

MAXX SST™

COMPACT POWER INVERTERS

CONVERTS 12VDC TO 110/120VAC
ADVANCED MOSFET TECHNOLOGY



VEC049C



VEC053C



VEC050C



VEC054C



VEC051C



VEC056C

OWNER'S MANUAL

THIS MANUAL CONTAINS IMPORTANT INFORMATION REGARDING SAFETY, OPERATION, MAINTENANCE AND STORAGE OF THIS PRODUCT. TO AVOID POSSIBLE INJURY OR PROPERTY DAMAGE, PLEASE READ THIS INSTRUCTION MANUAL CAREFULLY BEFORE USING THIS PRODUCT.

4140 S.W. 28TH WAY • FT. LAUDERDALE, FL 33312
TEL 954.584.4446 • FAX 954.584.5556
TOLL-FREE: (866) 584-5504

IMPORTANT SAFETY INFORMATION

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
- Remove appliance plug from outlet strip or turn off inverter before working on the appliance
- **DO NOT** place inverters in an area, room or compartment where explosive or flammable fumes might be present
- Using power strips, with switches and circuit breakers, only interrupt power to the "hot" receptacle terminals. The "neutral" terminals remain powered with respect to the "ground" terminals
- Always unplug appliances when servicing
- This is not a toy - **keep away from children**

CAUTIONS

- NO USER-SERVICEABLE COMPONENTS INSIDE; OPENING UNIT WILL VOID WARRANTY; TO SERVICE INVERTERS CONTACT SERVICE DEPARTMENT AT (866) 584-5504
- **Do not** install in engine compartment - install in a well ventilated area
- **Do not** use with positive ground electrical systems (the majority of modern automobiles, RVs, trucks and boats are negative ground)
- Reverse polarity connection will result in a blown fuse, may cause permanent damage to the inverter and will void the warranty
- This inverter will not operate appliances or equipment that exceed inverters maximum rating
- Grounding the Neutral will cause the inverter to shut down
- **Do not** operate this inverter if it is wet
- Not approved for use with medical equipment

IMPORTANT CABLE INFORMATION

Substantial power loss and reduced battery operating time results when inverters are installed with cables that are not able to supply full power. Low battery power can result from cables that are either excessively long or an insufficient gauge. The installer/operator should be aware of all installation requirements to maintain secure, electrical connections. Cable insulation and ampacity must be the appropriate type for the environment. To purchase a prepared cable and fuse set, **contact Technical Support at (954) 584-4446 or toll-free (866) 584-5504.**

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1.0 INTRODUCTION

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

The MAXX SST supplies continuous power and peak watts, in the form of three plug-in outlets ready to deliver 110/120VAC power whenever and wherever you need it! This inverter has enough power to run most household or electronic appliances. Added safety features include automatic shutdown and a low battery alarm to prevent damage to your battery.

This Power Inverter is configured with the latest Soft Start Technology (SST).™ Before introduction of Soft-Start, high start-up currents from large inductive loads could shut down the inverter. Soft Start improves inverter operation by:

1. Gradual voltage ramp-up during inverter start-up. This eliminates failed cold starts under load.
2. Output that momentarily dips in voltage and quickly recovers to allow large motorized loads to start. This eliminates almost all shutdowns from momentary overloads.
3. This power inverter also incorporates a new cooling technology. The new design cools the power transistors more efficiently, and combined with Soft Start, dramatically increases reliability and the life of the product.

1.1 BASIC TOUR OF THE MAXX SST™ MODEL INVERTER

AC power is supplied via three standard North American grounded, plug-in receptacles (U-ground) as shown in *FIGURE 1* (#1). This allows the connection and operation of most 110/120VAC powered electrical and electronic appliances.

Other front panel items are:

One green LED (#2) that lights when the inverter is operating.

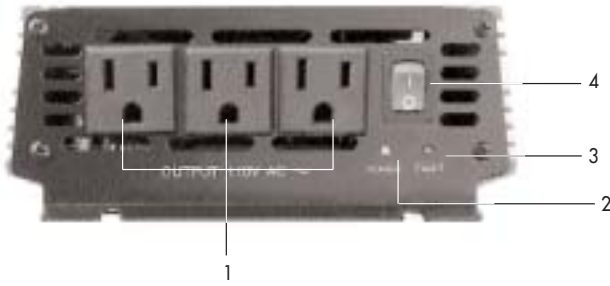
One combination over-temperature and overload LED (#3). If this lights, the inverter will automatically shut down.

One on/off switch (#4) that shuts off the AC output and all inverter functions.

The on/off switch is also used to reset the inverter, after shut down, due to overload or over-temperature condition.

FIGURE 2 shows the back panel DC connectors and fan locations. Note: The fan only operates when the inverter's load requires it to operate. It shuts off when cooling is not required.

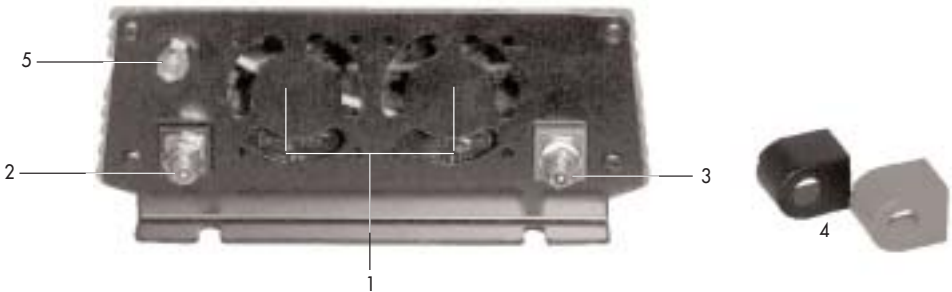
FIGURE 1 – FRONT PANEL



- 1) THREE NORTH AMERICAN STANDARD OUTLETS
- 2) GREEN LED SHOWS UNIT IS OPERATING

- 3) RED LED SHOWS UNIT IS SHUT DOWN
- 4) ON/OFF SWITCH

FIGURE 2 – BACK PANEL



- 1) HIGH SPEED COOLING FANS
- 2) BLACK NEGATIVE (-) TERMINAL AND RETAINING NUT

- 3) RED POSITIVE (+) TERMINAL AND RETAINING NUT
- 4) TERMINAL COVER
- 5) CHASSIS GROUND CONNECTOR

1.2 MAXX SST SAFETY FEATURES

BUILT-IN AUTOMATIC SAFETY FEATURES INCLUDE:

- Overload and over-temperature shutdown activated if AC output exceeds rated watts
- AC short-circuit shutdown and automatic reset
- Low voltage audible alarm and reset (sounds at 10.6 volts input)
- Low-voltage shutdown and automatic reset (activates at 10.0VDC)
- High-input voltage shutdown (activates at above 15.5VDC) and automatic reset

WARNING: MAXX SST™ output should be treated with the same caution as any 110/120VAC circuit. It is very important that installers and users read and follow all instructions provided in this manual to ensure optimum safety and performance.

MAXX SST™ inverters are ideal for powering:

- TV/VCR combinations
- Refrigerator/freezers
- Lights
- Radio receivers/transceivers
- Heavy duty power tools & chargers
- Stereo systems
- Small microwave ovens
- Household appliances
- Computers and peripheral equipment
- Dry and/or wet-and-dry vacuums
- Sump pumps, motors and other electric-powered equipment

MAXX SST™ uses a 12VDC power source like those found in motor vehicles, or it can be operated using multiple battery configurations with commercial battery chargers or solar battery chargers. For most heavy-duty applications, a multiple battery configuration and the use of deep-cycle batteries is required.

When using multiple batteries, inverters can be operated from one of the vehicle 12 volt batteries, so there's always one battery with adequate charge to start an engine.

MAXX SST™ includes a high-surge capability. This is required to start heavy loads, such as motors and other inductive devices.

1.3 APPLIANCE CAUTIONS

NEVER plug small appliances into the inverter outlets to directly recharge nickel-cadmium batteries. Always use the charger provided with that appliance.

NEVER plug in battery chargers for cordless power tools, if the charger carries a warning that dangerous voltages are present at the battery terminals.

Some fluorescent lamps may not operate properly with this type of inverter. If the bulb appears to be too bright, or fails to light, do not use the lamp with this inverter.

Some fans with synchronous motors may slightly increase in speed (RPM) when powered by the inverter. This is not harmful to the fan or to the inverter.

Certain chargers for small nickel-cadmium batteries can be damaged if plugged into the inverters.

DO NOT use inverters with the following two types of equipment.

1. Small, battery-operated appliances such as flashlights, cordless razors and tooth brushes that can be plugged directly into an AC receptacle to recharge.
2. Certain battery chargers for battery packs that are used in some cordless hand-tools. Chargers for these tools have a warning label stating that dangerous voltages are present at the battery terminals.

The majority of portable appliances do not have this problem. Most portable appliances use separate transformers or chargers that plug into AC receptacles to supply a low DC or AC voltage output to the appliance. If the appliance label states that the charger or adapter produces a low DC or AC voltage output (30 volts or less), there should be no problem powering that charger or adapter.

2.0 INVERTER APPLICATIONS

Aside from issues of supplying power to higher wattage appliances, inverters must be supplied with a constant source of high current 12VDC from a bank of batteries. At full watt load, the DC input requirements are up to 15 amps at 12VDC.

Read and comply with the following applications, and your inverter will give you years of reliable service.

WARNING: Never connect the inverter's AC output to an AC distribution system.

2.1 UNINTERRUPTIBLE POWER SUPPLY (UPS)

Inverters can be operated as uninterruptible power supplies that continuously provide AC even if outside AC is interrupted. This function continuously operates the inverter from a battery bank, simultaneously replacing the charge to the battery bank with an AC-powered 12 volt battery charger. Charging can also be by means of a solar charger system. (See FIGURE 3). The charger must be selected to operate continuously in order to fully replace the charge on the battery as the inverter operates. In this configuration, the battery "floats" on the DC from the charger, not really supplying power or being charged. When outside AC fails, the inverter continues to power the appliances for the life of the useful charge of the battery bank. When outside AC is restored, the batteries are charged as the inverter continues to operate. Battery charging must be sized to replace the average current supplied by the inverter plus a little more current. Another requirement is that the battery charging rate cannot exceed 10% of the Ampere Hour (AH) rating of the battery bank, otherwise the life of the batteries can be dramatically reduced through overcharging. Most modern battery chargers automatically adjust the charging rate based on the state of charge on the batteries they are charging. For this type of operation, use deep-cycle batteries and avoid charging at too fast a rate.

Common unattended applications for the UPS (floating battery) include powering: sump pumps, safety lighting, communications equipment, burglar alarm systems and computer systems.

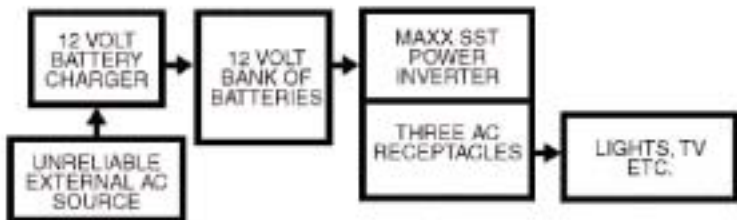


Figure 3 - Uninterruptible Power Supply

3.0 THEORY OF OPERATION

MAXX SST™ inverters change 12VDC into 110/120VAC RMS, electrical power. This is accomplished in two steps. (See *FIGURE 4*).

The first stage raises the 12VDC input to 145VDC. The advanced design of the DC-to-DC first stage uses high-frequency conversion techniques that replace bulky and heavy transformers found in older inverter technology. The output stage changes the 145VDC to 110/120VAC. This solid-state circuitry ensures excellent overload protection and the ability to operate reactive loads such as those found in inductive motors. The inverter's output stage uses multiple banks of metal-oxide semiconductor field-effect transistors (MOSFETS). This stage functions as a high-power bipolar switch, alternately applying opposite polarity to the AC outlet HOT and NEUTRAL terminals.

See Specs for Wire Gauge and Fuse Amperage Page 18

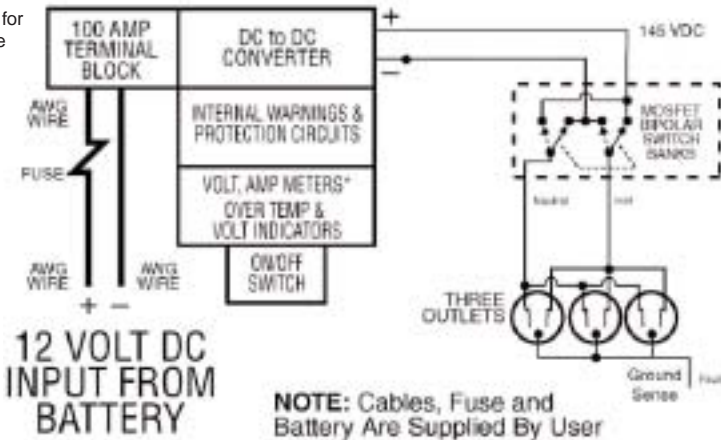


Figure 4 Simplified Diagram

Some Models only include volt, Amp and over temp indicators.

The 110/120VAC output of the inverter is in the form of a modified sine wave (MSW) as shown in *FIGURE 5*. This type of waveform has the same energy characteristics as the sine wave of commercial electrical power. The modified sine wave is superior to the 100% square wave output (not shown) produced by most other DC-to-AC inverters on the market. A modified sine wave, as compared to a square wave, is vital to the efficient and proper operation of certain appliances such as computers, TVs, and certain electronic equipment.

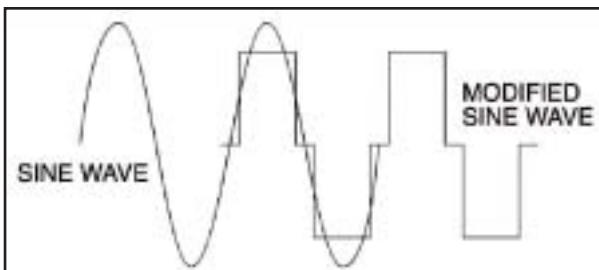


Figure 5- Modified Square Wave and Sine Wave Comparison

NOTE: Because of wave-shape differences, using standard digital or analog voltmeters may not correctly read the inverter output voltage. Unless a true RMS voltmeter such as a "Fluke 87", "Fluke 8060A", "Beckman 4410" or "Triplet 4200" is used, the reading will be from 2 to 20 volts low.

4.0 OPERATION

NOTE: Ensure that the total continuous power consumption of all tools and/or appliances connected to the inverter (and in use) does not exceed the inverter's continuous watts rating. Also ensure that the start-up wattage for inductive loads does not exceed peak watts for more than a second.

CAUTION: Appliances such as **microwave ovens** will normally draw more than their rated current and could possibly overload the inverter when operating simultaneously with other appliances. For example: A 600 watt microwave oven draws approximately 940 watts.

4.1 POWER REQUIREMENTS:

Most electrical tools, appliances and audio/video equipment have labels that show the unit's power consumption in amps, watts, or both. To avoid inverter shut-down and possible damage to the inverter, avoid exceeding the watt rating of this unit. If the power consumption of the tool or device is rated in amps, multiply the amps by 110/120 VAC to determine the wattage.

For instance, a power tool rated at 4 amps will draw 440 watts. The inverter has built-in overload protection so that if you do exceed the watt continuous duty limit, the inverter will automatically shut down. Once the excessive load is removed, the inverter can be restarted and resume normal operation.

Note: To **restart** the inverter, turn it off, and on. The on/off switch is located on the front panel of the inverter.

The inverter powers resistive loads the easiest; however, larger resistive loads, such as electric stoves or heaters, could draw more wattage than the inverter can deliver on a continuous basis.

The following chart shows the approximate amperage at 110/120VAC and the corresponding wattage at 110/120VAC for various common tools and appliances.

APPLIANCE	AMPS@ 110/120VAC	WATTS@ 110/120VAC
LAPTOP COMPUTER	0.5	55
HOUSEHOLD POWER MIXER	2	220
240-WATT STEREO/AMPLIFIER	2.2	242
REFRIGERATOR	3	330
3/8" VARIABLE SPEED DRILL	3	330
VARIABLE SPEED JIG SAW	3	330
10-SPEED BLENDER	3.2	352
BELT SANDER	3.4	374
3/8" REVERSIBLE DRILL	3.5	385
HOUSEHOLD FOOD PROCESSOR	3.6	396

APPLIANCE	AMPS@ 110/120VAC	WATTS@ 110/120VAC
COMPUTER AND MONITOR	4	440
PORTABLE VACUUM	4.6	506
8-CUP COFFEE MAKER	5.5	605
ELECTRIC TRIMMER	5.5	605
1/2" HAMMER-DRILL	5.5	605
RECIPROCATING SAW	6	660
VACUUM CLEANER	7.2	792
1-1/8" ROTARY HAMMER	7.8	858
1/6 H.P. SUBMERSIBLE SUMP PUMP	8	880
COMPACT MICROWAVE OVEN	8.5	935
10" BENCH SAW	13.0	1500

NOTE: APPLIANCE SPECIFICATIONS MAY VARY FROM BRAND TO BRAND. THIS TABLE IS OFFERED ONLY AS A GUIDE TO APPROXIMATE POWER RATINGS. CHECK APPLIANCE MANUALS OR PRODUCT LABELING FOR ACTUAL RATINGS. TO USE THE MAXIMUM OUTPUT OF CONTINUOUS WATTS, MAXX SST MUST BE CONNECTED TO A DC POWER SUPPLY CAPABLE OF PROVIDING 1/10TH OF INVERTER'S CONTINUOUS WATTAGE RATING.

A. Power Output

The inverter will operate most AC loads within its power rating. Some induction motors used in refrigerators, freezers, pumps and other motor-operated equipment, require very high surge currents to start them. The inverter may not be able to start some of these motors even though their rated current draw is within specifications for this power inverter.

If a motor refuses to start, observe the battery voltage using a DC voltmeter while trying to start the motor. If the battery voltmeter drops below 11 volts while the inverter is attempting to start the motor, this may be why the motor won't start. Make sure that the battery connections are tight and that the battery (or batteries) is (are) fully-charged. If the connections are good and the battery is charged, but the voltage still drops below 11 volts, you may need to use a larger battery (or battery combination).

B. Input Voltage

The inverter will operate from input voltages between 10.5 and 15.5VDC. If the voltage drops below 10.6 volts, an audible low battery warning alarm will sound. The inverter will shut down if the input voltage drops below 10.5VDC. This built-in feature protects the battery from being completely discharged.

The inverter will also shut down if the input voltage exceeds 15.5 volts. This protects the inverter against excessive input voltage. Although the inverter has built-in protection against over voltage, it may still be damaged if the input voltage exceeds 15.5 volts.

NOTE: Exceeding recommended voltage limits will void manufacturer's warranty.

Inductive loads, such as TVs and stereos, require more current to operate than do resistive loads with the same wattage rating. Induction motors, as well as some TVs, may require two to six times their rated wattage to start up. Because the MAXX SST™ inverters have a peak watt power rating, many such appliances and tools may be safely operated. The equipment that needs the highest starting wattage are pumps and compressors that start under load. This equipment can be safely tested. If an overload is detected, the inverters will simply shut down until the overload situation is corrected. Use the front panel switch to turn OFF the inverter, then ON, to reset the inverter.

CAUTION: NO USER-SERVICEABLE COMPONENTS INSIDE.
OPENING UNIT WILL VOID WARRANTY.

4.2 DETERMINING BATTERY SIZE:

To determine the minimum battery size that you will need to operate appliances from MAXX SST™ Models, follow these steps:

1. Determine the wattage of each appliance and/or tool you will need to simultaneously operate from the inverter. To do this, read the labels on the equipment to be operated. Usually, power consumption is shown in watts. If it is shown in amps, multiply by 110 to determine the wattage.
2. Estimate the number of hours the equipment will be in use between battery recharges.
3. Determine the total watt-hours of energy use, the total running time and the average power consumption.

To get an estimate of the current (in amps) that the battery must be capable of delivering, divide the load consumption power (in watts) by (10). Keep in mind that most appliances are not operating for long periods of time. For example, a typical home-use coffee maker draws 500 watts during its brew time of 5 minutes, but it maintains the temperature of the pot at about 100 watts. Typical use of a microwave is only for a few minutes, sometimes at low power. Some exceptions to brief operating times are lamps, TVs and computers.

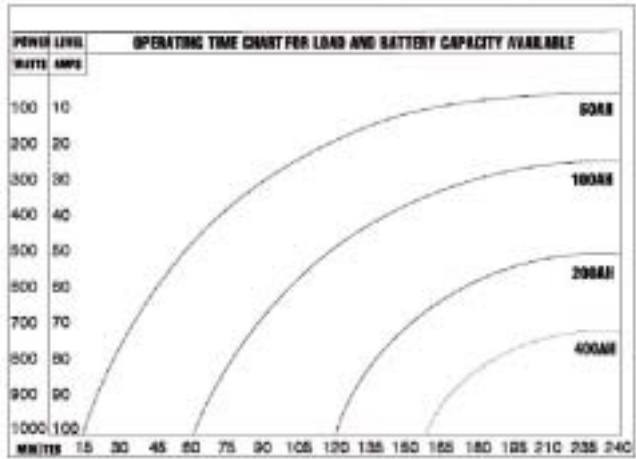
4.3 BATTERY OPERATING TIME

FIGURE 6 is a set of curves that show how appliance load in watts or in amperes affects operating time. These curves are only estimates of operating time, dependent upon:

- The condition of the batteries
- The state of charge on the batteries
- The amount of other DC appliances drawing current from the batteries

Three curves were developed for a battery of 50 Ampere Hours (AH) capacity, and three for multiple batteries in parallel. The higher capacity curves are for 120 AH, 200AH and 400AH capacities. These large capacity batteries clearly extend operating time at full load. To extend operating time in general, reduce the heavy appliance load to a minimum. Remember, you are operating on stored energy and probably under power loss conditions. All operating time curves assume permanent installation with the correct DC input wire (See Specs Page 18) and a full charge on the batteries.

Figure 6 – Battery Operating Time



For example, as shown in *FIGURE 6*, using a 400 amp hour battery (batteries), if the average power usage will be 1000 watts, the operating time will be about 150 minutes. A larger capacity battery will deliver more operating time between recharges.

NOTE: The manufacturer recommends conservative estimates when selecting a battery. More amp hours will deliver a reserve capacity, and a larger capacity battery will not be subject to deep discharges. Ideally, the number of amp hours (AH) you expect to use should be less than 50% of the battery’s rated capacity.

4.4 PROTECTIVE FEATURES

LOW BATTERY ALARM:

An audible alarm will sound when:

1. The 12 VDC power supply voltage drops down to 10.6 volts. This indicates that the battery needs to be charged or there is an excessive voltage drop between the battery power source and the inverter.

NOTE: It is normal for the alarm to sound when the inverter is being connected to, or disconnected from, a 12VDC-power source. This does NOT indicate a problem. However, if this alarm sounds continuously, discontinue inverter operation and charge the battery before resuming operation. If the voltage drops to 10.0VDC, the inverter will automatically shut down.

If the low voltage alarm sounds when the battery is fully-charged, refer to the troubleshooting table for possible causes and remedies. (Pages 19-20)

CIRCUIT PROTECTION: The inverter has electronic circuit protection against overload or short circuit conditions.

WARNING: If turning the front panel mounted switch OFF then ON does not reset the inverter, DO NOT ATTEMPT TO OPEN THE INVERTER. Opening the inverter, for any reason, will void the warranty. The unit must be returned to Vector Manufacturing, Ltd. for testing and repair by professional factory technicians.

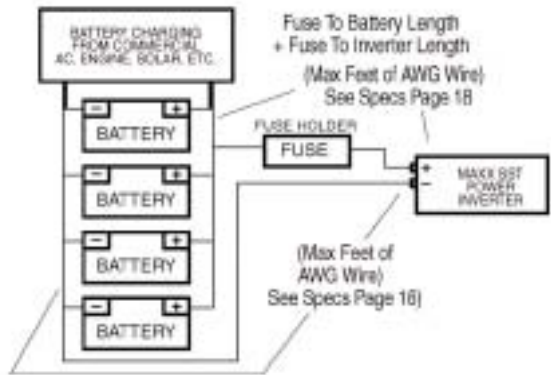
5.0 INSTALLATION

MAXX SST™ inverters will provide you with various watts of continuous, electrical power (See Models Specification Chart Page 18) when powered by a 12VDC source such as is found in a vehicle or multiple battery configuration as shown in *FIGURE 7*. This manual does not describe all of the possible types of battery, battery charging, and battery isolation configurations.

5.1 INPUT POWER REQUIREMENTS:

To properly operate the inverter, the DC power source must provide between 10.5 and 15.5VDC and nominally at 150 Amps. This DC power source must be a well-regulated DC power supply as typically found in vehicle and deep-cycle marine batteries. The DC power source may also be two 12 volt batteries connected in parallel. On larger applications the power source may be several batteries connected in parallel as shown on *FIGURE 7*.

Figure 7 –Battery Wiring



NOTE: Vector® Manufacturing recommends that for typical heavy-duty uses, a specified or equivalent main buss fuse (See Page 18) be added as close as possible to the power source (battery) positive terminal. The fuse amperage must be sized to allow simultaneous operation of all the AC appliances to be powered, with delay characteristics that allow for the momentary high start-up current requirements of inductive loads. Use the recommended fuse block (fuse holder) and fuse, or an electrical equivalent. For full rated output and motor start-up surge output, ensure that the installation is configured to handle the full load. *FIGURE 7* is also used as a guide when the cables are measured for installing the inverter; available through Vector Technical Support toll-free at (866) 584-5504.

5.2 OPERATING ENVIRONMENT

WARNINGS: DO NOT locate inverters in an area, room or compartment where explosive or flammable fumes might be present. Areas such as: engine room, engine compartment, boat, and small, unvented battery compartments.

In all **marine** applications, DO NOT install the inverter below or near the waterline, and keep the inverter away from moisture and water.

Use ONLY non-corrosive marine fasteners and fittings for installation. Only connect the inverter's DC input to existing wiring (which must be approved for marine use) rated specified gauge, cable and length. (See Page 18) For cable lengths exceeding 6 feet from inverter to batteries, call Vector Manufacturing for additional installation information. The cable, fuse holder, fuse (not supplied) can be purchased at an electrical supply company. The fuse holder and fuse are a specified amperage rating (See Page 18) fuse and appropriate fuse holder. Call Vector® Technical Support (954) 584-4446 or toll-free (866) 584-5504.

CAUTION: To avoid possible dangerous conditions, the inverters must be located where:

1. The unit is kept dry.
2. Air temperature is between 30°F (-1°C) non-condensing, and 105 degrees F (40°C).
3. At least three inches of clearance from other objects is maintained for cooling airflow.
4. The unit is not exposed to direct heat, sunlight or to explosive or flammable fumes.
5. The unit is as close to the DC power source as possible.

CAUTIONS: This device supplies 110/120VAC electrical power directly to the appliances through three standard, North American U-ground receptacles. NEVER try to use the inverter with any 12VDC-power source that uses a positive ground. Most vehicles, boats and aircraft use negative ground systems.

Never connect the ground wire from the inverter to the DC negative input.

- CHECK to ensure that the combined loads of the appliances being powered by the inverter DO NOT continuously exceed the inverter's watt rating.
- NEVER place items on or over the inverter during operation

MAXX SST™ inverters generate heat during operation like any high power device and must be placed where cooling air can circulate to the internal fan, and heated air can be removed.

For optimum operation, the inverter should be placed or mounted on a flat surface; ideally, a normally cool metal surface to help diffuse the heat that is generated. Two specified cables (See Page 18) will be required (not supplied); each should be a specified length (See Page 18) to allow for full power operation and to provide flexibility in positioning the inverter. For safety reasons, keep small children away from the inverter at all times.

5.3 INSTALLATION SEQUENCE

To wire the inverter to a 12VDC power source, observe the following cautions, and follow the installation sequence for Quick Operational Check and Permanent Installation.

CAUTIONS: Ensure that DC connection polarity is correct. Reversed polarity will blow a fuse and may cause permanent damage to the inverter. The manufacturer's warranty does NOT cover damage due to reversed polarity. Review FIGURE 2, if necessary, to identify the location of the DC terminals.

5.4 QUICK OPERATIONAL CHECKOUT OR EMERGENCY USE

YOU WILL NEED:

- One heavy-duty jumper cable set with specified AWD wire rating (See Page 18)
- One fully-charged automobile battery
- A common, slip joint pliers for loosening and tightening terminal nuts

TEST PROCEDURE:

1. Remove the plastic terminal covers and terminal nuts.
2. Identify the positive and negative terminals on the 12VDC battery and identify the positive and negative terminals on the inverter.
3. Using the set of heavy-duty jumper cables, attach one red cable clamp to the (+) terminal bolt and one black cable clamp on the (-) terminal bolt.
4. Connect the clamps on the other ends of the jumper cables to the corresponding positive (+) and negative (-) terminals on the 12VDC vehicle battery. There may be some minor sparking observed.
5. Turn the inverter power switch on.
6. Plug in a lamp with a 100 watt light bulb and switch the lamp on. If the lamp works normally, the inverter is functioning properly and you can proceed to a permanent installation or continue to use the inverter with low wattage appliances. If the lamp does not light or does not work correctly:
 - A. Check all connections and tighten any loose connections.
 - B. Ensure that the source battery has adequate charge.
 - C. If steps A through B do not correct the problem, contact Vector Customer Service Department toll-free (866) 584-5504, for assistance.

5.5 PERMANENT INSTALLATION

5.5.1 PREPARATION FOR PERMANENT INSTALLATION

(SEE PAGE 18 FOR SPECIFIC AWG CABLES FOR INVERTER MODELS)

For permanent installation to heavy-duty battery power you will need:

- Ring terminals to fit cable ends and stud terminals
- Hardware to connect two specified cables to the battery bank
- A specified single length of specific AWG cable multi-stranded, flexible, insulated cable
- A specified amp low voltage fuse holder and fuse (slow blow type or use a specified fuse or equivalent fuse holder
- Mounting screws, bolts and nuts for mounting the inverter and fuse holder
- A drill for mounting the inverter and fuse holder
- Lead-tin solder, flux, propane torch and an igniter for the torch
- Wire stripper/cutter tool
- Battery connector for specified cable for battery connection

PRELIMINARY INSTALLATION NOTES:

The inverter has four slots in its mounting bracket that allow the unit to be fastened against a bulkhead, floor, wall or other flat surface. Ideally, the mounting surface should be cool to the touch. It is more electrically efficient to use longer AC wiring than DC wiring, so install the inverter as close as possible to the 12VDC power source.

Vector inverters can be operated in any position, however, if it is to be mounted on a wall, mount it horizontally so that indicators, switches, outlets and terminal blocks on the front panel are visible and accessible.

- 1) If inverter is to be installed in a vehicle, Vector recommends that the inverter be shock mounted to either the floor (in a clear, safe area) or on a secure flat surface.
- 2) Locate a convenient place to mount the inverter and fuse holder.
- 3) Perform a test routing of the proposed cable length, but don't do any cutting at this time. (FIGURE 7)
- 4) Be sure that the positive (+) and negative (-) cables to the battery DO NOT exceed 6 feet.
- 5) Using a specified AWG cable, reposition the inverter and fuse holder if necessary.
- 6) After you have practiced the above preliminary installation steps, proceed with the "actual" inverter installation.

After you have selected an appropriate location for the inverter and fuse block, proceed with the actual installation of the inverter.

Contact Vector® Manufacturing for any further installation information or questions. You can purchase fuses, fuse holders, specific cable or cable battery connectors from your local electrical supplier or call Vector Technical Support toll-free (866) 584-5504.

This procedure is for using locally purchased supplies. Make appropriate changes to procedure if Vector Cable Set is purchased.

5.5.2 PERMANENT INSTALLATION PROCEDURES

The cables between the power source and inverter should be as shown in FIGURE 7 (Page 13). Remove terminal cover and terminal nuts before starting permanent installation.

Inverter DC cables and fuse installation are as follows:

1. Using tools and hardware, mount the inverter to a flat surface.
2. Mount the fuse holder to its mounting surface using appropriate hardware. Ensure that mounting hardware does not touch any fuse holder or fuse contacts. Ensure that fuse is removed from its holder.
3. Measure the cable twice before cutting the cable.
4. Cut one cable length to connect the negative (-) battery terminal and the inverter's negative terminal, leaving a little slack in the cable.
5. Cut another cable to connect the positive (+) battery terminal to one side of fuse holder, leaving a little slack.
6. Cut the final cable to connect the other side of fuse holder to the positive (+) terminal on the inverter back panel.
7. Strip the insulation of the three cables to 1-inch (2.45 cm) .
8. Crimp or sweat-solder the copper strands to ring terminals. For safety, do this in an open space because it may require the use of a propane torch.

9. Crimp or clamp on a heavy-duty, battery-connection terminal to the other end of the negative (-) and positive (+) cable. Connect the negative (-) battery terminal cable to the negative (-) battery terminal connector.
10. Ensure the inverter power switch is in the off position (see *FIGURE 1*).
11. Connect the ring terminal end of the negative (-) cable into the black stud marked (-) on the inverter back panel and tighten the retaining nut.
12. Connect the battery connector to the negative (-) battery terminal.
13. Connect the ring terminal end of the positive (+) cable into the red stud marked (+) on the inverter's back panel (see *FIGURE 2*) and tighten the retaining nut.
14. Connect the other end of the (+) positive cable to one terminal of the heavy-duty fuse holder.
15. Connect the other conductor of the heavy-duty fuse holder to the positive (+) battery terminal.
16. Connect an insulated wire (at least #12 AWG) between the chassis grounding screw on the inverter's case and a solid electrical ground to minimize possible electrical noise generation in TVs and radios.
Do NOT connect this wire to the negative DC input terminal.
17. Ensure that all electrical connections are tight.
18. Ensure that the inverter's on/of switch is OFF.
19. Insert the fuse into the fuse holder. (There may be some sparking.)
20. Turn "on" the inverter and apply a test load to the AC outlets.
21. Ensure the battery has an adequate charge. If voltage is low, the cables may be too long or the gauge too light.
22. If steps 17 and 21 do not correct the problem, contact Vector Technical Support Department toll-free (866) 584-5504, for professional direction.

6.0 SPECIFICATIONS

1. These Models Feature 3 U Ground Output Outlets
2. All Inverters Meet North American Standard Requirements
3. All Units Feature Siemens Mosfet Power Transistor

Power Inverter Model	VECO49C	VECO51C	VECO53C	VECO50C	VECO54C	VECO56C
						
Maximum Continuous Power	1000 Watts	3000 Watt	1200 Watts	1500 Watts	2000 Watts	2500 Watt
Surge Capacity (Peak Power)	2000 Watts	6000 Watts	2400 Watts	3000 Watts	4000 Watts	5000 Watts
No Load Current Draw (switch on)	0.6 amps	1.2 amps	1.3 amps	1.3 amps	1.3 amps	1.8 amps
Max. Efficiency Approximately	90%	90%	90%	90%	90%	90%
Input Voltage	10.5-15.5VDC	10.5-15.5VDC	10.5-15.5VDC	10.5-15.5VDC	10.5-15.5VDC	10.5-15.5VDC
Output Voltage	110/120VAC 60 Hz	110/120VAC 60 Hz	110/120VAC 60 Hz	110/120VAC 60 Hz	110/120VAC 60 Hz	110/120VAC 60 Hz
Low Voltage Alarm	10.6 Volts	10.6 Volts	10.6 Volts	10.6 Volts	10.6 Volts	10.6 Volts
Low Voltage Shutdown	10.0 volts Auto Reset	10.0 volts Auto Reset	10.0 volts Auto Reset	10.0 volts Auto Reset	10.0 volts Auto Reset	10.0 volts Auto Reset
Thermal Shutdown Auto Reset	YES	YES	YES	YES	YES	YES
Wave Form Modified Sine Wave (MSWM)	YES	YES	YES	YES	YES	YES
Proper Cable Gauge @ 6 FT.	#3	2/0	#3	#2	1/0	2/0
* Proper Cable Gauge @ 10 FT.	#1	250 mcm	1/0	2/0	3/0	3/0
ANL-Fuse Rating	200	500	250	300	500	500
Weight	4.6 lbs. (2.08 kg)	23.8 lbs. (10.8 kg)	5.75 lbs. (2.6 kg)	8.4 lbs. (3.81 kg)	11 lbs. (5.0 kg)	11 lbs. (5.0 kg)
Length	11.75 in. (29.85 cm)	20.8 in. (53 cm)	13.0 in. (33.02 cm)	12.37 in. (31.5 cm)	13.75 in. (34.93 cm)	13.75 in. (34.93 cm)
Width	6.06 in. (15.4 cm)	7.8 in. (20cm)	5.75 in. (14.6 cm)	8.0 in. (20.32 cm)	8.0 in. (20.32 cm)	8.0 in. (20.32 cm)
Height	2.5 in. (6.35 cm)	6.30 in. (16 cm)	2.88 in. (7.32 cm)	3.25 in. (8.26 cm)	3.25 in. (8.26 cm)	3.25 in. (8.26 cm)

* For lengths greater than 10 FT., contact Vector's Technical Support tollfree (866) 584-5504

7.0 SERVICE & PARTS

For service on the inverters, contact the Technical Support Department at:

VECTOR MANUFACTURING, LTD

4140 S.W. 28th Way • Ft. Lauderdale, Florida 33312

Tel. (954) 584-4446 • Fax (954) 584-5556 • Toll-free: (866) 584-5504

8.0 TROUBLESHOOTING

8.1 COMMON PROBLEMS:

POWER TOOLS AND MICROWAVE OVENS WON'T START

Read the information panel on each power tool carefully to accurately determine the tool's input wattage. The wattage output is sufficient to operate most power tools and microwave ovens, but remember, the power needed to start the power tool may be as much as 2 to 6 times its continuous wattage requirements.

"BUZZING" SOUND IN AUDIO SYSTEMS AND/OR SNOW IN TVS

Inverters are shielded to minimize interference with TV signals. Ensure that the TV antenna provides an adequate "snow free" signal and the antenna cable is high quality and shielded without the inverter operating. The problem may not be with the inverter. However, in some cases, some interference may be visible, particularly with weak TV signals. Try the following corrective measures:

- Position the TV and antenna further away from the inverter, if it is the cause of interference. Adjust the antenna, or use commercial cable hook-up (if possible) for best results
- Do not operate high-power appliances or tools when you are watching TV
- Make sure inverter's case is properly grounded as described in section 5.5.2 item 16

INVERTER SHUTS DOWN OR BATTERY FUSE OPENS

Inverter will continuously deliver rated watts (*FIGURE 6*) of AC power continuously and will deliver rated peak watts ; after which, the inverter may shut itself down, or the battery fuse will open, due to overload or excessive load demand on start-up. Replace battery fuse, if opened. Allow the inverter to cool for at least 15 minutes before attempting to start or run a high current draw device. Reduce the load on the inverter to its maximum rated output power.

8.2 TROUBLESHOOTING GUIDE

TROUBLE/ INDICATION	POSSIBLE CAUSE	SUGGESTED REMEDY
No AC output – red LED lit	DC input below 10 volts	Recharge or replace battery
No AC output – red LED lit	Excessive appliance load-thermal shutdown	Reduce load-wait for inverter to cool. Turn off
Low battery alarm sounds continuously	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	Rock the on/off switch several times. If appliance does not start, then appliance will not work with inverter
Motorized power tool does not operate at correct speed	Purely inductive load	Make the load not purely inductive. Operate an incandescent lamp at same time as motor
Television/radio interference	Snow in picture, buzz in speaker	Keep inverter and antenna distant from each other. Use shielded antenna cable. Connect antenna to amplifier and ground inverter case

9.0 MAINTENANCE

Inverters require minimal maintenance. However, for optimum performance, perform the following:

1. Turn off the inverter using the front panel on/off switch.
2. Disconnect the inverter by removing the DC power fuse.
3. Check and tighten all electrical connections, including the ground.
4. Using a non-metallic vacuum cleaner hose, vacuum the fan area and other air slots.
5. Clean any dirt and dust from the outside of the unit with a damp cloth.
6. Reconnect the fuse and resume operation

10. WARRANTY

VECTOR 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. 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 **(866) 584-5504** for general repair information and charges if applicable.

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 imitations 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 replacing the unit, we will attempt to return it to you within four weeks.

WARRANTY ACTIVATION: Please complete Warranty Activation Card and mail to Vector Manufacturing. Enter model and inverter number as Product Type. All Vector Manufacturing, Ltd. **products must be registered within 10 days of purchase.** To activate this warranty, mail completed form, a copy of the original sales receipt to:

VECTOR MANUFACTURING, Ltd.

4140 S.W. 28th Way, Fort Lauderdale, Florida 33312

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