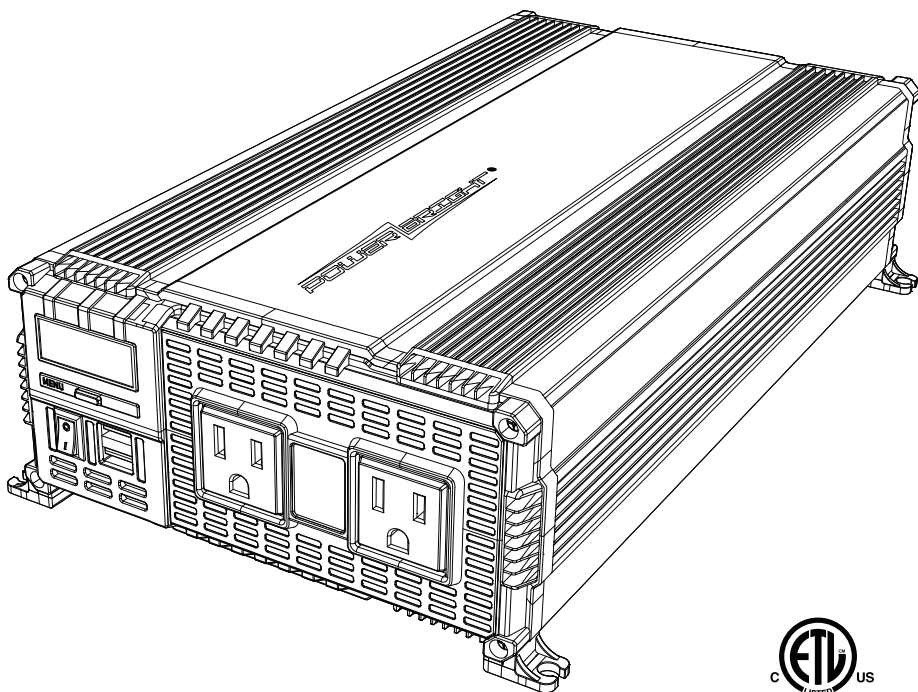


**POWER BRIGHT®**



# 1100 W / 1500 W / 2000 W POWER INVERTER

model no. PX1100 / PX1500 / PX2000



**Intertek**  
**4010229**

Conforms to / Conforme à UL std. 458,  
Certified to / Homologué à  
CSA std. C22.2 No. 107.1

## INSTRUCTION MANUAL

### **IMPORTANT:**

Please read this manual carefully before running this power inverter and save it for reference.

## WELCOME

Please read this manual thoroughly before installing and operating your new PowerBright® power inverter. This manual contains information you need to obtain the performance required for your application. Keep this manual for future reference.

This PowerBright® inverter converts low voltage, direct current (DC) to 120 V modified sine wave (MSW) alternating current (AC). The inverter draws power from 12 V, deep-cycle batteries such as those used for marine, golf cart, and fork-lift applications, or from other, high-current 12 V sources.

These models of power inverters have been performance tested by ETL and complies with Underwriters Laboratories and Canadian Standards Association safety standards.

## A HIGHER WATTAGE INVERTER MAY BE REQUIRED

To determine whether the PowerBright® power inverter will operate a particular appliance or a combination of appliances, run a test. All inverters are designed to automatically shut down in the event of a power overload. This protection feature prevents damage to the unit while running appliances with combined wattages below the 1100W/1500W/2000W power range. Turn on highest wattage appliance first, then other appliances. If an appliance combination in the maximum power range will not operate properly, then it is likely that this PowerBright® inverter does not have the required capacity to operate the appliance in question.

## WARNINGS, CAUTIONS AND NOTES

It is very important that any operator and installer of this inverter read and follow all **WARNINGS**, **CAUTIONS AND NOTES** and all installation and operation instructions. In particular, comply with **WARNINGS** (possibility of serious injury or death), **CAUTIONS** (possibility of damage to the inverter and/or other equipment), and **NOTES** (included to assist you in achieving the maximum performance and longest working life from this advanced-design inverter).

## WARNINGS: INVERTER OUTPUT

This is a heavy-duty device that produces voltages similar to commercial AC power.

- Danger of shock or electrocution—treat inverter output the same as commercial AC power.
- Do not use the inverter near flammable materials or in any locations that may accumulate flammable fumes or gases. This is an electrical device that can briefly spark when electrical connections are made or broken.
- Do not allow water or other liquids to contact the inverter.
- Do not use appliances with damaged or wet cords.

## CAUTIONS: INVERTER OPERATING ENVIRONMENT

- Surrounding air temperature should be between -20°C and 40°C (4°F and 104°F) – ideally between 15°C and 25°C (60°F and 80°F).
- Keep the inverter away from direct sunlight if at all possible.
- 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. The unit will shut down if the internal temperature gets too hot. Restart the inverter after it cools.
- This PowerBright® inverter will only operate from a 12 V power source. Do not attempt to connect the inverter to any other power source, including any AC power source.
- Do not reverse DC input polarity – this will void the warranty.

## APPLIANCE CAUTIONS

- Do NOT plug in battery chargers for cordless power tools if the charger carries a warning that dangerous voltages are present at the battery terminals.
- Certain chargers for small nickel-cadmium or nickel-metal-hydride batteries can be damaged if powered by this inverter. Two types of appliances are susceptible to damage:
  - Small, battery-operated appliances such as flashlights.
  - Cordless razors and toothbrushes that plug directly into an AC receptacle.

- Do NOT use this inverter with the above two types of equipment.
- 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-voltage DC or AC output to the appliance. If the appliance label states that the charger or adaptor produces a low-voltage DC or AC output (30 V or less), there will be no problem powering that charger or adaptor.
- 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.
- Route appliance cords and extension cords to prevent them from being accidentally pinched, crushed or abraded, and to prevent tripping hazards.
- Use safety approved extension cords rated at 15 A or higher.
- GFCI devices may not work with modified sine wave power.
- This inverter is not tested for use with medical equipment.
- This inverter is not tested for use in marine applications.
- In the event of a continuous audible alarm or automatic shutdown, turn the inverter off immediately. Do not restart the inverter until the source of the problem has been identified and corrected.
- When attempting to power lead-acid battery chargers with a modified sine wave, monitor the temperature of the battery charger for approximately 10 minutes. If the battery charger becomes abnormally warm, immediately disconnect it from the inverter.

## GETTING STARTED

When a motorized appliance or a tool turns on, there is an initial surge of power to start. This surge of power is referred to as the "starting load" or "peak load." Once started, the tool or appliance requires less power to operate. This is referred to as the "continuous load" in terms of power requirements. You will need to determine how much power your tool or appliance requires to start up (starting load) and its continued running power requirements (continuous load).

Power consumption is rated in watts, or it can be calculated from amperes (amps). This information is usually stamped or printed on most appliances and equipment. If this information is not indicated on the appliance or equipment, check the owner's manual. For electrically sensitive equipment, contact the manufacturer to determine if the device you are using is compatible with modified sine wave AC.

Multiply: **AC AMPS X 110** (AC voltage) = **WATTS**

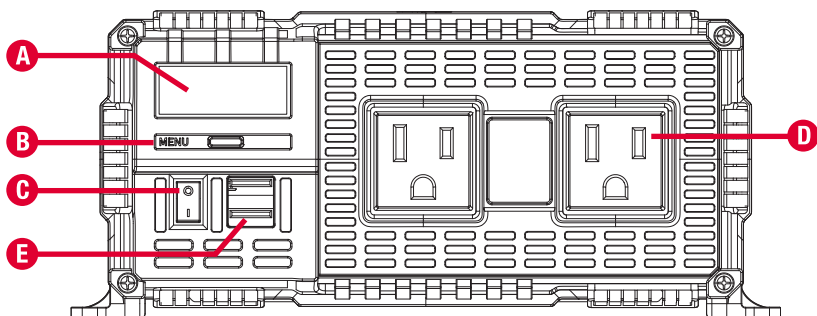
This formula yields a close approximation of the continuous load of your appliance.

Multiply: **WATTS X 2** = starting load for most appliances

This formula yields a close approximation of the starting load of most appliances. Exceptions are motorized appliances such as pumps, freezers and air conditioners. These appliances can have startup loads of up to eight times the rated watts.

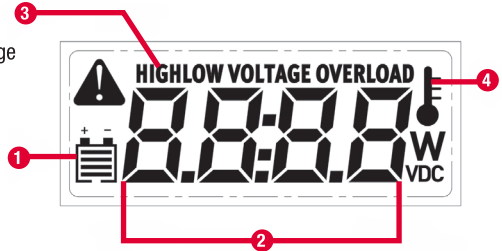
**FRONT PANEL PX1100 / PX1500 / PX2000**

- A** LCD Digital Display (see LCD diagram on next page).
- B** MENU Button: Pressing the button will change the display between OUTPUT WATTAGE or INPUT VOLTAGE.
- C** Main Switch is used for complete shutdown of the inverter.
- D** Two standard North American AC outlets, each rated at 15 A (1650 W).
- E** Two USB Ports (2.4 A each): Allows the user to power simultaneously two 2.4 A-compatible devices such as tablets or 1 A-compatible devices such as cell phones.



## LCD DIAGRAM

- 1 Battery Level.
- 2 Output Wattage (W) or Input Voltage Display (VDC).
- 3 Warning Indicator:
  - a. High voltage
  - b. Low voltage
  - c. Voltage overload
- 4 Temperature Shutdown.



## Remote Instructions (not included)

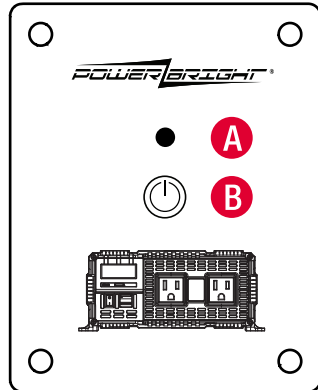
The optional remote control features an LED indicator showing on/off light, push button and 20' (6 m) cable that simply plugs into the inverter.

### Features

- A: LED indicator
- B: Push button

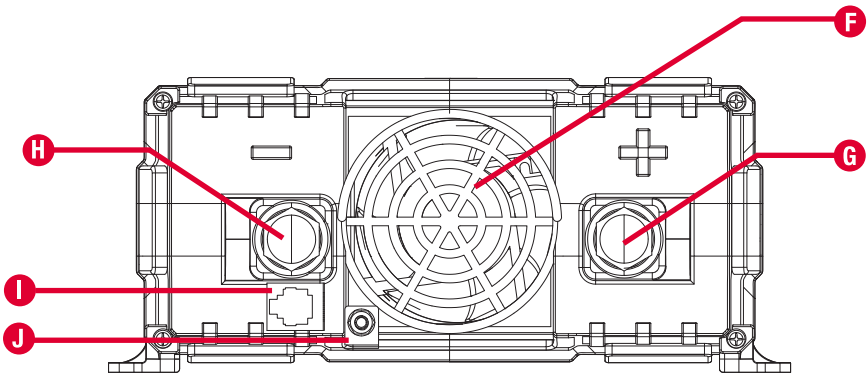
### Indicator

- Solid Green: Inverter "on"
- No Colour: Inverter "off"



**REAR PANEL PX1100 / PX1500 / PX2000**

- F** High-Speed Cooling Fans. When the temperature inside the inverter exceeds a preset limit, the cooling fans automatically turn on to cool the inverter. When the temperature reduces, the fans turn off.
- G** Positive Power Input Terminal.
- H** Negative Power Input Terminal.
- I** Remote Control Receptacle.
- J** Ground Terminal.



## CABLE GAUGES

When connecting the inverter to a battery bank use the thickest stranded insulated copper wire available, in the shortest length practicable. Recommended cable gauges are as follows:

Model	Description	Recommended Gauges
PX1100	1100 W POWER INVERTER	4 AWG (3'/0.9 m included)
PX1500	1500 W POWER INVERTER	2 AWG (3'/0.9 m included)
PX2000	2000 W POWER INVERTER	2 AWG (3'/0.9 m included)
PX3000	3000 W POWER INVERTER	0 AWG (3'/0.9 m included)
PX4000	4000 W POWER INVERTER	0 AWG (3'/0.9 m included)

## CAUTIONS:

- Loose connections can result in a severe decrease in voltage that can cause damage to cables and insulation.
- Failure to make correct polarity (pos, neg) connection between the inverter and the battery bank can result in blowing fuses in the inverter and can permanently damage the inverter. Damage caused by reversed polarity is not covered under the PowerBright® warranty.
- Making the connection to the positive terminal may cause a spark as a result of current flowing to charge capacitors within the inverter. This is a normal occurrence.
- Because of the possibility of sparking, however, it is extremely important that both the inverter and the 12 V battery be positioned far from any possible source of flammable fumes or gases. Failure to heed this warning could result in fire or explosion.
- Operating the inverter without correctly grounding the unit may result in electric shock.



### WARNING! DANGER OF BATTERY EXPLOSION – INSTALL A FUSE

Battery banks can deliver very high levels of current that can vaporize metal, start fires and cause explosions. PowerBright® recommends installing one ANL type fuse and fuse holder close to the positive battery bank terminal. This fuse protects the batteries from accidental DC cable shorts, which can cause batteries to explode. ANL fuses and fuse holders are available at most marine supply stores.



## DETERMINING THE DC POWER REQUIREMENTS

Powering multiple appliances from the high-powered DC to AC power inverter requires a 12 Volt battery OR a bank of batteries (several batteries). If using a bank of batteries, to calculate the approximate power in amps a 12 V battery bank has to supply, you need to know the current or amps required for powering the continuous AC load. A shortcut method is to divide the continuous AC load wattage by 10. For example, the continuous AC load is 3000 W, the current (amps) is:  $3000/10$  or 300 A at 12 V DC.

## SIZING THE BATTERY BANK

To determine the minimum battery bank ampere-hour rating that you will need to operate appliances from the inverter, and any DC appliances powered by the battery bank, follow these steps:

1. List the maximum wattage that the inverter has to provide (as above).
2. Estimate the number of hours the appliances will be in use between battery recharges. This will differ depending on appliances. As an example, a typical home-use coffeemaker draws 500 W during its brew time of 5 minutes; it maintains the temperature of the pot at about 100 W. Typical use of a microwave oven is only for a few minutes. Some longer operating time appliances are lamps, TVs, computers and refrigerators/freezers.
3. Determine the total watt-hours of energy needed. Then multiply the average power consumption in watts by the number of hours of run time. For example: 3000 W for 10 hours = 30,000 Wh. Using the 3000 W (or 300 A) for 10 hours example above, then 300 A is needed for 10 hours. This provides us with the basic amp-hours (Ah) of battery that is required. Ten hours at 300 A equals 3000 amp-hours (Ah).

This answer is just a beginning because there are other conditions that determine actual run time. These include:

- AC appliance load and time in use (basic amp hour)
- Cable gauge and length (cable losses)
- Charge level of the batteries (between use, chargers have to be able to fully charge the batteries)
- Temperature of the batteries (colder batteries provide fewer amps)
- Age and condition of the batteries (older batteries lose capacity/amp-hours)
- Compliance with turning off unnecessary AC and DC loads. If there is any doubt about sizing the battery bank, it is safe to overestimate the amp-hour requirements of the battery bank.

### NOTE:

The type of batteries you use to power your high-power inverter is important. Operating a high-power inverter will routinely discharge batteries and they will require frequent recharging. Batteries used to start engines are not designed to repeatedly charge and discharge. PowerBright® recommends using "deep-cycle" or "marine" rated batteries.

## MOUNTING THE INVERTER

Your PowerBright® inverter should not be mounted under the hood of a vehicle.

If installing in a vehicle, choose a dry, cool, ventilated area as close to the battery as practical. Before drilling any mounting holes, make sure that there are no wires, fuel lines or tanks directly behind the surface to be drilled. To mount the inverter:

1. Inverter must be off.
2. The inverter should be mounted horizontally.
3. Position the inverter against the mounting surface and mark locations of the mounting screw openings.
4. Remove the inverter and drill four mounting holes.
5. Fasten the inverter to the mounting surface using corrosion-resistant fasteners sized #10 or larger.

## CONNECTING THE INVERTER

This inverter has two DC cable connections, one positive and one negative. The order of steps in the following procedure minimizes the danger of sparking near the battery bank.

1. Prepare all cable set ends with ring terminals at the battery ends.
2. Install one fuse holder with fuse in the pos (+) cable close to the battery bank end.
3. Make sure the inverter is off
4. Ensure all appliance cords or extension cords are disconnected from the inverter.
5. Connect an appropriate, stranded, insulated wire to the enclosure ground terminal and connect the free end of the wire to the vehicle's chassis or any other ground point.
6. Connect the unfused cable to the neg (-) terminal of the battery bank.
7. Connect the neg (-) cable to the inverter's neg (-) terminal.
8. Insulate the end of the cable to be connected to the pos (+) inverter terminal.
9. Connect the fused cable to the battery bank pos (+) terminal.
10. Connect the pos (+) cable end to the pos (+) inverter terminal.

### NOTE:

Sparking is normal for the first connection.

Make sure you have good, secure connections – do not over-tighten.

## OPERATION

1. Turn on the inverter.
2. Turn off the inverter.
3. When you have confirmed that the appliance to be operated is turned off, plug an appliance cord into one of the two 120 V AC outlets on the front panel of the inverter.
4. Turn on the inverter.
5. Turn the appliance on.
6. Plug in additional appliances and turn them on.

### NOTE:

The audible alarm may make a momentary "chirp" when the inverter is turned off. This same alarm may also sound when the inverter is being connected to or disconnected from the 12 V battery bank.

## TELEVISION AND AUDIO SUGGESTIONS

Although all PowerBright® inverters are shielded and filtered to minimize signal interference, some interference with your television picture may be unavoidable, especially in weak signal areas.

However, here are some suggestions that may improve reception:

1. First, make sure that the television antenna produces a clear signal under normal operating conditions. Also, ensure that the antenna cable is properly shielded and of good quality.
2. Change the positions of the inverter, antenna cables and TV power cord.
3. Isolate the TV, its power cord and antenna cables from the 12 V power source by running an extension cord from the inverter to the television set.
4. Coil the television power cord and the input cables running from the 12 V power source to the inverter.
5. Attach a "Ferrite Data Line Filter" to the television power cord. More than one filter may be required. These filters are available at most electronic supply stores.

### NOTE:

Some inexpensive audio systems may produce a slight "buzzing" sound when operated with the inverter. The only solution to this problem is to use a sound system with better power supply filtering.

model no. PX1100 / PX1500 / PX2000 | contact us 1-866-295-6775

## OPERATING A MICROWAVE OVEN WITH YOUR POWER INVERTER

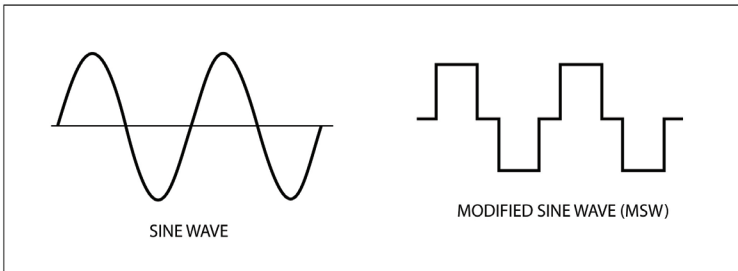
The power rating used with microwave ovens is the "cooking power" which means the power being "delivered" to the food being cooked. The actual operating power rating is listed on the back of the microwave. If the operating power cannot be found on the back of the microwave, check the owner's manual or contact the manufacturer.

## HOW THIS MODIFIED SINE WAVE POWER INVERTER WORKS

There are two stages in which this power inverter changes the 12 V DC (or battery) power into 120 V AC (household current).

**STAGE 1:** This inverter uses a DC to DC converter to increase the DC input voltage from the battery to 145 V DC.

**STAGE 2:** The inverter then converts the high voltage DC into 120 V AC (household current), using an advanced MOSFET transistor in a full bridge configuration. This design provides this PowerBright® inverter with the capability to start and run difficult reactive loads, while providing excellent overload capability. The waveform that is generated by this conversion is a "modified sine wave" as shown in the diagram below.



## BEST USE OF BATTERY POWER

Make sure any appliances are energy efficient and turned off after use. Use compact florescent lamps. Wherever possible, charge with solar panels or wind generators. Do not allow lead acid batteries to remain discharged for long periods of time; they lose capacity (amp-hours).

## DISPOSAL / RECYCLING OF INVERTER

Electronic products are known to contain materials that are toxic if improperly disposed. Contact local authorities for disposal and recycling information.

## TROUBLESHOOTING

### PROBLEM: OUTPUT VOLTAGE BELOW 100 V AC

Reason	Solution
A "True RMS" voltage meter is required to properly measure output voltage of a modified wave inverter.	Test output voltage with a "True RMS" voltage meter and the correct voltage will be displayed.

### PROBLEM: NO INPUT VOLTAGE

Reason	Solution
Poor contact with battery terminals.	Shut down inverter and disconnect. Clean terminals thoroughly and reconnect.
Blown DC battery fuse(s).	Turn off inverter. Fix problem. Replace fuse(s) with same type and rating.

### PROBLEM: INVERTER IS SHUT DOWN

Reason	Solution
Battery voltage below 10 V.	Charge or replace battery.
Inverter is too hot (thermal shutdown mode). Will be indicated on LCD panel.	Allow inverter to cool. Check for adequate ventilation. Reduce the load on the inverter to rated continuous power.
Unit may be defective.	See warranty and call customer service.
Internal fuse(s) may have blown.	Serviceable/replaceable by a qualified technician. Check specifications on page 16 for fuse size and type.

### PROBLEM: LOW BATTERY ALARM ON ALL THE TIME

Reason	Solution
Input voltage below 10.5 V. Will be indicated on LCD panel.	Keep input voltage above 10.5 V to maintain regulation.
Poor or weak battery condition.	Recharge or replace battery.
Inadequate power being delivered to the inverter or excessive voltage drop.	Use lower gauge (heavier) cable. Keep cable length as short as possible.

### PROBLEM: TV DOES NOT WORK

Reason	Solution
TV does not turn on.	Contact TV manufacturer to find out if the TV is compatible with a modified sine wave.

**SPECIFICATIONS:**

Model no.	PX1100	PX1500	PX2000
Output Continuous Watts (W)	1100 W + 24 W USB	1500 W + 24 W USB	2000 W + 24 W USB
Surge Capacity (Peak Power)	2200 W	3000 W	4000 W
Rated Input DC (V, A)	12 V DC, 108 A	13.5 V DC, 135 A	13.5 V DC, 175 A
Input Voltage Range	10.5 to 16 V DC +/- 0.3 V		
Rated Frequency (Hz)	60 Hz±1		
Rated Output AC (V, A)	120 V +/- 10%, 9.16 A	120 V +/- 10%, 12.5 A	120 V +/- 10%, 16.7 A
Rated Output USB (V, A)	2 * 5 V/max. 2.4 A/ea		
No Load Current	<0.5 A DC	<0.7 A DC	<0.8 A DC
Optimum Efficiency	85% min.		
Fuse (A)	(40 A*3)	(40 A*4)	(40 A*6)
Fuse Type	Internal Blade		
Output Wave Form	Modified Sine Wave		
Touch Temperature	65°C (149°F) Max.		
Operating Temperature	-20 to 40°C (4 to 104°F)		
Operating/Storage Humidity RH	5 to 95%		
Cooling System	Thermo Fan		
THD	< 40%		
Dimensions LxWxH	10 x 7 1/2 x 3 1/4"	13 7/8 x 7 1/2 x 3 1/4"	15 1/2 x 7 1/2 x 3 1/4"
Assembled Weight	4.0 lbs (1.8 kg)	6 lbs (2.7 kg)	7 lbs (3.2 kg)

**NOTE:**

All specifications are typical at 12 V nominal input, half load, and 77°F (25°C) unless otherwise noted. Specifications are subject to change without notice.

## WARRANTY AND RETURNS

**IF ANY PARTS ARE MISSING OR DAMAGED, OR IF YOU HAVE ANY QUESTIONS, PLEASE CALL OUR TOLL-FREE HELPLINE AT 1-866-295-6775**

Read and understand this instruction manual thoroughly before using the product. It contains important information for your safety as well as operating and maintenance advice.

Keep this instruction manual for future use. Should this product be passed on to a third party, this instruction manual must be included.

The English version of this manual is available online at:  
[www.powebright.com](http://www.powebright.com)



This Power Bright Inverter product carries a two (2) year warranty against defects in workmanship and materials. At its discretion, Bright Manufacturing agrees to have any defective part(s) repaired or replaced free of charge, within the stated warranty period, when returned by the original purchaser with proof of purchase. This product is not guaranteed against wear or breakage due to misuse and/or abuse.

MADE IN CHINA

IMPORTED BY  
BRIGHT MANUFACTURING LLC, FORT LAUDERDALE, FL