

Operator's Manual

WF-9800L2 Series

WF-9850L2, WF-9860L2, WF-9870L2 Deckmount Lithium-Ion Converter-Chargers



THE HEARTBEAT OF TODAY'S RVs

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TABLE OF CONTENTS

SAFETY INFORMATION	3
GENERAL INFORMATION	
Reverse Battery Protection	3
Automatic Cooling Fan	4
Over-Temperature Protection	4
Electronic Current Limiting	4
Short Circuit Protection	4
CIRCUIT PROTECTION	
DC Fuses	5
OPERATIONAL FEATURES	
Two Stage Smart Charging	5
Bulk Mode	6
Absorption Mode	6
TROUBLESHOOTING INSTRUCTIONS	
Converter Output Voltage	6
Reverse Polarity Fuses	7
Troubleshooting Flow Chart	8
GENERAL COMPLIANCE INFORMATION	
Agency Listings	8
INSTALLATION INSTRUCTIONS	
Mounting the Enclosure	9
SPECIFICATIONS	10
WARRANTY INFORMATION	11





!WARNING!

Risk of Electrical Shock. Disconnect or isolate all power supplies before making electrical connections. More than one disconnection or isolation may be required to completely de-energize equipment. Contact with components carrying hazardous voltage can cause electric shock and may result in severe personal injury or death.

!IMPORTANT!

All wiring must conform to local, national, and regional regulations. Use copper conductors only for all wire connections. Do not exceed the electrical ratings for the WF-9800L2 Series or the equipment connected to it.

!CAUTION!

This product should be installed by an experienced technician. CAUTION and care must be taken when servicing this equipment. To prevent severe shock or electrocution, consult your servicing dealer.

!WARNING!

This unit employs components that can produce arcs or sparks. To prevent fire or explosion, do not install in compartments containing batteries or flammable materials (LP gas). This product is NOT ignition protected.

!CAUTION!

To prevent fire, do not cover or obstruct front cover ventilation openings. For continued protection against risk of fire or electric shock, replace faulty DC fuses with ones of the same type and ratings as are installed.

!WARNING!

Use converter only on appropriate battery systems. Other usage may cause personal injury and damage. Consult all battery manufacturers' recommendations for additional safety information before use.

GENERAL INFORMATION

WF-9800L2 Series Converter-Charger Safety Features

Reverse Battery Protection

The WF-9800L2 Series Converter-Charger will charge the 12-volt house battery if installed. A battery does not have to be installed for WF-9800L2 Series Converter-Charger operation. When a battery is installed, two reverse polarity fuses are installed to protect the converter circuitry. The fuses are located on the rear panel of the enclosure near the AC power cord (refer to Figure 1 below). This feature prevents permanent damage to the converter from a battery connected into the circuit backwards. In addition to protecting the converter-charger, the reverse polarity fuses are the main connection between the converter-charger and the DC fuse board of a distribution center.



Automatic Cooling Fan

The cooling fan in the WF-9800L2 Series Converter-Charger is incremental and is controlled by the current drawn out of the converter to the applied load. The on-board microprocessor increases fan speed as the total load increases, and decreases fan speed as the load decreases.

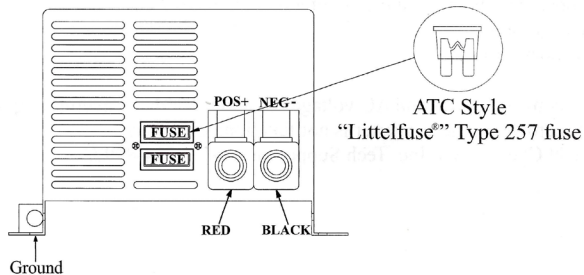


Figure 1

Unlike traditional temperature-controlled fans, the load-controlled fan provides better component cooling by avoiding temperature spikes which can lead to premature component failure.

Over-Temperature Protection

If the internal temperature of the converter exceeds a critical point, it will shut down. This protects the unit from excessive heat that may damage sensitive components. The unit will restart once the temperature inside has dropped.

Electronic Current Limiting

In the event that the output current exceeds the maximum rating for the WF-9800L2 Series Converter-Charger, the output current will remain constant, but the output voltage will begin to drop. If this occurs, the unit will recover once loads are reduced.

Short-Circuit Protection

Should a short circuit occur in the RV, the WF-9800L2 Series Converter-Charger will drop the voltage output to zero volts. If the short-circuit condition is removed and no other fault conditions are detected, the converter will resume normal operation. However, short-circuit conditions are **dangerous**, and an RV will require inspection by a qualified service technician.

CIRCUIT PROTECTION

WF-9800L2 Series Converter-Charger Fuses

DC Fuses (12 Volts)

The DC fuse receptacle on the rear panel of the WF-9800L2 Series Converter-Charger has space for 2 (two) 35 Amp Reverse Battery Protection fuses (see Figure 1 above). These fuses should be replaced with ATC or ATO automotive type fuses such as:

- Littelfuse type 257
- Bussmann type ATC

OPERATIONAL FEATURES

Converter Operation Modes

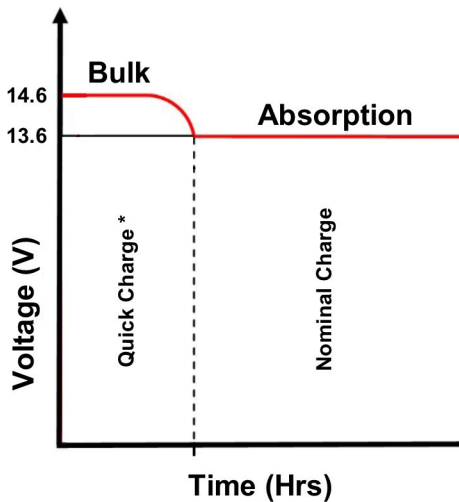


Two-Stage Smart Charging

The two-stage “smart” charger continuously measures the battery voltage output and regulates the amount of charge using two modes of operation; Bulk, and Absorption modes.

Converter Modes of Operation

Understanding output voltages of a two-stage converter.



* 1 Hr (min), 4 Hrs (max)

Figure 2



Bulk Mode

This mode is designed with 2 purposes in mind. First, to quickly restore the energy back into the battery. Second, to ensure the lithium cells inside the battery remain balanced. This is accomplished by boosting the output voltage to 14.6VDC and allowing the maximum current to flow as required by the loads.

The bulk mode stage could last anywhere from 1 to 4 hours based on the battery and load current which is being used. For a full battery, the bulk stage has a minimum time requirement of 1 hour, which allows the lithium cells inside the battery the time required to “balance”. For an empty battery, the bulk stage has a maximum time requirement of 4 hours. If your application requires longer than 4 hours (such as a larger battery bank > 200 Ahr), a simple cycling of power will reset the timers.

As the energy is restored into the battery, the DC system voltage will climb and the current from the converter will decrease. If the total amperage draw from the converter reaches a preset point (within the 1-4 hour timer), the converter is designed to drop out of bulk mode.

Absorption Mode

This mode is designed with 1 purpose in mind. This purpose is to provide a safe operating voltage for all loads in the RV. This is accomplished by reducing (from bulk mode) the output voltage to 13.6VDC and remaining at this voltage until the power is cycled to the converter.

The absorption mode stage is the default or normal mode of operation, which has no timer associated with it. In this mode an output of 13.6 VDC is provided to the DC circuits in the RV. This voltage has a long term history as the acceptable voltage for all loads in the RV, and should not place undue stress (nor reduce the longevity) of the lights and appliances in the RV. This is not to say that all loads will have an issue with a constant higher voltage; however, some loads may have an issue. Please refer to the individual manufacturers specifications for acceptable operating voltage range of the connected load.

TROUBLESHOOTING INSTRUCTIONS

Troubleshooting the WF-9800L2 Series Converter-Charger

Refer to the Troubleshooting Guide for the WF-9800L2 Series Converter-Charger (Figure 3) on the next page.

Converter Output Voltage

Before checking the WF-9800L2 Series Converter-Charger output voltage, disconnect the battery cables at the battery. Make sure the converter is plugged into an AC source (105-130 Volts). Check the converter output voltage at the battery with a voltmeter. Place the meter probes on the disconnected battery cables; place the Positive (red) meter probe on the + Positive red battery wire and place the Negative (black) meter probe on the - Negative black wire on the battery cable (Figure 3). Be sure you have good connections at the cables. If the voltage reads 13.6 - 14.6 VDC (+/- 0.2) with no load, the converter is functioning properly.

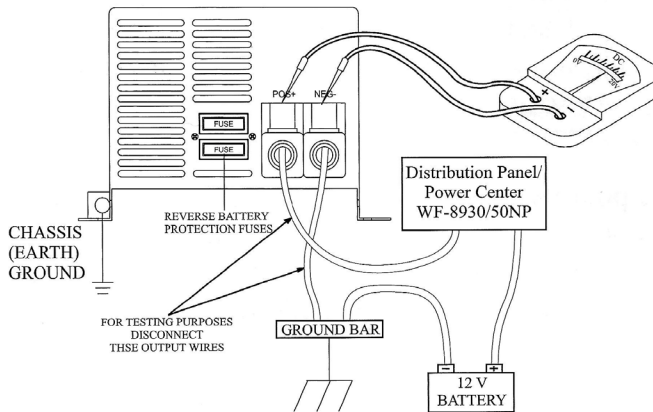


Figure 3

If the converter output voltage at the battery reads 0.0 VDC, or if the battery is not charging, check for an open inline fuse in the battery wire circuit. One may have been installed by the RV manufacturer. Also check for loose wiring connections.

Reverse Polarity Fuses

If there is no DC output coming from the WF-9800L2 Series Converter-Charger output lugs, first check the reverse polarity fuses on the rear panel. Then, visually inspect the fuses for any breaks in the fuse element. If no breaks are found, use a continuity tester to check for continuity. If the reverse polarity fuses are blown, it means the RV battery was accidentally connected in reverse, either at the battery or at the converter. Investigate the connections and reconnect the cables properly. Replace the fuse with the same type and amperage rating as the original.

IMPORTANT: These fuses protect the converter from damage in the event that the RV battery is accidentally connected in reverse. A reversed battery connection, even if for only a second, will cause these fuses to blow.

If the above checks have been made but the converter output still reads 0.0 VDC, the converter is not functioning properly.



Troubleshooting Guide for the WF- 9800L2 Series

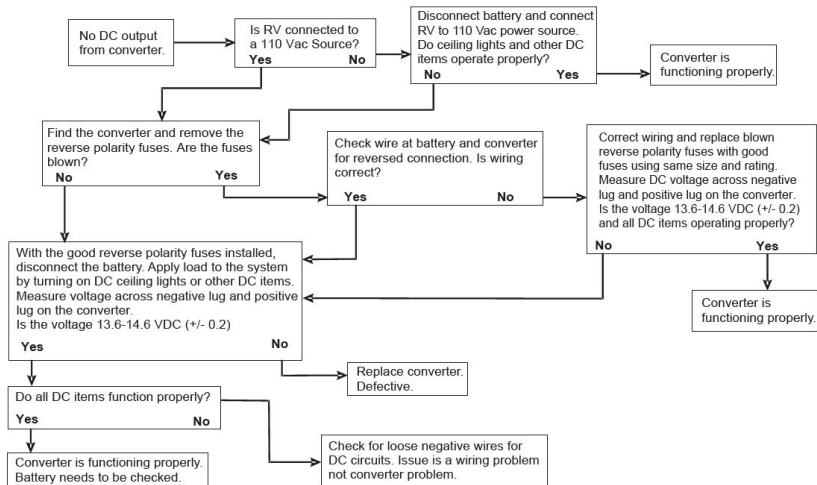


Figure 4

GENERAL COMPLIANCE INFORMATION

Agency Listings

UL

The WF-9800L2 Series Converter-Chargers are UL-Listed, and cUL-Listed (Canadian).

FCC Compliance Class B

NOTE: This equipment has been tested and found to comply with the limits for a Class B 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.

INSTALLATION INSTRUCTIONS

Installing the WF-9800L2 Series Converter-Charger



Mounting the Enclosure

The WF-9800L2 Series Converter-Charger enclosure should be mounted in an accessible area such as a wall or in the side of a cabinet. The front of the enclosure should not be obstructed to allow free air flow for the cooling fan (Figure 5).

An 8AWG copper conductor shall be used to bond the WF-9800L2 Series Converter-Charger to the vehicle frame.

Connect a Red 8 AWG wire to the POS+ lug on the distribution center's fuse board. Make sure this lug is torqued properly. In a similar fashion, connect a Black 8 AWG wire to the NEG- lug on the distribution center's fuse board.

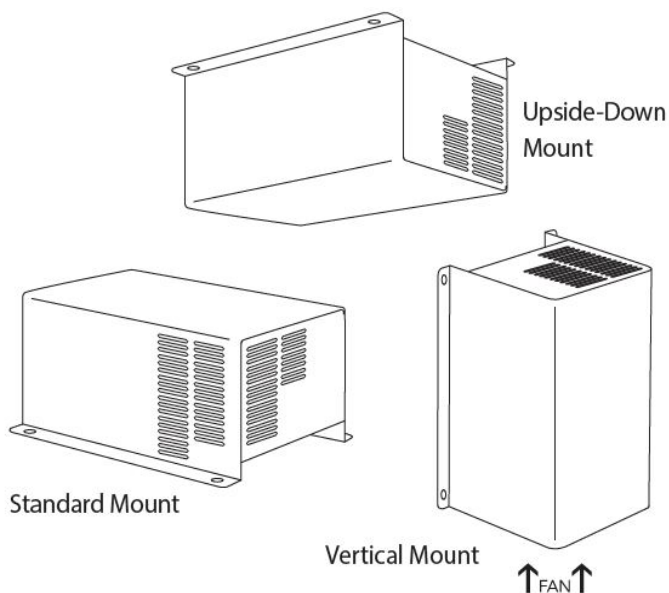


Figure 5



WF-9850L2 Lithium-Ion Converter Specifications			
Model No.	WF-9850L2	WF-9860L2	WF-9870L2
Converter Input Power:			
Voltage:	105-130Vac	105-130Vac	105-130Vac
Frequency:	60Hz	60Hz	60Hz
Converter Output Power			
Rated DC Current	50A	60A	70A
Voltage Output	13.6V - 14.6V DC Range	13.6V - 14.6V DC Range	13.6V - 14.6V DC Range
Charging Modes	2-Stage Converter Charger	2-Stage Converter Charger	2-Stage Converter Charger
Intelligent Charge Modes	Absorption and Bulk	Absorption and Bulk	Absorption and Bulk
Absorption charge voltage	13.6V	13.6V	13.6V
Bulk charge voltage: (4 Hrs)	14.6V	14.6V	14.6V
Protection:			
Over-Current	Yes	Yes	Yes
Short-Circuit	Yes	Yes	Yes
Over-Temperature	Yes	Yes	Yes
Cooling System	Yes	Yes	Yes
Reverse Polarity	Yes	Yes	Yes
Mechanical:			
Dimension: W x H x D	149 x 100 x 250 mm	120.7 x 101.6 x 222.3 mm	130 x 101.6 x 260.4 mm
Weight:	2.15 kg / 4.74 lbs.	2.5 kg / 5.5 lbs.	3.1 kg / 6.75 lbs.
Safety:	UL458 Certified; FCC	UL458 Certified; FCC	UL458 Certified; FCC

Figure 6



CONSUMER LIMITED WARRANTY for WFCO Electronic Products

WFCO extends, to the original owner, a Two Year Limited Product Warranty. This warranty is in effect from the date of original purchase for a period of two (2) years. This limited warranty is extended specifically for and is limited to Recreational Vehicle application and is only valid within the continental United States, Alaska, Hawaii and the Provinces of Canada. WFCO warrants, to the owner, that its products are free from defects in material and workmanship under normal use and service based on its intended use and function. This warranty is limited to the repair or replacement, at WFCO's discretion, of any defective parts or defective assembly. Any implied warranties of merchantability or fitness for intended use are limited in duration unless applicable State Law provides otherwise. You may have other rights as specified by each individual state.

EXCLUSIONS and LIMITATIONS

The OEM warranty specifically does not apply to the following:

- Any WFCO product that has been repaired or altered by an unauthorized person;
- Any damage caused by misuse, faulty installation, testing, negligence, accident or any WFCO product installed in a commercial vehicle;
- Any WFCO product, whose serial number has been defaced, altered or removed;
- Any WFCO product, whose installation has not been in accordance to the WFCO written instructions;
- Any consequential damages arising from the loss of use of the product including but not limited to: inconvenience, loss of service, loss of revenue, loss or damage to personal property, cost of all services performed in removing or replacing the WFCO product. Specifications are subject to change without notice or obligation.
- Any WFCO Electronics products sold through unauthorized Internet sources (Example: eBay) will be excluded from all warranty coverage offered by Arterra Distribution / WFCO.

CONSUMER WARRANTY CLAIM PROCEDURE

Upon determination and validation by an authorized OEM dealer that a WFCO product has a defect, a Return Goods Authorization (RGA) number will be required before the product can be returned. The RGA number can be requested by completing the Warranty Information Fax Sheet and appropriate Troubleshooting Form found at www.wfcoelectronics.com. Once these forms have been completed, email the forms along with Proof of Purchase to warranty@wfcoelectronics.com or fax the three documents to the Warranty Department at (574) 294-8698. After receipt of the forms, an RGA number will be issued. This number shall appear on all correspondence with warranty service. Upon validation of the warranty, WFCO shall replace the product with a like product. The RGA number shall be placed on the outside of the carton used to return the product for ease of identification. Do not mark directly on the product. The product must be packaged properly to avoid further product damage which could cause a non-warrantable condition.

WARRANTY ASSISTANCE

The consumer may contact the selling Dealer or OEM for warranty assistance.

The consumer may also contact Arterra Distribution, exclusive distributor to WFCO Products at: (574) 294-8997 or Fax (574) 294-8698.



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Follow proper safety practices. If in doubt, consult a professional RV technician.