

KEMOT®

Power inverter instruction manual



URZ3160 -70

SAFETY INSTRUCTIONS

To ensure reliable service your power inverter must be installed and used properly. Read and understand the installation and operating thoroughly prior to installation and use. Pay particular attention to the WARNING and CAUTION statements in this manual.

CAUTION statements advise against certain conditions and practices that may result in damage to your inverter.

WARNING statements identify the conditions or practices that may result in injury or death.

PLEASE READ ALL THE INSTRUCTIONS BEFORE USING THIS POWER INVERTER.

IMPORTANT CABLE INFORMATION

Substantial power loss and reduced battery operating time result 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 of an insufficient gauge. Marine installations are 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 provide for strain relief for DC cables and appliance wiring. Cable insulation must be the appropriate type for the environment.

INTRODUCTION

The inverter supplies continuous power in the form of one household type socket. The inverter has enough power to run almost any household or electronic appliance. Safety features include automatic shut down and a low battery alarm to prevent damage to your battery.

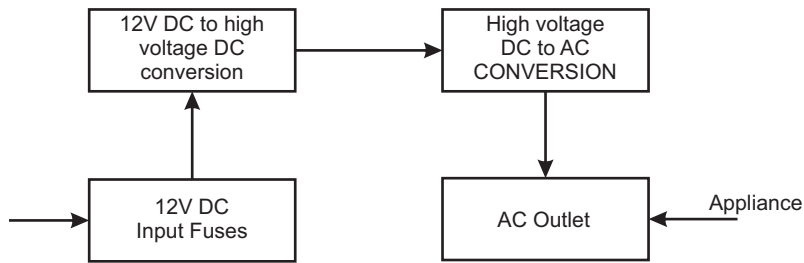
CONTROLS, INDICATORS AND CONNECTORS

The front panel of the inverter provides two LED indicators. The green LED indicator shows the unit is working correctly when lit. The red LED indicator shows inverter shut down from overload, over voltage or over temperature. The inverter is fitted with an on/off switch, the on/off switch is also used to force reset the inverter circuits in case of overload, over voltage or over temperature. Power is supplied through the three pin AC plug and DC input power is supplied via the rear panel.

HOW INVERTERS WORK

Principle of operation

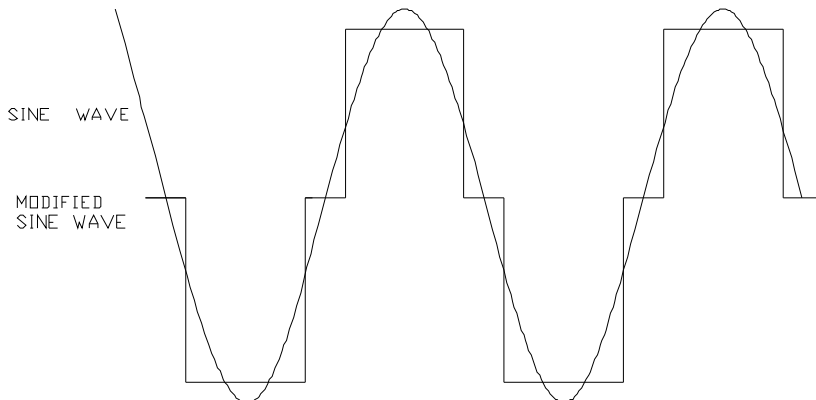
The inverter converts low voltage DC (direct current) from a battery or other power source to standard AC (alternating current) household power. The inverter converts power in two stages. The first stage is a DC to DC conversion process that raises low voltage DC from the inverter input to high volt DC. The second stage is the actual inverter stage that converts the high DC into AC power.



The DC to DC converter stage uses modern high frequency power conversion techniques that have replaced bulky transformers found in less technologically advanced models. The inverter uses advanced MOSFET transistors in a full bridge configuration, which ensures excellent overload capabilities and allows the inverter to operate reactive loads such as small induction motors.

The output waveform

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



The modified sine wave produced by the inverter has an RMS (root mean square) voltage, which is the same as standard household power. Most AC voltmeters (analog and digital) are sensitive to the average value of the waveform rather than the RMS value. They are calibrated for RMS voltage under the assumption that waveform measured will be a pure sine wave. Voltmeters will not read the RMS voltage of a modified sine wave correctly. The reading will be around 20-30 volts too low when measuring the inverters output.

INSTALLING THE INVERTER

Power source requirements

The power source for the inverter must provide between 11 and 15 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 Amps the power source must deliver simply divide the power consumption of the load by 10.

Example: If a load is rated at 700 watts AC, the power source must be able to deliver 700 by $10=70$ Amps.

CAUTION:

The inverter must be connected to batteries with a nominal output voltage of 12 volts

Connecting to the power source

The inverter is equipped with a cigarette lighter plug and battery clip cables (Inverter of 150 watts output without battery clip cables) for connection directly to the power source.

Using the fused cigarette lighter plug

The cigarette lighter plug is suitable for operating the inverter at power outputs up to 150 watts. The tip of the plug is positive and the side contact negative. Connect the inverter to the power source by firmly inserting the cigarette lighter plug into the cigarette lighter socket.

CAUTION:

Connect directly to battery or power source when operating above 150watts.

NOTE:

Most vehicle cigarette lighter circuits use fuses rated at 15 to 20 amps or greater. To operate at full output use the battery clip cable.

Connecting to a power source using provided cables

If the inverter is to be used for extended periods at power levels above 150 watts, direct connection to the power source is required. Use the leads provided to connect directly to the 12-volt power source using the following guidelines

- Check that the inverter is switched off and no flammable fumes are present
- Connect the black cable to the post marked negative (-) on the back panel of the inverter
Connect the black clip to the negative (-) terminal of the battery
- Connect the red cable to the post marked positive (+) on the back panel of the inverter.
Connect the red battery clip to the positive (+) terminal of the battery.
- Check that all the connections between battery clips and terminals are secure

CAUTION:

Loose connections may cause overheated wires and melted insulation. Check to make sure you have not reversed the polarity.

Connection to load

The inverter is equipped with a standard AC household type socket. Plug the cord from the appliance you wish to use into the socket. Make sure that the combined load requirement of your equipment does not exceed the rated watts.

The 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 recreational vehicle AC distribution wiring. Do not connect the inverter to any AC load circuit in which the neutral conductor is connected to earth or the negative of the DC (battery) source.

WARNING:

Never connect to AC distribution wiring.

CAUTION: RECHARGEABLE APPLIANCES

Certain rechargeable devices are designed to be recharged by plugging them directly in to a household socket. This type of device must never be used in the inverter. The device will damage the inverter. Do not use the inverter to recharge items that can be plugged directly into a household socket. This problem does not occur with the vast majority of battery-operated equipment. Most of these devices use a separate charger or transformer that is plugged into an AC household socket. The inverter is easily capable of running most chargers and transformers.

POSITIONING THE INVERTER

For best operating results, the inverter should be placed on a flat surface such as the ground, car floor or seat, or another solid surface. The unit is equipped with a 1 meter-power cord for easy positioning. The inverter should only be used in locations that meet the following criteria.

Dry : do not allow water or liquids to come into contact with the inverter

Cool: ambient air temperature should be between 30°F (-1°C) non-condensing, and 105°F (40°C). Do not place the inverter on or near a heating vent or any equipment, which is generating heat above room temperature keep the inverter out of direct sunlight.

Ventilated: keep the area surrounding the inverter clear to ensure free air circulation around the unit. Do not place items on or near the unit whilst it is operating. A fan is helpful if the unit is operating at maximum power outputs for extended periods of time. If the internal temperature of the inverter exceeds 90°C the inverter will shut down and restart when it has cooled.

Safe: do not position the inverter near any flammable material or in a position that may accumulate flammable fumes or gases.

OPERATING TIPS**Rated versus actual current draw.**

Most electrical equipment has labels that indicate the power consumption in amps or watts. Ensure the power consumption of the item you wish to operate is specified at the rated watts or less. The inverter has overload protection so it is safe to try and operate equipment rated at the specified 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 inverter to run. However larger resistive loads, such as, stoves and heaters usually require more wattage than the inverter can deliver on a continuous basis. Inductive loads such as, TV's and stereos require more current to operate than resistive loads of the same wattage rating. Induction motors as well as some televisions may require 2-6 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 of determining if a specific load can be started and how long it will run. The inverter is fitted with overload protection so will simply shut down if overloaded. To restart the unit after overloading remove the overload and if necessary turn the power switch off and then on.

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 it is recommended that the operator starts the vehicle every 2 to 3 hours to recharge the battery system thus guarding against unexpected equipment shut down and ensuring that there is still sufficient power to start the engine. The inverter's built in alarm will sound if the DC voltage drops below 10.5V. The inverter can be used whether or not the vehicles engine is running however the inverter will not operate whilst the engine is being turned over as battery voltage drops substantially whilst the engine is being started. In most cases the inverter can be left connected to the battery when not in use as it draws very little current, however if the vehicle is to remain unused for several days disconnect the inverter from the battery.

In built protection.

Your 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 audible signal will sound when input voltage drops to 10.5V. The inverter automatically shuts down when input voltage drops to 10.0V. When the power source input voltage is above 10.5V the inverter may be restarted.
- **Over voltage protection:** The inverter will automatically shut down when the input voltage exceeds 15.5V DC
- **Short circuit protection:** The inverter will shut down. Remove the short circuit and the inverter will reset.
- **Overload protection:** The inverter will automatically shut down when the continuous power consumption is over the rated Max power output.
- **Overheating protection:** When the temperature sensor inside the inverter reaches 65 degrees C, the unit will automatically shut down. In this instance, allow at least 15 minutes before attempting to restart the inverter and always disconnect appliances.

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.

TROUBLE SHOOTING

TROUBLE/INDICATION	POSSIBLE CAUSE	SUGGESTED REMEDY
No AC output	Inverter is cold	Disconnect load from inverter. Operate inverter without load for a few minutes. Reconnect load.
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
Motorised power tool won't start	Excessive start up load	If appliance does not start, then appliance is drawing excessive wattage and will not work with inverter
Motorised 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


Correct Disposal of This Product (Waste Electrical & Electronic Equipment)
(Applicable in the European Union and other European countries with separate collection systems)

This marking shown on the product or its literature, indicates that it should not be disposed with other household wastes at the end of its working life. To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate this from other types of wastes and recycle it responsibly to promote the sustainable reuse of material resources.

Household users should contact either the retailer where they purchased this product, or their local government office, for details of where and how they can take this item for environmentally safe recycling.