

DCDC18R

Boost Regulator



Table of Contents

PDF viewers: These page numbers refer to the printed version of this document. Use the PDF reader bookmarks tab for links to specific sections.

- 1. General Description..... 1**
- 2. Specifications 1**
- 3. Installation 2**
- 4. Grounding 3**

Figures

- 1-1. DCDC18R.....1
- 3-1. Wiring for DCDC18R2
- 3-2. DCDC18R on CR5000.....3
- 4-1. Schematic of Charging and Grounding Circuitry.....4

DCDC18R Boost Regulator

1. General Description

The DCDC18R Boost regulator is intended to accept an 11 to 16 VDC input and boost it to 18 VDC. Its main use is to boost automobile supply voltages to the 17 VDC minimum required to charge the batteries in the CR3000, CR5000, or CR23X LA bases. It can be conveniently bolted onto the side of the LA base next to the charger input.

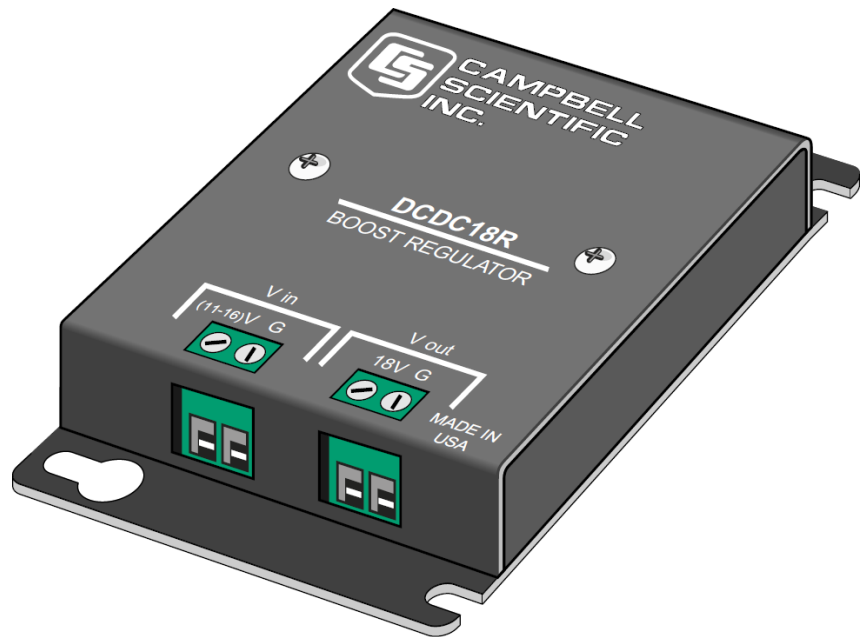


FIGURE 1-1. DCDC18R

Input Voltage:	11 to 16 VDC
Output Voltage:	18 V \pm 5%
Quiescent Current	4 mA
Maximum Output Current:	1 Amp
Maximum Input Current	2.25 Amps*
Power Conversion Efficiency	80 to 90%
Temperature Range:	-40 to +60°C

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

* The slow start boost regulator typically starts to work at a supply voltage of about 10 volts. Supply voltages below 10 volts pass directly to V out (through 2 Schottky diodes dropping the voltage by ~ 0.6 volts). With the DCDC18R operating at the maximum output current ($18\text{ V} * 1\text{ A} = 18\text{ W}$) the input power required is up to $18\text{ W} / 0.8\text{ efficiency} = 22.5\text{ watts}$; that is the maximum current specification of 2.25 Amps at 10 volts.

3. Installation

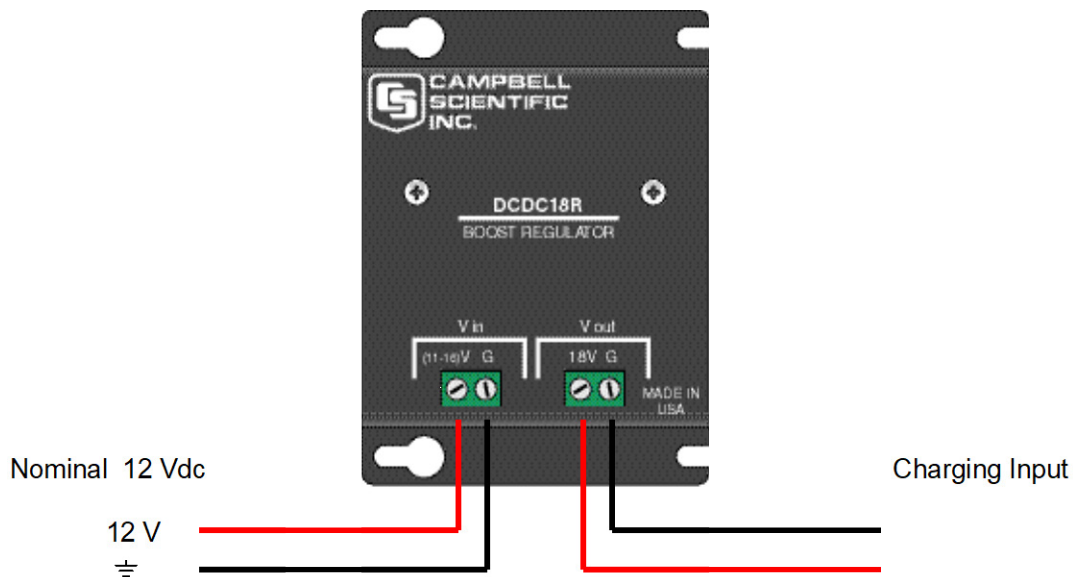


FIGURE 3-1. Wiring for DCDC18R



FIGURE 3-2. DCDC18R on CR5000

The DCDC18R is installed near the datalogger, either on the side of the datalogger (FIGURE 3-2) or to the back panel of the enclosure. The voltage input is connected to 12 volts and ground from the supply source. The leads from “V out” go to the charging input. The G lead from “V out” connects to either charge input terminal and the 18 V lead connects to the other. The polarity of the inputs does not matter.

4. Grounding

CAUTION

The datalogger must be grounded for its transient protection to work. CONNECTIONS TO THE CHARGING INPUT DO NOT PROPERLY GROUND THE DATALOGGER. The Ground connection should be made at the grounding lug on the wiring panel.

A full-wave bridge rectifier is included on the CR3000, CR5000, and CR23X LA bases and the PS100. This creates a diode drop (0.7 V) between the datalogger ground and the return side of the charging input (FIGURE 4-1). If the datalogger ground (ground lug) and the return side of the charging input (G terminal of the DCDC18R) are tied together through a wire, then the return current to the DCDC18R will flow through this wire rather than through the diode in the bridge rectifier. This is a valid connection and does not cause

measurement problems because the CR3000, CR5000, and CR23X have star ground connection at the ground lug. However, unwanted ground loops that induce single-ended measurement offsets will be generated if the \perp terminals and the return side of the charging input are tied together because the return current to the DCDC18R will flow through the \perp terminals.

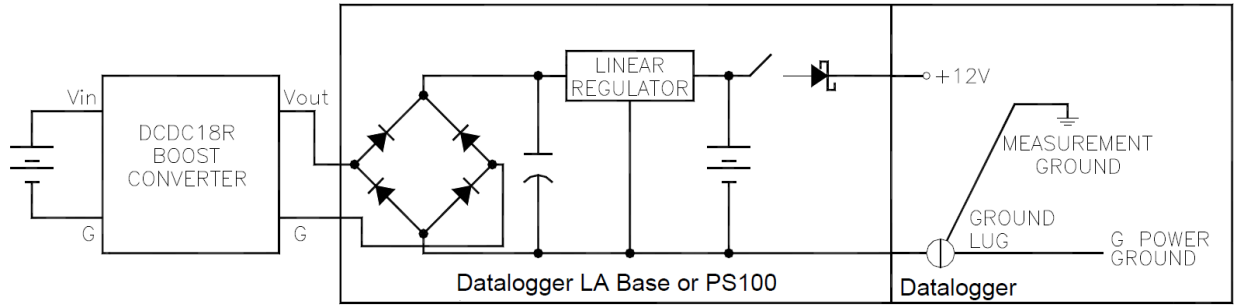


FIGURE 4-1. Schematic of Charging and Grounding Circuitry

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DANGER — MANY HAZARDS ARE ASSOCIATED WITH INSTALLING, USING, MAINTAINING, AND WORKING ON OR AROUND **TRIPODS, TOWERS, AND ANY ATTACHMENTS TO TRIPODS AND TOWERS SUCH AS SENSORS, CROSSARMS, ENCLOSURES, ANTENNAS, ETC.** FAILURE TO PROPERLY AND COMPLETELY ASSEMBLE, INSTALL, OPERATE, USE, AND MAINTAIN TRIPODS, TOWERS, AND ATTACHMENTS, AND FAILURE TO HEED WARNINGS, INCREASES THE RISK OF DEATH, ACCIDENT, SERIOUS INJURY, PROPERTY DAMAGE, AND PRODUCT FAILURE. TAKE ALL REASONABLE PRECAUTIONS TO AVOID THESE HAZARDS. CHECK WITH YOUR ORGANIZATION'S SAFETY COORDINATOR (OR POLICY) FOR PROCEDURES AND REQUIRED PROTECTIVE EQUIPMENT PRIOR TO PERFORMING ANY WORK.

Use tripods, towers, and attachments to tripods and towers only for purposes for which they are designed. Do not exceed design limits. Be familiar and comply with all instructions provided in product manuals. Manuals are available at www.campbellsci.com. You are responsible for conformance with governing codes and regulations, including safety regulations, and the integrity and location of structures or land to which towers, tripods, and any attachments are attached. Installation sites should be evaluated and approved by a qualified engineer. If questions or concerns arise regarding installation, use, or maintenance of tripods, towers, attachments, or electrical connections, consult with a licensed and qualified engineer or electrician.

General

- Protect from over-voltage.
- Protect electrical equipment from water.
- Protect from electrostatic discharge (ESD).
- Protect from lightning.
- Prior to performing site or installation work, obtain required approvals and permits. Comply with all governing structure-height regulations.
- Use only qualified personnel for installation, use, and maintenance of tripods and towers, and any attachments to tripods and towers. The use of licensed and qualified contractors is highly recommended.
- Read all applicable instructions carefully and understand procedures thoroughly before beginning work.
- Wear a **hardhat** and **eye protection**, and take **other appropriate safety precautions** while working on or around tripods and towers.
- **Do not climb** tripods or towers at any time, and prohibit climbing by other persons. Take reasonable precautions to secure tripod and tower sites from trespassers.
- Use only manufacturer recommended parts, materials, and tools.

Utility and Electrical

- **You can be killed** or sustain serious bodily injury if the tripod, tower, or attachments you are installing, constructing, using, or maintaining, or a tool, stake, or anchor, come in **contact with overhead or underground utility lines**.
- Maintain a distance of at least one-and-one-half times structure height, 6 meters (20 feet), or the distance required by applicable law, **whichever is greater**, between overhead utility lines and the structure (tripod, tower, attachments, or tools).
- Prior to performing site or installation work, inform all utility companies and have all underground utilities marked.
- Comply with all electrical codes. Electrical equipment and related grounding devices should be installed by a licensed and qualified electrician.
- Only use power sources approved for use in the country of installation to power Campbell Scientific devices.

Elevated Work and Weather

- Exercise extreme caution when performing elevated work.
- Use appropriate equipment and safety practices.
- During installation and maintenance, keep tower and tripod sites clear of un-trained or non-essential personnel. Take precautions to prevent elevated tools and objects from dropping.
- Do not perform any work in inclement weather, including wind, rain, snow, lightning, etc.

Maintenance

- Periodically (at least yearly) check for wear and damage, including corrosion, stress cracks, frayed cables, loose cable clamps, cable tightness, etc. and take necessary corrective actions.
- Periodically (at least yearly) check electrical ground connections.

Internal Battery

- Be aware of fire, explosion, and severe-burn hazards.
- Misuse or improper installation of the internal lithium battery can cause severe injury.
- Do not recharge, disassemble, heat above 100 °C (212 °F), solder directly to the cell, incinerate, or expose contents to water. Dispose of spent batteries properly.

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