

CR200X-series Datalogger Specifications

Electrical specifications are valid over a -40° to $+50^{\circ}\text{C}$ range unless otherwise specified; non-condensing environment required. We recommend that you confirm system configuration and critical specifications with Campbell Scientific before purchase.

ANALOG INPUTS; DIGITAL I/O

Channels SE1 to SE5 can be individually configured for single-ended measurement or digital I/O.

SINGLE-ENDED MEASUREMENT (SE1 TO SE5):

Analog Input Range: $0 \leq V < 2.5$ Vdc

Measurement Resolution: 0.6 mV

Measurement Accuracy

Typical: $\pm(0.25\%$ of reading + 1.2 mV offset) over -40° to $+50^{\circ}\text{C}$

Worst-case: $\pm(1\%$ of reading + 2.4 mV offset) over -40° to 50°C

DIGITAL I/O (SE1 TO SE5):

Input/Output High State: 2.1 to 3.3 Vdc

Input/Output Low State: <0.9 Vdc

Output High State: 3.3 V (no load)

Drive Current: 220 μA @ 2.7 Vdc

Maximum Input Voltage: 4 Vdc

HALF BRIDGE MEASUREMENTS:

Accuracy: Relative to the excitation.

Using +2.5 Vdc excitation, is $\pm(0.06\%$ of reading + 2.4 mV)/(2.5 Vdc)

PERIOD AVERAGING (SE1 TO SE4):

Maximum Input Voltage: 4 Vdc

Frequency Range: 0 to 150 kHz

Voltage Threshold: counts cycles on transition from <0.9 Vdc to >2.1 Vdc

EXCITATION CHANNELS (VX1 AND VX2):

Range: Programmable 0, 2.5, 5 Vdc, or off (floating)

Accuracy: ± 25 mV on +2.5 Vdc range, ± 125 mV on +5.0 Vdc range

Maximum Current: 25 mA on +2.5 Vdc range, 10 mA on +5.0 Vdc range

CONTROL PORTS (C1 AND C2)

DIGITAL I/O:

Voltage Level When Configured as Input: <0.9 Vdc (low state) to >2.7 Vdc (high state)

Voltage Level When Configured as Output: 0 V (low state), 5 Vdc (high state) (no load)

Logic Level: TTL

Drive Current: 1.5 mA @ 4.5 V

SDI-12: SDI-12 sensors connect to C1

PULSE COUNTERS

SWITCH CLOSURE (P_SW):

Maximum Count Rate: 100 Hz

Minimum Switch Open Time: 5 ms

Minimum Switch Closed Time: 5 ms

Maximum Bounce Time: 4 ms

PULSE COUNT (P_SW, C1, AND C2):

Voltage Threshold: count on transition from <0.9 V to >2.7 Vdc

Minimum Pulse Width: 320 μs

Maximum Input Frequency: 1 kHz

Max Input Voltage: C1 & C2 (6.5 V), P_SW (4 Vdc)

LOW LEVEL AC (P_LL):

Voltage Threshold: <0.5 V to >2 V

Minimum Input: 20 mV RMS

Maximum Frequency: 1 kHz

Maximum Input: ± 20 V

Note: C1 and C2 can be used for switch closure using the battery voltage and a 100 kOhm pull-up resistor. If the dc offset is >0.5 V, then AC coupling is required.

COMMUNICATIONS

SERIAL INTERFACE: Female RS-232 9-pin interface for logger-to-PC communications

ON-BOARD SPREAD SPECTRUM RADIO:

Frequency: 915 MHz (CR206X), 922 MHz (CR211X), or 2.4 GHz (CR216X)

Transmission Range: 1 mile with 0 dBd $\frac{1}{4}$ wave antenna (line-of-sight) and 900 MHz radios; 0.6 miles (1 km) with 0 dBd $\frac{1}{2}$ wave antenna (line-of-sight) and 2.4 GHz radio; up to 10 miles with higher gain antenna (line-of-sight)

RF4XX used as a base station radio

Transmitter Power Output:
250 mW (CR206X, CR211X);
50 mW (CR216X)

AVAILABLE RADIO TRANSMISSION MODES:

Always on, program controlled

Cycle Time: 1 or 8 s cycles; on for 100 ms every period; checks for incoming communication

Scheduled Transmission Time: off until transmission time

PAkBUS[®] packet switching network protocol

CLOCK ACCURACY

8.2 minutes/month @ -40° to $+50^{\circ}\text{C}$; 1 minute/month @ $+25^{\circ}\text{C}$

CPU AND STORAGE

FINAL STORAGE: 512 kB flash memory, data format is 4 Bs per data point

INTERMEDIATE STORAGE: 8 kB SRAM

COMPILED PROGRAM STORAGE: up to 19.2 kB flash memory depending on structure of CRBasic program

OPERATING SYSTEM: 106 kB flash memory

FASTEST SCAN RATE: once per second

SWITCHED BATTERY (SW BATTERY)

Switched under program control. Thermal fuse hold current = 670 mA @ -40°C ; 500 mA @ 20°C ; 290 mA @ 70°C

POWER

BATTERY VOLTAGE RANGE: 7 to 16 Vdc (can program datalogger to measure internal battery voltage)

MAXIMUM CONTINUOUS BATTERY CHARGING CURRENT:

0.9 A @ 20°C ; 0.65 A @ 50°C

RECOMMENDED BATTERIES: 12 Vdc, 7 Ah or smaller sealed rechargeable battery when connected to the on-board charging circuit. Using larger batteries with the datalogger's built-in charger may result in excessive PC board heating. This is especially a concern when the battery is deeply discharged or failing with a shorted cell.

Alkaline cells, lithium, or other non-rechargeable battery types may be connected if the charging circuit is not used (i.e., nothing connected to Charge terminals).

CHARGER INPUT VOLTAGE: 16 to 22 Vdc

SOLAR PANEL: 10 W or smaller when using on-board charging circuit.

WALL CHARGER: 1 A or smaller when using on-board charging circuit.

SHELF LIFE OF CLOCK'S BACKUP BATTERY: 5 years

CURRENT DRAIN (@ 12 V)

QUIESCENT CURRENT DRAIN:

No Radio or Radio Powered Off: ~ 0.2 mA

ACTIVE CURRENT DRAIN:

No radio ~ 3 mA

Radio receive ~ 20 mA (CR206X, CR211X), ~ 36 mA (CR216X)

Radio transmit ~ 75 mA (CR206X, CR211X, CR216X)

AVERAGE CONTINUOUS CURRENT DRAIN:

Radio always on ~ 20 mA (CR206X, CR211X), ~ 36 mA (CR216X)

Radio in 1 s duty cycle ~ 2.2 mA (CR206X, CR211X), ~ 4 mA (CR216X)

Radio in 8 s duty cycle ~ 0.45 mA (CR206X, CR211X), ~ 0.8 mA (CR216X)

CE COMPLIANCE (as of 10/15)

CE COMPLIANT DATALOGGERS: CR200X

STANDARD(S) TO WHICH CONFORMITY IS DECLARED: IEC61326:2002

EMI AND ESD PROTECTION

IMMUNITY: Meets or exceeds following standards:
ESD: per IEC 1000-4-2; ± 8 kV air, ± 4 kV contact discharge

RF: per IEC 1000-4-3; 3 V/m, 80-1000 MHz

EFT: per IEC 1000-4-4; 1 kV power, 500 V I/O

Surge: per IEC 1000-4-5; 1 kV power and I/O

Conducted: per IEC 1000-4-6; 3 V 150 kHz-80 MHz

Emissions and immunity performance criteria available on request.

PHYSICAL

CASE DESCRIPTION: Aluminum with spring-loaded terminals

DIMENSIONS (including terminals):

14.0 cm x 7.6 cm x 5.1 cm; 5.5 in x 3 in x 2 in

WEIGHT:

CR200X or CR295X: 242 g (8.5 oz)

CR206X, CR211X, or CR216X: 271 g (9.5 oz)

CUSTOM CASE: available for OEM applications; contact Campbell Scientific

WARRANTY

Three year covering parts and labor.