

SMART AUTOMATIC BATTERY CHARGER

OWNER'S MANUAL & WARRANTY INFORMATION 12 VOLT 2/4/6 AMPERE CHARGE RATES WITH

• IMPORTANT SAFETY INSTRUCTIONS •

WARNING - 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 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 instructions and those published by the battery manufacturer and manufacturer of any equipment you intend to use in vicinity of battery. Review cautionary markings on these products and on engine.

GENERAL SAFETY

1. Use this charger for charging a LEAD-ACID battery only. It is not intended to supply power to a low voltage electrical system other than in a starter-motor application. DO not use this battery charger for dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause injury to persons and damage to property.
2. Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock, or injury to persons.
3. To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
4. An extension cord should not be used unless absolutely necessary. Use of an improper extension cord could result in a risk of fire and electric shock.
If extension cord must be used, make sure:
 - a. Pins on plug of extension cord are the same number, size, and shape as those of plug on charger.
 - b. Extension cord is properly wired and in good electrical condition; and
 - c. Wire size is AWG#14 (14 gauge) to 100 feet and AWG#12 for distances over 100 feet.
5. Do not operate charger with damaged cord or plug - take to a qualified service technician for replacement of the cord or plug immediately.
6. Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in anyway; take it to a qualified service technician.
7. Do not disassemble charger; contact a qualified service technician when service or repair is required. Incorrect reassembly may result in risk of electric shock or fire.
8. To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off charger controls will not reduce this risk.
9. Do not operate charger in rain or snow or use when wet.
10. Never charge a frozen battery.

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

SAVE THESE INSTRUCTIONS:

This manual contains important safety and operating instructions for battery charger Model VEC1086B
4140 SW 28TH WAY, FT. LAUDERDALE, FL 33312 • TEL: 954-584-4446 • FAX: 954-584-5556 • TOLL-FREE 866-584-5504

PERSONAL PRECAUTIONS AND SAFETY

1. Another person should be close enough to come to your aid when you work near a lead-acid battery.
2. Fresh water and soap should be nearby in case battery acid contacts skin, clothing, or eyes.
3. Wear eye protection and protective clothing. Avoid touching eyes or skin while working with a battery. If acid particles or corrosion gets into eyes immediately flood eye with cold water (Eye Wash Station) for at least 10 minutes and get medical attention immediately.
4. If battery acid contacts skin or clothing, wash immediately with soap and water.
5. NEVER smoke or allow a spark or flame in vicinity of battery or engine.
6. CAUTION: Dropping metal tool or other object onto battery may cause spark, short-circuit battery or other electrical components and may cause explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a lead-acid battery. Lead-acid batteries can produce a short-circuit current high enough to cause a severe burn.

POWER CORD CONNECTION

This appliance has a polarized plug (one blade is wider than the other) as a safety feature. This plug will fit into a polarized outlet only one way. If the plug does not fit fully into the outlet, reverse the plug. If it still does not fit, contact a qualified electrician. Do not attempt to defeat this safety feature.

PREPARING TO CHARGE

1. Determine voltage of battery by referring to car owner's manual.
2. If necessary, remove battery from vehicle to charge, or to clean terminals, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
3. Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes or skin.
4. Add distilled water in each cell until battery acid reaches manufacturer's specified level. 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 manufacturers' precautions such as removing or not removing cell caps while charging and recommended charging rates.
6. Area around battery should be well ventilated while battery is being charged. Gas can be forcefully blown away by using a piece of cardboard or other nonmetallic material such as a fan.
7. Make sure the initial charging rate does not exceed manufacturer's recommendation.

CHARGER LOCATION

1. Locate charger as far away from battery as cables permit.
2. **NEVER** place charger directly above battery being charged; gases from battery will corrode and damage charger.
3. **NEVER** allow battery acid to drip on charger when reading specific gravity or filling battery cells with battery acid.
4. **NEVER** operate charger in a restricted or non-ventilated area.
5. Marine batteries must be removed and charged on shore.
6. Do not set a battery on top of charger.

DC CONNECTION PRECAUTIONS

1. Connect and disconnect DC output clamps only after unplugging AC cord from outlet.
2. Never allow clamps to touch each other.
3. Attach clamps to battery posts and check for secure connection. This will hold clamps securely on terminals and helps to reduce risk of sparking.

FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

1. Position AC and DC cords/cables to reduce risk of damage by hood, door, or other moving engine parts.
2. Stay clear of fan blades, belts, pulleys, and other parts that can cause injury.
3. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N, -) post.
4. Determine which battery post is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see (e). If positive post is grounded to the chassis, see (f).
5. For negative-grounded vehicle, connect POSITIVE (RED) clamp from battery charger to POSITIVE (POS,P, +) post of battery. Connect NEGATIVE (BLACK) clamp to vehicle chassis or engine block away from battery. Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts. Connect to heavy gauge metal part of the frame or engine block.
6. For positive-grounded vehicle, connect NEGATIVE (BLACK) clip from battery charger to NEGATIVE (NEG, N, -) post of battery. Connect POSITIVE (RED) clamp to vehicle chassis or engine block away from battery. Do not connect clamp to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
7. When disconnecting charger, disconnect AC cord first. Then remove clamps from vehicle chassis from battery terminal.
8. Refer to operating instructions for length of charge information.
9. Do not charge the battery while the engine is operating.

FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED OUTSIDE VEHICLE. A SPARK NEAR BATTERY MAY CAUSE BATTERY EXPLOSION. TO REDUCE RISK OF A SPARK NEAR BATTERY:

1. Check polarity of battery posts for top-mounted battery connectors, the Positive posts (marked POS,P, +) usually has a larger diameter than the Negative battery post (marked NEG, N, -). For side-mounted battery connections, the side-mounted battery connections, the Positive terminal is red, the Negative terminal is black.
2. Attach a 24-inch (minimum length) 6 AWG insulated battery cable to the Negative battery post (marked NEG, N, -).
3. Connect the Positive (RED) battery clamp to the Positive battery connector (marked POS,P, + or red).
4. Stand as far back from the battery as possible, and do not face battery when making final connection.
5. Carefully connect the NEGATIVE (BLACK) charger clamp to the free end of the battery cable connected to the negative terminal.
6. Set the charge rate to appropriate setting according to battery size.
7. When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
8. A marine (boat) battery must be removed and charged on shore. To charge it on board requires equipment specially designed for marine use.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and receiver
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected
- Consult the dealer or an experienced radio/TV technician for help

INTRODUCTION AND FEATURES

Thank you for selecting the Vector Model VEC1086B 2/4/6 AMP 12 Volt Smart Battery Charger. With proper care and use, it will give you years of dependable service. This battery charger has a high charge rate of up to 6 amps, and low charge rate of up to 2 amps. It is designed for charging only 12 volt lead-acid batteries - conventional automotive, maintenance free, marine deep cycle and Gel - used in cars, trucks, farm equipment, boats, RVs and SUVs, lawn mowers/garden tractors, motorcycles, personal watercraft, snowmobiles, ATVs, trucks and various commercial applications.

Vector Smart Battery Chargers feature 3-Stage High Efficiency Charging Technology Built-in Microprocessor Control that ensures Fast, Safe and complete Charge on serviceable batteries (See FIGURE 2).

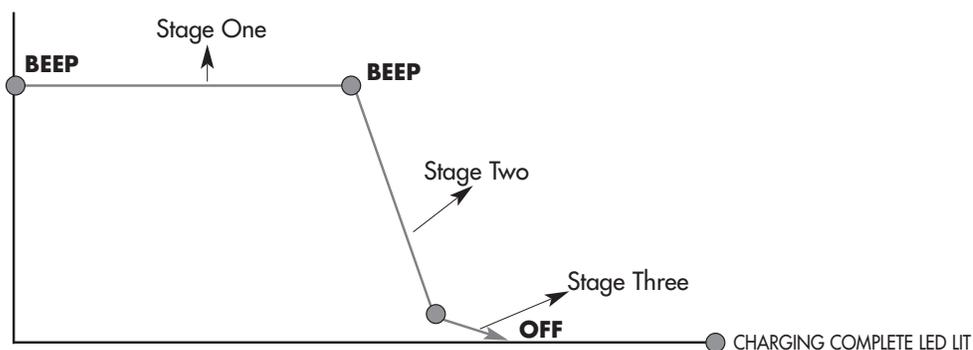
Stage One - Rapid Start Charge delivers maximum charging amperage to "wake up" any serviceable 12 Volt battery and allows for quick engine starting in just 5 minutes (based on midsize vehicle battery at 50% charge level). When battery reaches a maximum safe predetermined voltage, the charger will automatically signal a "BEEP" and move into Stage 2 of the charging process. At the end of Stage 2, the charger will signal a "BEEP" and move into Stage 3 charge mode.

Stage Two - Absorption Charge maintains the maximum possible charge at a constant safe predetermined voltage. During the phase, voltage absorption regulation charge, the charging voltage remains constant, while the actual charging current is reduced to allow for the maximum proper internal chemical energy transfer.

Stage Three - Top-Off Charge voltage is automatically maintained and reduced to a predetermined level while current is adjusted for a safe, effective battery charge level (step-down regulation mode); Ideal for topping off batteries that have been in storage. At the conclusion of Stage 3, the unit will BEEP signaling the completion of the charging cycle.

The Automatic Float Charge feature is ideal for maintaining a battery. It automatically tops off battery as needed to keep battery fully charged all the time.

FIGURE 2 - CHARGE CURVE



FEATURES

- This unit has three charge rate settings, with a 2/4/6 AMP push button charge rate switch:
 - a) 2 amps: smaller batteries as in lawn mowers, snowmobiles, motorcycles, etc.
 - b) 4 amps: middle sized batteries such as in small cars.
 - c) 6 amps: automobile batteries and light trucks.
- Automatic Float Charge Monitoring.
- Microprocessor controlled for proper operation and for fault detection.
- Charge Rate LED.
- High Frequency, Switch-Mode operation for pure DC output.
- Rapid charging three stage output.
- Heavy-duty cables and clamps are corrosion-resistant.
- Connect to side or top-mount battery terminals.
- Rugged case with baked on finish, plus sturdy carrying handle
- Self storage of cables and clamps.
- Ideal during winter season when vehicle's starting performance is reduced by cold or extreme weather conditions.
- Single beep tone indicates a button is pressed or a mode change occurs.

FIGURE 3 FRONT VIEW



WARNINGS: THERE ARE NO USER-SERVICEABLE PARTS IN THIS CHARGER. DO NOT OPEN THE UNIT! IT MUST BE RETURNED TO VECTOR FOR PROFESSIONAL TESTING AND REPAIR. OPENING THE UNIT WILL VOID THE MANUFACTURER'S WARRANTY.

Contact the Vector Technical Support Department at (954) 584-4446 or toll free: (866) 584-5504 for further information.

FIGURE 3 FRONT PANEL



CONTROLS AND INDICATORS

FUNCTIONS

2/4/6 AMP - allows the user to select the charger rate based on battery size. This selection and actual battery charge rate are monitored by the microprocessor and will stop charging if the rate is too fast or too slow for battery size or condition.

INDICATORS

FAULT - Lights when the battery is not connected properly or not chargeable.

Rev. Polarity - Lights when clamps are incorrectly connected to battery terminals.

Charging Complete - Indicates Battery is charged.

CHARGE RATE SELECTION

After charger clamps are correctly connected, plug in the charger to an AC outlet and the power indicator lights. Select proper charge current rate based on battery size. Press the 2/4/6 AMP push button and the charger will begin charging at 2 amps. Pressing the 2/4/6 AMP push button again will advance the charge rate to 4A, then 6A. Pressing the switch again will turn OFF the charger output.

CHARGING THE BATTERY

1. Press 2/4/6 AMP button to begin charging at 2 amps rate; the charger sounds a beep and lights charging current LED.
WARNING: If Charger lights **FAULT** indicator, the connection to battery terminals is bad. Clean battery terminals then reconnect clamps. If Rev Polarity indicator also lights, The Red (Positive) and Black (Negative) clamps are incorrectly connected to battery terminals. Reverse the clamps.
2. Pressing the 2/4/6 AMP button again advances charging rate to 4 amps and pressing once more advances charging rate to 6 amps.
NOTE:
 - If the battery is near full it will fall back to lower charge rate.
 - Pressing the 2/4/6 AMP 4 times advances to standby mode; sounds a beep, turn off all LEDs and stops charging.
3. The Charging Complete LED lights when the battery is fully charged.
4. Disconnect the AC power cord first then the NEGATIVE clamp and finally the POSITIVE clamp.

Automatic Float Charging - Ideal for maintaining a fully charged battery.

1. Keep the AC power and battery connected after battery is fully charged.
2. The charger monitors the battery and tops it off as needed.
NOTE:
 - If charging cycle is interrupted, the charger will go to Standby mode.
 - Automatic float can only be achieved after charging is complete and circuit has not been interrupted.

GENERAL BATTERY SAFETY

With minimal maintenance, the VEC1086B 2/4/6 AMP Smart Battery Charger will provide years of dependable service. Follow these simple steps to maintain the charger in optimum condition:

- After each use, clean the battery charger clamps - be sure to remove any battery fluid that will cause corrosion of the copper clamps.
- Clean the outside case of the charger with a soft cloth and, if necessary, a mild soap solution.
- Do not allow liquid to enter the charger. Do not operate when charger is wet.
- Keep the charger cords loosely coiled during storage to prevent damage to the cords.
- Do not use charger if cords or clamps have been damaged in any way - call Vector Technical Support Department toll-free: (866) 584-5504 to replace cords and clamps.

TROUBLESHOOTING - FAULT LED LIT

The following conditions may light the FAULT LED:

- Poor connection to battery (or frame).
- Charging too fast - Decrease Charge Rate - Press 2/4/6 AMP button to lower rate.
- Charging too slowly - Battery is large and did not complete charging in 24 hours - Press 2/4/6 AMP to charge at a faster rate.
- Shorted battery cell - Replace battery.
- Open battery Cell - Replace battery.
- Reverse Polarity LED Lit - disconnect AC then reverse clamp locations on battery and frame.
- Internal overheat in charger- make sure fan is not blocked.

Try charging another battery, if the FAULT LED does not light, then one of the above problems exists with the initial battery. Charger will not charge and the fan will not operate if there is a fault. Call Vector Technical Support toll free: (866) 584-5504.

INTERNAL SHORT CELL BATTERY

- If the battery being charged has an internal shorted cell, the FAULT LED will light.
- If FAULT LED light comes on, Vector recommends you take your battery to a certified automotive service center for evaluation.

BATTERY NOT ACCEPTING A CHARGE

- Make sure that the charger is plugged into a "live" 110/120VAC outlet and Power LED is lit.
- Unplug charger and check battery connections - ensure that there is a good connection at the battery terminal and/or vehicle chassis.
- Check that the correct charge rate was selected for the battery being charged.
- Ensure enough charging time was allowed to charge battery.

NOTE: Charger will NOT operate on batteries below 2.0 Volts. If a 12 Volt battery is below 2.0 volts it is probably shorted, open or sulfated and should be replaced.

VERY COLD BATTERY

If the battery to be charged is extremely cold (in temperatures less than freezing - 0° C/32° F) it cannot accept a high rate of charge, so the initial charge rate will be slow. The rate of charge will increase as the battery warms.

WARNING: DO NOT ATTEMPT TO CHARGE A FROZEN BATTERY

CHARGING TIMES

The VEC1086B, a fully automatic Smart Battery Charger will automatically adjust the charge rate as the battery becomes charged and stops charging when the battery is fully charged. For estimates of the time it takes to charge a battery refer to the following table for details. Deep cycle batteries may need longer charging time. It is recommended to repeat the charging cycle a second time beginning with the 2 AMP rate.

The following chart converts hydrometer readings into percent of charge values.

Refer to the chart below for approximate charging times.

SPECIFIC GRAVITY (HYDROMETER READING)	PERCENT OF CHARGE IN BATTERY	PERCENT OF CHARGE NEEDED BY BATTERY
1.265	100%	0%
1.225	75%	25%
1.190	50%	50%
1.155	25%	75%
1.120	0%	100%

The times shown in the chart above are approximate and refer to an average automotive battery. For smaller batteries, the charge time should be adjusted using the formula shown below and adding 1 hour to the time calculated.

To estimate charging time for a discharged battery, divide the amp hour (aH) rating of the battery by the charge rate selected. This is the number of hours required to recharge the battery. For example, a 50 AH (12 volt) battery is discharged (10 volts). How long should it be charged at the 10 Amp rate? Divide the 50 AH by 10.

Answer: 5.5 hours. Always round up the charge time by 10% to ensure full charge. In most cases, battery charging times will vary depending on the age and condition of the battery. Smaller batteries should be charged at a lower rate (2 Amps) and add an extra hour to charge time.

PERCENT OF CHARGE	75%	50%	25%	0%
2 AMPS	7 HRS	14 HRS	NR*	NR*
6 AMPS	2.5 HRS	5 HRS	7 HRS	9.2 HRS
10 AMPS	1.4 HRS	2.8 HRS	4.1 HRS	5.5 HRS

* Not recommended

WARRANTY

This limited warranty program is the only one that applies to this product, and it sets forth all the responsibilities of Vector Manufacturing, Ltd., regarding this product. There is no other warranty, other than described herein.

This Vector Manufacturing, Ltd. product is warranted, to the original purchaser only, to be free of defects in materials and workmanship for five years from the date of purchase without additional charge. The warranty does not extend to subsequent purchasers or users. Vector Manufacturing, Ltd. will not be responsible for any amount of damage in excess of the retail purchase price of the product under any circumstances. Incidental and consequential damages are specifically excluded from coverage under this warranty.

This product is not intended for commercial use. This warranty does not apply to accessories or damage to units from misuse or incorrect installation. Misuse includes wiring or connecting to improper polarity power sources.

RETURN/REPAIR POLICY: Defective products, other than accessories, may be returned postage prepaid to Vector Manufacturing. Any defective product, other than accessories, that is returned to Vector Manufacturing within 30 days of the date of purchase will be replaced free of charge. If such a product is returned more than 30 days but less than five year from the purchase date, Vector Manufacturing will repair the unit or, at its option, replace it free of charge.

If the unit is repaired, new or reconditioned replacement parts may be used, at Vector Manufacturing's option. A unit may be replaced with a new or reconditioned unit of the same or comparable design. The repaired or replaced unit will then be warranted under the terms of the remainder of the warranty period. The customer is responsible for the shipping charges on all returned items after 30 days. During the warranty period, Vector Manufacturing, Ltd. will be responsible for the return shipping charges.

LIMITATIONS: This warranty does not cover accessories, bulbs, fuses and batteries, defects resulting from normal wear and tear (including chips, scratches, abrasions, discoloration or fading due to usage or exposure to sunlight), accidents, damage during shipping to our service facility, alterations, unauthorized use or repair, neglect, misuse, abuse, failure to follow instructions for care and maintenance, fire, flood and Acts of God.

If your problem is not covered by this warranty, call our Technical Support Department at (954) 584-4446 or toll free: (866) 584-5504 for general repair information and charges if applicable. You may also contact us through our website at www.vectormfg.com.

STATE LAW RIGHTS: This warranty gives you specific legal rights. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the exclusions or limitations stated herein may not apply. This warranty gives the purchaser specific legal rights; other rights, which vary from state to state, may apply.

TO REQUEST WARRANTY SERVICE FOR THIS PRODUCT: Contact Vector Manufacturing Technical Support by telephone, fax or mail. We suggest that you keep the original packaging in case you need to ship the unit. When returning a product, include your name, address, phone number, dated sales receipt (or copy) and a description of the reason for return and product serial number. After repairing or replacing the unit, we will make every effort to return it to you within four weeks.

WARRANTY ACTIVATION: Please complete Warranty Activation Card and mail to Vector Manufacturing. Enter "VEC1086B" as Model and "12V 2/4/6 Amp Battery Charger" as Product Type. All Vector Manufacturing, Ltd. products must be registered within 30 days of purchase to activate this warranty. Mail the completed registration form, along with a copy of the original sales receipt to:

ATTN.: CUSTOMER SERVICE / VECTOR MANUFACTURING, Ltd.
4140 SW 28th Way, Ft. Lauderdale, FL 33312
PH: 954-584-4446 • TOLL FREE: 866-584-5504 • Fax: 954-584-5556.
You may also contact us at our web site www.vectormfg.com.

WARRANTY IS NON-TRANSFERABLE AND NON-REFUNDABLE.
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