



Models 1000-12, 1500-12, 2500-12

Part No. 84-6504-12, 84-6505-12, 84-6506-12

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Welcome To HEART INTERFACE.

Thank you for purchasing a Heart Interface Freedom Jazz Series Inverter. We are proud of the quality products we offer to meet your power requirements.

The Freedom Jazz series is a complete line of DC to AC inverters ranging in capacity from 50 Watts to 2500 Watts. These inverters offer advanced technology, dependable operation and will provide years of reliable service.

Freedom Jazz inverters convert low voltage, direct (DC) current to 110 volt alternating (AC) household current. The inverters draw power from 12 volt deep cycle batteries. The output is a modified sine wave and is compatible with most appliances, tools and other 120 VAC equipment. The Freedom Jazz 1000-12, 1500-12, and 2500-12 are designed to be hard wired directly to the 12 volt power source.

Important Information About Your New FREEDOM JAZZ Inverter.

This manual provides directions for the safe and efficient operation of your FREEDOM JAZZ 1000 Watt, 1500 Watt or 2500 Watt Inverter. Read the manual carefully before using your inverter and keep the manual on file for future reference.

Note:

- Your FREEDOM JAZZ inverter is designed to operate from a 12 volt power source only. Never attempt to connect the inverter to any other power source including any AC power source.
- 110 Volts of current can be lethal. Improper use of your inverter may result in property damage, personal injury or loss of life.

Getting Off To A Good Start.

Power equipment and appliances which operate with motors or tubes require an initial surge of power to get them started. This power surge is referred to as the "starting load" or "peak load." (By comparison, devices such as standard light bulbs do not require a starting load). Once the equipment or appliance has been powered up, it settles down to a slower pace and requires far less electrical power to operate. This lower power requirement is referred to as the "continuous load."

To ensure that the capacity of your FREEDOM JAZZ inverter is sufficient to meet the required start up load, first determine the power consumption of the equipment or appliance you plan to operate.

Power consumption is rated either in wattage or in amperes. Information regarding the required "watts" or "amps" is stamped or printed on most appliances and equipment. If this information is not indicated on the appliance or equipment, check the owner's manual or contact the manufacturer.

If the power consumption is rated in amps, multiply the number of amps by 110 (AC voltage) to determine the comparable wattage rating. As a general rule, you can determine the *required start up load* by multiplying the wattage rating by 10. It is the start up load of the equipment or appliance you plan to operate that will determine whether or not your inverter has the required capacity to power it.

For further information on the fundamental operating principles of inverters and related data, see "**For You Technical Types.**"

Don't Push It.

Although your FREEDOM JAZZ inverter has the capacity to provide power output (excess current) equal to approximately two times its rated wattage capacity for a very brief period, it is designed to operate equipment and appliances with *start up load* wattage ratings no higher than its own *maximum continuous wattage rating*.

The 1500-12 model has a maximum continuous rating of 1500 watts. Although this model has the capacity to briefly provide up to 3000 watts of power (that is, excess current), it is designed to operate equipment and appliances with start up load requirements of 1500 watts or less.

Consequently, if the start up load rating of your equipment or appliance is the same or approximately the same as the maximum continuous rating of the inverter, the inverter may not have the capacity to provide the required start up load.

To determine whether your inverter will operate a particular piece of equipment or appliance, run a test. The inverter is designed to shut down automatically in the event of a power overload. Testing equipment and appliances with start up load ratings comparable the maximum wattage rating of the inverter will not damage it.

Some refrigerators, freezers, pumps and other similar equipment and appliances require very high start up loads to operate. Before attempting to power up this type of equipment or appliance, make especially certain that all connections have been properly made and that the power source is fully charged.

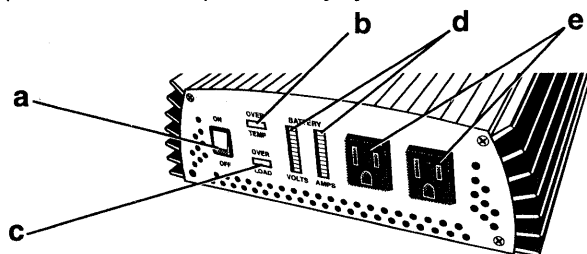
Once those conditions have been checked, turn the inverter switch ON

and monitor the Battery Voltage Indicator (See "Operating Guidelines & Safety Features"). If the Voltage Indicator confirms that the input voltage is in the acceptable range, turn the inverter switch OFF, ON, OFF, and ON again in quick succession. If this procedure is unsuccessful, it is likely that the inverter does not have the required start up capacity to operate the equipment or appliance.

If the Voltage Indicator reading falls below 11 volts during the start up process, a battery greater ampere hour capacity may be required.

Operating Guidelines & Safety Features.

Important Note: Each of the following operating procedures and safety features must be carefully reviewed and thoroughly understood prior to using the inverter. Failure to do so may result in damage to the inverter or equipment or serious personal injury.



FREEDOM JAZZ 1000-12 & 1500-12
Front View

- a). **ON/OFF Switch.** This switch turns the inverter ON or OFF.
- b). **High Temperature LED Indicator Light.** This light will turn RED and the inverter will automatically shut down when the internal temperature exceeds design parameters for safe operation. When this occurs, turn the equipment or appliance off.
- In the event of excess temperature, the High Speed Cooling Fan will automatically turn on. Overheating may result when the inverter is being operated at levels exceeding its wattage rating or because it has been placed in a location or in a manner which prevents proper heat dissipation. After approximately 15 minutes, the High Temperature Indicator light and the Cooling Fan will turn off and the inverter will automatically restart indicating that the inverter temperature has dropped to a safe operating level.

- c). **Over Load LED Indicator Light.** This light will turn RED and the inverter will automatically shut down when the continuous power draw from the inverter exceeds the maximum continuous power rating for the inverter. Turn the inverter OFF (O), determine and resolve the cause of the overload prior to resuming operation of the equipment or appliance. Turning the inverter ON (I) will reset it.

- d). **Battery Current & Voltage Bar Graph Meters (GREEN, YELLOW, RED).**

Current Indicator. This illuminated Bar Graph monitors the current being drawn from the battery by the inverter. Depending on the amount of current being drawn, the Bar Graph reading should be in the GREEN or YELLOW zone.

When the reading rises to the RED zone, the inverter may automatically shut down. In this event, it is likely that the draw of the equipment or appliance being operated is greater than the battery is capable of producing.

Voltage Indicator. This Bar Graph displays the voltage being drawn from the battery by the inverter. The voltage is measured at the Negative and Positive power input terminals on the inverter. At "low voltage input," the voltage level reading will approximate the battery voltage. At "high voltage input," the voltage level reading will be lower than the battery voltage due to the voltage "drop" that occurs as the battery voltage runs through the terminal connections and cables.

The inverter is designed to operate with input voltages ranging from 10 to 15 volts of direct current (DC). When the voltage drops below 10.5 volts DC, the voltage indicator will register in the lower RED zone and an audible alarm will sound. If the voltage drops below 10 volts DC, the voltage indicator will go out and the inverter will automatically shut down.

The inverter also will shut down automatically when the input voltage exceeds 15 volts DC. Despite this "built in" protection, the inverter may be damaged if the input voltage exceeds 15 volts DC and damage caused by excess voltage input is not covered under the FREEDOM JAZZ warranty.

Under optimum conditions, the voltage reading will be in the GREEN zone.

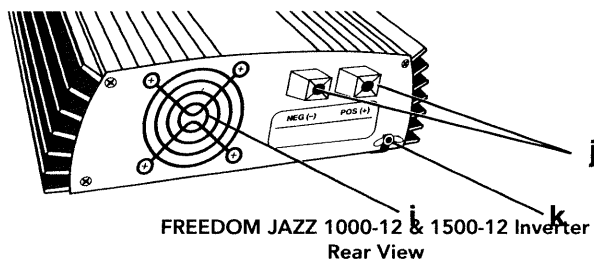
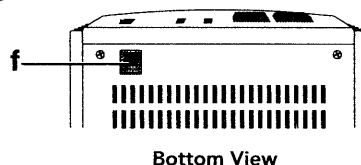
Note:

- In the event of automatic shut down or continuous audible alarm, turn the inverter OFF (O) until the source of the related problem has been determined and resolved.
- e). **Two Standard North American 110 AC Outlets are provided.**

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f). Remote Operation Socket.

The inverter is designed to be operated from a remote location via the FREEDOM JAZZ Remote Control Switch 84-6509-12 which plugs into this socket. This optional accessory is available from your FREEDOM JAZZ dealer.



i). **High Speed Cooling Fan.** This fan will turn on automatically when the internal temperature exceeds design parameters for safe operation. The Cooling Fan will automatically turn off when the temperature drops to a safe operating level. *This fan does not run continuously.*

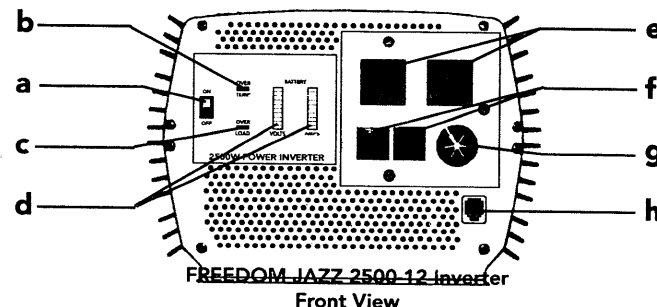
j). **Power Input Terminals** (Negative/White -, Positive/Red +)
IMPORTANT: The Negative Terminal (-) on the 2500-12 model is **BLACK**. See opposite.

k). **Chassis Ground Terminal Lug.**

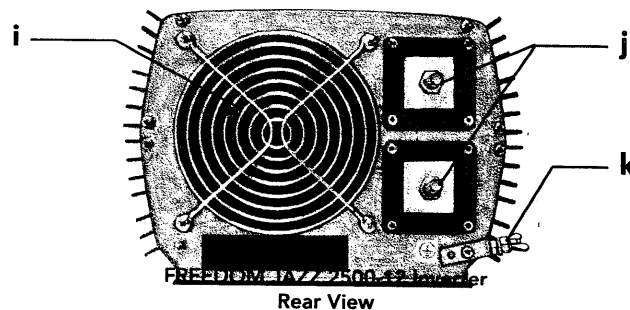
Note:

- The 2500-12 model inverter incorporates all of the operating and safety features of the 1000-12 and 1500-12 models. In addition to these common features, the FREEDOM JAZZ 2500-12 is equipped with circuit breakers and a terminal for making a direct connection between the inverter and an electrical distribution panel.

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- a). **ON/OFF Switch.**
b). **High Temperature LED Indicator Light.**
c). **Over Load LED Indicator Light.**
d). **Battery Current & Voltage Bar Graph Meters.**
e). **Twin Standard North American 110 AC Outlets.**
f). **Remote Operation Socket.**
g). **Circuit Breakers. (2500-12 Model Only).** Each 110 AC outlet is equipped with a 15 amp circuit breaker.
h). **"Direct Wire" Connection. (2500-12 Model Only).** This terminal is utilized for direct connection to an electrical distribution panel. This connection is to be made only by a licensed electrician. See Notes in the following section, "Making The Connection".



i). **High Speed Cooling Fan.**

j). **Power Input Terminals.** (Negative/Black/–, Positive/Red/+).

IMPORTANT: The Negative (–) terminal on the 1000-12 and 1500-12 models is **WHITE**. See previous page.

k). **Ground Terminal Lug.**

Selecting The Optimum Power Source.

Operating the inverter for extended periods combined with a high continuous load demand may result in excessive power drain from the battery. Therefore, the reserve capacity of the battery you select to power the inverter is an important consideration.

The potential power drain can be estimated by calculating the reserve power ("amp/hour") of the battery and the amps required by the inverter to meet the continuous load demand of the equipment or appliance being operated.

1. To calculate the amp/hour of the battery, first determine its "reserve minutes" rating. (Deep cycle marine batteries generally have the highest reserve minute ratings). This rating typically is marked on the battery. Multiply the reserve minutes rating of the battery by 0.3 to determine the battery amp/hour.

A battery with a reserve minutes rating of 166 has an amp/hour rating of 50 ($166 \times 0.3 = 49.8$).

2. To estimate the maximum battery power the inverter will require to run a piece of equipment or appliance, divide its continuous load wattage requirement by 10.

The FREEDOM JAZZ 1000-12 utilizes 50 amps of battery power to operate an appliance with a 500 watt continuous load requirement. ($500 \div 10 = 50$).

3. Conclusion: The reserve power of the battery is sufficient to satisfy the continuous load demand placed on the inverter for a maximum of about one hour. ($49.8 \div 50 = 1$ hour).

Note:

- When the inverter will be operating equipment or appliances with high continuous load ratings for extended periods, it is not advisable to power the inverter with the same battery used to power your car, recreational vehicle or boat. If the vehicle battery is utilized for an extended period, it is possible that the battery voltage may be drained to the point where the battery has insufficient reserve power

to start.

- It may be advisable to operate the inverter from a bank of batteries of the same type in a "parallel" configuration. Two such batteries will generate twice the amp/hours of a single battery; three batteries will generate three times the amp/hours and so on.

This multiple parallel battery option is especially recommended for the FREEDOM JAZZ 2500-12 due to the high level of amps this model requires to produce 2500 watts of continuous load.

Wire Cable Gauges.

For safe and proper operation of the inverter, connect the inverter to the power source with the thickest wire available and in the shortest length practical.

1000-12 & 1500-12 Models.

When the inverter and the battery are set up within four feet of each other, use a minimum of # 4 gauge wire to make the connections. Within four to six feet, use a minimum of # 2 gauge wire. At distances of more than six feet, use # 0 gauge wire.

Regardless of the wire gauge selected to make the connections to the battery, we recommend use of an "O Ring Adapter." Use of #0 gauge wire to make the connections to the inverter may require a "0 to 4 Gauge Adapter." Both adapters are available through electronic supply stores including Radio Shack. Radio Shack part numbers are as follows:

O Ring Adapter:	RSU11538139
0-4 Gauge Adapter:	RSU11539667

2500-12 Model.

When the inverter and the battery are set up within four feet of each other, use a minimum of # 2 gauge wire to make the connections. Within four to six feet, use a minimum of # 0 gauge wire. At distances of more than six feet, use two # 0 gauge wires connected in parallel to the battery. This connection will require eight O Ring Adapters as referenced above. Alternatively, use # 00 (2/0) gauge wire with the appropriate adapters. These # 00 gauge wire adapters are available through most electronic supply stores.

Making The Connection.

1. Make certain the inverter power switch is in the OFF position.
2. Connect one wire each to the Negative (–) and Positive (+) terminals at the rear of the inverter and tighten the screws to make a secure connection. *Do not over tighten these screws.*
(To make these connections on the 2500-12 model, remove the supplied nut at each terminal on the inverter, install the wire connectors flush with the metal backing plates and refasten the nuts securely. *Do not overtighten these nuts.*)
3. Connect the wire from the Negative (–) terminal (WHITE on the 1000-12, 1500-12 models, BLACK on the 2500-12 model) on the inverter to the Negative (–) terminal on the 12 volt power source. Make certain the connection is secure.
4. Confirm that the wire you have just installed is properly connected. *(Specifically, make certain that the wire is connected to the Negative (–) terminals on both the inverter and the 12 volt power source).*
5. Connect the wire from the Positive (+) terminal (RED on all three models) on the inverter to the Positive (+) terminal on the power source. Make certain that the connection is secure.

Note:

- Failure to make a proper connection between the inverter and the power source will result in reverse polarity. Reverse polarity will blow the internal fuses in the inverter and permanently damage the inverter. *Damage caused by reverse polarity is not covered under the FREEDOM JAZZ warranty.*
 - Loose connections can result in a severe decrease in voltage which may cause damage to the wires and insulation.
 - The audible alarm may make a momentary “chirp” when the inverter is being connected to or disconnected from the power source. This is normal.
 - Making the connection between the Positive terminals may cause a spark as a result of current flowing to charge capacitors within the inverter. This is a normal occurrence. Due to the possibility of sparking, however, it is extremely important that both the inverter and the 12 volt battery be well removed from any possible source of flammable fumes or gases.
Failure to heed this warning could result in fire or explosion.
6. Run a ground from the Ground Lug Terminal at the rear of the inverter to a proper grounding point using the shortest practical length of 8 AWG wire. Selection of the grounding point will depend on where you are using the inverter. The ground wire may be connected to the

chassis of your vehicle or to the grounding system in your boat or to the earth if you are operating the inverter in a remote location. Before connecting the ground, make certain that the inverter is turned off.

Operating the inverter without properly grounding it may result in electrical shock.

7. Turn the inverter ON (I). Check the Bar Graph Meter on the front panel. The Voltage Bar Graph should read between 11 and 14 volts depending on the voltage of the power source. If the reading is not within this range, check the voltage of the power source and the terminal connections on the power source and the inverter to make sure they are secure.
Neither the High Temperature or Over Load LED Indicators should be lighted.
8. Turn the inverter OFF (O). The High Temperature and Over Load Indicators may “blink” briefly. This is normal. Also, the internal audible alarm may make a momentary “chirp.” This is normal.
9. Confirm that the equipment or appliance to be operated is turned off. Plug the equipment or appliance into one of the two AC receptacles on the front panel of the inverter.
10. Turn the inverter on. Turn the equipment or appliance on.

Note:

- The use of an extension cord from the inverter to the appliance or equipment being operated will not significantly decrease the power being generated by the inverter. For best operating results, the extension cord should be no more than 50 feet long.
- *The following precautions apply to the 2500-12 model only.*
 - a). The AC receptacles on the 2500-12 are equipped with 15 amp circuit breakers. Consequently, each of these outlets is rated for a maximum output of 1500 watts (110 volts x 15 amps).
To generate the maximum output of 2500 watts, the 2500 model should be connected to a power supply which has the capacity to produce 250 amps. The loads should be distributed between the two receptacles to ensure that each outlet is producing no more than its maximum 1500 watt output.
 - If more than one piece of equipment or appliance is to be operated at the same time, first turn on the inverter and then turn on each piece of equipment or appliance separately to enable the inverter to produce the required start up loads.
 - b). The 2500-12 model is designed for direct wiring to an electrical

distribution panel via the direct wire connection "cut out" on the front panel of the inverter.

This direct wire connection must be performed only by a licensed electrician. Failure to make this connection properly may result in severe injury.

You'll Get A Charge Out Of This. (Or Maybe Not).

Using the inverter to recharge charging units associated with such equipment as portable power tools, flashlights, video cameras and laptop computers may cause damage to the inverter or the charging unit.

Although we advise against it, if you attempt to recharge a charging unit, monitor the temperature of the charging unit for approximately 10 minutes. If the charging unit become unusually warm, disconnect it from the inverter immediately.

For You Television Fans & Audiophiles.

Although the inverter is shielded and filtered to minimize signal interference, some interference with your television picture may be unavoidable, especially with weak signals. However, here are some suggestions that may improve the reception.

1. First, make certain that the television antenna produces a clear signal under normal operating conditions (i.e., at home plugged into a standard 110 AC wall outlet). Also, ensure that the antenna cable is properly shielded and of good quality.
2. Change the relative positions of the inverter, antenna cables and television power cord.
3. Isolate the television, its power cord and antenna cables from the 12 volt power source by running an extension cord from the inverter to the television set.
4. Coil the television power cord and the input cables running from the 12 volt power source to the inverter.
5. Attach a "Ferrite Data Line Filter" to the television power cord. More than one filter may be required. These filters are available at most electronic supply stores including Radio Shack. (Radio Shack Part Number 273-105).

Note:

- Inexpensive sound systems may emit a "buzzing" sound when operated with the inverter. This is due to inadequate filters in the sound system. There is no solution to this problem short of purchasing a sound system with a higher quality power supply.

For You Microwave Chefs.

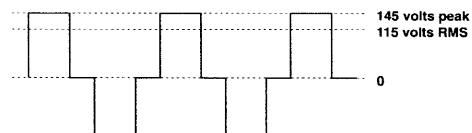
The power rating commonly associated with microwave ovens is the "cooking power" which is the power being "delivered" to the item being microwaved. The actual operating power requirement rating is higher than the cooking power rating and typically is referenced on the back of the microwave. If the operating power requirement does not appear on the back of the microwave, check the owner's manual or contact the manufacturer.

For You Technical Types.

I. Basic Operating Principles.

Inverters work in two stages. During the first stage, the DC to DC converter increases the DC input voltage from the power source (e.g. a 12 volt battery) to 145 volts DC. In the second stage, the high voltage DC is converted to 110 volts (60 Hz AC), using advanced power MOSFET transistors in a full bridge configuration. The result is excellent overload capability and the capacity to operate difficult reactive loads. The output waveform resulting from this conversion is a "quasi-sine wave" or a "modified sine wave" as shown below.

This stepped waveform is similar to the power generated by utilities and has a broad range of applications.



FREEDOM JAZZ 1000-12, 1500-12, 2500-12 Inverters
Modified Sine Wave

The modified sine wave produced by FREEDOM JAZZ inverters has a root mean square (RMS) voltage of 110 volts. The majority of AC voltmeters are calibrated for RMS voltage and assume that the measured waveform will be a pure sine wave.

Consequently, these meters will not read the RMS modified sine wave voltage correctly and, when measuring the inverter output, the meters will read about 20 to 30 volts too low. To accurately measure of the output voltage of the inverter, use a true RMS reading voltmeter such as a Fluke 87, Fluke 8060A, Beckman 4410, Triplett 4200 or any multimeter identified as "True RMS."

Some Powerful Advice.

The inverter will work best when placed on a reasonably flat surface. The floor of your car or truck is an acceptable location as long as the area is dry and well ventilated.

To maintain the inverter in proper working condition, note the following important safety precautions:

- **MOISTURE.** Keep the inverter dry. Do not expose it to moisture.
Do not operate the inverter if you, the inverter, or the device being operated or any other surfaces that may come in contact with any power source are wet. Water and many other liquids can conduct electricity which may lead to serious injury or death.
- **HEAT.** The ambient air temperature should be between 50° and 80° F. Avoid placing the inverter on or near heating vents, radiators or other sources of heat. Do not place the inverter in direct sunlight.
- **VENTILATION.** In order to properly disperse heat generated while the inverter is in operation, keep it well ventilated. While in use, maintain several inches of clearance around the top and sides of the inverter.

- **FUMES & GASES.** Avoid using the inverter near flammable materials. Do not place the inverter in areas such as battery compartments where fumes or gases may accumulate.

In Review.

- Never attempt to operate the inverter from any power source other than a 12 volt battery.
- Always ensure the power cable terminal connections run Negative (-) to Negative (-) and Positive (+) to Positive (+). Check these connections frequently to ensure they are secure.
- Use the heaviest gauge wire available to connect the inverter to the power source.
- While connecting the inverter to the power source, make certain that the inverter is well removed from any potential source of flammable fumes or gases.
- Direct connection of the 2500-12 model inverter to a distribution panel is to be made by a licensed electrical only.
- Always ground the inverter before operating it.
- Make certain the power consumption of the appliance or equipment you wish to operate is compatible with the capacity of the inverter.
- If the rated power consumption of the equipment is in the range of the rated capacity of the inverter, test the inverter to ensure that it will operate properly.
- When attempting to recharge battery chargers, monitor the temperature of the battery charger for approximately 10 minutes. If the battery charger becomes abnormally warm, disconnect it from the inverter immediately.
- When operating the inverter with an automobile or marine battery, start the engine every 30 to 60 minutes and let it run for approximately 10 minutes to recharge the battery.
- In the event a continuous audible alarm or automatic shut off, turn the inverter OFF immediately. Do not restart the inverter until the source of the problem has been identified and corrected.
- Always disconnect the inverter when not in use.
- Do not expose the inverter to moisture.
- Avoid placing the inverter near sources of heat or in direct sunlight.

Troubleshooting

PROBLEM: Low or No Output Voltage

Problem	Solution
Poor contact with battery terminals.	Clean terminals thoroughly.
Battery voltage below 10.5 volts.	Recharge or replace battery.
Equipment being operated draws too much power.	Use a higher capacity inverter or do not use this equipment.
Inverter is too hot (thermal shutdown mode.)	Allow inverter to cool. Check for adequate ventilation. Reduce the load on the inverter to rated continuous power output.
Using incorrect type of voltmeter.	Use true RMS reading meter. See "For You Technical Types" Section of this manual.

PROBLEM: Low Battery Alarm On All The Time

Problem	Solution
Input voltage below 10.5 volts.	Keep input voltage above 10.5 volts to maintain regulation.
Poor or weak battery condition.	Replace battery.
Inadequate power being delivered to the inverter or excessive voltage drop.	Use lower gauge wire. See "Wire Cable Gauges" Section of this manual. Keep wire length as short as possible.

PROBLEM: TV Interference

Problem	Solution
Electrical interference from inverter.	Add a Ferrite data line filter on to the TV power cord. See the "For You Television Fans and Audiophiles" Section of this manual.

FREEDOM JAZZ 1000-12 WATT INVERTER SPECIFICATIONS

Maximum Continuous Power 1000 Watts
Maximum Surge Capability (Peak Power) 2000 Watts
No Load Current Draw < 0.32 A
Waveform Modified Sine Wave
Operating Input Voltage Range 10 - 15 Volts DC
AC Receptacle Dual 3 Prong Grounded
Approximate Dimensions 3.25" H x 10.25" W x 13.50" L
Approximate Weight 7.25 lbs

FREEDOM JAZZ 1500-12 WATT INVERTER SPECIFICATIONS

Maximum Continuous Power 1500 Watts
Maximum Surge Capability (Peak Power) 3000 Watts
No Load Current Draw < 0.37 A
Waveform Modified Sine Wave
Operating Input Voltage Range 10 - 15 Volts DC
AC Receptacle Dual 3 Prong Grounded
Approximate Dimensions 3.25" H x 10.25" W x 18.50" L
Approximate Weight 10 lbs

FREEDOM JAZZ 2500-12 WATT INVERTER SPECIFICATIONS

Maximum Continuous Power 2500 Watts
Maximum Surge Capability (Peak Power) 4500 Watts
No Load Current Draw < 0.6 A
Waveform Modified Sine Wave
Operating Input Voltage Range 10 - 15 Volts DC
AC Receptacle Dual 3 Prong Grounded
Approximate Dimensions 6.5" H x 9.0" W x 19.0" L
Approximate Weight 19 lbs

FREEDOM JAZZ PRODUCTS

1-800-446-6180

For technical support and additional information about Heart Interface products, visit our web site at: www.heartinterface.com

or send us an e-mail message:
techhelp@heartinterface.com

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