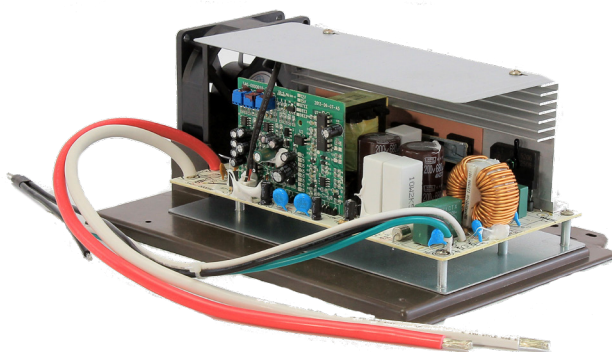


WF-8950L2-MBA

Replacement Lithium-Ion Converter-Charger Main Board Assembly



THE HEARTBEAT OF TODAY'S RVs

Distributed in the U.S.A. and Canada by
ARTERRA DISTRIBUTION

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Power PROs Technical Support
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!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-8950L2-MBA 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-8950L2-MBA Converter-Charger Safety Features

Reverse Battery Protection

The WF-8950L2-MBA will charge the 12-volt house battery if installed. A battery does not have to be installed for the WF-8950L2-MBA to operate. When a battery is installed, two reverse polarity fuses protect the MBA circuitry. The fuses are located on the left-center edge of the DC fuse board below the VCC+ lug (refer to Figure 1 on the next page). This feature prevents permanent damage to the MBA from a battery connected into the circuit backwards. In addition to protecting the MBA, the reverse polarity fuses are the main connection between the WF-8950L2-MBA and the DC fuse board.

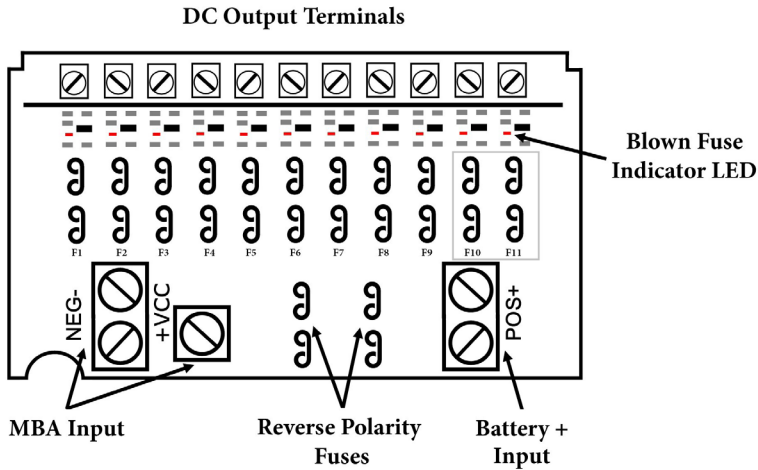


Figure 1

Automatic Cooling Fan

The cooling fan in the WF-8950L2-MBA 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. 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-8950L2-MBA, 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-8950L2-MBA 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-8950L2-MBA Converter-Charger Fuses

DC Fuses (12 Volts)

The DC fuse board in the WF-8900PEC panel section includes all fuse receptacles for the DC circuits and the Reverse Battery Protection circuits. The Reverse Battery Protection circuit has space for 2 (two) 40 Amp fuses. The manufacturer of your RV has installed fuses for each DC circuit that is operational. Any blown fuse will illuminate a red LED on the board next to the blown fuse. Replace blown fuses with fuses of the same rating (printed on each fuse). Use only ATC or ATO automotive type fuses such as:

- Littelfuse type 257
- Bussmann type ATC

OPERATIONAL FEATURES

Converter Operation Modes

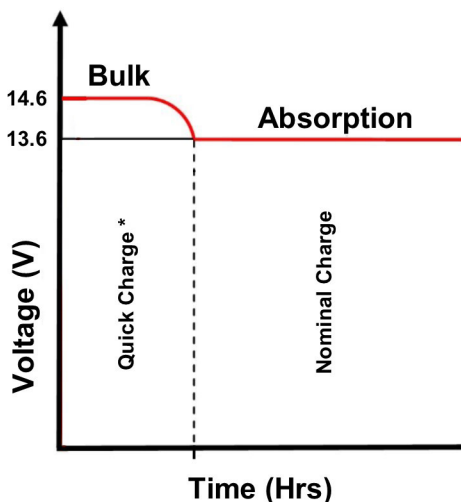


Two-Stage Smart Charging

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-8950L2-MBA Converter-Charger

Refer to the Troubleshooting Guide for the WF-8950L2-MBA (Figure 3) on the next page.

Converter Output Voltage

Before checking the WF-8950L2-MBA 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. 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.

AC Reverse Polarity (Audible Alarm)

This power center is equipped with an AC REVERSE POLARITY PROTECTION feature. Should the incoming AC neutral wire and lead wire be connected backwards at the power center, an alarm located in the power center enclosure will sound. This alarm will continue to sound until the AC wires are connected correctly.

If the above checks have been made but the converter output still reads 0.0 VDC, the converter is not functioning properly. Contact the Arterra Distribution Power PROs at 1 (877) 294-8997.



Troubleshooting Guide for the WF- 8950L2- MBA Main Board Assembly

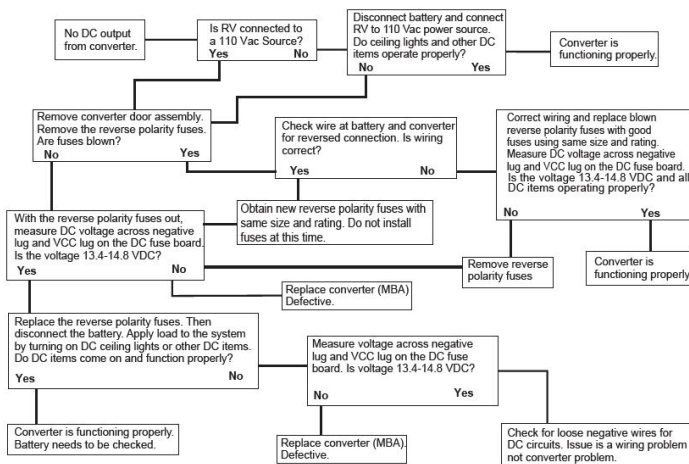


Figure 3

Should it be determined that the WF-8950L2-MBA needs to be replaced, removal of the Main Board Assembly is a simple process.

INSTALLATION INSTRUCTIONS

Replacing the WF-8950L2-MBA Converter-Charger

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.

Make sure no AC power is coming into the RV from either the Shore Power cord or an on-board generator. Remove and set aside the Reverse Polarity Fuses located on the fuse board to disconnect the converter section from the rest of the RV's DC power.



Perform the following steps:

1. Remove the door assembly by loosening the two screws located in the upper left and right corners. The screws are captive and will not fall out. Pull forward and outward on the door assembly to clear the case.
2. In the upper left portion of the fuse board, loosen the **NEG-** lug (White wire) and the **VCC+** lug (Red wire). Do not back the lug screws all the way out.
3. Locate the tab at the bottom of the fuse board holding the board in place. Gently depress the tab allowing the fuse board to be pulled forward.
4. With the fuse board pulled slightly away from its mounting, pull the Red and White wires out of the lugs.
5. In the AC section of the enclosure, locate the Black wire coming up from the converter in the lower section. As an extra precaution, **MAKE SURE THE CONVERTER BREAKER IS IN THE OFF POSITION**. Remove the wire from the breaker. NOTE: this wire has a metal pin terminal on the end inserted into the breaker. Remove and position out of the way any wire connected to the pigtail.
6. Locate and remove the converter's Green Ground wire attached to the AC Ground bar on the left side of the compartment. In a similar fashion, locate and remove the converter's White Neutral wire attached to the AC Neutral bar at the top of the compartment.
7. In the converter compartment, remove the two screws at the front of the MBA holding it in place. Slide the MBA forward routing the wires through the slots in the case until the MBA clears the enclosure.

If the MBA is being returned under a warranty claim, follow the packaging instructions in your warranty claim packet.

When installing a replacement MBA, reverse the order of steps 1-7.

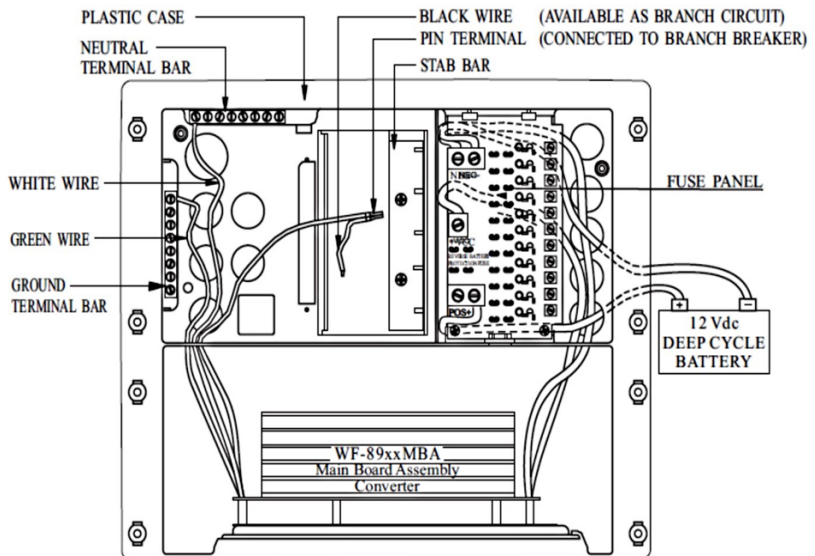


Figure 4



GENERAL COMPLIANCE INFORMATION

Agency Listings

UL

The WF-8950L2-MBA is 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.



WF-8950L2-MBA Lithium-Ion Main Board Assembly Specification	
Model No.	WF-8950L2-MBA
Converter Input Power:	
Voltage:	105-130Vac
Frequency:	60Hz
Max. input current @105Vac	11A
Max Power	940 watt
Converter Output Power	
Continuous power:	730 watt
Rated DC Output Voltage	13.6 - 14.6 VDC
Rated DC Current	50A
Charging Control	automatically controlled by micro-processor
Charging Modes	2-stage Intelligent charge
Intelligent charge mode	Absorption & Bulk Modes
Battery Adaptability	Lithium Ion
Absorption charge voltage	13.6V
Bulk charge voltage: (4 Hrs)	14.6V
Regulation	± 1.5% accuracy against input or load changes
Cooling Fan	Two speed according to the DC load amperage
VA Efficiency:	> 80% (under 70% of load condition)
Protection:	
Overload	current-limiting & shut down; auto recovery upon normal load
Short-circuit	shut down & auto recovery upon normal
Over-temperature	shut down & auto recovery upon normal
Battery reverse polarity	protected by Fuses; same rated fuse replacement required
DC Distribution	
DC Battery Lugs: NEG-, POS+	Lugs accept 2 to 14 AWG wire; Lug screws are 5/16" Allen Head
Mechanical:	
Dimensions:	7.1" W x 3.9" H x 9.6" D / 181mm W x 99mm H x 243mm D
Weight:	3.46 lbs / 1.57 kg
Environmental Condition:	
20 ~ 90% Non-condensing	
Safety	
UL458 certified; FCC Class B (compliant)	

Figure 5



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.



THE HEARTBEAT OF TODAY'S RVS

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