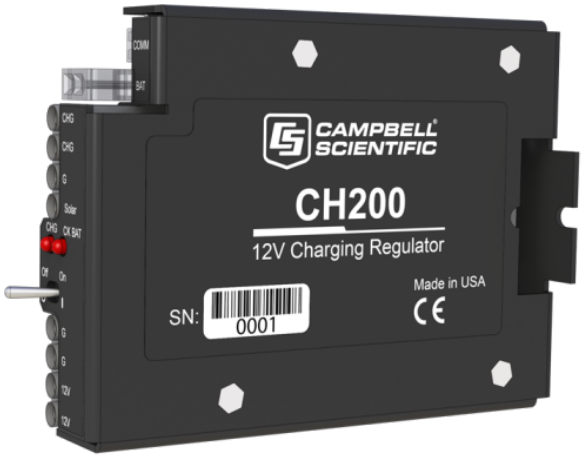
CH200

Smart 12 V Charging Regulator



Optimized Power Performance

Manages voltage and amperage to protect battery

Overview

The CH200 is microcontroller-based smart charge controller that is ideal for an external rechargeable 12 Vdc VRLA battery such as Campbell Scientific's BP12 or BP24. The controller manages amperage and voltage for safe, optimized battery charging from a solar-panel or ac power source. It also measures various input, output, and status parameters to allow close monitoring of the battery.

Benefits and Features

- Allows charging from various sources: solar panels or AC wall chargers
- Two-step constant voltage charging and temperature compensation optimize battery charging and increase the battery's life
- Allows simultaneous connection of two charging sources (e.g., solar panel, ac wall charger)
- Ability to monitor both load and battery current
- Battery reversal protection
- Protects against high-amperage and high-voltage damage to power supply
- Real-time measurements of charge input voltage, battery voltage, on-board temperature, battery current, and load current

Detailed Description

The CH200 has two input terminals that enable simultaneous connection of two charging sources. It also incorporates a maximum power point tracking algorithm for solar inputs that maximize available solar charging resources. RS-232 and SDI-12 terminals allow the CH200 to convey charging parameters to a data logger.

The CH200 has several safety features intended to protect the charging source, battery, charger, and load devices. Both the SOLAR – G and CHARGE – CHARGE input terminals incorporate hardware current limits and polarity reversal protection.

A fail-safe, self-resettable thermal fuse protects the CHARGE – CHARGE inputs in the event of a catastrophic AC/AC or AC/DC charging source failure. Another self-resettable thermal fuse protects the 12 V output terminals of the charger in the event of an output load fault.

The CH200 also has battery reversal protection, and includes ESD and surge protection on all of its inputs and outputs.

Specifications

Operational Temperature	-40° to +60°C (VRLA battery manufacturers state that "heat kills batteries" and recommend operating batteries at ≤ 50°C.)
Dimensions	7.5 x 3.7 x 10 cm (3 x 1.5 x 3.9 in.)

CHARGE - CHARGE Terminals (AC or DC Source)

AC	18 to 24 VRMS (with 1.2 ARMS maximum)
DC	16 to 40 Vdc (with 1.1 Adc maximum)

SOLAR Terminals (Solar Panel or Other DC Source)

-NOTE-	*Battery voltages below 8.7 V may result in less than 3.0 A current limit because of fold-back current limit.*
Input Voltage Range	15 to 40 Vdc
Maximum Charging Current	4.0 Adc typical (3.2 to 4.9 Adc depending upon individual charger)

Quiescent Current

No Charge Source Present	300 µA maximum
No Battery Connected	2 mA maximum

Battery Charging

-NOTE-	*Two-step temperature-compensated constant-voltage charging for valve-regulated lead-acid batteries; cycle and float charging voltage parameters are programmable with the default values listed.*
CYCLE Charging	Vbatt(T) = 14.70 V - (24 mV) x (T-25°C)
FLOAT Charging	Vbatt(T) = 13.65 V - (18 mV) x (T-25°C)
Accuracy	±1% (on charging voltage over -40° to +60°C)

Power Out (+12 Terminals)

Voltage	Unregulated 12 V from battery
4 A Self-Resettable Thermal Fuse Hold Current Limit	› > 4 A (< 20°C) › 2.7 A (60°C) › 3.1 A (50°C) › 4.0 A (20°C)

Measurements

-NOTE-	*At -40° to +60°C*
Average Battery Voltage	±(1% of reading + 15 mV)
Average Battery/Load Current Regulator Input Voltage	±(2% of reading + 2 mA) Impulse type changes in current may have an average current error of ±(10% of reading + 2 mA).
Solar	±(1% of reading - 0.25 V) / -(1% of reading + 1 V) 1.0 V negative offset is worst-case due to reversal protection diode on input; typical diode drop is 0.35 V.
Continuous	±(1% of reading - 0.5 V) / -(1% of reading + 2 V) 2.0 V negative offset is worst-case due to two series diodes in AC full-bridge. Typical diode drops are 0.35 each for 0.7 V total.
Charger Temperature	± 2°C

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