TECHNICAL INFORMATION

AND TIPS ON
WFCO PRODUCTS

MANUAL

Thank you for using WFCO products. The technical information and tips in the WFCO product manuals are for engineers, installers, and service technicians.

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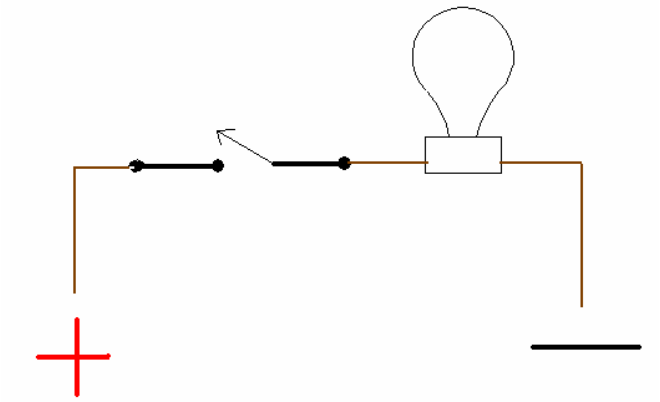
MAKING YOUR OWN LOAD TESTING CENTER

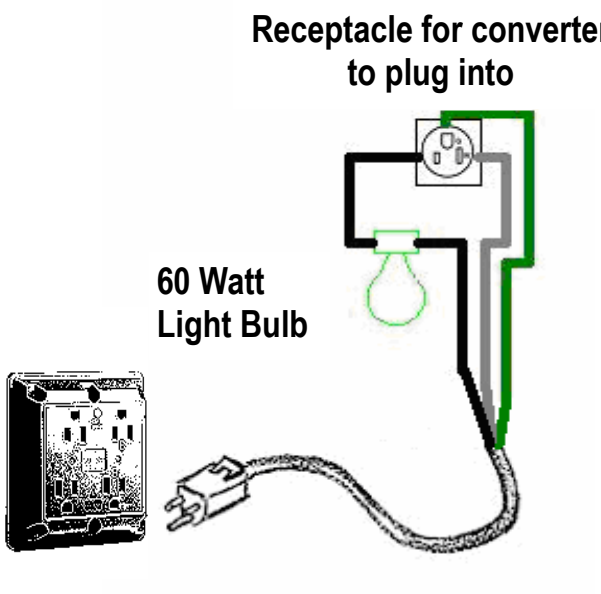
For the different amp rated converters you will need to connect more lights with switches in order to achieve the correct amp draw for each unit. Here is just a simple circuit showing how to make the connections. You can get 12 VDC @ 50 Watt light bulbs and 15-20 Amp toggles switches (Maximum 3 bulbs per switch) from you local electrical supplier.

Amp draw	Quantity of 50 Watt light bulb
12	3 lights
25	6 lights
35	9 lights
45	11 lights
55	13 lights
65	16 lights
75	18 lights



Lamp Short Test Diagram

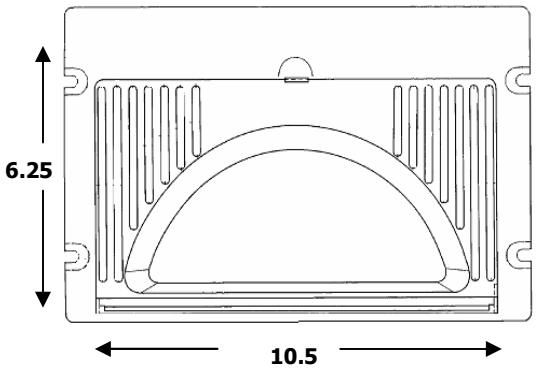
Connecting a 40 Watt light bulb in series with the hot side of the AC line to a receptacle will prevent you from tripping a circuit breaker if a converter has a short.



If light is very bright the converter has a short.
Do not connect the converter to 120 VAC receptacle

If the light goes bright and dim the converter is ok to plug into 120VAC receptacle

MOUNTING OF THE 8700 SERIES POWER CENTER



Select the mounting location and cut a rough opening 1/8" wider than the box to allow the distribution panel to slide in easily. The hole should be framed out so the power center can be secured tightly. Cut the opening for the 8700 series power center should be 10.5 inches wide by 6.25 inches high. The recommended mounting from the floor is 1 inch (2 to 3 inches would be preferred) and 2 cubic feet of air space. Caution: you do not want to mount the converter in a area where the owner can use it as a storage area, this could have an effect the efficiency of the converter.

WARNING
Do not mount the 8700 series power center in a battery or LP gas compartment

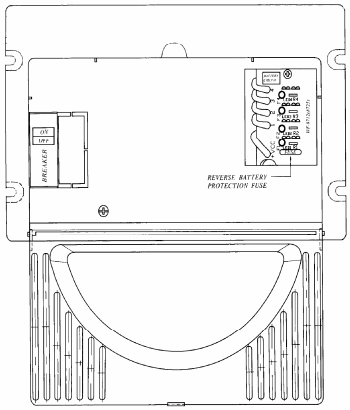
INSTALLATION OF THE 8700 SERIES POWER CENTER

Caution should be used when installing the 8700 series be sure that all openings are protected from debris falling into the converter. Metal shavings and debris from the manufacturing process may cause damage (This is a non-warranty item)

The 8700 series converter were made to use a 30 amp main breaker with branch circuits, double breakers may be use also. Proper breaker are listed below.

Main Circuit Breaker:
Cutler Hammer - Type BR and C
Thomas & Betts -Type TB
Siemens/ITT—Type QB
Square D—Type HOM

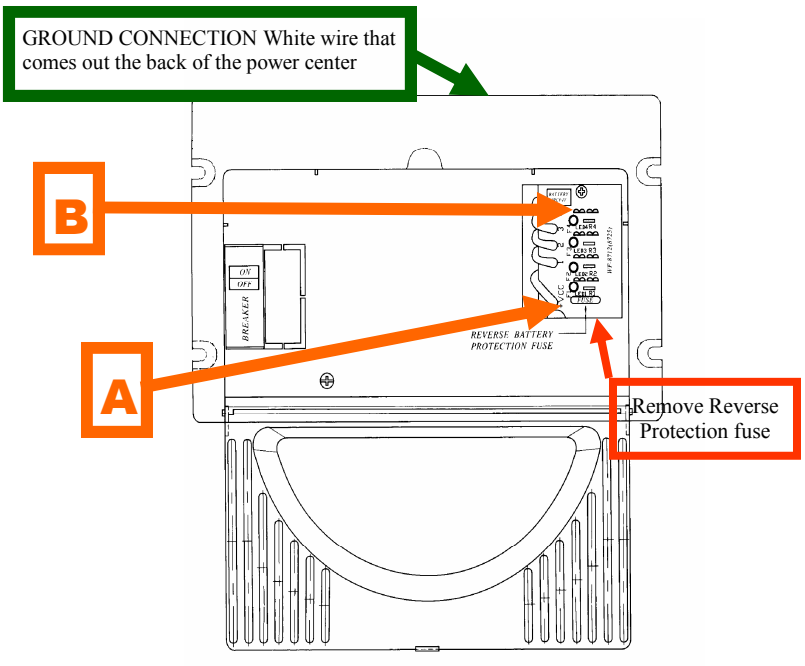
Branch Circuit Breaker:
Cutler Hammer—Types BR, C, BRD, BD, and A
Thomas & Betts—Types TBBD and TB
Siemens/ITT — Type QT and QP
Square D —Type HOM and HOMT



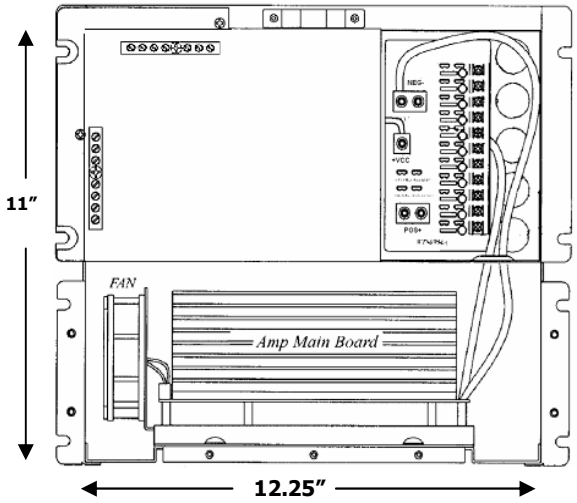
DC FUSE PANEL: The DC Fuse Panel should have protection fuses and circuit fuses installed. If a circuit fuse is blown the circuit LED (Light Emitting Diode) will indicate that you have a blown fuse. Check for shorts on the circuit and replace the fuse with the same size of fuse. The WF-8712 the DC Fuse Maximum draw is 15 Amp and the 8725

QUICK CHECK FOR THE 8700 SERIES POWER CENTER

1. Turn off the converter and pull the protection fuses
2. Be sure that you have good AC power (120 to 105 Volt AC) to the input of the power center.
3. Turn on the power center with the reverse protection fuses pulled and measure the voltage output at **point A (this is on the fuse holder left connection)**, if voltage reads 13.2 to 14.4VDC the power center is functionally normal.
4. Measure the voltage output at **point B (this is on the fuse holder left connection)**, if voltage reads less then 12 volts then the battery could have a problem.
5. If you still are measuring 0 VDC on **point A and B** then contact CHENG USA for repair or replacement. (See last page for information)



MOUNTING OF THE 8900 SERIES POWER CENTER



Select the mounting location and cut a rough opening 1/8" wider than the box to allow the power center to slide in easily. The hole should be framed out so the power center can be secured tightly. Cut the opening for the 8900 series power center should be 12.25 inches wide by 11 inches high. The recommended mounting from the floor is 1 inch (2 to 3 inches would be preferred), 2 inches around the sides of the power center and minimum of 2 cubic feet of air space. Caution: you do not want to mount the power center in a area where the owner can use it as a storage area, this could have an effect the efficiency of the power center.

WARNING

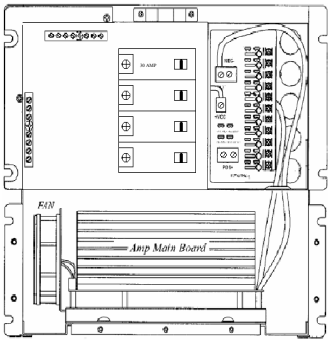
Do not mount the 8900 series power center in a battery or LP gas compartment

INSTALLATION OF THE 8900 SERIES POWER CENTER

Caution should be used when installing the 8900 series. Be sure that all openings are protected from debris falling into the converter. Metal shavings and debris from the manufacturing process may cause damage (This is a non-warranty item)

The 8900 series of power center use a 30 amp main breaker with branch circuits, double breakers may be use also. Proper breaker are listed below.

NOTICE: Per the N.E.C. use of a listed energy management system is required when more then 5 circuits are utilized with a 30A supply



Main Circuit Breaker:
Cutler Hammer - Type BR and C
Thomas & Betts -Type TB
Siemens/ITT—Type QB
Square D—Type HOM

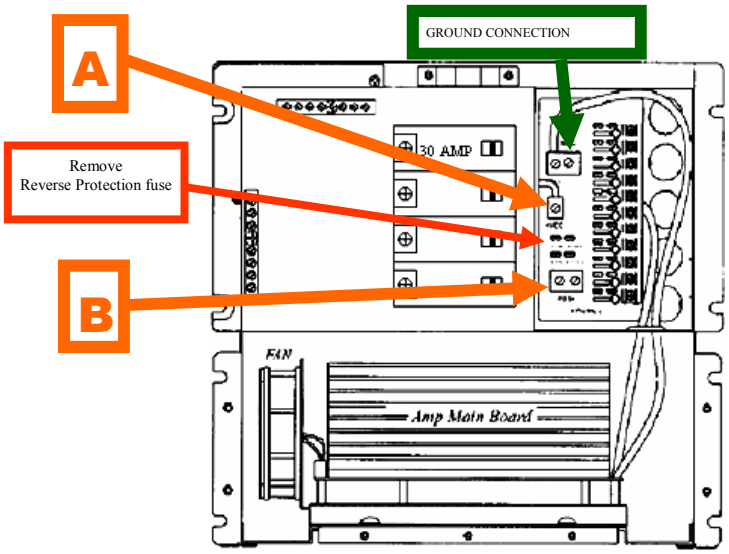
Branch Circuit Breaker:
Cutler Hammer—Types BR, C, BRD, BD, and A
Thomas & Betts—Types TBBD and TB
Siemens/ITT — Type QT and QP
Square D —Type HOM and HOMT

To securing the AC/DC wires determine how many knockouts you need out. To pop out the knockout for the circuits (AC&DC) use a screw driver to pop the holes out. Then connect the Romex/strain relief connector to the converter. Refer to page 8 for torque specification sheet to properly torque wires for each connector

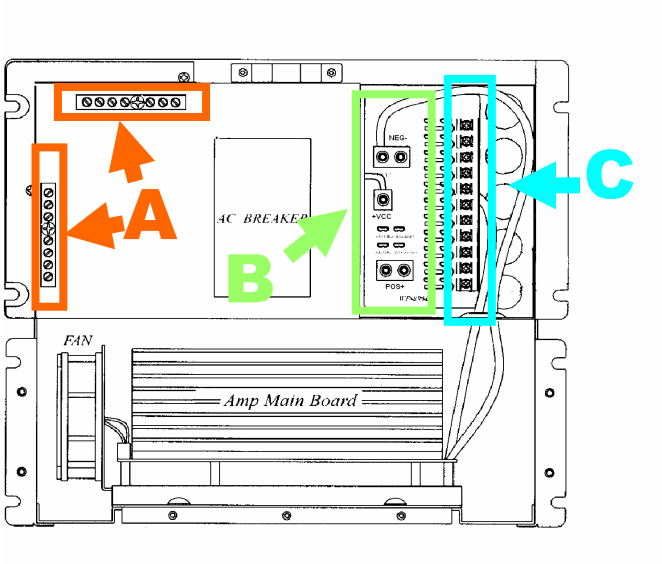
DC FUSE PANEL: The DC Fuse Panel should have reverse protection fuses and circuit fuses installed. Each 12 VDC circuit on the fuse Panel was designed for a maximum of a 20 Amp fuse unless otherwise labeled. If a circuit fuse is blown the circuit LED (Light Emitting Diode) will indicate that you have a blown fuse. Check for shorts and over loads on that circuit and replace the fuse with the same type and rating.

QUICK CHECK ON THE 8900 SERIES POWER CENTER

1. Turn the converter off and remove reverse protection fuses.
2. Be sure the you have good AC power (120 to 105) Volt AC to the input of the converter.
3. Turn on the converter with the reverse protection fuses removed and measure the voltage output at **point A.** If voltage reads 13.2 to 14.4VDC the converter is functioning normally.
4. Measure the voltage output at **point B**, if voltage reads less then 12 volts then the battery could have a problem
5. If you still measure 0 VDC on **point A and B** then contact CHENG USA for repair or replacement.



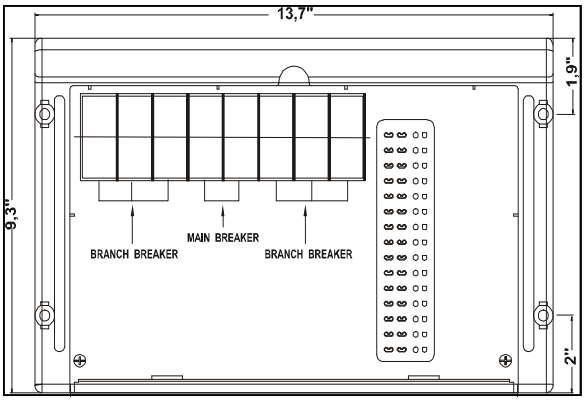
TORQUE SPECIFICATIONS



TORQUE SPECIFICATIONS ON TERMINAL CONNECTORS

	ITEM		TORQUE (Lb-in)	REMARK
A	GROUND NEUTRAL	3P/5P/8P/10P/18P	25	Wire Range 10-14 AWG
A	TERMINAL LUGS		30	Wire Range 8 AWG
A			35	Wire Range 4-6 AWG
	GREEN TERMINAL BAR		4.4	Wire Range 10-26 AWG
B	V++, V— DC FUSE PANEL	LUGS	25	Wire Range 10 AWG
B			32	Wire Range 8 AWG
B			45	Wire Range 6 AWG
C	METAL TERMINALS DC		20	Wire Range 14 AWG
C	PANEL SINGLE CIRCUIT LUGS		25	Wire Range 12 AWG
C			30	Wire Range 10 AWG

MOUNTING OF THE 8930/50 DISTRIBUTION PANEL



Select the mounting location and cut a rough opening 1/8" wider than the box to allow the distribution panel to slide in easily. The hole should be framed out so the distribution panel can be secured tightly. Two sizes of knockouts have been provided 1" KO for the 50 amp and 3/4" KO for the 30 amp power cord. The 7/8" holes are provided for the 12VDC installation and built in 120VAC strain relief for romex. (NOTE: insert only what you need of romex it will not pull out once installed) Remember to select the proper gauge wire for the load and N.E.C. Standards. Be sure to use appropriate romex connector and strain relief to secure the wires to the distribution panel.

WARNING

Do not mount the 8930/50 in a battery or LP gas compartment

INSTALLATION
OF THE WF-8930/50
DISTRIBUTION PANEL

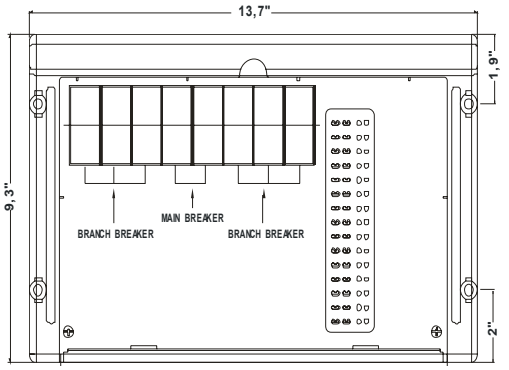
The WF-8930/50N ULTRA distribution panel was designed to be use with either a 30 AMP or 50 AMP main breaker with branch circuits. Double breakers may be used for the branch circuits. Should a breaker become faulty replace with the same type and rating of breaker as provided by the OEM.

AC Breaker Information:

AC Breaker Specification: Max 30/50 Amp 120V/240V
l pole or 2 poles. Current interrupting rating MAX.RMS Sym. Amperes 10,000 at 120/240 Volt AC.

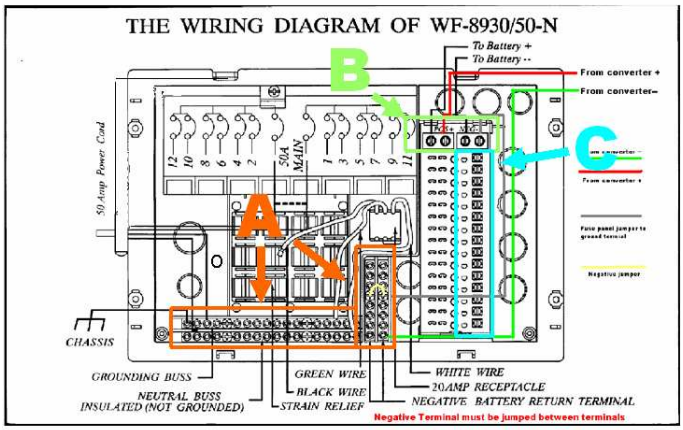
AC Breaker Manufacture:

Main Circuit Breaker:
Cutler Hammer Type BR230, BR250, or C230, or C250
Siemens Type QP
Square D Type HOM
Branch Circuits Breakers:
Cutler Hammer Type BD2020,A2020
Siemens type QP or QT
Square D Type HOMT



DC FUSE PANEL: The DC Fuse Panel should have protection fuses and circuit fuses installed. Each 12 VDC circuit on the fuse panel was designed for a maximum of a 20 Amp fuse unless otherwise labeled. If a circuit fuse is blown the circuit LED (Light Emitting Diode) will indicate that you have a blown fuse. Check for shorts on the circuit and replace the fuse with the same type and rating.

TORQUE SPECIFICATIONS



TORQUE SPECIFICATIONS ON TERMINAL CONNECTORS

	ITEM		TORQUE (Lb-in)	REMARK
A	GROUND NEUTRAL TERMINAL LUGS	3P/5P/8P/10P/18P	25	Wire Range 10-14 AWG
			30	Wire Range 8 AWG
			35	Wire Range 4-6 AWG
B	V++, V— DC FUSE PANEL LUGS		25	Wire Range 10 AWG
			32	Wire Range 8 AWG
			45	Wire Range 6 AWG
C	METAL TERMINALS DC PANEL SINGLE CIRCUIT LUGS		20	Wire Range 14 AWG
			25	Wire Range 12 AWG
			30	Wire Range 10 AWG

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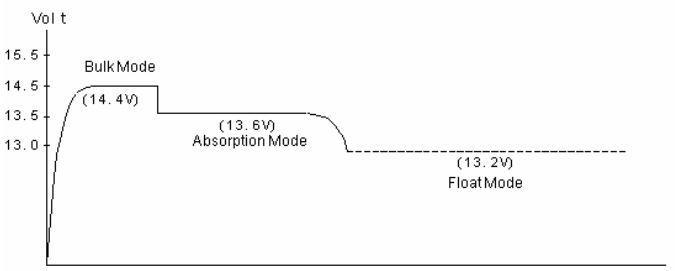
UNDERSTANDING OUTPUT VOLTAGES OF WFCO CONVERTERS



1. Bulk Mode

1). When the converter detects that the output voltage of the battery has dropped to 13.2VDC, the converter will auto matically boost the output voltage to 14.4 volts, this means the battery energy is less than 50%.

2). If converter detects that the output voltage is 14.4 volts, the converter will drop to 13.6 volts (Absorption Mode), this means battery energy is full.

3). The converter will supply the output voltage of 14.4 for a period of time, then the converter will automatically return to 13.6 volts. This is to avoid battery damaged under a prolong period of charging .

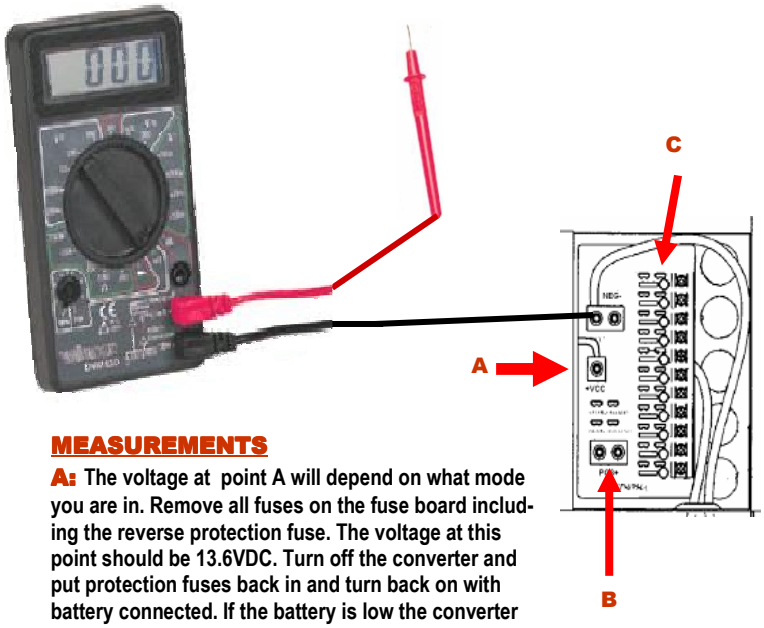
2. Absorption Mode:

During this period the converter will keep the voltage at 13.6 volts.

3. Float Mode:

After a prolong period of sensing no load or demand the microcontroller automatically places the converter in the "Float Mode".

MEASURING VOLTAGE ON THE FUSE BOARD



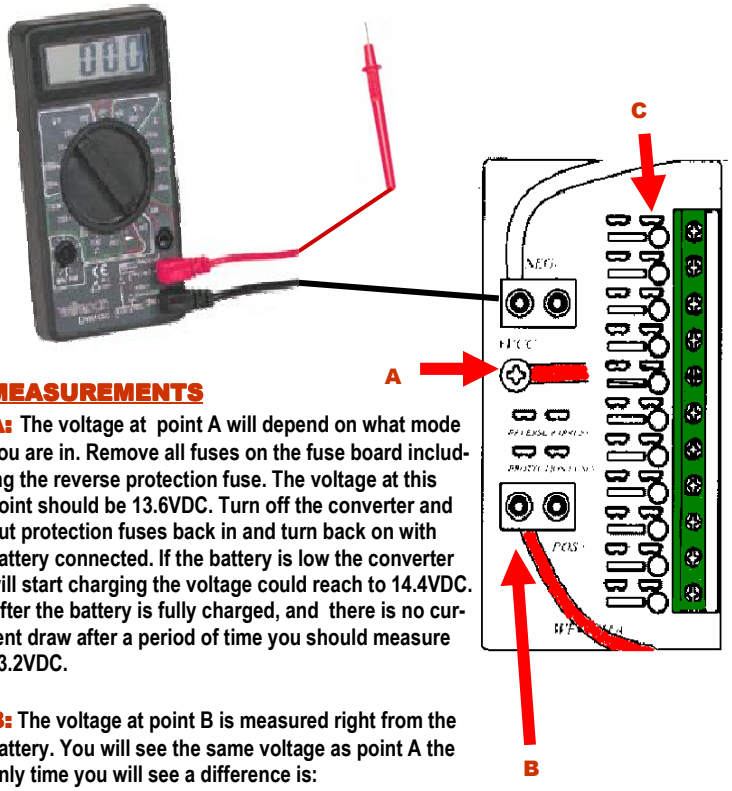
MEASUREMENTS

A: The voltage at point A will depend on what mode you are in. Remove all fuses on the fuse board including the reverse protection fuse. The voltage at this point should be 13.6VDC. Turn off the converter and put protection fuses back in and turn back on with battery connected. If the battery is low the converter will start charging the voltage could reach to 14.4VDC. After the battery is fully charged, and there is no current draw after a period of time you should measure 13.2VDC.

B: The voltage at point B is measured right from the battery. You will see the same voltage as point A the only time you will see a difference is:
1. The converter is not plugged in
2. The reverse protection fuses are blown
3. The converter is not working and your are running off the battery only.

C: The voltage at point C with no load on the output of the circuit can read up to 12VDC with a good fuse.

MEASURING VOLTAGE
ON THE OLD FUSE BOARD



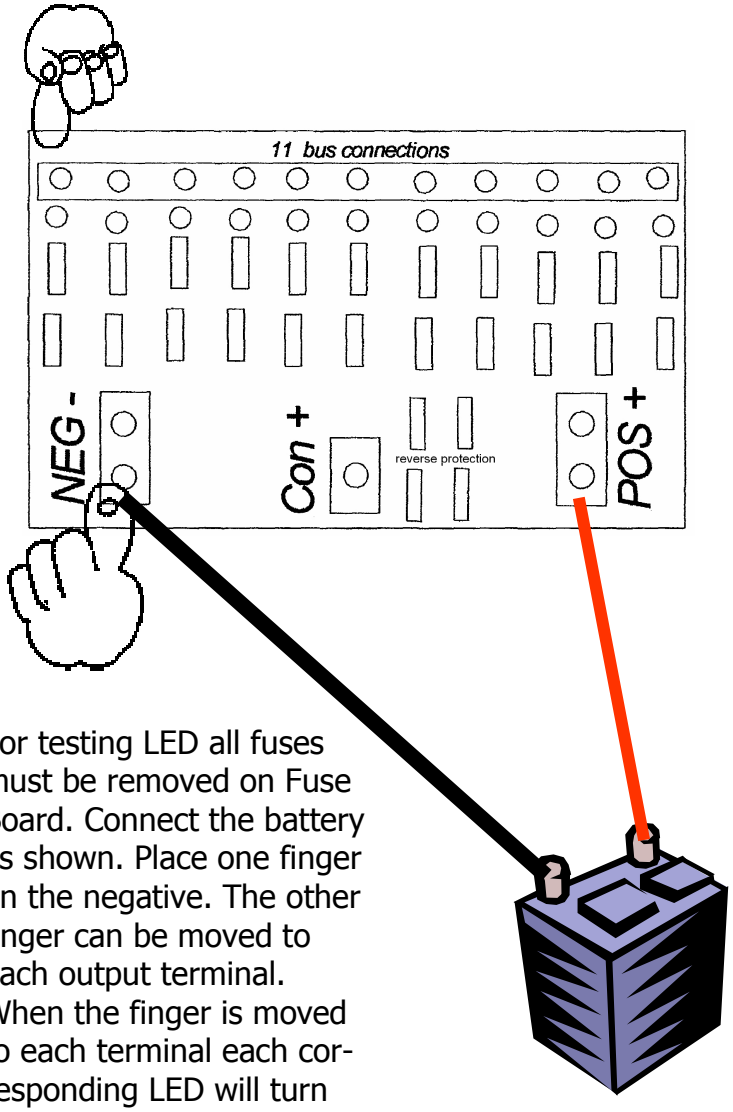
MEASUREMENTS

A: The voltage at point A will depend on what mode you are in. Remove all fuses on the fuse board including the reverse protection fuse. The voltage at this point should be 13.6VDC. Turn off the converter and put protection fuses back in and turn back on with battery connected. If the battery is low the converter will start charging the voltage could reach to 14.4VDC. After the battery is fully charged, and there is no current draw after a period of time you should measure 13.2VDC.

B: The voltage at point B is measured right from the battery. You will see the same voltage as point A the only time you will see a difference is:
1. The converter is not plugged in
2. The reverse protection fuses are blown
3. The converter is not working and your are running off the battery only.

C: The voltage at point C with no load on the output of the circuit can read up to 12VDC with a good fuse.

TESTING FUSE BOARD LED



For testing LED all fuses must be removed on Fuse Board. Connect the battery as shown. Place one finger on the negative. The other finger can be moved to each output terminal. When the finger is moved to each terminal each corresponding LED will turn

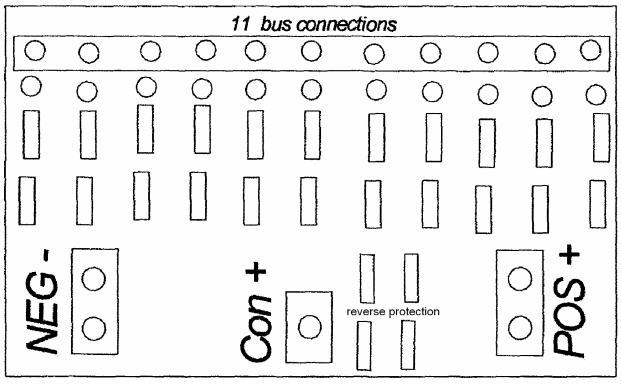
CHENG USA, Inc.
28255 Charlotte Avenue Elkhart, Indiana 46517
Phone: (574) 294-8997 Fax: (574) 294-8698

DC Dielectric Testing of WFCO Power Centers

The WFCO power center has been designed with LED's on each circuit. During the manufacturing process, with fuses installed in all branch circuits, should there be a short or open circuit the LED will light up on that specific circuit. Make any repair before doing the dielectric test.

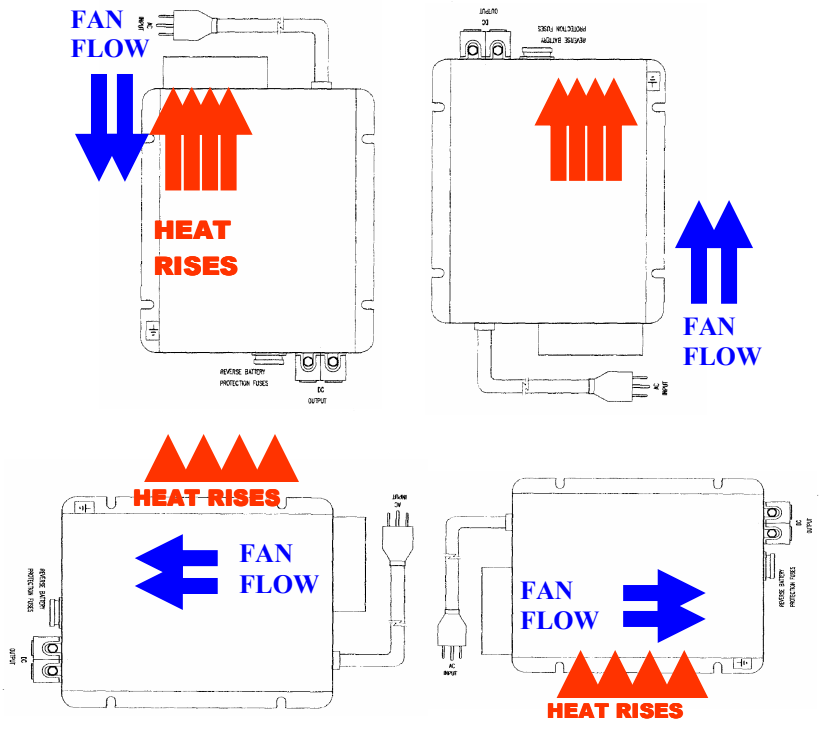
1. *On the 12VDC distribution panel disconnect the WHITE (A) wires from the power converter.*
2. *On the 12VDC distribution panel disconnect the WHITE (A) wire from the battery.*
3. *REMOVE all 12 VDC branch circuit fuses and reverse polarity fuses (D).*
4. *Conduct test by checking from CHASSIS white wire (the one connected to A Along with converter 12VDC negative white wire) to each 12VDC circuit (1 – 11) on the 12VDC bus bar with DC Hi-pot tester.*
5. *Check each circuit individually and make the repairs as needed.*
6. *Retest each circuit BEFORE reconnecting white wires to the circuit board.*
7. *When the dielectric test is complete reconnect all wires that were previously disconnected. Be sure to connect the wires to the correct terminal.*

Failure to follow the above procedures could result in the failure of the converter.
Applying too much voltage to the converter or LED's will damage them and is NOT a warranty failure.

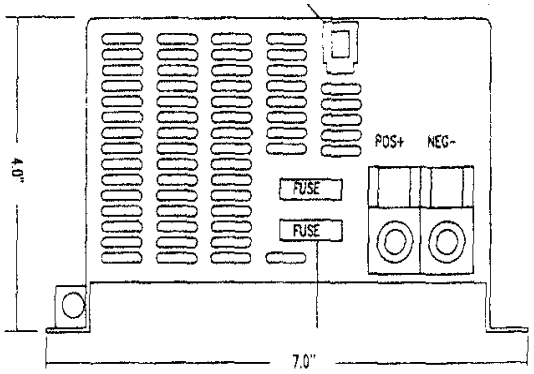


INSTALATION OF THE WF-8800
MOUNTING AND VENTALATION

Horizontal mounting of the converter is recommended although it can be mounted in any position that provides unobstructed ventilation for the fan and vent holes. We recommend 2 inches of clearance at the entrance at the fan and the vent holes, also 2 cubic feet of air space.



QUICK CHECK ON THE WF-8800 DECK MOUNT CONVERTER

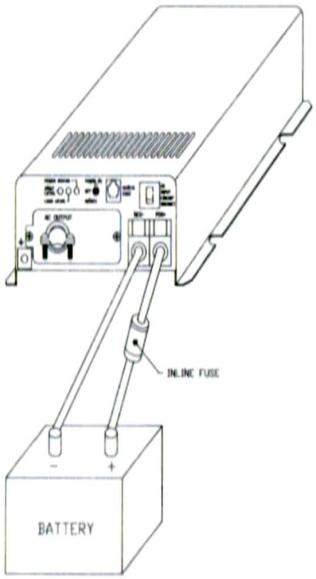


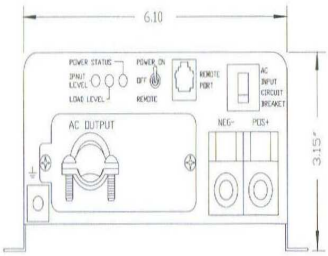
1. Be sure the you have good AC power (120 to 105 Volt AC) at the plug.
2. Connect converter with out any wires attached and measure the voltage output of the converter (Red and Black connection point), if voltage reads 13.2 to 14.4VDC the converter is functionally normal, if 0 VDC is measured go to next step.
3. Check protection fuses by visually inspecting or check with a continuity checker, if fuses can blown by accidentally reversing the connection at the battery or the converter. Replace fuse with same type and size then retest converter.
4. If still measuring 0 VDC on the output contact CHENG USA for repair or replacement.

TESTING 600W INVERTER

When testing, plug in inverter to AC short tester to confirm that the unit is ok to plug in.

1. *Have meter set up to measure ac voltage at the white and black wire of the output of the inverter.*
2. *Once that the inverter is ok to plug in, then connect the inverter to the battery and plug it in to the wall.*
3. *Then turn on the inverter to see if you have voltage on the output. If voltage is present unplug it from the wall to see if the inverter switches to DC to power the inverter.*
4. *If the inverter does not switch to DC check internal fuse (35 Amp ATC Style) by the DC input connection.*
5. **If fuse is good send back to WFCO**
6. *If fuse is bad replace fuse with the same value of fuse and repeat steps 2,3,and 4.*





Note: The inverter qualifies the incoming AC power as far as frequency, voltage and THD. If the power from the generator or shore power is not within 105 VAC to 120 VAC, the inverter will not pass the non-conforming AC power on to the loads. Instead, the inverter will continue to power the loads with a better regulated and cleaner AC signal. If the inverter is left in the on position the converter will always supply clean safe power to the loads. The WF600 TH is designed specifically this way to prevent premature failure of entertainment system components due to spikes, surges and other non-conforming power issues emanating from the generator or occasionally even shore power sources.

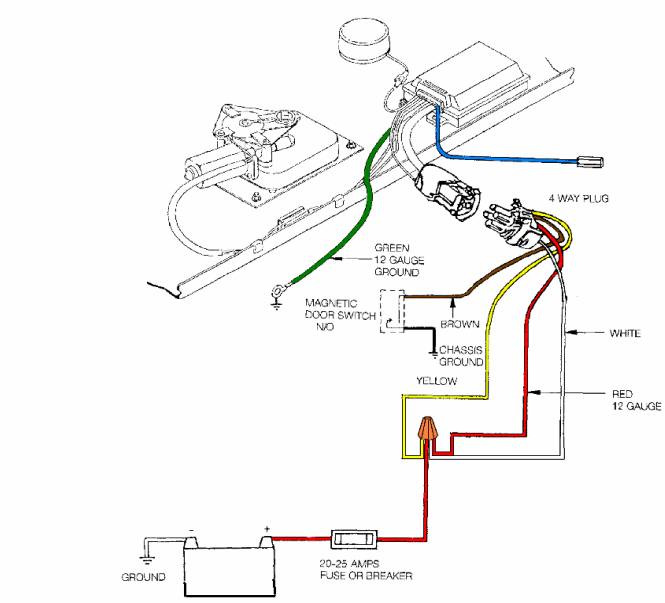
ADDING ADDITIONAL WIRE

When additional wiring is needed refer to the chart below to determine the correct size of wire. Selecting the correct size and type of wire will enhance the performance and reliability of your system. The size of the wire must be large enough to carry the maximum current expected without undue voltage losses. There are several different types of wire available depending on how and where it will be used. The wire sizing guide below provides the minimum wire size needed to limit voltage drops to 5% at a given distance in a 12V system

This table leans a bit towards heavier wire than is absolutely necessary, but that's actually safer in the long run.

Amp \ Length	Up to 4'	4' to 7'	7' to 10'	10' to 13'	13' to 16'	16' to 19'	19' to 22 '	22' to 28'
0 - 10	16 Gauge	14 Gauge	14 Gauge	12 Gauge	12 Gauge	12 Gauge	10 Gauge	10 Gauge
10 - 20	14 Gauge	12 Gauge	12 Gauge	10 Gauge	10 Gauge	8 Gauge	8 Gauge	8 Gauge
20 - 35	12 Gauge	10 Gauge	8 Gauge	8 Gauge	6 Gauge	6 Gauge	6 Gauge	4 Gauge
35 - 50	10 Gauge	8 Gauge	8 Gauge	6 Gauge	4 Gauge	4 Gauge	4 Gauge	4 Gauge
50 - 65	8 Gauge	8 Gauge	6 Gauge	4 Gauge	4 Gauge	4 Gauge	4 Gauge	2 Gauge
65 - 85	6 Gauge	6 Gauge	4 Gauge	4 Gauge	2 Gauge	2 Gauge	2 Gauge	0 Gauge
85 - 105	6 Gauge	6 Gauge	4 Gauge	2 Gauge	2 Gauge	2 Gauge	2 Gauge	0 Gauge
105 - 125	4 Gauge	4 Gauge	4 Gauge	2 Gauge	0 Gauge	0 Gauge	0 Gauge	0 Gauge
125 - 150	2 Gauge	2 Gauge	2 Gauge	0 Gauge	0 Gauge	0 Gauge	0 Gauge	00 Gauge

STEP CONTROLER QUICK TEST HOOK UP



"DANGER"

KEEP BODY PARTS AWAY FROM MOVING PARTS FOR YOUR SAFTEY
The step will move fast when engaged

This hook up is only a for testing the controller
In normal mode the door is open and the steps come out from under the door. If this does not work check the door switch or replace it with a normally open switch.
NOTE: if you have a normally closed switch it will work in reverse where the step is out when the door is close

The ground connection must be a good connection if the connection has corrosion on the connection or not tighten this will cause the control to malfunction also.

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