Vec1043MG

750 WATT Power Inverter

Converts 12V DC Vehicle Power to 120V AC Household Power

OWNER'S MANUAL AND WARRANTY INFORMATION

THIS MANUAL CONTAINS IMPORTANT INFORMATION REGARDING SAFETY, OPERATION, MAINTENANCE AND STORAGE OF THIS PRODUCT. READ CAREFULLY BEFORE USE, AND RETAIN FOR FUTURE REFERENCE.

4140 S.W. 28th Way, Ft. Lauderdale, FL 33312
Toll Free: (866) 584-5504

TABLE OF CONTENTS

IMPORTANT SAFETY INSTRUCTIONS

To ensure reliable service, your power inverter must be installed and used properly. Please read the installation and operating instructions thoroughly prior to installation and use. Pay particular attention to the WARNING and CAUTION statements in this manual. The CAUTION statements advise against certain conditions and practices that may result in damage to your inverter. The WARNING statements identify conditions or practices that may result in personal injury.

Read All Instructions Before Using This Power Inverter!

WARNINGS:

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, EXPLOSION OR INJURY:

- Do not connect to AC distribution wiring
- NOT approved for ignition protected areas. Do not make any electrical connections or disconnections in areas designated as IGNITION PROTECTED
- This is not a toy - keep away from children

CAUTIONS:

- This inverter will not operate high wattage appliances or equipment that produce heat, such as hair dryers, microwave ovens and toasters
- This inverter is not tested for use with medical devices

IMPORTANT CABLE INFORMATION

Substantial power loss and reduced battery operating time results from inverters installed with cables that are not able to supply full power. Symptoms of low battery power can result from cables that are either excessively long or an insufficient gauge. Marine installations are also subjected to vibration and stresses that exceed those of other mobile installations. Therefore, the installer/operator should be especially aware of the requirements to maintain secure, tight, water-resistant electrical connections and to provide for strain relief for DC cables and appliance wiring. Cable insulation must be the appropriate type for the environment.

CAUTION: Always inspect battery supply connections and cables to ensure they are tight and that cable insulation is not damaged.

1. INTRODUCTION

Your new Vector Power Inverter is one in a series of the most advanced DC to AC inverters available. With proper care and appropriate usage, it will give you years of dependable service in your car, truck, RV or boat.

The Vector Power Inverter supplies 750 watts of continuous power, in the form of two household-type outlets that are ready to deliver 120 volt AC power whenever and wherever you need it! The heavy-duty inverter has enough power to run most household or electronic appliances. It also comes equipped with battery clips to handle higher amperage/load applications, such as: power tools, stereo amplifiers, vacuums, etc. Added safety features include automatic shutdown and a low battery alarm to prevent damage to your battery.

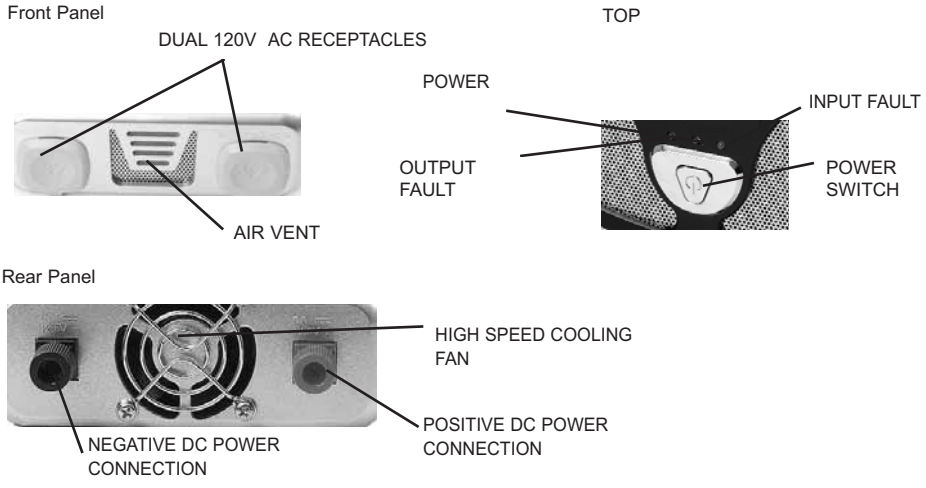
This Vector Power Inverter is configured with the latest Soft Start Technology (SST). Before introduction of Soft-Start, high startup currents from large inductive loads could shut down the inverter. Soft Start improves inverter operation. Three major features incorporated in SST include: First, gradual voltage ramp-up during inverter startup. This eliminates failed cold starts under load. Second, output that momentarily dips in voltage and quickly recovers to allow large motorized loads to start. This eliminates almost all shutdowns from momentary overloads. Last, the inverter automatically re-starts when an overload that causes inverter shutdown is removed. Previously, manual reset was required.

This power inverter also incorporates a new cooling technology that directly benefits our customers. The new design more efficiently cools the power transistors, and combined with Soft Start, dramatically increases reliability and the life of the product.

2. CONTROLS, INDICATORS AND CONNECTORS

Figure 1 details the front panel of the inverter. The top panel provides three LED indicators. A green LED indicates power and proper operation of the inverter, the red LED indicates inverter shutdown from over-load, or over-temperature and the yellow LED indicates an input fault.

Power is supplied through two standard North American outlets. Outlets accommodate either two or three pin AC plugs. An ON/OFF Switch turns the inverter circuitry ON and OFF. The switch is used to force reset of inverter circuits if it is switched OFF, then ON.



3. HOW YOUR INVERTER WORKS

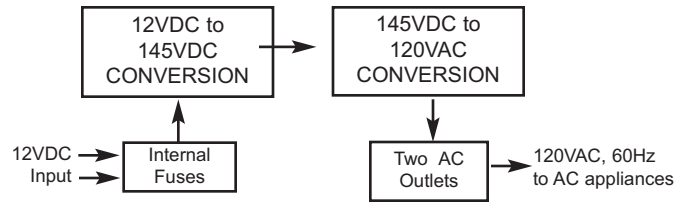
The inverter converts low voltage DC (direct current) from a battery or other power source to standard 120 volt AC (alternating current) household power.

3.1 PRINCIPLE OF OPERATION

The inverter converts power in two stages. The first stage is a DC-to-DC conversion process that raises the low voltage DC at the inverter input to 145 volts DC. The second stage is the actual inverter stage that converts the high voltage DC into 120 volts, 60 Hz AC.

The DC-to-DC converter stage uses modern high frequency power conversion techniques that have replaced the bulky transformers found in less technologically-advanced models. The inverter stage uses advanced power MOSFET transistors in a full bridge configuration. This ensures excellent overload capability and the ability to operate reactive loads like small induction motors.

FIGURE 3 PRINCIPLE OF OPERATION

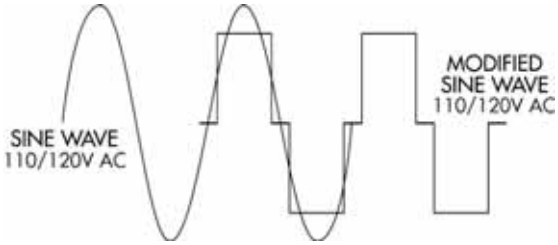


3.2 THE VECTOR POWER INVERTER OUTPUT WAVEFORM

The AC output wave form of the Vector Power Inverter is known as “modified sine wave”. It is a wave form that has characteristics similar to the sine wave shape of utility power. This type of waveform is suitable for most AC loads, including linear and switching power supplies used in electronic equipment, transformers, and motors.

The modified sine wave produced by the Vector Power Inverter has an RMS (root mean square) voltage of 120 volts, which is the same as standard household power. Most AC voltmeters (both digital and analog) are sensitive to the average value of the waveform rather than the RMS value. They are calibrated for RMS voltage under the assumption that the waveform measured will be a pure sine wave. These meters will not read the RMS voltage of a modified sine wave correctly. They will read about 20 to 30 volts low when measuring the output of the inverter. For accurate measurement of the output voltage of this unit, use a true RMS reading voltmeter such as a Fluke 87, Fluke 8060A, Fluke 77/99 series, Beckman 4410, or Triplett 4200.

FIGURE 4 Modified Sine Wave and Sine Wave Comparison



4. INSTALLATION

4.1 POWER SOURCE REQUIREMENTS

The power source must provide 12.5 volts DC and must be able to supply the necessary current to operate the load. The power source may be a battery or a well-regulated DC power supply. To obtain a rough estimate of the current (in amperes) the power source must deliver, simply divide the power consumption of the load (in watts AC) by 10.

Example: If a load is rated at 750 watts AC, the power source must be able to deliver: 750 divided by 10 = 75 amperes

CAUTION: The Vector Power Inverter must be connected only to batteries with a nominal voltage of 12 volts. The unit will not operate from a 6 volt battery and will sustain permanent damage if connected to a 24 volt battery.

4.2 CONNECTION TO POWER SOURCE

The Vector Power Inverter comes equipped with battery clip cables for connection to the power source:

To operate at full 750 watts , either use the battery clip cable (supplied) or directly wire to the power source with user supplied wire and fuse. Use wire #8 AWG for lengths of four feet or less and #6 AWG for lengths to 10 feet.

CAUTION: Reverse polarity connection will result in a blown fuse and may cause permanent damage to the inverter.

Connecting to a Power Source Using Provided Cables:

Use the provided cables and connect the Vector Power Inverter directly to the 12 volt power source as follows:

1. Make sure the Vector Power Inverter power is turned off and that no flammable fumes are present in the installation area.
2. Connect the red cable to the red post marked (+) on the back of the inverter. Connect the battery clip to the positive terminal of the battery.
3. Connect the black cable to the black post marked (-) on the back of the inverter. Connect the battery clip to the negative terminal of the battery.
4. Make sure all connections between battery clips and terminals are secure.

Direct Hardwiring to Power Source:

Use #8 AWG wire if the inverter to power source connection is 4 feet or less. For longer cable lengths use #6 AWG wire for lengths to 10 feet. In either case, protect the positive (+) wire from shorts by installing a 150 to 200 Amp fuse or circuit breaker close to the DC power source (battery) terminal.

1. Check to be sure the inverter's power switch is turned off and that no flammable fumes are present.
2. Identify the positive (+) and negative (-) DC power source (battery) terminals.
3. Install a fuse holder or breaker close to the positive (+) terminal of the DC source (battery).
4. Connect a length of wire on one side of the fuse holder or circuit breaker. Connect the other end of the wire to the Positive (+) terminal of the inverter.
5. Connect a length of wire between the inverter's negative (-) terminal and the DC power source negative (-) terminal.

6. Connect a short length of wire to the other terminal of the fuse holder or circuit breaker. Mark it “POSITIVE” or “+”.
7. Connect the free end of the fuse or breaker wire to the positive (+) terminal of the DC power source (battery).
8. Insert an 150 to 200 Amp fuse in the fuse holder.
9. Test the inverter by turning it on and plugging in a 100 watt lamp or equipment.
10. If the inverter is not properly operating, then refer to the troubleshooting sections of this manual.

CAUTION: **Loose connectors may cause overheated wires and melted insulation. Check to make sure you have not reversed the polarity. Damage due to reversed polarity is not covered by our warranty.**

4.3 CONNECTION TO LOAD

The Vector Power Inverter is equipped with two standard North American AC power receptacles. Plug the cord from the equipment you wish to operate into the AC receptacle(s). Make sure the combined load requirement of your equipment does not exceed 750 watts.

The Vector Power Inverter is engineered to be connected directly to standard electrical and electronic equipment in the manner described above. Do not connect the Power Inverter to household or RV AC distribution wiring.

WARNING: **Do not connect to AC distribution wiring!**

CAUTION: RECHARGEABLE APPLIANCES

Certain rechargeable devices do not operate well from a modified sinewave inverter. They only operate properly from a standard household outlet which provides a pure sine wave. Therefore, Vector recommends that these types of devices be operated from a standard household outlet only, not from the inverter

This problem does not occur with the majority of battery-operated equipment. Most of these devices use a separate charger or transformer that is plugged into an AC receptacle. The Vector Power Inverter is easily capable of running most chargers and transformers.

4.4 PLACEMENT OF THE INVERTER

For best operating results, the inverter should be placed on a flat and/or solid surface. A power cord measuring 2.5 feet (0.76 meters) has been provided for easy positioning of the inverter. The inverter should only be used in locations that meet the following criteria:

DRY - Do not allow water and/or other liquids to come into contact with the Vector Power Inverter.

VENTILATED - Keep the area surrounding the inverter clear to ensure free air circulation around the unit. Do not place items on or over the inverter during operation. A fan is helpful if the inverter is operating at maximum power outputs for extended periods of time. The unit will shut down if the internal temperature exceeds operating temperatures. The unit will restart after it cools.

CAUTION - DO NOT USE THE INVERTER NEAR FLAMMABLE MATERIALS OR IN ANY LOCATIONS THAT MAY ACCUMULATE FLAMMABLE FUMES OR GASES.

5. OPERATING TIPS

5.1 RATED VERSUS ACTUAL CURRENT DRAW OF EQUIPMENT

Most electrical tools, appliances and audio/video equipment have labels that indicate the power consumption in amps or watts. Be sure that the power consumption of the item you

wish to operate is rated at 750 watts or less (If the power consumption is rated in amps AC, simply multiply by the AC volts (120) to determine the wattage). The inverter has overload protection, so it is safe to try to operate equipment rated at 750 watts or less. The inverter will shut down if it is overloaded. The overload must be removed before the inverter will restart. Resistive loads are the easiest for the Vector Power Inverter to run. However, larger resistive loads, such as electric stoves or heaters, usually require more wattage than the Vector Power Inverter can deliver on a continuous basis. Inductive loads, such as TV's and stereos, require more current to operate than do resistive loads of the same wattage rating. Induction motors, as well as some televisions, may require 2 to 6 times their wattage rating to start up.

The most demanding in this category are those that start under load, such as compressors and pumps. Testing is the only definitive way to determine whether a specific load can be started and how long it can run. The unit will simply shut down if it is overloaded. To restart the unit after a shutdown due to overloading, remove the overload.

CAUTION: This inverter will not operate high wattage appliances or equipment that produce heat, such as hair dryers, microwave ovens, and toasters.

5.2 BATTERY OPERATING TIME

With a typical vehicle battery, a minimum operating time of 2 to 3 hours can be expected. In most instances, 5 to 10 hours of operating time is achievable. However, Vector recommends that the operator start the vehicle every half hour to recharge the battery system. This will guard against any unexpected shut-down of the equipment and will ensure that there is always sufficient battery capacity to start the vehicle's engine. The inverter will sound it's alarm when DC voltage drops to 11.0V.

The inverter may be used whether or not the vehicle's engine is running. However, the inverter may not operate while the engine is starting since the battery voltage can drop substantially during cranking.

The inverter draws less than 1.4 amps from the battery when it is not supplying power to a load and switch is in ON position. In most instances, the inverter can be left connected to the battery when not in use since it draws so little current. However, if the vehicle is to remain unused for several days, disconnect the inverter from the battery.

6. PROTECTIVE FEATURES OF THE INVERTER

Your Vector Power Inverter monitors the following potentially hazardous conditions:

Low Battery Voltage - This condition is not harmful to the inverter but could damage the power source. An alarm will sound when input voltage drops to 11.0 Volts. The Vector Power Inverter automatically shuts down when input voltage drops to 10 volts. When the condition is corrected, the unit may be restarted.

Overvoltage Protection - The Vector Power Inverter will automatically shutdown when the input voltage exceeds 15.5 volts DC.

Short Circuit Protection - Reverse polarity or short circuit condition may cause external or internal fuses to open and may cause irreversible damage to the inverter. Take extra care to insure a proper polarity hook-up.

Overload Protection - The inverter will automatically shut down when the continuous draw exceeds 750 watts. When the overload is removed, the inverter will self-start.

Over Temperature Protection - If the temperature inside the Vector Power Inverter reaches 150 degrees F, the unit will automatically shut down. Allow the unit to cool for at least 15 minutes before restarting after a heat-related shutdown. Unplug unit while cooling.

If the low voltage alarm sounds when the battery is fully charged, follow the steps for

solving lack of output power in the TROUBLESHOOTING section of this manual. The alarm will sound or if there is an excessive voltage drop between the battery and the inverter.

NOTE: It is normal for the alarm to sound while the unit is being connected to, or disconnected from, the power source. This is not indicative of a problem.

7. COMMON PROBLEMS

"Buzzing" sound in audio systems:

Some inexpensive stereo systems and "boom boxes" emit a buzzing sound from their speakers when operated from the Vector Power Inverter. This occurs because the power supply in the electronic device does not adequately filter the modified sine wave produced by the inverter. The only solution to this problem is to use a higher quality sound system that incorporates a higher quality power amplified supply.

Television Interference:

The Vector Power Inverter is shielded to minimize interference with TV signals. However, in some instances, some interference may still be visible, particularly with weak TV signals. Try the following corrective measures:

- Position the inverter as far as possible from the television, the antenna and the antenna cables. Use an extension cable, if necessary
- Adjust the orientation of the inverter, the antenna cables and the TV power cord to minimize interference
- Make sure that the antenna feeding the television provides an adequate ("snow free") signal and that high quality, shielded antenna cable is used

8. FAULT PROTECTION CODE AND TROUBLESHOOTING GUIDE:

TABLE 1 - INVERTER POWER SWITCH TURNED ON

TROUBLE/INDICATION	POSSIBLE CAUSE	SUGGESTED REMEDY
No AC output yellow LED lit	DC input below 10 volts	Recharge or replace battery
No AC output red LED lit	Excessive appliance load-	Turn Off, then turn On.
No AC output red LED lit	Inverter hot-	Disconnect load from inverter. Operate inverter without load for a few minutes. Reconnect load.
No AC output green LED not lit	Bad connection or wiring-	Tighten all DC connections.
Low battery alarm sounds	Low battery voltage-	Recharge battery. Remove load from inverter while recharging battery.
Motorized power tool won't start	Excessive start-up load-	If appliance does not start, appliance is drawing excessive voltage and will not work with

		inverter.
Motorized power tool does not operate at correct speed time	Purely inductive load-	Make the load not purely inductive. Operate an incandescent lamp as same as motor.
Television/Radio distant in speaker antenna cable.	Snow in picture, buzz- from each other. Use shielded Connect antenna to amplifier	Keep inverter and antenna

9. FUSE REPLACEMENT

This power inverter is equipped with multiple internal fuses. Normally, these fuses will not blow unless there is a serious problem inside the unit. Internal fuses are replaceable, however, only electronically knowledgeable people should attempt fuse replacement. If the unit is damaged during fuse replacement, the warranty may be voided. Vector recommends contacting Technical Support for guidance. Call toll free: (866) 584-5504.

10. SPECIFICATIONS

Output Connection . . . . . North American Standard Receptacles
Output Voltage . . . . . .Approx. 120 VAC RMS 60 Hz
Output Current . . . . . .6.2 Amps Max
Output Waveform . . . . . .Modified Sinewave
Input Voltage . . . . . .12.5 VDC
Low Voltage Alarm . . . . . .11 VDC
No Load Input Current . . . . . .1.2 Amps Max
Input Fuses . . . . . .Internal
Input Cables: . . . . . .Battery Clip Cables
Additional Protection . . . . . .Overload, overvoltage, overheating

2 YEAR LIMITED WARRANTY PROGRAM

This limited warranty program is the only one that applies to this product, and it sets forth all the responsibilities of Vector Manufacturing, Ltd., regarding this product. There is no other warranty, other than those described herein.

This Vector Manufacturing, Ltd. product is warranted, to the original purchaser only, to be free of defects in materials and workmanship for two years from the date of purchase without additional charge. The warranty does not extend to subsequent purchasers or users. Vector Manufacturing, Ltd. will not be responsible for any amount of damage in excess of the retail purchase price of the product under any circumstances. Incidental and consequential damages are specifically excluded from coverage under this warranty.

This product is not intended for commercial use. This warranty does not apply to accessories or damage to units from misuse or incorrect installation. Misuse includes wiring or connecting to improper polarity power sources.

RETURN/REPAIR POLICY: Defective products, other than accessories, may be returned postage prepaid to Vector Manufacturing. Any defective product, other than accessories, that is returned to Vector Manufacturing within 30 days of the date of purchase will be replaced free of charge. If such a product is returned more than 30 days but less than two years from the purchase date, Vector Manufacturing will repair the unit or, at its option, replace it free of charge.

If the unit is repaired, new or reconditioned replacement parts may be used, at Vector Manufacturing's option. A unit may be replaced with a new or reconditioned unit of the same or comparable design. The repaired or replaced unit will then be warranted under the terms of the remainder of the warranty period. The customer is responsible for the shipping charges on all returned items after 30 days. During the warranty period, Vector Manufacturing, Ltd. will be responsible for the return shipping charges.

LIMITATIONS: This warranty does not cover accessories, bulbs, fuses and batteries, defects resulting from normal wear and tear (including chips, scratches, abrasions, discoloration or fading due to usage or exposure to sunlight), accidents, damage during shipping to our service facility, alterations, unauthorized use or repair, neglect, misuse, abuse, failure to follow instructions for care and maintenance, fire, flood and Acts of God.

If your problem is not covered by this warranty, call our Technical Support Department at (954) 584-4446 or toll free at (866) 584-5504 for general repair information and charges if applicable. You may also contact us through our website at www.vectormfg.com.

STATE LAW RIGHTS: This warranty gives you specific legal rights. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the exclusions or limitations stated herein may not apply. This warranty gives the purchaser specific legal rights; other rights, which vary from state to state, may apply.

TO REQUEST WARRANTY SERVICE FOR THIS PRODUCT: Contact Vector Manufacturing Technical Support by telephone, fax or mail. We suggest that you keep the original packaging in case you need to ship the unit. When returning a product, include your name, address, phone number, dated sales receipt (or copy) and a description of the reason for return and product serial number. After repairing or replacing the unit, we will make every effort to return it to you within four weeks.

WARRANTY ACTIVATION: Please complete Warranty Activation Card and mail to Vector Manufacturing. Enter "VEC1043MG" as Model and "700Watt Power Inverter " as Product Type. All Vector Manufacturing, Ltd. products must be registered within 10 days of purchase to activate this warranty. Mail the completed registration form, along with a copy of the original sales receipt to:

ATTN.: CUSTOMER SERVICE / VECTOR MANUFACTURING, Ltd.
4140 SW 28th Way, Ft. Lauderdale, FL 33312
PH: 954-584-4446 • TOLL FREE: 866-584-5504 • Fax: 954-584-5556.
You may also contact us at our web site www.vectormfg.com.

WARRANTY IS NON-TRANSFERABLE AND NON-REFUNDABLE.

RD010605