

OWNER'S MANUAL

DP AUDIO

Model No. DN350

12 Volt DC to 115 Volt AC

150 WATT

300WATT

HIGH SURGE POWER INVERTER

Please read installation and operation instruction before using this Power inverter.

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Principle of Operation

The inverter converts power in two stages. The first is a DC-to-DC converter, which raises the low voltage DC at the inverter input to 145 volts DC. The second stage is the actual inverter stage. It converts the high voltage DC into 115 volts, 60 Hz AC. The inverter stage uses advanced power MOSFET transistors in a full bridge configuration. This gives your excellent overload capability and the ability to operate tough reactive loads.

Inverter Output Waveform

The AC output waveform of the Inverter is called a “quasi-sine wave” or a “modified sine wave”. It is a stepped waveform that is designed to have characteristics similar to the sine wave shape of utility power. A waveform of this type is suitable for a wide variety of applications.

The modified sine wave produced by the Inverter is designed to have an **RMS** (root mean square) voltage of 115 volts, 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 the inverter, a true RMS reading Voltmeter such as a Fluke 87, Fluke 8060A, Beckman 4410, or Triplet 4200 must be used.

Installation

Power source

The power source must be provide between 9.5 and 15.8 volts DC and must be able to supply sufficient current to operate the load. The power source may be a battery or a well regulated DC power supply. As a rough guideline, divide the power consumption of the load (in watts) by 12(the input voltage) to obtain the current (in amperes) the power source must deliver.

Example: Load in rated at 150 watts

Power source must be able to deliver: $150/12=12.5$ amperes

CAUTION: THE INVERTER MUST BE CONNECTED ONLY TO BATTERIES WITH A NOMINAL OUTPUT VOLTAGE OF 12 VOLTS. THE INVERTER WILL NOT OPERATE FROM A 6 VOLT BATTERY AND WILL BE DAMAGED IF IT IS CONNECTED TO A 24 VOLT BATTERY

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Connecting to Power Source

The Inverter is equipped with a cigarette lighter plug for connection to the power source. The tip of the plug is positive and the side contact is negative. Connect the plug to the cigarette lighter socket by pushing it firmly to ensure proper contact.

CAUTION: DO NOT USE WITH POSITIVE GROUND ELECTRICAL SYSTEMS.

The majority of modern automobiles, RVs, and trucks are negative ground. Do not use the Inverter with positive ground vehicle electrical systems.

Connection to Load

Once you have determined the proper method of connection to this power source, connect the 150W Inverter accordingly, making sure to fully push the plug into the appropriate socket. Now plug appliance(s) into the receptacle(s) on the inverter, flip the rocker switch to the (ON) position, and the green LED above it will illuminate. Turn on your appliance(s) making sure the load requirements are within the parameters of the Inverter's output.

If an audible alarm sounds, that means the power is too low. At 9.5V, the indicator light will switch to red and the inverter will automatically shut down.

CAUTION: DO NOT CONNECT TO AC DISTRIBUTION WIRING

The Inverter is designed to be directly connected to standard electrical and electronic equipment in the fashion described above. Do not connect the Inverter to household or RV AC distribution wiring. Do not connect the Inverter to any AC load circuit in which the neutral conductor is connected to ground (earth) or to the negative of the DC (battery) source.

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CAUTION: RECHARGEABLE APPLIANCES

Certain rechargeable devices are designed to be plugged directly into an AC receptacle to be recharged. These devices may damage the Inverter. When first using a rechargeable device monitor its temperature for the first 10 minutes to ensure that it does not become abnormally hot. That will be your indication that it should not be used with this inverter.

This problem does not occur with the vast majority of battery operated equipment. Most of this equipment uses a separate charger or transformer that is plugged into the AC receptacle. The Inverter had no trouble powering these chargers and transformers.

Placement of Inverter

For best operating results, the Inverter should be placed on a flat surface, such as the floor or seat of a vehicle. Approximately 20' of cord have been provided for this purpose. The inverter should only be used in locations that meet following requirements:

DRY-do not allow water to drip or splash on the Inverter.

COOL- ambient air temperature should be between 50 and 80 F. Do not place the Inverter on or near a heating vent or any piece of equipment, which is generating heat above room temperature. Do not place the Inverter in direct sunlight.

VENTILATED- allow at least one inch of clearance around the Inverter for airflow. Do not place items on or over the Inverter during operation. Make sure that air is allowed to circulate freely around the unit.

SAFE-do not use the Inverter near flammable materials or in any location which may accumulate flammable fumes or gases, such as the battery compartment of your car, truck, RV or boat.

Operating Tips

Rated versus Actual Current Draw of Equipment

Most electrical tools, appliances and audio/video equipment have a label indicating power consumption in amps or watts. Add up the power consumption of those items you will be using simultaneously, keeping the total below the rating of Inverter. If the power consumption is rated in amps, multiply by the AC volt (115) to determine the wattage. For example, a power drill rated at 3.2 amps will draw 368 watts, more than 300W Inverter can handle on a continuous basis.

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Resistive loads are the easiest for the Inverter to drive, though larger resistive loads, such as electric stoves or heaters, usually require more wattage than the Inverter can deliver continuously. Inductive loads, such as TV's and stereos (and device with a coil or transformer in it), by nature require more current to operate than a resistive load of the same wattage rating. Induction motors (motors without brushes), as well as some televisions, may require 2 or 6 times their wattage to start up. This condition may require repeated "ON OFF, ON OFF, ON OFF" switching of the

power switch on your Inverter in order to get them “started”.

The most demanding are those that start under load, i.e. compressors and pumps. Since motor and television characteristics vary widely, only testing will determine if a specific load can be started and how long it can be run. There are no standards for “surge power” partly because this specification cannot be represented accurately by a simple number

Through the 150W Inverter can provide power up to 150 watts on a momentary basis, experimentation is the only means of determining whether it can handle the surges needed to start a particular load.

IMPORTANT NOTE: The 150W Inverter will not operate most appliances designed to produce heat, such as hair dryers, coffee makers, irons, heaters, and toasters. The current draw of most of these exceeds 1000 watts, far beyond the capacity of this unit.

Battery Operating Time

With a typical vehicle battery, a minimum operating time of 1 to 2 hours can be expected between recharging, depending on the current draw of the load being driven. We recommend that the operator start the vehicle every hour to recharge the battery system. This will prevent any unexpected shutdowns of the equipment and will ensure that there is always sufficient battery capacity to start the vehicle engine. The inverter may be used either while the engine is running or turned off. However, the Inverter may not operate while the engine is being started since the battery voltage can drop substantially during cranking.

The Inverter draws less than 0.2 ampere from the battery when it is not supplying power to a load. In most cases the 300W Inverter may be left connected to the battery for up to 3 hours when it is not in use since it draws so little current. If the vehicle will not be used for several days, disconnect the Inverter from the battery.

CAUTION: LOW BATTERY ALARM

An alarm will sound when the voltage from the battery drops to 10.2 volts. This indicates that the battery requires recharging. The user should stop operations at this time since the inverter AC will shut down automatically shortly afterwards (when battery voltage drops to 9.5 volts)

NOTE: The alarm may sound momentarily when the unit is being connected to, or disconnected from the power source. This is normal and does not indicate any problem.

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Troubleshooting

Automatic Protective Features of the Inverter

Your Inverter circuitry constantly monitors the following potentially hazardous conditions:

- a) Low Battery Voltage- This condition is not harmful to the inverter but could damage the power source. The Inverter shut down when input voltage drops to 9.5 volts.
When the condition is corrected (i.e alternator charges battery) the unit may be restarted.
- b) Over Voltage Protection- The inverter will automatically shut down when the input voltage exceeds 15.8 volts DC.

- c) Overload Protection – The inverter will automatically shut down when the continuous draw exceeds 150 watts.
- d) Over Temperature Protection- When the temperature of the internal heat sinks reaches 150° F, the solid-state temperature sensor located in the Inverter will automatically shut down the unit. The unit may be “restarted” by turning the unit OFF and then ON again after approximately 15 minutes of cool down.

Common Problems

Televisions will not start/ Power tools will start but will not continue to run

Certain induction motors (motors without brush) may require two or six time their wattage ratings to start up. If the power tool runs momentarily then stops when power is applied, try leaving the power to the tool “on” while quickly turning the power switch on the Inverter on and off.

Buzz in audio systems

Some inexpensive stereo systems and “boom boxes” will emit a buzzing sound from their loudspeakers when operated from the Inverter. This is because the power supply in the device does not adequately filter the modified sine wave produced by the Inverter. The only solution is to use a sound system that incorporates a higher quality power supply.

Television interference

The Inverter is shielded and filtered to minimize interference with TV signals. In some cases, particularly with weak TV signals, some interference may still be visible. Try the following corrective measures:

- a) Position the Inverter as far as possible from the television, the antenna and the antenna cables.
- b) 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 a high quality, shielded antenna cable is used.

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Troubleshooting Guide

PROBLEM: Lack of power output

Possible causes

- Inverter not adequately warmed up
- Automotive system requires ignition to be on
- Battery voltage below 9.5 volts
- Equipment being operated draws too much power
- Inverter in thermal shutdown condition

If the alligator clips of the hardwire adapter kit are connected incorrectly to the terminals.

PROBLEM: Low Output Voltage

Possible causes

- Using average-reading voltmeter
- Inverter is overloaded
- Input voltage below 9.5 volts

Suggested remedy

- Turn Inverter power switch off and then on again until the Inverter powers your appliance. Repeat as necessary to get your appliance “started”.
- Turn ignition to accessory position.
- Recharge or replace battery
- Reduce load to a maximum of 150 watts
- Allow Inverter to cool down. Ensure there is ventilation around unit. Ensure the load is no more than 150 watts for continuous operation.
- Replace a new 20-Amp fuse, then ensure the red clip to the positive terminal and the black clip to the negative terminal.

Suggested remedy

- Use true RMS reading meter.

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- Reduce load to maximum 150 watts to maintain regulation.
- Keep input voltage above 9.5 volts to maintain regulation.

Suggested remedy

- Replace battery
- Check conditions of cigarette lighter plug and socket. Clean or replace as necessary voltage drop.

Cautions

WHEN CONNECTING DIRECTLY TO A BATTERY OR OTHER POWER SOURCE OBSERVE PROPER POLARITY.

DO NOT EXCEED THE MAXIMUM INPUT VOLTAGE 15 VDC (DIRECT CURRENT).

ALWAYS DISCONNECT THE INPUT TO THE INVERTER WHEN IT IS NOT IN USE.

REGULARLY CHECK THAT THE INPUT AND OUTPUT CONNECTIONS ARE TIGHT. LOOSE CONNECTIONS CAN GENERATE HARMFUL HEAT AND/OR DAMAGE THE INVERTER OR POWER SOURCE.

IMPROPER USE OF THE DEVICE CAN CAUSE DAMAGE OR INJURY TO PEOPLE, PROPERLY, DOMESTIC ANIMALS AND EVEN LOSS OF LIFE.

SPECIFICATIONS

Max. Continuous Power	150 watts
Leak Power	300 watts
USB Output	DC5V, 500mA
No Load Current Draw	<0.3Amp
Wave form	Modified Sine Wave
Input Voltage Range	11-15VDC
AC Receptacles	dual 3-Prong
Fuse	20 Amp
Dimensions	5.1”L*4.05”W*2.36”H

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