

MAJORCHARGE

Battery Charger Owner's Manual

GEL, PRO, HD SERIES

6/8/12/16/24/36/48 Volt



Standard Features of all Chargers

- ◇ Battery Type Switch (BTS)
- ◇ High energy return, fast charging
- ◇ Constant current first stage
- ◇ Dual voltage limit (cyclic/standby)
- ◇ Proportional timed cyclic charge stage
- ◇ Constant voltage float standby
- ◇ Automatic safety override timer
- ◇ Start delay on battery connect
- ◇ Short and reverse connector shutdown
- ◇ Rugged SCR phase control
- ◇ Mains zero-crossing battery sensing

*****CAUTION*****

**READ THIS MANUAL CAREFULLY
FOR RULES OF SAFE OPERATION
AND PROPER USE OF THE CHARGER
SAVE THESE INSTRUCTIONS**

HD SERIES

12/24/36/48 Volt

DIMENSIONS

- 12"L x 7"W x 7"H

Model	Input	Output
MajorCharge12/25	117VAC, 60Hz, 480VA	12VDC, 25A
MajorCharge24/25	117VAC, 60Hz, 850VA	24VDC, 25A
MajorCharge36/20	117VAC, 60Hz, 1120VA	36VDC, 20A
MajorCharge48/20	117VAC, 60Hz, 1400VA	48VDC, 20A

Suitable for use with all types of lead-acid batteries, including the new types of maintenance-free and gelled electrolyte batteries.

OPTIONAL EXPORT AC INPUT RATINGS

- 100 V – 50 Hz AC Input (Japan)
- 115/230 V – 50 Hz AC Input (Europe) (CE)
- Full Wave Phase Controlled Rectification

CONTROL

- Voltage limited to 2.42 V/Cell (Normal Mode)
- 2.33 V/Cell (Gel-Cell Mode)
- 2.62 V/Cell (Liquid Electrolyte Mode)
- Current limited to AMP rating MEAN DC
- Automatic timer starts when first stage voltage limit reached. Proportional CV stage timer $-t/2+1$ hour.
- Constant voltage 2.3 V/Cell after timeout, with temperature compensation.

PROTECTION

- Electronic reverse polarity.
- Short circuit shutdown and current limit.
- Combined circuit breaker and power switch on front panel.

BATTERY TYPE & RATING

- HD Chargers are for use with Lead Acid Batteries of minimum capacity 50 AH, Gel Cell, Absorbed Electrolyte or Liquid Electrolyte types by using the BTS (Battery Type Switch)



PRO SERIES

12/24 Volt

DIMENSIONS

- 6"L x 6.5"W x 5.25"H

Model	Input	Output
MajorCharge12/5	117VAC, 60Hz, 110VA	12VDC, 5A
MajorCharge12/10	117VAC, 60Hz, 220VA	12VDC, 10A
MajorCharge24/5	117VAC, 60Hz, 200VA	24VDC, 5A
MajorCharge24/8	117VAC, 60Hz, 320VA	24VDC, 8A

Suitable for use with all types of lead-acid batteries, including the new types of maintenance-free and gelled electrolyte batteries.

OPTIONAL EXPORT AC INPUT RATINGS

- 100 V – 50 Hz AC Input (Japan)
- 115/230 V – 50 Hz AC Input (Europe) (CE)
- Full Wave Phase Controlled Rectification

CONTROL

- Voltage limited to 2.42 V/Cell (Normal Mode)
- 2.33 V/Cell (Gel-Cell Mode)
- 2.62 V/Cell (Liquid Electrolyte Mode)
- Current limited to AMP rating MEAN DC
- Automatic timer starts when first stage voltage limit reached. Proportional CV stage timer $-t/2+1$ hour.
- Constant voltage 2.3 V/Cell after timeout, with temperature compensation.

PROTECTION

- Electronic reverse polarity.
- Short circuit shutdown and current limit.
- AC input fuse in AC input connector.

BATTERY TYPE & RATING

- PRO Chargers are for use with Lead Acid Batteries, Gel Cell, Absorbed Electrolyte or Liquid Electrolyte types by using the BTS (Battery Type Switch)



GEL SERIES

6/12/24 Volt

DIMENSIONS

- 6"L x 6.5"W x 5.25"H

Model	Input	Output
MajorCharge6/6	117VAC, 60Hz	6VDC, 6A
MajorCharge12/2	117VAC, 60Hz	12VDC, 2A
MajorCharge24/3	117VAC, 60Hz	24VDC, 3A
MajorCharge36/3	117VAC, 60Hz	36VDC, 3A
MajorCharge48/5	117VAC, 60Hz	48VDC, 5A

Suitable for use with all types of lead-acid batteries, including the new types of maintenance-free and gelled electrolyte batteries.

OPTIONAL EXPORT AC INPUT RATINGS

- 100 V – 50 Hz AC Input (Japan)
- 115/230 V – 50 Hz AC Input (Europe) (CE)
- Full Wave Phase Controlled Rectification

CONTROL

- Voltage limited to 2.4 V/Cell
- Current limited to AMP rating MEAN DC
- Finish voltage 2.3 Volts/Cell
- Proportional Timed Cyclic Charge Stage
- Flashing Yellow LED to show 80% state of charge

PROTECTION

- Electronic reverse polarity.
- Short circuit shutdown.
- Low voltage start.
- Optional temperature compensation.

BATTERY TYPE & RATING

- GEL Chargers are for use with Lead Acid, Gel Cell Batteries



SAFETY INSTRUCTIONS

- SAVE THESE INSTRUCTIONS** – This manual contains important safety and operating instructions.
 - Before using this battery charger, read all instructions and cautionary markings on (1) the battery charger, (2) the battery, (3) product using the battery.
 - CAUTION** – To reduce risk of injury, charge only lead acid, maintenance-free, or flooded lead acid type rechargeable batteries. Other types of batteries may burst, causing personal injury or damage.
 - Do not expose charger to rain or snow.
 - Use of an attachment not sold or recommended by the battery charger manufacturer may result in a risk of fire, electric shock or injury to person.
 - To reduce risk of damage to electric plug and cord, pull by plug rather than cord with disconnecting charger.
 - Make sure cord is located so that it will not be stepped on, tripped over or otherwise subjected to damage or stress.
 - An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in risk of fire and electrical shock. If an extension cord must be used, make sure:
 - That pins on plug of the extension cord are the same number, size and shape as those of the plug on the charger.
 - That the extension cord is properly wired and in good electrical condition.
 - That the wire size is large enough for the A/C ampere rating of the charger as specified in the table below:
- | Length of cord | 25 ft | 50 ft | 100 ft | 100 ft |
|----------------|-------|-------|--------|--------|
| AWG Wire Size | 18 | 18 | 16 | 14 |
- Do not operate charger with damaged cord or plug. **REPLACE THEM IMMEDIATELY.**
 - Do not operate charger if it has received a sharp blow, been dropped or otherwise damaged in any way; return it to a qualified service source.
 - Do not disassemble charger if repair or service is required; Incorrect reassembly may result in a risk of electrical shock or fire. Bring charger to a qualified service source.
 - To reduce risk of electrical shock, unplug charger from outlet before attempting any maintenance or cleaning.

RISK OF EXPLOSIVE GASES

1. **WORKING IN VICINITY OF A LEAD-ACID BATTERY IS DANGEROUS. BATTERIES GENERATE EXPLOSIVE GASES DURING NORMAL BATTERY OPERATION. FOR THIS REASON, IT IS OF THE UTMOST IMPORTANCE THAT EACH TIME BEFORE USING YOUR CHARGER, YOU READ THIS MANUAL AND FOLLOW THE INSTRUCTIONS EXACTLY.**
2. To reduce risk of battery explosion, follow these directions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in vicinity of the battery. Review cautionary marking on these products and on engine.

PERSONAL PRECAUTIONS

1. Someone should be within range of your voice or close enough to come to your aid when you work near a lead-acid battery.
2. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
3. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
4. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eyes, immediately flood eyes with running cold water for at least 10 minutes and get medical attention immediately.
5. **NEVER** smoke or allow a spark or flame in the vicinity of battery or engine.
6. Be extra cautious to reduce risk of dropping a metal tool onto battery. It might spark or short-circuit battery or other electrical part that may cause explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. A lead-acid battery can produce a short circuit high enough to weld a ring or the like to the metal, causing a severe burn.
8. Use charger for charging a **LEAD-ACID BATTERY ONLY**. Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
9. **NEVER** charge a frozen battery.

PREPARING TO CHARGE

1. If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in vehicle are off so as not to cause an arc.
2. Be sure area is well ventilated while battery is being charged. A piece of cardboard or other nonmetallic material can be used as a fan.
3. Clean all battery terminals. Be careful to keep corrosion from coming in contact with eyes.
4. Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without cell caps, carefully follow manufacturer's recharging instructions.
5. Study all battery manufacturer's precautions, such as removing/not removing cell caps while charging and recommended rates of charge.
6. Determine voltage of battery by referring to car or equipment owner's manual and make sure it matches output rating of battery charger.

CHARGER LOCATION

1. Place charger as far away from battery as charging cables will permit.
2. Never place charger above battery being charged; gasses from battery will corrode and damage charger.
3. Never allow battery acid to drip on charger.
4. Do not operate charger in a closed-in area or restrict ventilation in any way.
5. Do not set a battery on top of a charger.

DC CONNECTION PRECAUTIONS

1. Connect and disconnect DC output only after removing AC cord from electric outlet. Never allow clips to touch each other.
2. Attach clips to battery posts and twist or rock back and forth several times to make a good connection, preventing clips from slipping off terminals and reducing risk of sparking.

BATTERY TYPE SWITCH FEATURE

All 117 AC Volt PRO & HD chargers have an AC input fuse located in the fuse drawer found below the AC power cord. To access it, remove the power cord and use a screwdriver to open the fuse compartment. If the fuse requires replacement, the same type and value fuse must be used. The rating for the fuse is found on the SERIAL number label.



GROUNDING & AC POWER CORD

FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION.

1. Carefully position AC and DC cords to reduce risk of damage by hood, door or moving engine parts.
2. Stay clear of fan blades, belts, pulleys and other parts that can cause injury to persons.
3. Check polarity of battery posts. **POSITIVE (POS, P, +)**, battery posts usually have a larger diameter than the **NEGATIVE (NEG, N, -)** posts.
4. Determine which post of battery is grounded (connected) to the chassis.
5. For negative-grounded vehicle, connect **POSITIVE (RED)** clip from battery charger to **POSITIVE (POS, P, +) UNGROUNDED POST OF THE BATTERY. Connect NEGATIVE (BLACK)** clip to vehicle chassis or engine block away from battery. **DO NOT CONNECT CLIPS TO CARBURETOR, FUEL LINES, OR SHEET METAL BODY PARTS.** Connect to a heavy gauge metal part of the frame or engine block.
6. For positive-grounded vehicle, connect **NEGATIVE (BLACK)** clip from battery charger to the **NEGATIVE (NEG, N, -) UNGROUNDED POST OF THE BATTERY.** Connect **POSITIVE (RED)** clip to the vehicle chassis or engine block away from battery. **DO NOT CONNECT CLIP TO CARBURETOR, FUEL LINES OR SHEET METAL BODY PARTS.** Connect to heavy gauge metal part of the frame or engine block.
7. When disconnecting charger, turn switches to off, disconnect AC cord, remove clip from vehicle chassis and then remove clip from battery terminal.

FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE. A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION.

1. Check polarity of battery posts. **POSITIVE (POS, P, +)** battery post usually has a larger diameter than the **NEGATIVE (NEG, N, -)** post.
2. Attach at least a 24-inch long, 6 gauge (AWG) insulated battery cable to the **NEGATIVE (NEG, N, -)** battery post.
3. Connect **POSITIVE (RED)** charger to clip to **POSITIVE (POS, P, +)** of the battery.
4. Position yourself and free end of cable as far away from battery as possible, then connect **NEGATIVE (BLACK)** charger clip to free end of cable.
5. Do not face battery when making final connection.
6. When disconnecting charger, always do so in reverse sequence while as far away from battery as practical.

Charger should be grounded to reduce risk or electrical shock. Charger is equipped with an electrical cord having an equipment grounding conductor and a grounding pin. This plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.

DANGER - Never alter AC cord or plug provided. If it will not fit outlet, have proper outlet installed by a qualified electrician. Improper connection can result in a risk of an electrical shock.

This battery charger is for use on a nominal 117 Volt AC circuit* and has a grounded plug like the one illustrated in figure 1.1. A temporary adapter, which looks like the one illustrated in figures 1.2 & 1.3, may be used to connect this plug to a two-pole receptacle as shown in figure 1.2 if a properly grounded outlet is not available. The temporary adapter should only be used until a properly grounded outlet can be installed by a qualified electrician.

Figure 1.1

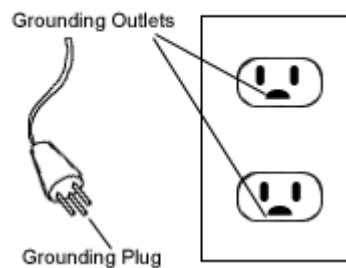
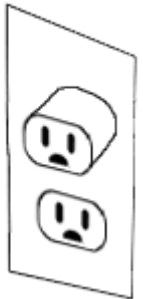


Figure 1.2



Figure 1.3



USE OF AN ADAPTER IS FORBIDDEN IN CANADA.

If a grounding type receptacle is not available, **DO NOT** use this appliance in CANADA until the proper outlet is installed by a qualified electrician.

DANGER – Before using an adapter as illustrated, be certain that the center screw of the outlet plate is grounded. The green colored rigid ear or lug extending from the adapter must be connected to a properly grounded outlet. Make certain it is grounded.

If necessary, replace original outlet cover plate screw with a longer screw that will secure adapter ear or lug to outlet cover plate and make ground connection to grounded outlet.

HD & PRO OPERATION

1. Disconnect vehicle battery cables.
2. Connect charger to battery. Ensure correct polarity. **BLACK** lead to negative (-) terminal and **RED** lead to **POSITIVE (+)** terminal.

THIS CHARGER IS PROTECTED AGAINST REVERSE CONNECTION. CHARGING WILL NOT COMMENCE IF BATTERY IS INCORRECTLY CONNECTED.

3. Connect the charger to AC power supply.
THE CHARGER WILL NOW SWITCH ON AND THE YELLOW LED WILL LIGHT.

4. The charger will now commence to charge the battery, as indicated by the **RED** charging LEDs.
NOTE: The length of time the charger remains in the "Charging Mode" depends on the size and state of discharge of the battery. This is controlled by the charger's solid state circuitry which constantly monitors the state of the battery and provides the correct charge automatically.

IMPORTANT: The charger must be allowed to go through the complete charge routine in order to obtain the optimum charge. This will take a minimum of two hours.

5. When the **GREEN "READY"** LED comes **ON**, the battery is ready for use.

NOTE: The battery may be connected to the charger in the "**READY**" mode indefinitely, in order to maintain the battery in a fully charged state while not in use without risk of over charging.

IMPORTANT: The charger must be disconnected from the 120 Volt power supply before disconnecting from the battery to prevent the possibility of arcing.

SPECIAL NOTE

6. During charging, the current flowing into the battery is indicated by the LED Amp Meter. At the start of charge, if the battery is normally discharged, all 4 **RED** LEDs will be on and will go out in sequence as the charge current drops. When the last **RED** LED goes off, the internal proportional timer will start, the **GREEN** LED will show proportional to the time of the constant current time. (T/2+1hr)
7. If battery voltage is less than ½ a volt, the battery is considered very heavily discharged. In this case, the **YELLOW** charging LED will **NOT** show.

GEL OPERATION

1. Disconnect vehicle battery cables.
2. Connect charger to battery. Ensure correct polarity. **BLACK** lead to **NEGATIVE (-)** terminal and **RED** lead to **POSITIVE (+)** terminal.

THIS CHARGER IS PROTECTED AGAINST REVERSE CONNECTION. CHARGING WILL NOT COMMENCE IF THE BATTERY IS INCORRECTLY CONNECTED.

3. Connect the charger to an AC Power Supply.
Check that **RED (Power)** and **YELLOW (Charge)** indicator LEDs are **ON**. After a time, which depends on how heavily the battery is discharged, the **YELLOW** LED will begin to flash, indicating the battery has reached 80% recharge level.

4. After a further time, the **GREEN "READY"** LED will indicate that the battery is fully charged. The minimum time before the **GREEN "READY"** LED shows is one hour. The battery should be left on charge until required for use.

NOTE: The length of time the charger remains in **YELLOW** mode depends on the size and "State of Charge" of the battery. This function is controlled by the solid State Circuitry of the charger, which provides the correct charge profile automatically. This charger can be left safely connected to the battery for extended periods of time.

SPECIAL NOTE

5. Batteries that have a suspect condition, particularly "Sulfated Cells", may, when first connected, proceed directly to the **FLASHING YELLOW** LED indication. After current flow begins, the **YELLOW CHARGE** LED stays **ON**, indicating that a normal charge cycle is operating. This is normal operation for the GEL charger.

BATTERY TYPE SWITCH FEATURE

The PRO & GEL chargers are fitted with a dealer-settable BTS, which will work correctly with sealed, gelled or flooded type batteries. Only an authorized service technician is permitted to change the charger battery type setting. **NOTE:** Failure to select correct setting will affect the performance of the battery and may cause battery to gas and void any warranty of the battery. If battery type is not specified, set charger to **NORMAL** mode, which will work with most battery types. The charger is factory set in the **NORMAL** mode unless otherwise specified by the original purchaser. The BTS is **NOT** intended for consumer use. If your dealer or authorized service technician is unable to offer you this service, contact the factory for assistance.

TROUBLESHOOTING GUIDE

YELLOW CHARGE LIGHT DOES NOT SWITCH ON:

The charger will not commence charging unless properly connected.

1. Check to ensure the charger is connected correctly. – **BLACK** lead to **NEGATIVE (-)** terminal and **RED** lead to **POSITIVE (+)** terminal or that the factory-installed OEM (Original Equipment Manufacturer) custom connector is properly installed regarding the polarity at the connectors contact terminals or at the mating connector on the battery or equipment.
2. Check that the clips made a good connection to the battery posts. Twist clips or clean battery posts to ensure good connection

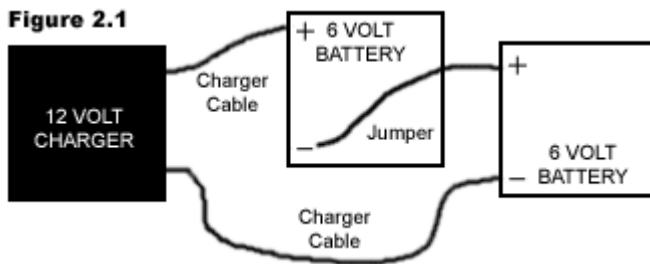
GREEN READY LIGHT DOES NOT APPEAR AFTER 18 HOURS:

3. The Microprocessor Control can indicate a problem with the battery. If the battery has not reached the First Stage of the Operation within 18 hours, the charger may determine that a problem exists within the battery or the battery is too big for the charger's output rating. The **VERRIDE TIMER FUNCTION** is indicated by the **GREEN LED FLASHING**.

SERIES & PARALLEL CHARGING

1. Two 6 Volt batteries may be charged with the charger if they are connected in series as shown in **Figure 2.1**.

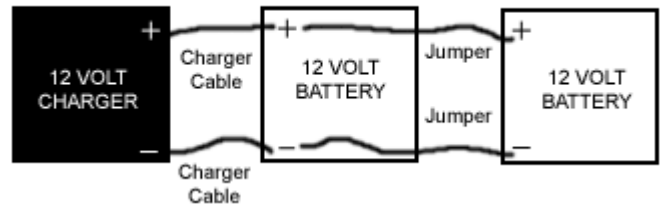
Figure 2.1



CAUTION: NEVER UNDER ANY CIRCUMSTANCES ATTEMPT TO CHARGE A SINGLE 6 VOLT BATTERY WITH THIS CHARGER. THIS WILL RESULT IN SERIOUS DAMAGE TO THE BATTERY AND CREATE A RISK OF EXPLOSION. EXTREME CARE SHOULD BE TAKEN TO CONNECT THE BATTERIES ONLY AS SHOWN ABOVE. IMPROPER CONNECTION CAN RESULT IN EXPLOSION AND SERIOUS INJURY.

2. Two or more 12 Volt batteries may be bank charged with the (1) charger if they are connected in parallel as shown in **Figure 2.2**.

Figure 2.2



NOTE: It is important that the batteries in the circuit be of the same type (e.g. maintenance-free only or conventional lead-acid only). Mixing different types of batteries in the same circuit will result in improper charging.

24 VOLT SERIES CHARGING

1. Two 12 Volt batteries may be charged with a 24 Volt charger if they are connected in series as shown in **Figure 2.1**.

CAUTION: EXTREME CARE SHOULD BE TAKEN TO CONNECT THE BATTERIES ONLY AS SHOWN. IMPROPER CONNECTION CAN RESULT IN EXPLOSION AND SERIOUS INJURY.

STORAGE INSTRUCTIONS

1. When not in use, store the charger in a cool, dry place, preferable in its original packaging.
2. Place these instructions with the charger.

MAINTENANCE & CLEANING

Very little maintenance is required other than protecting it from damage and weather.

1. Coil cord when not in use.
2. Clean case and cords with a slightly damp cloth.
3. Corrosion on the clips may be removed with a solution of water and baking soda.
4. Examine cords for damage periodically. Replace if necessary with manufacturer approved parts.

SERVICE

This charger is a solid-state device and should not require service under normal operating conditions and if used according to these instructions. For service, call or write the manufacturer.

CAUTION: RISK OF ELECTRICAL SHOCK.

Do not attempt any servicing unless you are authorized and qualified to do so.

BATTERY CHARGER LIMITED WARRANTY

MajorPower.Com warrants the accompanying battery charger (the "UNIT") to be free from defects in materials and workmanship for a period of 12 months from the date of purchase. In addition, the manufacturer warrants the transformer for a period of two years. This warranty applies to normal and non-commercial use and is subject to the terms and conditions given below.

For performance of the warranty, contact the dealer or MajorPower.Com for information. If it is necessary to return the Unit for repair or replacement, purchaser will be given a return merchandise authorization number (RMA). The Unit must be returned freight prepaid, in the original factory carton in order to prevent damage. Warranty does not cover such damage.

To qualify for warranty service, the following must be returned with the Unit; (a) A letter explaining the difficulties experienced with the Unit, (b) The return authorization number and (c) A copy of proof of the original purchase, such as a sales receipt or canceled check.

Failure to operate or maintain the Unit in compliance with the instructions furnished in the owner's manual, unreasonable use, use of replacement parts and repairs not authorized by the manufacturer, accidents, negligence or commercial use voids this warranty. Parts subject to normal wear and tear are not covered by this warranty.

Should a unit be returned for a cause not covered by this warranty or without the items specified above, any repairs, handling or testing will be made at the owner's expense and risk.

ALL IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS ARE LIMITED IN DURATION TO NINETY (90) DAYS. REPAIR OR REPLACEMENT AS STATED HEREIN IS THE OWNER'S SOLE REMEDY. FOR BREACH OF ANY KIND AND ALL WARRANTIES AND THE SOLE REMEDY FOR THE MANUFACTURER LIABILITY OF ANY KIND WITH RESPECT TO THE UNIT.

THERE SHALL BE NO LIABILITY FOR SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO, LOSS OF USE, INCONVENIENCE, LOSS OF TIME, OR DAMAGES TO ANY BUSINESS PROPERTY, WHETHER AS A RESULT OF BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY IN TORT, OR OTHERWISE.

This warranty gives purchaser specific legal rights. Purchaser may have other rights which vary from state to state. Some states do not allow limitations on the length of any implied warranty or the limitations or exclusion of incidental or consequential damages. Because of this, the above limitations or exclusions may not apply.

MODEL _____ **VOLTS** _____ **AMPS** _____ **SERIAL#** _____
(keep for your records)

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