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DC-DC Converter



Installation and Operation Manual

This manual is subject to change without notice. You may obtain the newest version of the manual at www.lamarchemfg.com

Important Safety Instructions

Before using this equipment, read all manuals and other documents related to this converter and other equipment connected to this unit. Always have a copy of the DC-DC converter's manual on file nearby, in a safe place; if a replacement copy of a manual is needed, it can be found at www.lamarchemfg.com.

Electrical Safety



WARNING: Hazardous voltages are present at the input of systems. The output from the converter and batteries may be low in voltage but can have a very high current capacity that may cause severe or even fatal injury.

When working with any live battery or power system, follow these precautions:

- Never work alone on any live power system, someone should always be close enough to come to your aid.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Wear complete eye protection (with side shields) and clothing protection.
- Always wear gloves and use insulated hand tools.



WARNING: Lethal voltages are present within the power system. Parts inside the unit may still be energized even when the unit has been disconnected from the DC input power. Check with a meter before proceeding. Do not touch any parts that are not insulated.

- A licensed electrician should be used in the installation of any unit.
- Always disconnect the unit from the supply, batteries, and loads before performing maintenance or cleaning.
- If the unit is hot-swappable, simply remove it from the shelf for any maintenance or cleaning.
- Always assume that an electrical connection is live and check the connection relative to the ground.
- Be sure that neither liquids nor any wet material come in contact with any internal components.
- Do not operate this unit outside the input and output ratings listed on the unit nameplate.
- Do not use this unit for any purpose not described in the operation manual.

Mechanical Safety

- This unit or parts of the unit may get very hot during normal operation, use care when working nearby.
- Do not expose equipment to rain or snow. Always install in a clean, dry location.
- Do not operate the equipment if it has received a sharp blow, been dropped, or otherwise damaged in any way.
- Do not disassemble this unit. Incorrect re-assembly may result in a risk of electric shock or fire.

Battery Safety



WARNING: Follow all of the battery manufacturer's safety recommendations when working with or around battery systems. DO NOT smoke or introduce a spark or open flame in the vicinity of a battery. Some batteries generate explosive gases during normal battery operation.

- To reduce the risk of arc, connect, and disconnect the battery only when the unit is off.
- If it is necessary to remove the battery connections, always remove the grounded terminal from the battery first.
- Remove personal metal items such as rings, bracelets, necklaces, and watches.
- Always wear rubber gloves, safety glasses, and a rubber-lined vest/apron when working near a battery.
- Have plenty of freshwater and soap nearby in case the battery electrolyte contacts skin, clothing, or eyes.
- If the battery electrolyte contacts skin or clothing, wash immediately with soap and water.
- If the electrolyte enters the eye, immediately flood the eye with running cold water for at least ten (10) minutes and seek medical attention immediately.
- Do not drop metal on a battery. A spark or short-circuit could occur and could cause an explosion.

Unit Location

- Allow at least 6 inches of free air on all vented surfaces for proper cooling.
- Do not operate this unit in a closed-in area or restrict ventilation in any way.
- Do not set any battery on top of this unit.
- Never allow battery electrolyte to drip on this unit when reading the specific gravity or filling the battery.
- Never place this unit directly above a standard flooded battery. Gases from the battery will corrode and damage equipment.
- A sealed maintenance-free or valve-regulated lead-acid (VRLA) battery may be placed below this equipment.

Check for Damages

Before unpacking the product, note any damage to the shipping container and take pictures. Unpack the product and inspect the exterior and interior of the product for damage. If any damage is observed, take pictures and contact the carrier immediately to file a damage claim. Contact La Marche for a Return Material Authorization number to have the inverter sent back for evaluation and repair.



CAUTION: Failure to properly file a claim for shipping damages or provide a copy of the claim to La Marche, may void warranty service for any physical damages reported for repair.

Returns for Service

Save the original shipping container. If the product needs to be returned for service, it should be packaged in its original shipping container. If the original container is damaged/unavailable, make sure the product is packed with at least three inches of shock-absorbing material to prevent shipping damage. *La Marche is not responsible for damage caused by improper packaging of returned products.*

Inspection Checklist

- The enclosure exterior and interior are not marred or dented.
- No visible damage to the components.
- All hardware and connections are tight.
- All wire terminations are secure.
- All items on the packing list have been included.

Handling

Equipment can be very heavy with uneven distribution of weight. Use adequate manpower or equipment for handling. Until the equipment is securely mounted, care must be used to prevent equipment from being accidentally tipped over or dropped.

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Model Scope/General Description

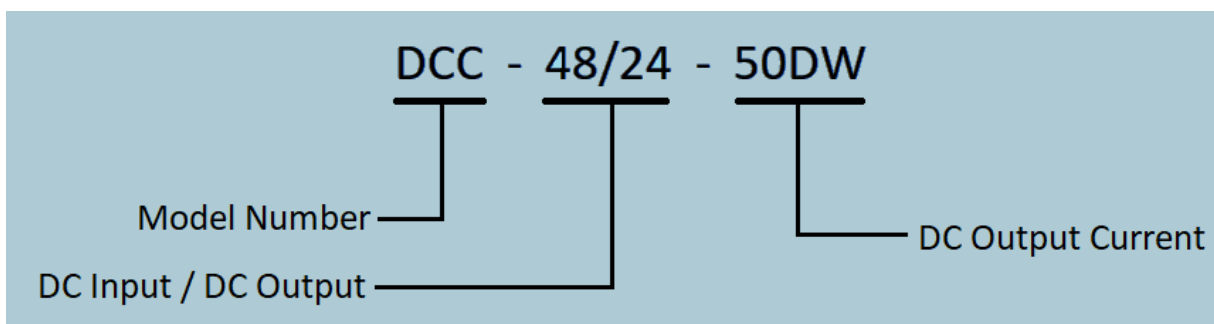
DC-DC Converter is specially designed for meeting the requirements of all kinds of communication and electric power products. DC-DC Converter adopts the high-frequency switching technology including high accuracy voltage stabilizing, low output noise, strong capacity of resisting disturbance, small volume, lightweight, etc. DC-DC Converter is the ideal configuration supplying power to the communication equipment of different voltage grades.



Figure 1 – DC-DC Converter Overview

Understanding the Model Number

The DCC model number is coded to describe the features that are included. Find the model number on the nomenclature nameplate of the enclosure. Follow the chart below to determine the configuration of the converter.



Optional Accessories Included in the Converter

This inverter may have been outfitted with several optional accessories or option packages. To determine the options included (if any) refer to the cover page of the manual package. If the manual package that is included with the inverter is no longer available, contact La Marche and provide the model or serial number to receive a list of the included accessories.

1.0 Equipment Handling

1.1 Storing the DCC

If the DCC is to be stored for more than a few days after delivery, it should be stored within its shipping container. The location chosen for storage should be within an ambient temperature of -40 to 185° F (-40 to 85° C) with a non-condensing relative humidity of 5 to 95%. Storage should not exceed 6 months due to the limited shelf life of the filter capacitors when they are not in service.

2.0 Installation

2.1 Mounting the DCC

The DCC is available with mounting holes, can be fit for 19" rack mounting. When mounting the DCC in any configuration, consider the size and weight of the converter. The rack must be able to support the weight of the converter, as well as an additional safety factor. Refer to Table 1 to verify the weight of the converter. The location chosen for the converter should be within an ambient temperature range of 14°F to 122°F (-10°C to 50°C) with a non-condensing relative humidity no higher than 95%. The converter should be mounted in an area free of explosive materials and away from any liquids. Avoid using equipment in a location with corrosive gases (e.g. over flooded Lead Acid batteries) and dust. The DCC utilizes fan-assisted cooling, so clearance of at least 6 inches of free air must be maintained in front and on top for proper cooling. Maintain 12 inches (300 mm) or more of clearance at the rear of the converter when rack mounting to allow for operation and maintenance. The preferred fastener is a machine bolt backed with a flat washer, lock washer, and nut. All hardware should be corrosion-resistant.

2.1.1 Rack-Mounting the DCC

The DCC enclosure can be rack mounted on a standard 19/23" rack. For the rack-mounting installation dimension, seen in Figure 2. Flush mount the DCC enclosure to the relay rack.

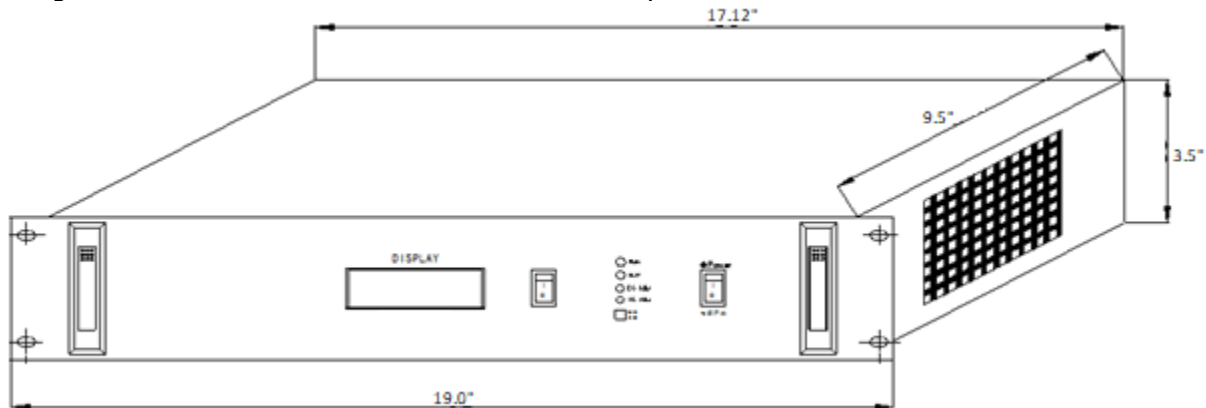


Figure 2 – Rack Mounting Dimensions

2.2 Electrical Connections

Before beginning any work on the converter, ensure that all incoming and output power is de-energized. Verify that no voltage is present by using a voltmeter at all input and output terminals. Check that the voltage matches the converter front nameplate specifications. Select wire size using the table below.

2.2.1 Input Wiring



WARNING: Connecting the battery to the Converter may cause a spark at the point of connection. There is a RISK OF EXPLOSION in hazardous areas or locations where explosive gases have accumulated.

Access the rear of the Converter and locate the DC Input connection terminal. Connect DC wiring to the Converter per Figure 4. Refer to Table 4 for the recommended wire size.

With DC input wiring connected and operating within the DC range. Use the power switch to the front panel, the green LED at RUN, indicating a successful start-up, and the OFF alarm LED indicates no faults. Using a digital multimeter, measure the DC output to verify voltage output.

2.2.2 Output Wiring

The DCC comes with Bulk DC output connections at the rear of the Converter. Connect DC cables to the equipment per the Figure-3. Select the recommended DC wire size using Table 4.

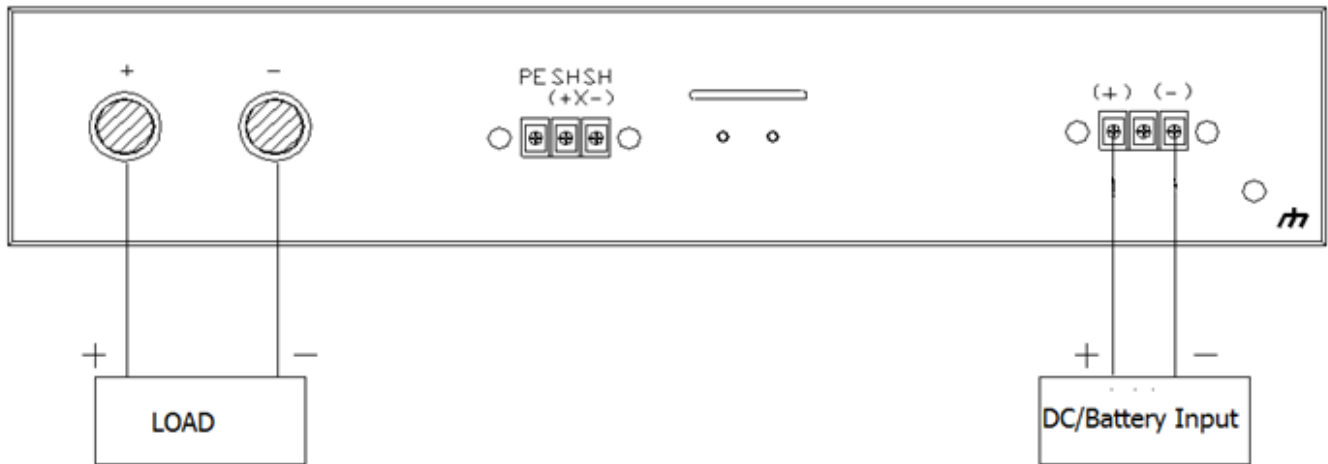


Figure 3 – DC Input and DC Output Connections to the DCC

3.0 Operation

3.1 Start-Up Sequence

After all DC input and output connections have been made, apply DC power, and turn on the converter Power Switch. The unit will automatically power up and the Converter RUN LED should turn solid green, indicating successful start-up and ALARM OFF LED indicating no faults. The Converter will output 26.7 VDC if set to float or 28.0 VDC for Equalize.

3.2 Front Panel (Switch, LED and Alarm) Details



Figure 4 – Front Panel Detail

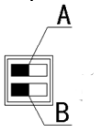
Name	Description
LCD Window	-Display the voltage and current
Backlight	-Switch ON/OFF for the LCD Display window light
RUN	-ON LED in green color, indicates Converter ON condition. -OFF LED indicates the Converter OFF condition.
ALM	-ON LED in Red Color, indicates converter fault or under protection. OFF LED, indicates Converter works in normal condition.
EC ADJ/FC ADJ	-Equal voltage / Float voltage adjustable knob
FC /EC MANU /AUTO 	Dial code for Float /Equal Charge and Manual/automatic A==Switch Float charge and Equal charge. Turn to the right is Equal charge, Turn to the left is float charge B== Switch Manual and automatic. Turn to the right is automatic, Turn to the left is Manual Note: Automatic float equal charge must be compatible with the power monitoring system
Power	Switch ON/OFF of the dc converter

Table 1 – Front panel detail

3.3 Rear Panel details



Figure 5 – Rear Panel Detail

Name	Description
DC Voltage input terminal	-Connect Red wire to (+) terminal and Black wire to (-) terminal of the DC input source to the DC input terminal.
PE SH(+) SH(-) Current sharing	-Parallel connect port -Use several units of the same specification of converter connect to get more current output -For connection refer to Figure 6.
DC Voltage Output terminal	-Connect Red wire to (+) terminal and Black wire to (-) terminal of the DC load to the DC output terminal.
GND	-Connect ground cable to the GND terminal.

Table 2 – Rear Panel Details

3.4 Parallel Operation

To get more current output it is possible to parallel DCC. Follow the parallel connection according to Figure 6.

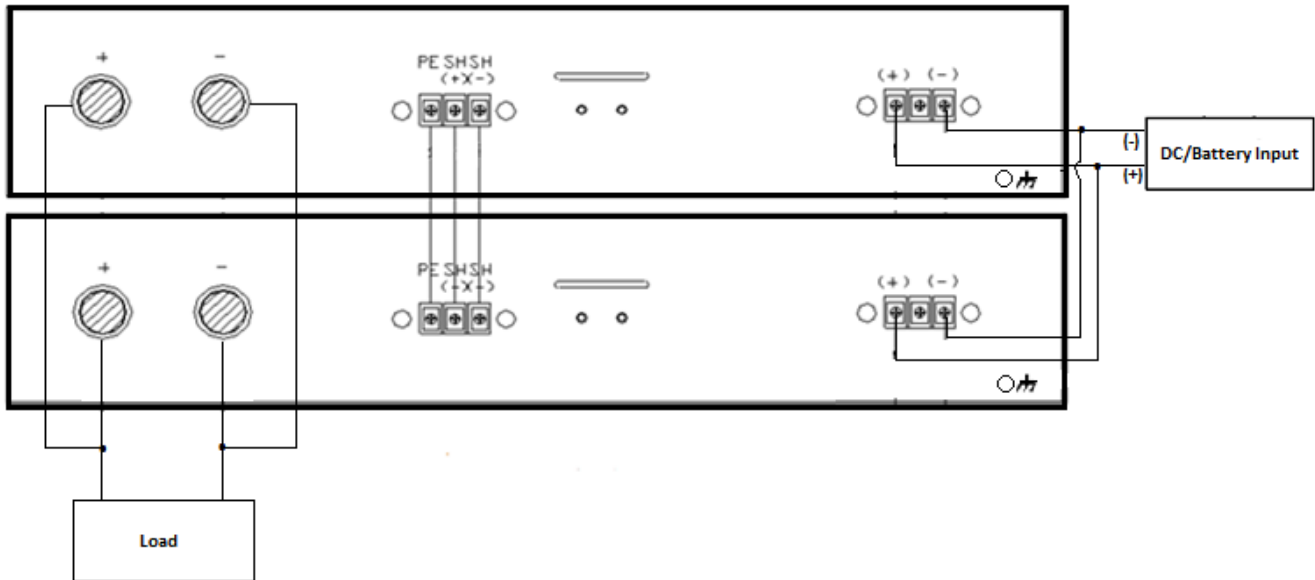


Figure 6 – Parallel Connection

4.0 Troubleshoot

<i>Symptom</i>	<i>Possible Cause</i>	<i>Remedy</i>
<p>Output failure with the following LED status:</p> <p>RUN LED with Green color and ALM LED with RED color</p>	Load short-circuit or overload	- Power off, then eliminate short-circuit or reduce load, Restart again
<p>Output failure with the following LED status:</p> <p>RUN LED with Green color and ALM LED with OFF</p>	Higher or lower DC Input voltage	- Adjust DC Input voltage to normal Range

*Other problems please contact the service department of La Marche Mfg.

Table 3 – Troubleshooting detail

Appendix A: Technical Specifications

<i>ELECTRICAL</i>			
Load regulation	≤0.2%		
Peak—peak noise	≤150mV		
Discrete noise	≤20mV		
Efficiency	≥83%		
Dynamic response	20% ~ 100% step load≤200Restoring time≤100uS		
Working temperature	– 5~45°C		
Cooling mode	Forced Cool		
MTBF	100,000Hour		
Weight	17.6 lbs		
Dimension	19 x 9.5 x 3.5"		
Alarm and Indicators	RUN LED (Indicates Operation of a converter) ALM LED (Indicates Fault in a converter)		
<i>PROTECTION</i>			
<ul style="list-style-type: none"> - Output over/under voltage - Over-current - Short-circuit - Over-temperature protection 			
<i>ENVIRONMENT</i>			
	Technical Specification	Unit	
Operating Temperature	-10~50	°C	-10°C Module to work properly, -20 ° C module rated power start.
Storage Temperature	-40~85	°C	
Relative temperature	5—95	%	No condensation
Cooling mode	Forced air cooling		Intelligent fan, The fan will start if > 55°C (± 5°C) the fan will stop running if < 55°C (± 5°C)
Altitude	≤4000	m	In 3000—4000 m Environmental conditions of high-temperature derating, be reduced by 1 ° C since the 3000 m per 300 m.

Appendix B: Power Cabling Guide

Use the following formulas and tables to determine proper wire size for minimal voltage drop. At distances exceeding 10 feet, the DC wire size should be chosen to keep the voltage difference between the inverter's DC input terminals and the battery at less than 1/2 volt when the inverter is fully loaded.

Table of Conventions:

<i>CMA</i>	= Cross-section of wire in circular MIL area
<i>A</i>	= Ultimate drain in amperes
<i>LF</i>	= Conductor loop feet
<i>MaxAmp</i>	= Maximum allowable amperes for given voltage drop
<i>AVD</i>	= Allowable voltage drop
<i>K</i>	= 11.1 for commercial (TW) copper wire = 17.4 for aluminum

Calculating Wire Size Requirements:

$$CMA = \frac{A \times LF \times K}{AVD}$$

Calculating Current Carrying Capacity of Wire:

$$MaxAmp = \frac{CMA \times AVD}{LF \times K}$$

Size (AWG)	Area CIR.MILS	Size (MCM)	Area CIR.MILS
18	1620	250	250000
16	2580	300	300000
14	4110	350	350000
12	6530	400	400000
10	10380	500	500000
8	16510	600	600000
6	26240	700	700000
4	41740	750	750000
3	52620	800	800000
2	66360	900	900000
1	83690	1000	1000000
0	105600	1250	1250000
00	133100	1500	1500000
000	167800	1750	1750000
0000	211600	2000	2000000

Table 4 – Wire Size/Area Table

Appendix C: Manufacturer's Warranty

All La Marche Manufacturing Co. equipment has been thoroughly tested and found to be in proper operating condition upon shipment from the factory and is warranted to be free from any defect in workmanship and material that may develop within one (1) years from the date of purchase under normal use.

If the equipment proves defective within one year, it shall be replaced without charge after examination at our factory, providing such defect in our opinion, is due to faulty material or workmanship and not caused by tampering, abuse, misapplication, or improper installation.

Should the equipment require major replacement or repair, the equipment must be returned to the La Marche factory to have the inspections, parts, replacements, and testing performed by factory personnel. Should it be necessary to return a piece of equipment to the factory, the customer or Sales representative must first obtain an RMA (Return Material Authorization) from the factory. If upon inspection at the factory, the defect was due to faulty material or workmanship, all repairs will be made at no cost to the customer during the warranty period.

All internal maintenance to be performed by La Marche.

La Marche reserves the right to honor the warranty with a replacement unit.

In accepting delivery of the equipment, the purchaser assumes full responsibility for proper installation, installation adjustments, and service arrangements. Should minor adjustments be required, the local La Marche Sales Representative should be contacted to provide this service.

All sales are final. Only standard La Marche units will be considered for return. A 25% restocking fee is charged when return is a factory authorized. Special units are not returnable.

In no event shall La Marche Manufacturing Co. have any liability for consequential damages, or loss, damage, or expense directly or indirectly arising from the use of the products, or any inability to use them either separately or in combination with other equipment or materials, or from any other cause. Also, any alterations of equipment made by anyone other than La Marche Manufacturing Co. render this warranty null and void.

La Marche Manufacturing Co. reserves the right to make revisions in the current production of equipment and assumes no obligation to incorporate these revisions in earlier models.

The failure of La Marche Manufacturing Co. to object to provisions contained in customers' purchase orders or other communications shall not be deemed a waiver of the terms or conditions hereof, nor acceptance of such provisions.

The above warranty is exclusive, supersedes, and is instead of all other warranties, expressed or implied, including any implied warranty of merchantability or fitness. No person, agent, or dealer is authorized to give any warranties on behalf of the Manufacturer, nor to assume for the Manufacturer any other liability in connection with any of its products unless made in writing and signed by an official of the manufacturer.

Appendix D: Document Control and Revision History

Part Number: 143459
Instruction Number: P25-LDCC-1
Issue ECN:
