Consumption - Active	75 mA (average)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V
Radio Output Power	■ 23 dBm on LTE ■ 24 dBm on UMTS
Radio Sensitivity Range	-99.5 to 110.5 dBm (10 M)

CR350-CELL225 Option

-NOTE-	***The CR350-CELL225 option is intended for use in Japan.***
Cell Technologies	4G (LTE CAT-1)
4G Frequency Bands	800 (lower), 800 (upper), 850+, 900, 1800, and 2100 MHz
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr350 for Campbell Scientific antennas)
Power Consumption - Idle	14 mA (average)
Power Consumption - Active	75 mA (average)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V
Radio Output Power	23 dBm on LTE
Radio Sensitivity Range	-99.5 to 110.5 dBm (10 M)

Specifications

CR350-CELL230 Option

Cell Technologies	LTE-Cat M, NB-IoT
Frequency Bands	■ LTE M B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B26/B27/B28/B66/B85 ■ LTE NB-IoT B1/B2/B3/B4/B5/B8/B12/B13/B18/B19/B20/B25/B28/B66/B71/B85
Antenna Connector	SMA (External antenna required; see www.campbellsci.com/order/cr350 for Campbell Scientific antennas)
Power Consumption - Idle	23 mA average (26 mA if GPS is on)
Power Consumption - Active	50 mA average (53 mA if GPS is on)
SIM Interface	3FF (6 position/contacts) Supports SIMs that require 1.8 or 3 V

FileOption (File Format): TOB1, TOA5, CSIXML, CSIJSON

TOB1 - Binary. Data stored in a binary format. Though this format saves disk storage space, it must be converted before it is usable in other programs. Table output binary version 1. See the LoggerNet manual appendix for details on differnet file formats.
TOA5 - Also called ASCII, Long Header. Data stored in a comma separated format. Header information for each column is included, along with field names and units of measure if they are available. Table output ascii version 5. See the LoggerNet manual appendix for details on differnet file formats.

Logging possibilities: Sensor parameters, logger parameters (power supply voltage, logger panel temperature/battery temperature, charge status, logger operation state) and all variables defined in the program

CR350-Series Specifications

Data Logger

Electrical specifications are valid over a -40 to +70 °C, non-condensing environment, unless otherwise specified. Recalibration is recommended every three years. Critical specifications and system configuration should be confirmed with Campbell Scientific before purchase.

System specifications

Processor: ARM Cortex M4 running at 120 MHz

Memory:

- CPU Drive: 50 MB serial flash
- Data Storage: 50 MB serial flash
- Operating System: 2 MB flash
- Settings, Calibration, TLS Certificates and Key, System Information: 3 MB serial flash
- Background Tasks and Table Information, Buffers, System Memory, Program Variables: 7 MB RAM

Program Execution Period: 100 ms to 1 day

Real-Time Clock:

- Battery backed while external power is disconnected
- **Resolution**: 1 ms
- **Accuracy**: ±3 min. per year

Wiring Panel Temperature: Measured using a sensor, located on the processor board.

Physical specifications

Dimensions (additional clearance required for cables, wires and antennas):

- **CR350**: 16.3 x 8.4 x 5.6 cm (6.4 x 3.3 x 2.2 in)

Weight/Mass:

- **CR350**: 288 g (0.64 lb)
- **CR350-CELL**: 306 g (0.68 lb)
- **CR350-WIFI/RF407/RF412/RF422/RF452** : 306 g (0.68 lb)

Case Material: High-impact-resistant polycarbonate, recycle code 7

Power requirements

Power specifications for a communications option are shown within the specifications section for that option.

Protection: Power inputs are protected against surge, over-voltage, over-current, and reverse power. IEC 61000-4 Class 4 level.

Charge Terminal Characteristics (CHG+ and CHG-):

- Input from Power converter or solar panel
- *ES1 PS2 energy sources only
- 16 to 32 VDC
- Hold Current limit at 1.1 A @ 20 °C

Battery Terminal Characteristics (BAT+ and BAT-):

- Input from external battery, 7 Ah lead-acid typical
- Voltage input 12 VDC only
- Hold Current limit 3.7 A @ 20 °C

> **NOTE:**
> *Energy Source Class 1 (ES1) and Power Source Class 2 (PS2), as defined in Clauses 5 and 7 of IEC/AS/NZS 62368-1:2022.

Internal Lithium Battery: 3 V coin cell CR2032X for battery-backed clock. 6-year life with no external power source.

Revision: 01/2026

RELIABLE MONITORING SINCE 1974

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Average Current Drain:

Assumes 12 VDC on BAT terminals — add 2 mA if using CHG terminals.

- **Idle**: 0.5 mA
- **Active 1 Hz scan w/ one analog measurement**: 1.5 mA
- **Active** (Processor always on): 8 mA
- **Serial** (RS-232): Active + 5 mA

USB Power: Functions that will be active with USB 5 VDC include sending programs, adjusting data logger settings, and making some measurements. If USB is the only power source, then the VX1 and VX2 ranges are reduced to 150 to 2500 mV. The SW1, SW2, and 12V terminals will not be operational. For the control terminals (C1, C2), voltage output is limited to 4.75 V.

Cellular Average Additional Current Contribution at 12 VDC:

- **Idle**: Connected to network, no data transfer.
  - -CELL205 average = 14 mA
  - -CELL210 average = 28 mA
  - -CELL215 average = 14 mA
  - -CELL220 average = 14 mA
  - -CELL225 average = 14 mA
  - -CELL230 average = 23 mA, 26 mA if GPS is on
- **Transfer/Receive**:
  - -CELL205 average = 75 mA
  - -CELL210 average = 90 mA
  - -CELL215 average = 75 mA
  - -CELL220 average = 75 mA
  - -CELL225 average = 75 mA
  - -CELL230 average = 50 mA, 53 mA if GPS is on

Wi-Fi Additional Current Contribution at 12 VDC:

- **Client mode communicating**: 70 mA typical
- **Client mode idle**: 7 mA typical
- **Access point mode communicating**: 70 mA
- **Access point mode idle**: 62 mA typical
- **Idle**: <0.1 mA

RF Average Additional Current Contribution at 12 VDC

	-RF407, -RF412, -RF427	-RF422	-RF452
Transmit	< 80 mA	20 mA	650 mA, maximum
Idle On	12 mA	9.5 mA	15 mA, maximum
Idle 0.5 s Power Mode	4 mA	3.5 mA	NA
Idle 1 s Power Mode	3 mA	2 mA	NA
Idle 4 s Power Mode	1.5 mA	1.5 mA	NA

Power output specifications

System power out limits (when powered with 12 VDC):

Temperature (°C)	Current Limit[1] (A)
–40°	5.8
20°	3.7
70°	2.0
[1] Limited by self-resetting thermal fuse	

12V: Provide unregulated 12 VDC power with voltage equal to BAT+ input voltage. Disabled when operating on USB power only. Current output limited by thermal fuses. Two 12V terminals share one thermal fuse up to 2.5 A @ 20 °C.

- **Terminals**:
  - **12V**: two terminals, always on
  - **SW1 and SW2**: switched under program control, current limit at 2.1 A each

VX: Two independently configurable voltage terminals (VX1-VX2). VX outputs are produced by a 12-bit DAC[1]. VX terminals can also be used to supply a switched, regulated 5 VDC power source to power digital sensors and toggle control lines.

- **Range**: 150 to 5000 mV
- **Resolution**: 1.6 mV
- **Maximum Source Current**: 50 mA total, concurrently or independently.

Analog measurement specifications

4 single-ended (SE) or 2 differential (DIFF) terminals individually configurable for voltage, thermocouple, current loop, ratiometric, and period average measurements, using a 24-bit ADC. One channel at a time is measured.

Voltage measurements

Terminals:

- **Differential Configuration**: DIFF 1H/1L – 2H/2L
- **Single-Ended Configuration**: SE1 – SE4

Input Resistance:

- 5 GΩ typical (f_{N1} = 50/60 Hz)
- 300 MΩ typical (f_{N1} = 4000 Hz)

Input Voltage Limits: -100 to +2500 mV

Sustained Input Voltage without Damage:

- SE1-SE2: –6 V, +9 V
- SE3-SE4: ±17 V

DC Common Mode Rejection:

- >120 dB with input reversal
- ≥90 dB without input reversal

Normal Mode Rejection:

- >71 dB at 50 Hz
- >74 dB at 60 Hz

[1]Digital to analog conversion. The process that translates digital voltage levels to analog values.

Input Current @ 25 °C:

- ±.08 nA typical (f_{N1} = 50/60 Hz)
- ±13 nA typical (f_{N1} = 4000 Hz)

Filter First Notch Frequency (f_{N1}) Range: 50/60, 400, 4000 Hz (user specified)

Analog Range and Resolution:

		Differential with input reversal		Single-ended and differential without input reversal	
Notch frequency (f_{N1}) (Hz)	**Range[1] (mV)**	**RMS (µV)**	**Bits[2]**	**RMS (µV)**	**Bits[2]**
4000	–100 to +2500 –34 to +34	23 3.0	16.8 14.5	33 4.2	16.3 14.0
400	–100 to +2500 –34 to +34	3.8 0.58	19.4 16.8	5.4 0.82	18.9 16.3
50/60[3]	–100 to +2500 –34 to +34	1.6 0.23	20.6 18.2	2.3 0.33	20.1 17.7

[1] Range overhead of ~10% on all ranges guarantees that full-scale values will not cause over range

[2] Typical effective resolution (ER) in bits; computed from ratio of full-scale range to RMS resolution.

[3] 50/60 corresponds to rejection of 50 and 60 Hz ac power mains noise.

Accuracy (does not include sensor or measurement noise):

- 0 to 40 °C: ±(0.04% of measurement + offset)
- –40 to 70 °C: ±(0.1% of measurement+ offset)

Voltage Measurement Accuracy Offsets:

	Typical offset (µV RMS)		
Range (mV)	**Differential with input reversal**	**Differential without input reversal**	**Single-ended**
–100 to +2500	±20	±40	±60
–34 to +34	±6	±14	±20

Measurement Settling Time: 10 µs to 50 ms; 500 µs default

Multiplexed Measurement Time:

Measurement time = (multiplexed measurement time + settling time) • reps +0.8 ms

	Differential with input reversal	Single-ended or differential without input reversal
Example fN1[1] (Hz)	**Time[2] (ms)**	**Time[2] (ms)**
4000	2.9	1.4
400	14.6	7.3
50/60	103	51.5

[1] Notch frequency (1/integration time).

[2] Default settling time of 500 µs used.

Resistance measurement specifications

The data logger makes ratiometric-resistance measurements for four- and six-wire full-bridge circuits and two-, three-, and four-wire half-bridge circuits using voltage excitation.

Accuracy:

Assumes input reversal for differential measurements `RevDiff`. Does not include bridge resistor errors or sensor and measurement noise.

- 0 to 40 °C: ±(0.05% of voltage measurement + offset)
- –40 to 70 °C: ±(0.06% of voltage measurement + offset)

Period-averaging measurement specifications

Terminals:

- SE1-SE4
- C1-C2

Accuracy: ±(0.01% of measurement + resolution), where resolution is 0.13 µs divided by the number of cycles to be measured

Voltage Range: 0 to 3.3 V

Minimum Pulse Width: 33 ns

Voltage Threshold: Counts cycles on transition from <0.9 VDC to >2.1 VDC

Current-loop measurement specifications

Two analog inputs terminals may be configured as independent, non-isolated 0-20 mA or 4-to-20 mA current-loop inputs referenced to ground. One channel at a time is measured. Current is measured using a 24-bit ADC[1].

Terminals: SE1-SE2

Range: 0 to 25 mA

[1]Analog to digital conversion. The process that translates analog voltage levels to digital values.

Accuracy:

- **0 to 40 °C**: ±0.14% of reading
- **–40 to 70 °C**: ±0.26% of reading

Pulse measurement specifications

Terminals are individually configurable for switch closure, high-frequency pulse, or low-level AC measurements.

Switch-closure input

Terminals:

- P_SW
- C1-C2
- SE1-SE4

Maximum Input Frequency: 150 Hz

Minimum Switch Closed Time: 3 ms

Minimum Switch Open Time: 3 ms

Maximum Bounce Time: 1 ms open without being counted

High-frequency input

Terminals:

- SE1-SE4
- P_LL
- P_SW
- C1-C2

Maximum Input Frequency:

- SE1-SE4: 35 kHz
- P_LL: 20 kHz
- P_SW: 35 kHz
- C1-C2: 35 kHz

Low-level AC input

Terminals: P_LL

Maximum Input Voltage: ±20 VDC

DC-offset Rejection: Internal AC coupling eliminates DC-offset voltages up to ±0.05 VDC

Input Hysteresis: 12 mV at 1 Hz

Low-Level AC Pulse Input Ranges:

Sine wave (mV RMS)	Range (Hz)
20	1.0 to 20
200	0.5 to 200
2000	0.3 to 10,000
5000	0.3 to 20,000

Quadrature input

Terminals: SE1 and SE2, SE3 and SE4, or C1 and C2 can be configured as digital terminal pairs to monitor the two sensing channels of an encoder.

Maximum Frequency: 2.5 kHz

Digital input/output specifications

Up to seven terminals may be configured for digital input or output (I/O).

Terminals:

- SE1-SE4
- P_SW
- C1-C2

Digital I/O Voltage Levels:

Terminal	High State	Low State	Current Source	Maximum Input Voltage
C1 C2	5.0 V output 3.3V input	0 V	10 mA at 3.5 V	–10 V, +15 V
SE1 SE2	3.3 V	0 V	100 µA at 3.0 V	–6 V, +9 V
SE3 SE4 P_SW	3.3 V	0 V	100 µA at 3.0 V	±17 V

Pulse-width modulation

Terminals:

- SE1-SE4
- C1

Period Maximum: 2047 ms

Resolution

- 0 – 5 ms: 83.33 ns or 12 MHz
- 5 – 325 ms: 5.00 µs or 200 kHz
- > 325 ms: 31.25 µs or 32 kHz

Communications specifications

Internet Protocols: Ethernet, PPP, RNDIS, ICMP/Ping, Auto-IP (APIPA), IPv4, IPv6, UDP, TCP, TLS (v1.2), DNS, DHCP, SLAAC, Telnet, HTTP(S), FTP(S), POP3/TLS, NTP, SMTP/TLS, MQTT

Additional Protocols: PakBus, PakBus Encryption, SDI-12, Modbus RTU / ASCII / TCP, DNP3 outstation, custom user definable over serial

USB: Type C 2.0. Full speed: 12 Mbps. Operates as:

- Device for computer communications
- Host for mass storage devices

SDI-12 (C1, C2): Two independent SDI-12 compliant terminals are individually configured and meet SDI-12 Standard v 1.4.

RS-232:

- **COMRS232**: Female RS-232, 9-pin interface, 1200 to 115.2 kbps
- **COM1 (C1,C2)**: TTL or RS-232 logic
- **COM2 - COM3**: Two independent RS-232 Rx/Tx pairs

RS-485 (COM2 - COM3): Two independent RS-485 half duplex

Cellular option specifications

Cell Technology:

Option	Cellular technology
-CELL205	4G LTE with automatic 3G fallback
-CELL210	4G LTE CAT-1
-CELL215	4G LTE with automatic 3G and 2G fallback
-CELL220	4G LTE with automatic 3G fallback
-CELL225	4G LTE
-CELL230	LTE CAT-M1 LTE NB-IoT

See https://s.campbellsci.com/documents/us/miscellaneous/Cellular%20Modem%20Frequency%20Bands.pdf for a complete list of supported frequency bands.

Antenna: Two SMA connectors, one for TX/RX, one for diversity RX

SIM Slot: Industry standard 3FF micro-SIM (6 position / contacts) (not externally accessible)

Wi-Fi specifications

WLAN (Wi-Fi)

Maximum Possible Over-the-Air Data Rates: <11 Mbps over 802.11b, <54 Mbps over 802.11g, <72 Mbps over 802.11n

Operating Frequency: 2.4 GHz, 20 MHz bandwidth

Antenna Connector: Reverse Polarity SMA (RPSMA)

Antenna (shipped with data logger): Unity gain (0 dBd), 1/2 wave whip, omnidirectional. Features an articulating knuckle joint that can be oriented vertically or at right angles

Supported Technologies: 802.11 b/g/n, WPA/WPA2-Personal, WPA/WPA2-Enterprise Security, WEP

Client Mode: WPA/WPA2-Personal and Enterprise, WEP

Access Point Mode: WPA2-Personal

Receive Sensitivity: -97 dBm

RF radio option specifications

Antenna Terminal: Reverse Polarity SMA (RPSMA)

Radio Type

- **RF407, RF412, RF427**, and **RF452**: Frequency-Hopping Spread-Spectrum (FHSS)
- **RF422**: SRD860 Radio with Listen Before Talk (LBT) and Automatic Frequency Agility (AFA)

Frequency

- **RF407**: 902 to 928 MHz (US, Canada)
- **RF412**: 915 to 928 MHz (Australia, New Zealand)
- **RF422**: 863 to 870 MHz (Europe, Middle East, and Africa)
- **RF427**: 902 to 907.5 MHz/915 to 928 MHz (Brazil)
- **RF452**: 902 to 928 MHz

Transmit Power Output (software selectable)

- **RF407** and **RF412**: 5 to 250 mW
- **RF422**: 2 to 25 mW
- **RF427**: 5 to 250 mW
- **RF452**: 10 mW to 1,000 mW

Channel Capacity

- **RF407**: Eight 25-channel hop sequences sharing 64 available channels.
- **RF412**: Eight 25-channel hop sequences sharing 31 available channels.
- **RF422**: Ten 30-channel hop sequences (default), software configurable to meet local regulations; 10 sequences for reducing interference through channel hop.
- **RF427**: Eight 25-channel hop sequences sharing 43 available channels.
- **RF452**: 50 to 112 user-selectable channels for a given network.

Receive Sensitivity

- **RF407**, **RF412**, and **RF427**: –101 dBm
- **RF422**: –106 dBm
- **RF452**:
  - –108 dBm at 115.2 kbps for 10^{-4} BER
  - –103 dBm at 153.6 kbps for 10^{-4} BER

RF Data Rate

- **RF407**, **RF412**, and **RF427**: 200 kbps
- **RF422**: 10 kbps
- **RF452**: 115.2 or 153.6 kbps

Maximum nodes in network

- **RF407**, **RF412**, and **RF427**: 50
- **RF422**: 20
- **RF452**: 4 repeaters

Standards compliance specifications

View compliance and conformity documents at www.campbellsci.com/cr350.

Shock and Vibration: ASTM D4169

Protection: IP30

EMI and ESD protection:

- **Immunity**: Meets or exceeds following standards:
  - **ESD**: per IEC 61000-4-2; ±15 kV air, ±8 kV contact discharge
  - **Radiated RF**: per IEC 61000-4-3; 10 V/m, 80-1000 MHz
  - **EFT**: per IEC 61000-4-4; 4 kV power, 4 kV I/O
  - **Surge**: per IEC 61000-4-5; 4 kV power, 4kV I/O
  - **Conducted RF**: per IEC 61000-4-6; 10 V power, 10 V I/O
- Emissions and immunity performance criteria available on request.

RF407 Option

- United States FCC Part 15.247: MCQ-XB900HP
- Industry Canada (IC): 1846A-XB900HP
- Mexico IF: RCPDIXB15-0672-A1

RF412 Option

- ACMA RCM
- United States FCC Part 15.247:
- MCQ-XB900HP
- Industry Canada (IC): 1846A-XB900HP

RF422 Option: View EU Declaration of Conformity at www.campbellsci.com/cr350.

RF427 Option: Brazil ANATEL standards in Resolution No. 506: 08335-17-10644. View the RF427 Brazilian Certificate of Conformity at www.campbellsci.com/cr350.

RF452 Option:

- United States FCC ID: KNYMM3
- Industry Canada (IC): 2329B-MM3

Wi-Fi

- United States FCC ID: XF6-RS9113SB
- Industry Canada (IC): 8407A-RS9113SB

Cellular Option:

- Industry Canada (IC): 10224A-201611EC21A
- -CELL230:
  - Industry Canada (IC): 10224A-2019BG95M3
  - FCC ID: XMR201910BF95M3

> **NOTE:**
> The user is responsible for emissions if changing the antenna type or increasing the gain.

Warranty

Three years against defects in materials and workmanship.

Terminal functions

Analog input terminal functions				
SE DIFF	1 2 ┌1┐ H L		3 4 ┌2┐ H L	
Single-Ended Voltage	✓	✓	✓	✓
Differential Voltage	H	L	H	L
Ratiometric/Bridge	✓	✓	✓	✓
Thermocouple	✓	✓	✓	✓
Current Loop	✓	✓		

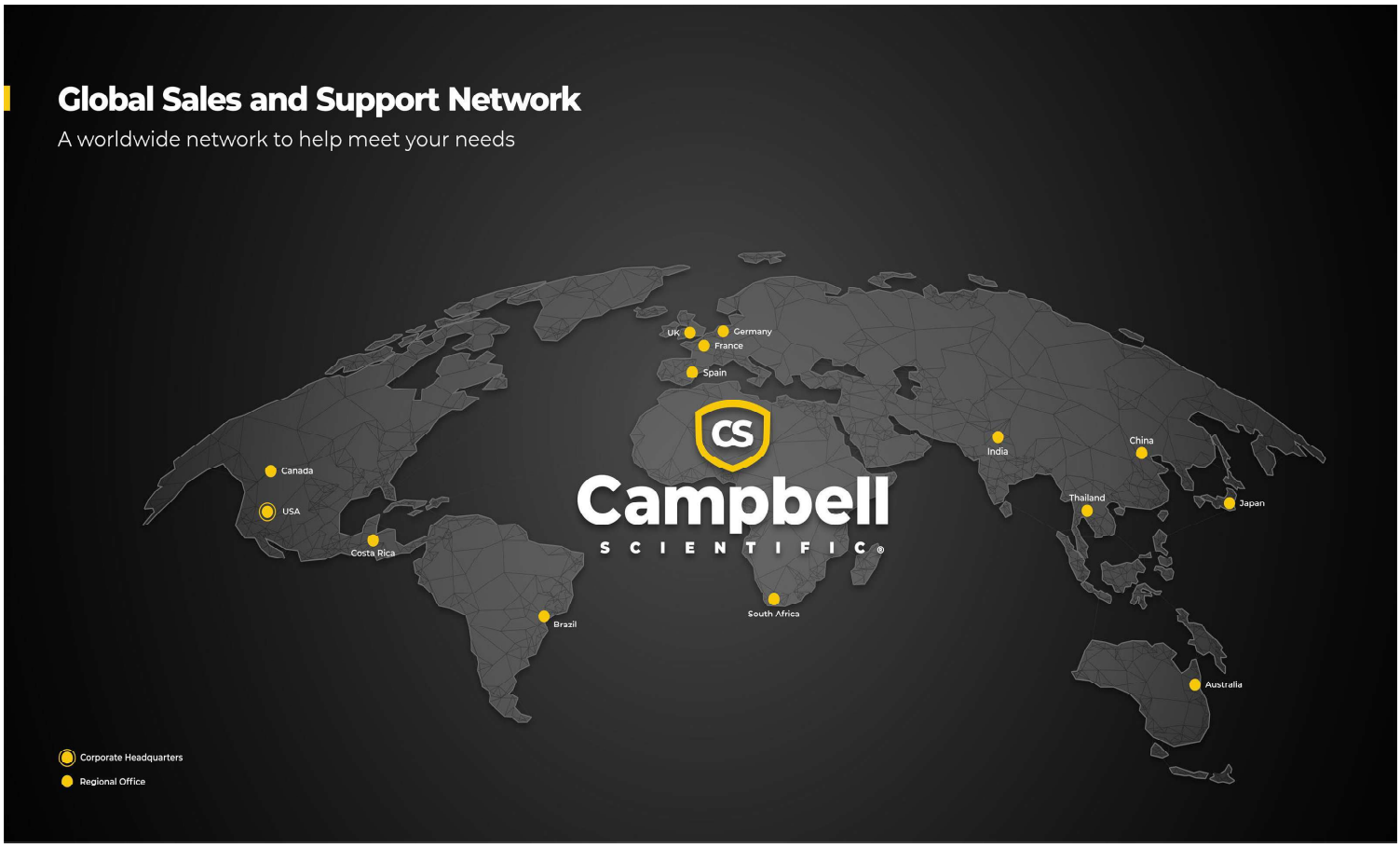
Pulse counting terminal functions								
	C1	C2	P_SW	P_LL	SE1	SE2	SE3	SE4
Switch-Closure	✓	✓	✓		✓	✓	✓	✓
High Frequency	✓	✓	✓	✓	✓	✓	✓	✓
Low-level AC				✓				
Quadrature	✓	✓			✓	✓	✓	✓
Period Average	✓	✓			✓	✓	✓	✓

Analog output terminal functions		
	VX1	VX2
Switched Voltage Excitation	✓	✓

Voltage output terminal functions								
	C1	C2	SE1-4	VX1	VX2	P_SW	12V	SW1 SW2
3.3 VDC			✓	✓	✓	✓		
5 VDC	✓	✓		✓	✓			
BAT +							✓	✓

Communications terminal functions						
	C1	C2	SE1-3	RS-232	COM2	COM3
SDI-12	✓	✓				
RS-232				✓	✓	✓
RS-232 0-5V	✓	✓				
GPS Time Sync	✓	✓	✓			
GPS NMEA Sentences	Rx	Rx		Rx		
RS-485 Half duplex					Tx (A-) Rx (B+)	Tx (A-) Rx (B+)
RS-485 Full duplex					Tx pair	Rx pair
Communications functions also include USB						

Digital I/O terminal functions							
	C1	C2	P_SW	SE1	SE2	SE3	SE4
General I/O	✓	✓	✓	✓	✓	✓	✓
Pulse-Width Modulation Output	✓			✓	✓	✓	✓
Interrupt	✓	✓	✓	✓	✓	✓	✓



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PRODUCT

CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

ENC10/12

Weather-Resistant Enclosure, 10 x 12 inches

Rugged, Versatile

Campbell components mount easily and securely

Overview

The ENC10/12 is a weather-resistant enclosure that is 10 inches wide and 12 inches tall. This enclosure can house and protect a smaller data logger, a power supply, and a small peripheral. Or it can house a peripheral that needs to be housed in an enclosure separate from the data logger.

Benefits and Features

- Weather resistant to protect instruments
- Backplate designed so that Campbell Scientific components mount easily and securely
- White, UV-stabilized enclosure reflects solar radiation—reducing temperature gradients inside the enclosure without requiring a separate radiation shield

Detailed Description

The ENC10/12's backplate is prepunched with half-inch-on-center holes suitable for attaching a data logger, power supply, and a communications or measurement and control peripheral.

The ENC10/12 is shipped with the 7363 enclosure supply kit that consists of desiccant, a humidity indicator card, cable ties, wire tie tabs, putty, grommets, screws, and PVC coupling. Additionally, Campbell Scientific offers a CS210 Enclosure Humidity Sensor for monitoring relative humidity inside of the enclosure. (See Ordering Info on the web page.)

Specifications

Color	White (Reflects solar radiation, reducing temperature gradients inside the enclosure without using a separate radiation shield.)
Construction	Fiberglass-reinforced polyester enclosure with door gasket, external grounding lug, stainless-steel hinge, and lockable hasps

Enclosure Classification	NEMA 4X (before being modified for cable entry)
Number of Cable-Entry Seals	1 medium, 2 small

Dimensions	34.06 x 29.03 x 13.23 cm (13.41 x 11.43 x 5.21 in.) external 30.5 x 25.4 x 11.4 cm (12 x 10 x 4.5 in.) internal
Weight	4.1 kg (9.0 lb)

EkoTechnika

Environmental diagnostics equipment

SEDIMENT

Přístrojové vybavení pro odběr vzorků

EnviroDATA

- Webová aplikace pro snadnou správu naměřených dat ze stanic s dálkovým přenosem dat
- Kompatibilní s telemetrickými stanicemi a dataloggery Campbell Scientific, EkoLoggerNB-12 a WaterLogger
- Přehledné zobrazení dat formou grafů a tabulek
- Snadná změna pořadí zobrazených grafů a parametrů v tabulkách pomocí funkce drag and drop
- Možnost přehledného grafického srovnání parametrů z více stanic ve společném grafu
- Zabezpečený přístup a možnost sdílení jednotlivých stanic více uživateli
- Vícenásobné jištění dat na vzájemně nezávislých serverech
- Možnost prodlužování poskytovaných služeb uživatelem (i dlouhodobého)
- API pro distribuci dat třetím stranám, včetně veškeré dokumentace přímo v uživatelském rozhraní
- Export dat ve formátu .CSV pro případné další zpracování
- Možnost přeposílat data na FTP server nebo e-mail
- Kontrola, zda stanice pravidelně odesílá data včetně možnosti odesílání varovných e-mailů
- Kontrola limitů parametrů včetně možnosti odesílání varovných e-mailů
- Funkce automatického načítání nejnovějších dat
- Přehledné zobrazení informací o stanici včetně polohy v mapě, dokumentace a dalších informací
- Možnost manuálního importu dat (pro stanice, které nejsou vybaveny bezdrátovým přenosem dat)
- Online technická podpora (komunikační formulář přímo v uživatelském rozhraní)

Aplikace EnviroDATA

Ekotechnika s.r.o.
K Třešňovce 700, 252 29 Karlík u Prahy, Czech Republic

www.ekotechnika.c

LI-710 Evapotranspiration Sensor

Accurately measure evapotranspiration with this simplified sensor

- Easy to operate and maintain
- Direct measurements
- Based on established science

Easy operation

The LI-710 Evapotranspiration Sensor gives you answers—no data processing is necessary. From mounting to output, it is designed for ease-of-use.

Mounting

Attach it to a simple pole—no tower or tripod needed—and it is compatible with NuRail® and other commonly used mounting hardware.

Output

SDI-12 output from a single cable makes it easy to collect data and integrate the sensor into existing infrastructures.

Power

Its 1.5 W power requirement means you only need a battery and small solar panel to run it.

Maintenance

It requires no calibration and is low maintenance.

Actual evapotranspiration measurements

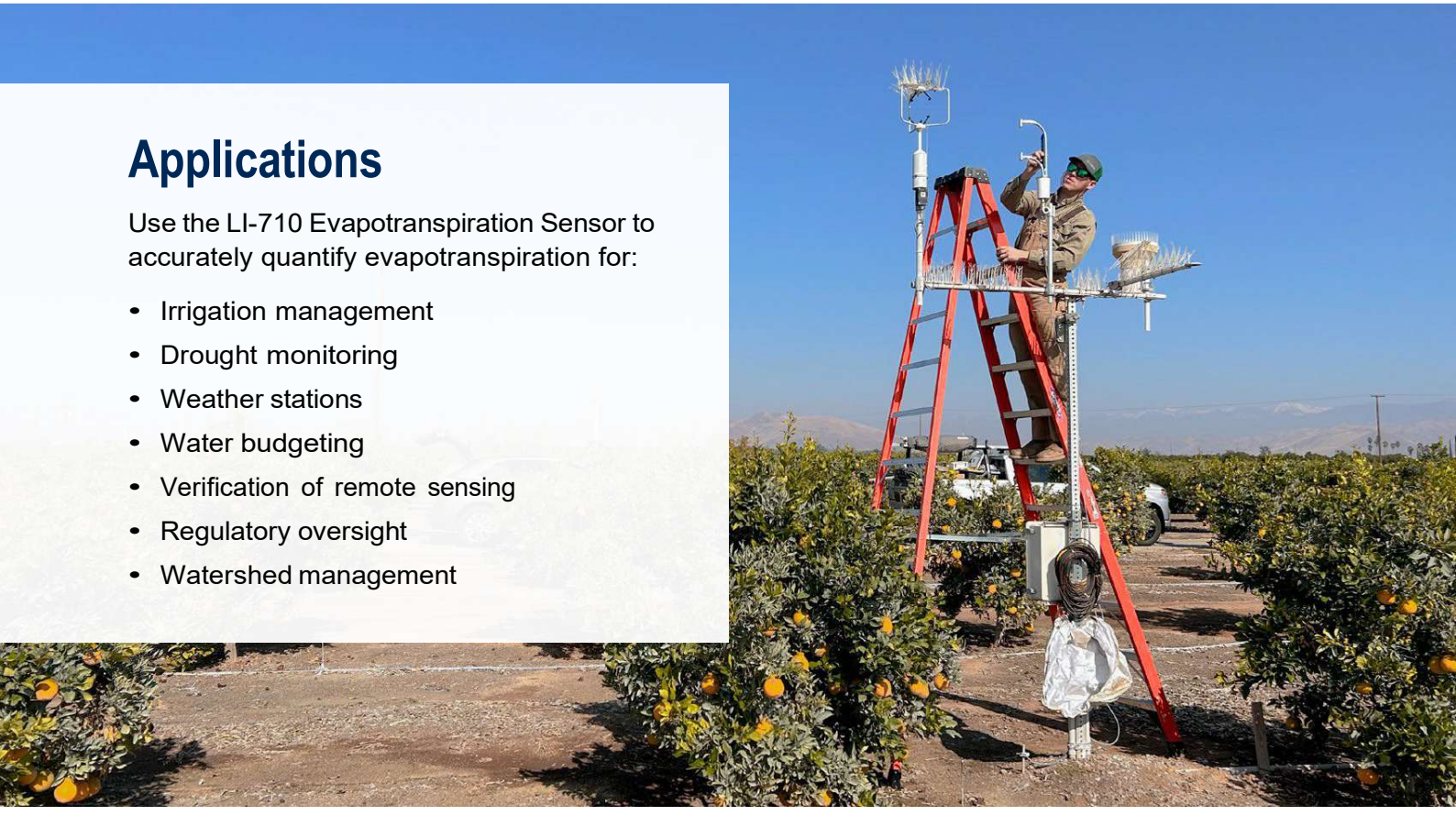
The direct measurement of evapotranspiration hasn't been widely used because of the cost and complexity of traditional measurement methods. Indirect methods rely on estimates based on crop coefficients and reference or potential evapotranspiration, which leads to uncertainty.

The LI-710 measures actual evapotranspiration—water vapor moving out of the field and into the atmosphere—without the need for crop coefficients. It works over any relatively flat and uniform ground cover at field or ecosystem scale.

Applications

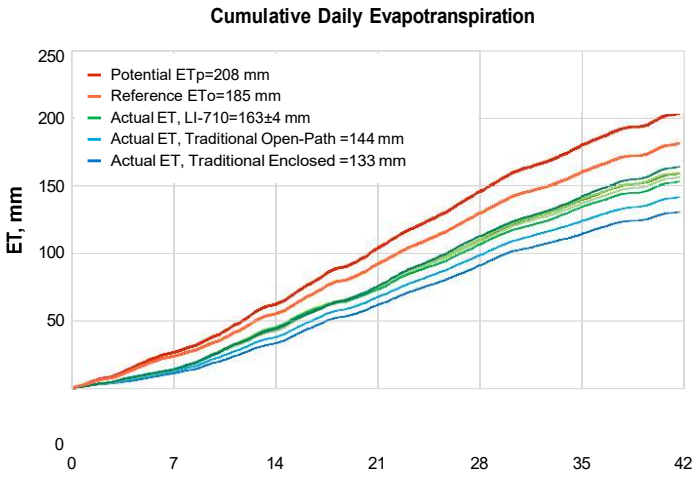
Use the LI-710 Evapotranspiration Sensor to accurately quantify evapotranspiration for:

- Irrigation management
- Drought monitoring
- Weather stations
- Water budgeting
- Verification of remote sensing
- Regulatory oversight
- Watershed management



Research-grade accuracy

The LI-710 applies the eddy covariance method to measure vertical wind and water vapor concentration at 10 Hz, then provides fully processed results every 30 minutes.



A comparison of the LI-710 to traditional eddy covariance and Penman-Monteith Estimates shows that the LI-710 reports evapotranspiration with the accuracy of traditional eddy covariance.

A high-quality, cost-effective solution

With the LI-710, you get high-quality evapotranspiration measurements for a fraction of the cost of more complex direct measurement methods. You can deploy multiple sensors to expand your data collection footprint. You don't need to hire a data analyst, and it has low ongoing power and maintenance costs.

Specifications

Instrument Specifications

Operating Temperature: 5 – 50 °C up to 85% RH
Communication: SDI-12
Power:
Input Voltage Range: 8-33 V
Power: ≤ 1.5 W
Weight: 1.4 kg
Size: 58 x 17.5 x 7.6 cm
Mount: 1 inch mounting post, compatible with NuRail® and other commonly used mounting hardware

Measurement Specifications

H_2O Mole Fraction Range: 0 - 60 mmol/mol
Inlet Flow: 0.3 lpm (typical)

Output Variables

Variable	Description
ET	Actual Evapotranspiration (mm)
LE	Latent Energy Flux (W/m2)
H	Sensible Heat Flux (W/m2)
VPD	Vapor Pressure Deficit (kPa)
Pa	Atmospheric Pressure (kPa)
Ta	Air Temperature (°C)
RH	Relative Humidity Ambient (%)
AH	Absolute Humidity Ambient (g/m3)
SVP	Saturated Vapor Pressure Ambient (kPa)
Td	Dewpoint (°C)

System Requirement

Minimum Separation Between Sonics: 2 meters
Minimum Mounting Height: 2 meters

Weatherproof Rating

Tested to IEC IP54 standard user

Specifications subject to change without notice.

About LI-COR

LI-COR Environmental is a leading technology innovator for plant physiology, ecosystem, soil, light, water, wind, and greenhouse gas monitoring research.

To learn more, visit
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980-20520 03/23

Specifications

Temperature

Calibrated Operating Range: +5[a] to 50 °C

Ambient Operating Range: -20[b] to 50 °C

Deployed Non-Operating Range: -20 to 60 °C

Temperature Accuracy: ±1.5 °C

Relative Humidity

Calibrated Operating Range: 0 to 85% RH

H_2O Mole Fraction Range: 0 to 60 mmol/mol

H_2O Mole Fraction Accuracy: 2% of reading at > 5 mmol/mol

Deployed Non-Operating Range: 0 to 85% RH

Pressure

Operating Pressure Range: 50 to 110 kPa

Ambient Pressure Accuracy: ±0.2 kPa

Inlet Flow Rate: 230 cm^3/min (typical)

Communication: SDI-12

Power Requirements

Voltage: 9 to 33 VDC

Power: s1.5 W nominally; up to 26.4 W for 20 milliseconds during startup

Weight: 1.4 kg

Dimensions: 58 x 17.5 x 7.7 cm (H x L x W)

Mount: 1 inch (2.54 cm) diameter post; compatible with 1 inch (2.54 cm) crossover fittings

Weatherproof Rating: Tested to IEC IP54

[a]Sampling cell temperature.

[b]Flow, required for ET and RH, turns off s5 °C, unless custom insulated or heated