CR9000X & CR9000XC Specifications

Electrical specifications are valid over a -25°C to +50°C range unless otherwise specified; extended testing over -40°C to +70°C range available as an option, excluding batteries. Non-condensing environment is required. To maintain specifications, Campbell Scientific recommends recalibrating dataloggers every two years. We recommend that you confirm system configuration and critical specifications with Campbell Scientific before purchase.

CR9032 CPU MODULE
PROCESSOR: 180 MHz Hitachi SH-4
MEMORY: 128 Mbytes of internal SRAM for program and data storage. Expanded data storage with PMCIO type L, type II or type III cards or CompactFlash® cards with an adapter
SERIAL INTERFACES: RS-232 9-pin RS-232 DCE port for computer or modem. CS I/O 9-pin port for CS peripherals and SOM devices.
ETHERNET INTERFACE: 10baseT/100baseT port for communications over a local network or the Internet.

CR9011 POWER SUPPLY MODULE
VOLTAGE: 9.6 to 18 Vdc
TYPICAL CURRENT DRAIN: Base system with no modules is 500 mA active; 300 mA standby. Current drain of individual I/O modules varies. Refer to specifications for each I/O module for specific values. Power supply module can place the system in stand-by mode by shutting off power to the rest of the modules.
DC CHARGING: 9.6 to 18 Vdc input charges internal batteries at up to 2 A rate. Charging circuit includes temperature compensation.
INTERNAL BATTERIES: Sealed rechargeable with 14 Ah (7 Ah for the CR9000X) capacity per channel. EXTERNAL BATTERIES: External 12 V batteries can be connected.

CR9041 A/D and AMPLIFIER MODULE
A/D Conversions: 16-bit, 100 kHz

CR9050 & CR9051E ANALOG INPUT MODULES

<table>
<thead>
<tr>
<th>Input Channels Per Module: 14 Differential (diff) or 28 single-ended (SE)</th>
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<tbody>
<tr>
<td>Resolution, and Input Noise:</td>
</tr>
<tr>
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ACCURACY OF VOLTAGE MEASUREMENTS:
Single-ended & Differential:
\[ \pm (0.01\% \text{ of reading} + 4 \text{ A/D counts}) \]
\[ -25^\circ \text{C} + 50^\circ \text{C} \]
\[ \pm (0.02\% \text{ of reading} + 4 \text{ A/D counts}) \]
\[ -40^\circ \text{C} + 70^\circ \text{C} \]
Dual Differential:
\[ \pm (0.01\% \text{ of reading plus polarization reversed}) \]
\[ -25^\circ \text{C} + 50^\circ \text{C} \]
\[ \pm (0.02\% \text{ of reading} + 4 \text{ A/D counts}) \]
\[ -40^\circ \text{C} + 70^\circ \text{C} \]

COMMON MODE RANGE: ±5 V
DC COMMON MODE REJECTION: >120 dB
MAXIMUM INPUT VOLTAGE WITHOUT DAMAGE: ±20 V

CR90585E ISOLATION MODULE
INPUT CHANNELS PER Module: 10 isolated, differential;
each channel has its own isolation ground for shielded cable connection.

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<th>Resolution, and Input Noise:</th>
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ACCURACY:
Gain Error: ±0.02% of reading (40°C to 50°C), ±0.07% of reading (60°C to 70°C)
Offset Error: ±0.01% of FSR (40°C to 50°C), ±0.01% of FSR (40°C to 70°C)

INPUT TO SYSTEM GROUND CMRR db:
<table>
<thead>
<tr>
<th>Input Range</th>
<th>DC</th>
<th>60 Hz</th>
<th>300 Hz</th>
<th>2 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>±2 ±208 ±109 ±93.3 ±109.8 ±96.1 ±87.9 ±82.5</td>
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</tbody>
</table>

MINIMUM SCAN TIME PER MODULE (for VoltDiff or TCDiff):
<table>
<thead>
<tr>
<th>DC</th>
<th>60 Hz</th>
<th>300 Hz</th>
<th>2 kHz</th>
</tr>
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<tbody>
<tr>
<td>±2 ±160 ±91.1 ±60.5 ±36.0 ±24.6</td>
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</tbody>
</table>

INPUT TO INPUT CROSSTALK dB:
<table>
<thead>
<tr>
<th>Offset</th>
<th>DC</th>
<th>60 Hz</th>
<th>300 Hz</th>
<th>2 kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>±2 ±160 ±91.1 ±60.5 ±36.0 ±24.6</td>
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</tbody>
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MAXIMUM CONTINUOUS VOLTAGE W/O DAMAGE:
<table>
<thead>
<tr>
<th>Voltage</th>
<th>Range H to L ISO</th>
<th>Base</th>
<th>Systm</th>
<th>Systm Ground</th>
</tr>
</thead>
<tbody>
<tr>
<td>±2 ±160 ±121.3 ±108.7 ±96.3 ±82.5</td>
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</tbody>
</table>

MAXIMUM ESD VOLTAGE ON INPUTS: ±5000V
TYPICAL CURRENT DRAIN: 360 mA operating, 5 mA standby

CR9052DC/CR9052IEPE ANTI-ALIAS MODULES
Refer to the CR9052DC and CR9052IEPE Brochure.

CR9060 EXCITATION MODULE
TYPICAL CURRENT DRAIN: 108 mA quiescent, 125 mA active

 Analog Outputs
ANALOG OUTPUTS PER MODULE: 12 switched, 6 continuous
SWITCHED: Provides excitation for resistance measurements. Only one output can be active simultaneously.
CONTINUOUS: All outputs can be active simultaneously.

<table>
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<tr>
<th>Output Voltage (no load):</th>
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<tr>
<td>High: 5.0 V ±0.2 V Low: &lt; 0.2 V</td>
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OUTPUT RESISTANCE: 100 ohms

CR9071E COUNTER & Digital I/O module
COUNTER CHANNELS PER MODULE: 12
MAXIMUM COUNTS PER INTERVAL: \[ 2^{32} \]
MAXIMUM input frequency of 1 MHz, the 32-bit counter will go 71.58 minutes before it rolls over.

SWITCH CLOSURE MODE (4 channels):
Minimum switch closed time: 5 ms
Minimum switch open time: 6 ms
Maximum bounce time: 1 ms open without being counted

HIGH FREQUENCY MODE (all channels):
Maximum pulse width: 500 ns
Maximum input frequency: 1 MHz
Thresholds: Pulse counted on transition from below 1.5 V to above 3.5 V
Maximum input voltage: ±20 V

Note: Because of the pulse channels’ input filter with a 200 ns time constant, higher frequencies will required larger input transitions.

LOW LEVEL AC MODE (8 channels):
Input hysteresis: 10 mV
MAXIMUM AC voltage: 25 mV RMS
Maximum input voltage: ±20 V
Frequency range: 1 kHz

(p) RMS RANGE (Hz)
| 25 | 1 to 10,000 |
| 50 | 0.5 to 20,000 |

Typical current drain: 35 mA

Digital inputs/Outputs
I/O CHANNELS PER MODULE: 16
OUTPUT VOLTAGES (no load):
| High: 5.0 V ±0.2 V Low: < 0.2 V |

OUTPUT RESISTANCE: 320 ohms
INPUT RANGE:
| High: ±3.5 V ±0.5 V Low: ±1.2 V |

INPUT RESISTANCE: 100 kOhms

Interval Measurement
I/O CHANNELS: Resolution is the scan rate
PULSE CHANNELS: Minimum interval: 1 minute
Resolution: 40 ns

TRANSIENT PROTECTION
All analog and digital inputs and outputs use gas discharge tubes and transient filters to protect against high-voltage transients. Digital I/Os also have over-voltage protection clamping.

PHYSICAL
Size
LAB ENCLOSURE: 15.75 L x 9.27 W x 8 D (40 x 24 x 20.3 cm)
FIBERGLASS ENVIRONMENTAL ENCLOSURE: 18.1 L x 13.5 W x 9 D (45.7 x 34.3 x 22.9 cm)
CR9000XC: 10.1 L x 11.0 W x 9.5 D (25.4 x 27.9 x 22.9 cm)

Weight
LAB ENCLOSURE: 30 lbs including modules (13.6 kg)
FIBERGLASS ENVIRONMENTAL ENCLOSURE: 42 lbs including modules (19.1 kg)
CR9000XC: 27 lbs including modules (12.3 kg)
REPLACEMENT BATTERIES: 6.4 lbs (2.9 kg)
ADDITIONAL MODULES: 1 lb each (0.5 kg)

WARRANTY
Three years against defects in materials and workmanship.