CR200X-series Datalogger Specifications

Electrical specifications are valid over a -40° to +50°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 ± V to < 2.5 Vdc
- Measurement Resolution: 0.6 mV
- Measurement Accuracy
  - Typical: ±(0.25% of reading + 1.2 mV offset) over -40° to +50°C
  - Worst-case: ±(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 Vdc (no load)
- Drive Current: 220 µA at 2.7 Vdc
- Maximum Input Voltage: 4 Vdc

HALF BRIDGE MEASUREMENTS:
- Accuracy: Relative to the excitation. Using +2.5 Vdc excitation, is ±(0.6% 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):
- 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 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 kΩ 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 ½ wave antenna (line-of-sight) and 900 MHz radios:
  - 0.6 miles (1 km) with 0 dBd ½ wave antenna (line-of-sight) and 2.4 GHz radio;
  - up to 10 miles with higher gain antenna
- RF4XX used as a base station radio

AVAILABLE RADIO TRANSMISSION MODES:
- On always, 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°C; 1 minute/month @ +25°C

CPU AND STORAGE

FINAL STORAGE: 512 kB flash memory, data format is 4 Bps 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 shortened 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: 271 g (9.5 oz)
- CR206X, CR211X, or CR216X: 242 g (8.5 oz)
- CR211X, CR216X): 227 g (8 oz)

CUSTOM CASE: available for OEM applications; contact Campbell Scientific

WARRANTY

Three year covering parts and labor.