

CLAMPBO®

POWER



12V DC to 230V AC POWER INVERTERS

MODEL NOS: CI400B, CI600B, CI800B, CI000B, CI1200B, &
CI1600B

OPERATING & MAINTENANCE INSTRUCTIONS



INTRODUCTION

Thank you for purchasing this CLARKE Power Inverter.

Before attempting to operate the product, it is essential that you read this manual thoroughly and carefully follow all instructions given. In doing so you will ensure the safety of yourself and that of others around you, and you can also look forward to the product giving you long and satisfactory service.

GUARANTEE

This CLARKE product is guaranteed against faulty manufacture for a period of 12 months from the date of purchase. Please keep your receipt as proof of purchase.

This guarantee is invalid if the product is found to have been abused or tampered with in any way, or not used for the purpose for which it was intended.

Faulty goods should be returned to their place of purchase, no product can be returned to us without prior permission.

This guarantee does not effect your statutory rights.

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GENERAL SAFETY PRECAUTIONS



WARNING: TO ENSURE RELIABLE SERVICE FROM YOUR POWER INVERTER, YOU MUST ENSURE IT IS INSTALLED AND USED ACCORDING TO THESE OPERATOR INSTRUCTIONS, PLEASE READ THESE INSTRUCTIONS THOROUGHLY BEFORE ATTEMPTING TO USE THE INVERTER.

PERSONAL SAFETY

1. **ALWAYS** stay alert, watch what you are doing and use common sense when using this product. Do not use the product when you are tired or under the influence of medication, drugs or alcohol. A moment of inattention can result in personal injury.
2. **ALWAYS** thoroughly familiarise yourself with this product & its operation, and always read and understand the instructions and warnings in this manual before using the equipment.
3. **NEVER** dismantle the unit. Always return this product to the dealer if any problem is found.
4. **ALWAYS** have the unit repaired by your local CLARKE dealer, using only identical replacement parts. This will ensure the safety of the unit is maintained. The use of non standard parts could be hazardous.
5. **DO NOT** use with positive earth systems (most modern vehicles, lorries, boats etc, are negative earth). Reverse polarity connection will result in a blown fuse and may cause permanent damage to the inverter.
6. **DO NOT** use in a wet environment.
7. **DO NOT** install inside an engine compartment - the inverter must always be installed in a well ventilated area.
8. **DO NOT** use in potentially explosive atmospheres such as garage forecourts etc.
9. **NEVER** connect to an AC supply.
10. **ALWAYS** disconnect the appliance from the inverter before making adjustments to the appliance being run.
11. This inverter is not tested for use with medical devices.

This CLARKE product has been designed to give long and trouble free service. If, however, having followed the instructions in this booklet carefully, you encounter problems, take the unit to your local CLARKE dealer.

ENVIRONMENTAL PROTECTION



Do not dispose of this product with general household waste. All tools, accessories and packaging should be sorted, taken to a recycling centre and disposed of appropriately.

EQUIPMENT COMPONENTS

INTRODUCTION

The inverter gives a continuous 230V, 50Hz power supply via a standard 3-pin socket and is capable of running a range of household appliances, including TVs, camcorders, laptops, lamps and power tool chargers etc., depending upon the rating of the inverter.

Safety features include automatic shutdown and a low battery alarm - to avoid the possibility of damaging your battery.

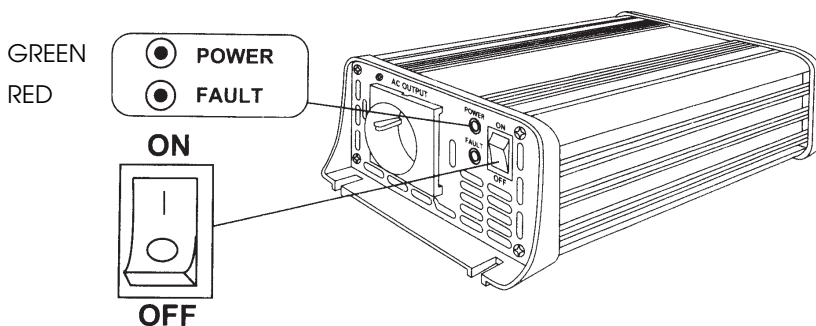
CONTROLS INDICATORS AND CONNECTORS

An ON/OFF rocker switch turns the inverter On and Off and will reset the inverter circuits.

The back panel provides DC connections for battery clamps (or cigar lighter connector on the CI400B model).

Two LEDs are provided on the front panel.

- The **GREEN** LED illuminates when the inverter is connected, switched ON, and working correctly.
- The **RED** LED, when illuminated, indicates that the inverter is in a fault condition and has shutdown from overload, excess voltage or overheating.



SUITABLE POWER SOURCES

In order to operate the inverter and supply power to an appliance, a suitable DC power supply is required. This can be a vehicle or caravan battery, portable power pack, or an independent 12 Volt battery. For most applications, a 'deep cycle' battery is recommended for best performance.

The size of the battery used will determine how long the inverter will supply power to an appliance and how well the inverter will perform. Most batteries are marked with their size in Amp Hours (AH).

Because 12 Volt inverters are capable of drawing high currents, the inverter should only be connected to a suitable size battery. Connection to an undersized battery could damage the battery and will result in the inverter shutting down within a short period due to low battery voltage. The amount of power drawn from the battery is proportional to the inverter load.

	200 W	300 W	400 W	500 W	600 W	800 W
Minimum recommended battery size	24 Ah	24 Ah	50 Ah	50 Ah	50 Ah	75 Ah
Run time with maximum load & minimum battery size	53 min	40 min	40 min	35 min	30 min	20 min
Run time for a 100 Watt lamp with minimum battery size	2 hours	2 hours	4 hours	4 hours	4 hours	6 hours
Ideal battery size (A/h)	50-70	50-70	50-100	50-130	50-130	75-250

DETERMINING SUITABLE LOADS

All appliances have a rating plate that shows the amount of power (Watts) used, or the current (Amps) drawn during normal use. The following table shows the load that can be run by the inverter.

Some appliances that use an electric motor or transformer may draw considerably more than their rating when first turned on. These are known as inductive loads and are the most difficult for the inverter to run.

Model No:	CI400B	CI600B	CI800B	CI1000B	CI1200B	CI1600B
AC max load (Watts)	200	300	400	500	600	800
AC max load (Amps)	0.87	1.3	1.74	2.2	2.7	3.5

Resistive loads are the easiest for the inverter to run. However, larger resistive loads, such as heaters, usually require more power than the inverter can deliver on a continuous basis. Inductive loads, such as TVs 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, disconnect the load and if necessary turn the power switch OFF then ON.

The following table is a guide to the approximate AC power drawn by various appliances. The DC Amps column shows the approximate power drawn from the 12 Volt supply.

APPLICATION CHART		
Appliance	AC power (W)	Current drawn (A)
Small Air Compressor/Water Heater	5000	470
Larger Power Tools/Electric Kettle	3000	260
Circular Power Saw/Electric Chainsaw	2000	175
Toaster/Sandwich Maker	1500	140
Small Household Vacuum Cleaner	1250	95
Belt Sander & other Power Tools	1000	92
Small Microwave Oven (500/600 Watts)	900	83
Combo TV/VCR	750	69
Power Drill/Portable Grinder	600	50
Floodlights (500 Watts)	500	46
Submersible Pump	400	37
Small Colour Television	350	32
Small Power Tools/Fluorescent Light	300	28
Juicer/Blender	250	23
Bar Fridge/Large Stereo/PA Amplifier	200	19
Hand Mixer	175	16
Laptop Computer/Electric Knife	150	12
Portable Stereo/CD/DVD/VCR/Playstation	100	9
Charger (Mobile Phone/Camera/Camcorder)	50	5

CONNECTION AND POSITIONING

POSITIONING OF THE INVERTER

The inverter should always be placed on a flat, level surface and should only be used in locations that meet the following criteria:

DRY - Do not allow water/other liquids to come into contact with the inverter.

COOL - Do not place the inverter on or near a heating vent or any piece of equipment which is generating heat. Keep the inverter away from direct sunlight.

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 for extended periods. The unit will shut down if the internal temperature exceeds 65°C. The unit will restart after it cools.

SAFE - Do not use the inverter near flammable materials or in locations that may accumulate flammable vapours.



CAUTION: THE INVERTER MUST BE CONNECTED ONLY TO BATTERIES WITH A NOMINAL OUTPUT 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.



CAUTION: DO NOT USE WITH POSITIVE EARTH ELECTRICAL SYSTEMS (THE MAJORITY OF MODERN VEHICLES AND LORRIES ARE NEGATIVE EARTH).

The inverter is provided with battery cables with clamps for connection to a suitable battery (or a fused cigarette lighter plug - CI400B model only).

EXTENSION CABLES

Avoid using an extension cable between the DC power source and the inverter DC input. Using an extension this way will create a voltage drop causing reduced efficiency and output. Any extension cable should be used between the inverter AC output and the AC appliance. An extension cable up to 30m may be used but greater lengths will result in a noticeable drop in power.

Any cable used between the appliance and the inverter must be of the correct diameter and length, otherwise power loss or reduced operating time may occur.

Marine installations are also subjected to vibration and stresses that exceed those of other mobile installations. Therefore ensure all connections are tight, water resistant and have suitable strain relief for DC cables etc.

Cable installation must be the correct type for the environment.

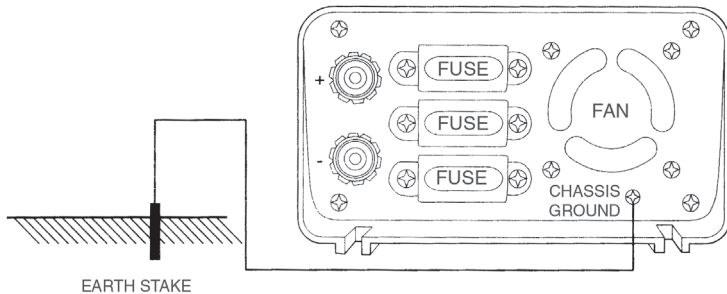
- Position the inverter as far away as possible from the television, the antenna, and the antenna cable. Use an extension cable if necessary.

GROUNDING CONNECTION



WARNING: Before using this inverter you must provide a ground connection.

On the rear panel of the inverter is a terminal fitted with a screw. This terminal is connected to the case of the inverter and also to the earth terminal of the AC output socket. The use of this terminal will depend on your particular installation. In any installation, heavy duty insulated wire should be used for this connection.



In a stationary, land based installation, the earth terminal should be connected to a metal earthing stake driven into the ground. If the battery system powering the inverter does not have a connection to ground, one of the battery terminals (commonly the negative terminal), should also be connected to the earthing stake.

In a vehicle where the inverter is wired directly to the battery, the earth terminal is simply connected to the vehicle chassis. If the inverter is to be used in a vehicle on a temporary basis, and will be powered via the cigarette lighter socket in the vehicle, the earth terminal should be connected via a short link to either the negative or positive DC input terminal of the inverter, depending on whether the vehicle has a negative or positive chassis connection. Most modern vehicles have a negative chassis connection. However when using the inverter to power equipment used outside the vehicle, an earthing stake should be used, as described above.

In a boat, the grounding terminal should be connected to the existing grounding system, which may be the hull of the craft, or a network of ground wires.

NOTE: The grounding terminal of the AC outlet is connected to the neutral terminal. This is the same as a standard household power point where the neutral line is bonded to grounding and there is normally no voltage between them.

CONNECTING TO POWER SOURCE VIA CIGARETTE LIGHTER PLUG (CI400B ONLY)

The cigarette lighter plug is suitable for operating the inverter at power outputs up to 200 Watts. The tip of the plug is positive and the side contact is negative. Connect the inverter to the power source by inserting the cigarette lighter plug firmly into the cigarette lighter socket of a vehicle or other DC power source.

Connect directly to the car battery when operating appliances above 200 Watts.

NOTE: Most vehicle cigarette lighter circuits use fuses rated at 15 to 20 Amps or greater. To operate at full power, either use the battery clamp cable (supplied) or directly wire to the power source with suitable wire and fuse (not supplied).



CAUTION: REVERSE POLARITY CONNECTION WILL RESULT IN A BLOWN FUSE AND MAY CAUSE PERMANENT DAMAGE TO THE INVERTER. (ALWAYS ENSURE THE LEADS ARE CONNECTED AS BELOW).

CONNECTING TO A POWER SOURCE VIA CABLES

Use the cables provided to connect the inverter directly to the 12 volt power source using the following guidelines:

1. Check that the inverter power switch is turned OFF and that no flammable fumes are present.
2. Connect the black cable to the black terminal marked “(-)” on the back of the inverter. Connect the black battery clip to the negative terminal of the battery.
3. Connect the red cable to the red terminal marked “(+)” on the back of the inverter. Connect the red battery clip to the positive terminal of the battery.
4. Check to ensure that all connections between battery clips and terminals are clean and secure.

CONNECTING THE LOAD

With the inverter connected to the power source, but switched OFF, ensure the appliance is also switched off before plugging the cable from the appliance, into the AC socket on the inverter.

Switch ON the inverter and the green LED will illuminate to indicate that the

inverter is functioning. Make sure the load of your appliance does not exceed the rated output of the inverter (in Watts) before switching on the appliance.

Always unplug the inverter when not in use.

Always unplug the inverter when starting the engine of the vehicle.



WARNING: Do not UNDER ANY CIRCUMSTANCES connect the inverter to household AC circuits.

RECHARGABLE DEVICES



CAUTION: SHOULD YOU ENCOUNTER ANY RECHARGEABLE DEVICE DESIGNED TO BE RECHARGED BY PLUGGING DIRECTLY INTO AN AC SOCKET, DO NOT USE THE INVERTER TO RECHARGE SUCH DEVICES AS THEY COULD DAMAGE 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 socket. The inverter is capable of running most chargers and transformers.



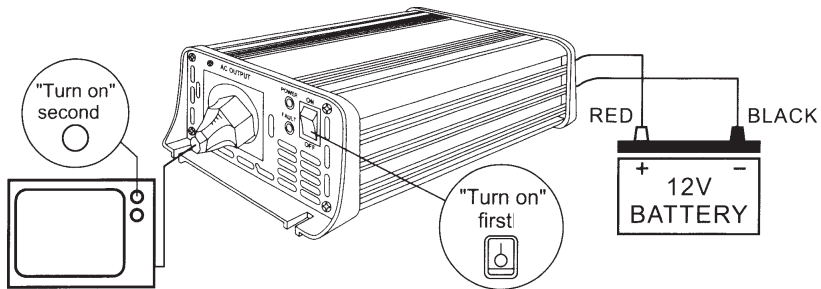
CAUTION: MAKE SURE THAT THE BATTERY'S VOLTAGE NEVER EXCEEDS 15VDC. CONNECTING THE INVERTER TO A DC POWER SOURCE GREATER THAN 15VDC WILL INVALIDATE THE WARRANTY AND MAY DAMAGE THE INVERTER.

OPERATION



WARNING: If you connect the wires to the incorrect terminals, the polarity will be reversed and the inverter will be damaged. Reversing the polarity will invalidate your manufacturer's warranty.

When connecting to an appliance incorporating an electric motor such as a compressor, drill or fan, always ensure that the power rating of the inverter is adequate for the power rating of the appliance.



If the inverter makes a beeping sound, switch off the appliance, unplug the inverter and restart the vehicle engine. The beeping sound is simply the low-battery warning which indicates that the voltage of your battery is getting low. The inverter will shut down automatically if you do not restart the engine and continue the use of the inverter. This will leave the vehicle battery at about 10.5 VDC, enabling you to start your engine and resume operation of the inverter.

To avoid excessively discharging the vehicle battery, it is advisable to let your engine run for a while after a period of using the inverter. This allows the vehicle battery to recharge. Refer to the chart on page 5 (Suitable Power Sources), as an indication of run-times based on the worst case situation.

Always remember to disconnect the AC inverter before using a battery charger to recharge your battery. Failure to disconnect the inverter prior to connecting a charger may result in an input spike which will damage the inverter. **CONNECTING THE INVERTERS INPUT TO A BATTERY CHARGER WILL VOID THE WARRANTY.**

SYSTEM PROTECTION

The inverter will switch off automatically if the total wattage of the appliance(s) exceeds the inverter output capacity. This will also happen if the temperature of the inverter exceeds 65°C due to prolonged use.

The protection circuit will also switch off the output in the case of short-circuit or overload. If this should happen:

1. Switch off the inverter.
2. Disconnect any appliances.
3. Check all connections.

The inverter can be used again when any faults have been rectified.

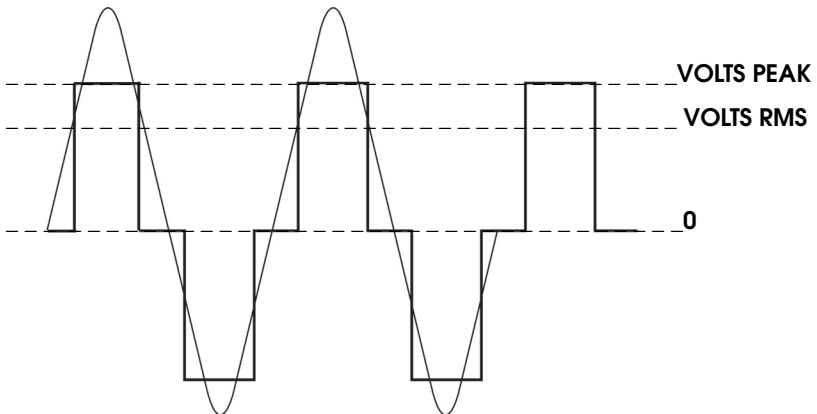
When the unit is in continuous operation, the AC output may suddenly stop although there remains a good supply from the battery. This may be caused by overheating and the inverter should be switched off until it cools down.



WARNING; Never connect the inverter to the battery with the wrong polarity. This will damage the unit and invalidate the warranty.

MEASURING AC VOLTAGE

The output wave of the AC inverter is a modified sine-wave. If you choose to measure the AC output voltage, you must use an authentic RMS volt meter. Using any other type of voltage measuring device will result in an AC voltage reading that is up to 20 to 30 volts lower than the rated value. The reading will only be accurate when using an authentic RMS voltmeter.



FUSE REPLACEMENT

If an external fuse on the rear of the unit blows, there is most likely a short circuit or overload in the DC wiring, or the polarity has been reversed. Find and correct the problem before replacing the fuses. The quantity and rating

of fuses for each model are stated in the Technical Specification on page 14, where multiple fuses may be used, relative to the total amperage of the load current for that inverter.

Fuses can be replaced individually or they may all fail together dependant upon the nature of the fault condition. After fuse replacement, reconnect the inverter and if a fuse continues to blow, contact your Clarke dealer or telephone Clarke International on 020 8998 7400. DO NOT open the unit as there are no user serviceable parts inside.

TROUBLESHOOTING

PROBLEM	PROBABLE CAUSE	SOLUTION
No AC output - red LED illuminated.	Excessive load - thermal shutdown.	Recharge or replace battery. Reduce load - wait for inverter to cool. Turn off, then turn back on.
No AC output.	Inverter cold.	Disconnect load from inverter. Operate inverter without load for a few minutes. Reconnect load.
No AC output - Green LED not illuminated.	Inverter fuse blown.	Remove fuses from their holders and replace with those of the same type and rating.
No AC output - Red LED illuminated.	Protection circuit activated.	Switch off inverter, disconnect any appliances and check connections as on page 12.
Low battery alarm sounds continuously.	Bad wiring connections.	Tighten all DC connections.
Low battery alarm sounds.	Low battery voltage. Recharge battery.	Remove load from inverter and re-charge battery.
Motorised power tool wont start.	Excessive start-up load.	Appliance may be trying to draw too much power.
Motorised power tool does not operate at correct speed.	Purely inductive load.	Make the load not purely inductive. Use an adaptor to operate a lamp at the same time as the motorised appliance, ensuring the combined load does not exceed that of the inverter.
Snow in TV picture, buzz in speaker.	RF interference.	Keep inverter and any antenna well away from each other. Use shielded antenna cable.

If you are still having difficulties with this product, contact your CLARKE International Service Department on 020-8988-7400.

MAINTENANCE

No routine maintenance is required but you can clean the exterior of the unit periodically with a damp cloth to prevent accumulation of dust and dirt. At the same time check that the screws on the DC terminals are tight.

Never attempt to dismantle the unit due to hazardous voltages. Please return to the dealer if any problem is found with this unit.

TECHNICAL SPECIFICATION

Model	CI400B	CI600B	CI800B	CI1000B	CI1200B	CI1600B
Part No	6013030	6013035	6013040	6013045	6013050	6013055
Input Voltage	Nominal 12 V d.c.					
Output Power (Continuous)	200 W	300 W	400 W	500 W	600 W	800 W
Output Voltage	Nominal 230 V @ 50Hz					
Fuse Rating	25A	40A	25A (x 2)	20A (x 3)	25A (x 3)	25A (x 4)
Input Full Load Current	18.46 A	30.0 A	40.4 A	45.5 A	55.0 A	79 A
Output Wave Form	Modified Sinewave					
Thermal Protection	65°C +/- 5					
Outlet Socket	13A, 3-pin					
USB Output	5Vd.c.@ 500mA	5Vdc@ 500mA	N/A	N/A	N/A	N/A
Low Battery Voltages	Alarm at 10.5+/- 0.5V Shutdown at 10.0+/- 0.5V					

Please note that the details and specifications contained herein, are correct at the time of going to print. However, CLARKE International reserve the right to change specifications at any time without prior notice.

DECLARATION OF CONFORMITY



Clarke[®]
INTERNATIONAL

Hemnall Street, Epping, Essex CM16 4LG

DECLARATION OF CONFORMITY

This is an important document and should be retained.

We hereby declare that this product(s) complies with the following directive(s):

2004/108/EC *Electromagnetic Compatibility Directive.*
2006/95/EC *Low Voltage Equipment Directive.*
2002/95/EC *Restriction of Hazardous substances.*

The following standards have been applied to the product(s):

EN 60650-1:2006+A11:2009, EN 61000-6-3:2007, EN 61000-6-1:2007.

The technical documentation required to demonstrate that the product(s) meet(s) the requirement(s) of the aforementioned directive(s) has been compiled and is available for inspection by the relevant enforcement authorities.

The CE mark was first applied in: 2009

Product Description: Inverters 200, 300, 400, 500, 600, 800W
Model number(s): CI400B, CI600B, CI800B, CI1000B, CI1200B, CI1600B
Serial / batch Number: N/A
Date of Issue: 02/09/2010

Signed:

J.A. Clarke
Director

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Clarke INTERNATIONAL Hemnall Street, Epping, Essex CM16 4LG
www.clarkeinternational.com