

OPERATING INSTRUCTIONS FOR YOUR

Cobra[®]

TURBO power
inverter

“Big Power In Small Packages.”

MODELS TRADESMAN AND ROAD WARRIOR

Cobra[®]

Cobra Electronics Corporation
6500 W. Cortland Street
Chicago, IL 60707





MODELS TRADESMAN and ROAD WARRIOR

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INTRODUCTION

Thank you for your purchase of a Cobra® **TURBO** power inverter. The **TURBO** series provides big power in small packages. High efficiency designs make each model ideal for all mobile environments where space is at a premium.

Inverter is the proper term for any device that turns DC (direct current) into AC (alternating current). The **TURBO** inverter takes 12 volts DC from your battery and converts it to 115 volts AC to run appliances. Just like utility power, the frequency is held constant at 60 Hertz, and the output voltage is regulated between 110 and 120 volts true RMS, despite changes in load and battery voltage.

The energy delivered by the inverter comes from the battery which powers it. And that energy was put into your battery by your battery charger, which might be a vehicle alternator or an electronic power supply.

The most appropriate use of an inverter system is for light, long-term loads, such as TVs, VCRs and small computers, or for heavy, short-term loads such as vacuum cleaners, microwave ovens and hair dryers.

Heavy, long-term loads like electric heaters and air conditioners require a great deal of energy. While they won't harm your inverter, they would need an extremely large battery to run continuously overnight, and then a very heavy charger to recharge that battery the following day.

There really aren't a lot of do's and don'ts to remember. Your **TURBO** inverter is designed to protect itself and your battery.

NOTE: While the **TURBO** inverter does not mistreat your appliances, it cannot protect them. A light bulb can burn out, or an appliance can fail, just as it might when plugged into utility power.

Please take a few moments to read this owners manual. It contains important safety information as well as practical application tips.

SAFETY

A few common-sense precautions should be observed:

1. The **TURBO** inverter delivers 115 volts AC. This is the same kind of electricity as in the wall sockets of most homes and offices. 115 volts AC is potentially lethal and must be treated with respect.
2. The **TURBO** inverter is polarity sensitive and will be damaged if connected to the battery incorrectly. If there is any doubt, consult an electrician. (See Installation).
3. A safety hazard will result if inadequate wiring is used to make connection to the inverter. (See Installation).
4. The **TURBO** inverter is intended to deliver stand-alone AC power. Its output cannot be safely connected to utility power, another inverter, a generator, or any other power source. Where other power sources are available in the same system, isolating relays should be used to prevent connection of the inverter's output to those other sources of AC.
5. In case of malfunction, immediately turn the power switch OFF and disconnect the inverter from the battery.
6. DO NOT STICK ANYTHING INSIDE THE CASE. The high voltage inside can cause severe injury, even death.
7. KEEP THIS UNIT AWAY FROM CONTACT WITH WATER OR OTHER LIQUIDS.
8. DO NOT OPERATE THIS UNIT, or any electrical device, when you, the device or any surfaces that might touch a power source are WET. Many fluids can conduct electricity, causing severe injury, even death.
9. DO NOT OPEN THE CASE. This will void your warranty.

INSTALLATION

When working on the installation, be sure that the inverter power switch is in the OFF position. Note that this is only a control switch which tells the inverter whether or not to run. Even though it may be OFF, the battery will still be connected directly to the inverter's input terminals, so they will always be live. Treat them accordingly.

Please get the polarity right. If you get it wrong, you will damage the inverter and void the warranty. It does happen, despite this warning. So please double check before you make that last connection. The positive (+) terminal on the battery should connect to the positive (+) terminal on the inverter, and the negative (-) terminal on the battery should connect to the negative (-) terminal on the inverter.

SUGGESTION: Before making the last connection, brush the cable lightly against the terminal. There should be no spark, or at most a very slight one. Heavy sparking indicates a problem.

The inverter may be mounted in any position on any flat surface: wall, ceiling or floor. It should be bolted or screwed down using a #6 screw in each of the four mounting holes. In choosing a location, look for a dry, cool, dust-free, well ventilated spot as close to the battery as possible, but clear of battery acid and fumes. Under the hood of a vehicle is a harsh environment which should be avoided.

The battery cables are the key to a successful installation. They must be at least AWG (American Wire Gauge) #4 and should be as heavy and as short as practical. To be extremely conservative just use #2 gauge wire which is as large as the inverter terminal will accept. Otherwise, the minimum acceptable sizes are shown below. The wire and the appropriate battery terminals are usually available from auto supply stores. If you cannot find the right wire there, try an electrical distributor or a welding supply house.

INSTALLATION (continued)

| DISTANCE TO BATTERY | INVERTER MODEL | |
|---------------------|--------------------|-----------------------|
| 5 FEET | TRADESMAN AWG 4 | ROAD WARRIOR AWG 3 |
| 10 FEET | AWG 3 | AWG 2 |
| 15 FEET | AWG 2 | NOT RECOMMENDED |

Note that the heavier the wire, the smaller the wire gauge number. The wire sizes called out in the table will keep the voltage drop between the battery and the terminals down to 0.4 volt or less. More voltage drop than this would impair performance.

SPECIFICATIONS

| | TRADESMAN | ROAD WARRIOR |
|-----------------------------|---|---|
| Output Power, | | |
| Continuous: | 700 Watts | 1400 Watts |
| Peak: | 1200 Watts | 2200 Watts |
| Input Voltage: | 10 to 16.5 Volts DC | 10.5 to 16.5 Volts DC |
| Output Voltage: | 115 volts AC $\pm 5\%$ | 115 volts AC $\pm 5\%$ |
| Output Frequency: | 60 Hz ± 1 Hz, Modified Sinewave | 60 Hz ± 1 Hz, Modified Sinewave |
| Idle Current: | 0.090A | 0.090A |
| Efficiency: | >90% | >90% |
| Thermal Protection: | Proportional power reduction | Proportional power reduction |
| Overload Protection: | Dual mode limiter | Dual mode limiter |
| Dimensions: | 3 $\frac{1}{8}$ " H x 12" W x 2 $\frac{3}{8}$ " D | 3 $\frac{1}{8}$ " H x 12" W x 3 $\frac{1}{8}$ " D |
| Weight: | 3.4 lbs. | 4.3 lbs. |

REMOTE CONTROL

Each inverter comes with a removable connector for remote ON-OFF control plus a hard-wired output. The remote connector has five terminals, each of which will accept a wire as heavy as AWG #12. The terminals viewed end-on are: (1) (2) (3) (4) (5).

The first two, (1) and (2), are connected internally to the two terminals of the built in switch. Connecting (1) and (2) together will turn on the inverter. Therefore, a pair of wires may run from these terminals to any kind of switch within, say, 50 feet, and that switch will control the inverter, so long as the built-in switch is left OFF. The switch voltage is 12 volts DC and the current is less than 1/2 ampere.

To summarize, for remote control:

1. Leave the built-in switch OFF.
2. Install a SPST (single-pole, single-throw) or other switch in the desired location.
NOTE: This switch cannot have a pilot light associated with it, as this will damage the inverter.
3. Run a pair of wires, AWG #16 or heavier, from (1) and (2) to the new switch terminals.

For a vehicle installation, it may be desirable to control the inverter with the ignition switch. That way there is less likelihood of inadvertently leaving the inverter running overnight; removing the keys will turn it off. To do this, find a terminal that's hot (+12 volts) only when the ignition is in ACCESSORIES or ON. In the fuse box, after the fuse that feeds the radio would be a good spot. Connect a #16 wire from this point to terminal (2). No connection to (1) should be made. Tape the built-in switch in the OFF position and don't use it while the above connection is present. The key will then control the inverter.

HARD-WIRED OUTPUT

If it is desired to permanently connect the inverter's output to a string of outlets or to a load, the remote connector should be used. The three right-hand terminals correspond to (3) White: neutral; (4) Black: hot; and (5) Green: ground or chassis. Any three-wire electrical cable will have these colors (although the ground wire may be bare copper instead of green), and the wires should be connected to their corresponding terminals. For a wire run of 50 feet or less, AWG #14 can be used. If it's longer, use AWG #12.

CAUTION: When making a permanent installation, make sure these same lines being fed by the inverter will never be fed by shore power, a generator, another inverter or any other source of AC; once again, that would cause damage and void the warranty. If you wish to use another source of AC on the same lines, it is necessary to disconnect the inverter first. To do this automatically, install a DPDT (double-pole, double-throw) relay in the White and Black lines.

OPERATION

Using your **TURBO** inverter is quite simple. Just turn the switch ON, and observe that the AC light comes on, indicating there is 115 volt AC power at the output. Any appliance connected to the inverter will operate, if it is within the inverter's power capability. Should you wish to connect more than one appliance to the inverter, a multi-tap extension cord may be used. It should be rated at a minimum of 12 amps.

Please note that the fan will run only when the inverter is loaded beyond 120 watts.

When operated at full load for extended periods it is normal for the inverter to be HOT to the touch.

The output is factory pre-set to 115 volts AC at 60 Hertz. The waveform, a "modified sinewave", has been found satisfactory for running virtually all loads. The output voltage can only be measured accurately with a "true RMS" voltmeter. Because of the special waveform, all other voltmeters, analog or digital, will read 10 to 20 volts low.

Low Battery

If the voltage at the input terminals of the inverter drops below 10.3 volts, the LOW BATTERY ALARM will emit a high-pitched warning tone, and the inverter will continue to operate. The tone will stop if the voltage is raised back above 12.0 volts.

If the battery voltage continues downward, the tone stays on and the inverter keeps running until the voltage drops below 10.0 volts. At this point the inverter locks itself off to protect your battery, but the warning tone stays on.

To reset:

Manually: Turn the power switch OFF for one second and then back ON.

Automatically: Recharge the battery above 13.0 volts.

OPERATION (continued)

Overvoltage

If the input voltage goes above 16.5 volts, the inverter will shut down to protect itself. When the voltage returns to less than 16.5 volts, the inverter will turn back on automatically.

CAUTION: Voltages above 18 volts can cause permanent damage.

Overload

When the inverter is loaded beyond its capacity, its output voltage will drop in proportion to the overload. If a heavy overload is sustained for more than a few seconds, the inverter will shut down. To reset, turn the power switch OFF for one second and then back ON.

Temperature

A cold inverter can deliver more power than a hot one. The wattage rating for each model is based on a free air "room temperature" environment. If it's in a hot location, or if air isn't available for cooling, the inverter will protect itself by lowering its overload trip point and will not deliver full rated power.

For technical assistance, please call our Automated Help Desk which can assist you by answering the most frequently asked questions about Cobra products.

(773) 889-3087

24 hours a day, 7 days a week.

A consumer Service Representative can be reached through this number 8:00 am - 8:00 pm, Monday through Friday, CST.

If You Think You Need Service Call 1-773-889-3087

You may be asked to send your unit to the Cobra factory. It will be necessary to furnish the following in order to have the product serviced and returned.

1. For Warranty Repair include some form of proof-of-purchase, such as a mechanical reproduction or carbon or a sales receipt. If you send the original receipt it cannot be returned.
2. Send the entire product.
3. Enclose a description of what is happening with the unit. Include a typed or clearly printed name and address of where the unit is to be returned.
4. Pack unit securely to prevent damage in transit. If possible, use the original packing material.
5. Ship prepaid and insured by way of a traceable carrier; such as United Parcel Service (UPS) or First Class Mail; to avoid loss in transit to Cobra Factory Service, Cobra Electronics Corporation, 6500 W. Cortland St., Chicago, IL 60707.
6. If the unit is in warranty, upon receipt of your unit it will either be repaired or exchanged depending on the model. Please allow approximately 3 to 4 weeks before contacting us for status. If the unit is out of warranty a letter will automatically be sent informing you of the repair charge or replacement charge. If you have any questions, please call 1-773-889-3087 for assistance.

LIMITED ONE-YEAR WARRANTY

COBRA ELECTRONICS CORPORATION warrants that its COBRA power inverter products, and the component parts thereof, will be free of defects in workmanship and materials for period of one (1) year from the date of first consumer purchase. This warranty may be enforced by the first consumer purchaser, provided that the product is utilized within the U.S.A.

Cobra will, without charge, repair or replace, at its option, defective inverter products or component parts upon delivery to the Cobra factory Service Department, accompanied by proof of the date of first consumer purchase, such as a duplicated copy of a sales receipt.

You must pay any initial shipping charges required to ship the product for warranty service. The return charges will be at Cobra's expense if the product is repaired or replaced under warranty. For further details concerning procedures for obtaining service, see the "If You Need Service" section of this Owner's Manual.

Exclusions: This limited warranty does not apply 1) to any product damaged by accident, improper input voltage or weather related circumstances; 2) in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs; 3) if the serial number has been altered, defaced or removed; or 4) if the owner of the product resides outside the U.S.A.

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

Cobra shall not be liable for any incidental, consequential or other damages, including, without limitation, damages resulting from loss of use or cost of installation.

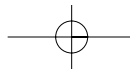
Some states do not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations may not apply to you.

This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

COBRA ELECTRONICS CORPORATION

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In addition to its exclusive series of **TURBO** power inverters, Cobra is also one of America's leading brands of CB radios and accessories, **Intenna** cordless telephones and answering systems, and Safety Alert® radar/laser detectors.



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