



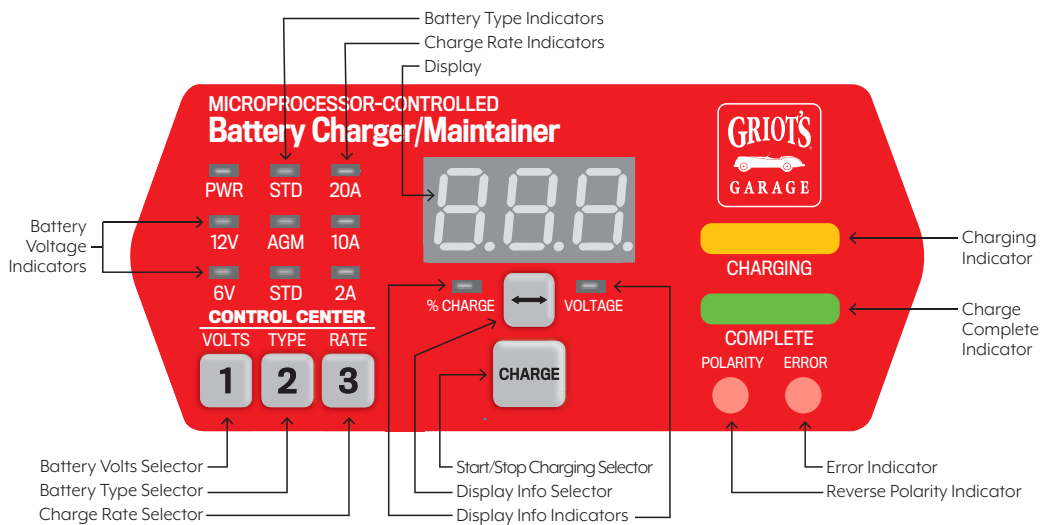
MICROPROCESSOR-CONTROLLED Battery Charger/Maintainer

Charges, Maintains & Reconditions 6V & 12V Batteries



FEATURES & SPECIFICATIONS

- Reverse Polarity Protection
- Input: 120Vac ~ 60hz 5.2A 380W
- Output: 12Vdc 20A, 6Vdc 20A
- Use With 6V Or 12V Batteries
- Three Charge Rates (20A/10A/2A)
- Safe, Multi-Phase Charging Process
- Exercising Mode Maintains Battery Health
- Display Shows Voltage Or Percent Charge
- Reconditions Dead & Weak Batteries
- Clamps Store Neatly On Bottom Of Unit



Have fun in your garage!®

THANK YOU

Thank you for choosing this quality Griot's Garage product. The Microprocessor-Controlled Battery Charger/Maintainer features state-of-the-art technology to improve battery performance, longevity and overall condition. Please read and understand all instructions before using the Microprocessor-Controlled Battery Charger/Maintainer. Enjoy the best!

PREPARING TO CHARGE A BATTERY

1. If it is necessary to remove the battery from the vehicle to charge, always remove the grounded terminal from the battery first. Make sure all accessories in the vehicle are off, to avoid causing an arc.
2. Be sure the area around battery is well ventilated while battery is being charged. Make sure there is no gasoline or other combustible material in the vicinity.
3. Clean battery terminals with a mixture of baking soda and hot water. Be careful to avoid corrosion 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 Maintenance-Free Batteries, carefully follow the manufacturer's recharging instructions.
5. Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
6. Determine voltage of battery by referring to vehicle owner's manual and make sure that charger output voltage matches.

LOCATING THE CHARGER

1. Locate the charger as far away from the battery as the cables permit.
2. Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.
3. Never allow battery acid to drip on the charger when reading specific gravity or filling the battery.
4. Do not operate the charger in a closed area or restrict ventilation in any way.
5. Do not set a battery on top of the charger.
6. Locate the charger at least 18" above the floor.
7. Do not place the charger where rain, snow or other moisture could drip on it.

CONNECTING TO BATTERY INSTALLED IN A VEHICLE

Caution: A marine (boat) battery must be removed and charged on shore. To charge it onboard requires equipment specially designed for marine use.

Caution: A spark near the battery may cause battery explosion. To reduce this risk:

1. Position AC and DC cords to reduce risk of damage by hood, door or moving engine part.
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 post usually has larger diameter than NEGATIVE (NEG, N, -) post.
4. Determine which post of battery is grounded (connected) to the chassis. If the negative post is grounded to the chassis (as in most vehicles), see instruction 5a. If the positive post is grounded to the chassis, see instruction 5b.
5. a) For NEGATIVE GROUNDED vehicle, connect POSITIVE (Red) clip from the battery charger to the POSITIVE (POS, P, +) ungrounded post of the battery.
b) For POSITIVE GROUNDED vehicle, connect the NEGATIVE (Black) clip from the battery charger to the NEGATIVE (NEG, N, -) ungrounded post of the battery. (This arrangement is usually found in pre-1970 foreign vehicles or pre-1970 farm tractors. This is a rare occurrence.)
6. Connect the remaining battery charger clip to the vehicle chassis or engine block, as far away from the battery as possible. Do not connect the clip 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, turn charging sequence OFF by depressing the "CHARGE" button, disconnect AC cord, remove clip from vehicle chassis and remove clip from battery terminal.
8. Refer to the Operating Instructions for information on setting selector switches.

CONNECTING TO BATTERY OUTSIDE OF A VEHICLE

1. Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, -) post.
2. Attach at least a 24" long, #6 gauge (AWG) insulated battery cable to NEGATIVE (NEG, N, -) battery post.
3. Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
4. Position yourself and the free end of the cable (installed in step #2) as FAR away from the battery as possible. FACING AWAY FROM THE BATTERY, connect the NEGATIVE (Black) charger clip to the free end of the cable.
5. When charging is complete, turn charging sequence off by depressing the "CHARGE" button. Then disconnect charger, always in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.

SELECTING THE CHARGE RATE

20A – batteries over 550 CCA, 75 Reserve Minutes or 60 Amp Hours.
10A – 300-550 CCA or 50-75 Reserve Minutes or 40-60 Amp Hours.
2A – power sport, motorcycle, lawn and garden batteries.

SELECTING THE BATTERY TYPE

For Conventional and Maintenance Free flooded (wet) batteries, the ideal Battery Type selection is "STD". For batteries identified as AGM construction, the ideal Battery Type selection is "AGM". For batteries identified as LiFePO4 Lithium construction, the ideal Battery Type selection is "LiFe". For most Spiral Wound batteries, the best Battery Type selection is "AGM". For Deep Cycle & Marine batteries, determine whether it's a wet cell battery or another type of construction.

BATTERY CHARGING INSTRUCTIONS

Upon making a proper battery connection, plug AC power cord into an AC receptacle. All unit LEDs will light momentarily, then only the LEDs corresponding to charging settings should stay lit. The charger is now in Standby Mode. If an ERROR Indicator LED illuminates, disconnect from AC power supply immediately and determine the cause of the alarm. The POLARITY light indicates reverse polarity error connection, while the ERROR light indicates the detection of a battery fault, such as a shorted connection. To charge a battery:

1. Choose a battery voltage charge setting. The default setting is the 12V mode, which will apply to most charging applications. To charge in 6V mode, push the voltage setting button until the "6V" LED is lit.
2. Choose a battery type setting. Refer to "Selecting the Battery Type" on the previous page.
Note: When charging lithium batteries, please note that there are many different lithium battery chemistries. The Lithium charging setting on this charger is specifically for Lithium Iron Phosphate (LiFePO4) batteries and only these lithium batteries. The charger should never be used for charging any other lithium battery type.
3. Choose a battery charging rate. Refer to "Selecting the Charge Rate" on the previous page.
Note: When charging lithium batteries, for safety, output current is limited to charging rates 10A and below.
4. Press the "CHARGE" button and the charging indicator LED will illuminate. The charger will automatically commence and complete the charging process. If you press the "CHARGE" button at any point during the charging sequence, the charger will stop charging and return to Standby Mode. Note: If the ERROR LED illuminates, disconnect from AC power immediately and determine the cause of the alarm. See Battery Charger Features

- for a list of conditions that might cause this warning. Note: The charger is designed to protect against faults and shorts (see Battery Charger Features). If the battery to be charged has an open circuit voltage of less than 1V, the charger will indicate a fault. If, after unplugging unit, checking connections and verifying all settings, you determine the problem causing the "fault" condition is battery voltage below 1V, you can override the charger's protection by holding down the "CHARGE" button for 3 seconds. The charger will commence the charging sequence and, assuming there are no other hindrances that caused the fault indication, will complete the charging process and automatically turn off when the battery has reached full charge.
- When the battery approaches full charge and enters the Completion Phase, the green CHARGING COMPLETE indicator will light, and the CHARGING LED indicator will flash. At this point, if time is critical, the battery can be put into service if it will be used in a charging situation, such as in a vehicle that will be used immediately. To reach a true 100% state of charge, the charger should stay connected until the charger reaches the Rest Phase, when only the green CHARGING COMPLETE is lit.
 - When you are finished with the charging process, disconnect AC power cord from AC outlet, then disconnect DC leads from vehicle ground (if charging with battery in vehicle) and battery in the reverse sequence of the connection procedure.

MICROPROCESSOR-CONTROLLED BATTERY CHARGER/MAINTAINER FEATURES

The charger uses a proprietary Multi-Stage charging process designed to optimally charge and maintain batteries. An example is shown on the back page. The chart shows the charging routine when charging a deeply discharged AGM battery in the 20A setting.

LOW ENERGY CONSUMPTION MODE

Note: The charger is designed to minimize energy consumption as much as possible. Once a charging routine is initiated, if the unit is left for 10+ minutes without a key pressed, the PWR LED will illuminate solid, and all other lights will turn off. The unit is still functioning and detecting what the battery needs but is now in Low Energy Consumption Mode. At any time, you can wake the display by pressing any button one time.

ENERGIZING PHASE

The charging process includes an initial energizing mode in which the charger determines the best charging path for the connected battery. The charger then enters the Fast Charge stage (most cases), Soft Start Mode, Battery Recondition Mode or stops the charging routine because unsafe battery conditions (short, etc.) are detected.

SOFT START MODE

Soft Start Mode is activated when the charger is connected to a deeply discharged battery. This mode protects the battery during the initial charge period, as the battery's voltage rises to a more normal level, and is beneficial for the long-term health of the battery.

BATTERY RECONDITIONING MODE

During the Energizing Phase, if the charger detects the presence of battery sulfation, it will activate this mode. If this occurs, the CHARGING LED will flash. This indicates the charge time will be extended while the charger attempts to recondition the battery.

IDEAL BATTERY MAINTENANCE

A key feature of this charger is how it manages a battery that remains on the charger after a complete charge has been achieved, such as during the storage of a seasonal use vehicle. Once the charger reaches the Resting Phase, its output is virtually turned off, except to occasionally monitor battery condition. This is beneficial for the connected battery, as it reduces chemical reaction within the battery compared to traditional charger maintenance modes. This greatly reduces the chance of damaging a battery in long-term storage. In addition, during the exercising phase, it introduces a load on the battery, simulating active use and recharges the battery to full charge. This Exercising feature keeps the battery in optimal

condition during periods of storage and non-use.

TWO DISPLAY OPTIONS

Other than when the charger is in Exercising Phase or an Error is detected, the charger's display will offer two options as to the information shown: Battery Voltage or Battery Percent of Charge. To change the display from one mode to the other, press the Arrow button below the display.

COMPATIBLE WITH MULTIPLE BATTERY TYPES

The charger will properly charge a wide variety of battery types, including Conventional, Maintenance Free, AGM, Gel Cell, Spiral Wound and Deep Cycle batteries.

SMART CLAMP TECHNOLOGY

The charger will send power to the output leads only when a proper battery connection is made.

REVERSE POLARITY PROTECTION

Guards against reverse connections. POLARITY LED will light on control panel and power will not be sent to output cables if a reverse connection is sensed.

BATTERY FAULT PROTECTION

Guards against excessively charging compromised batteries. ERROR and CHARGING LED will flash indicating charging has stopped and the charger has detected a compromised battery. Conditions that cause this error include: if the battery voltage does not rise appropriately during the charging process (indicating a shorted cell) or if the maximum charge time has been exceeded.

USING AS A 12V POWER SUPPLY

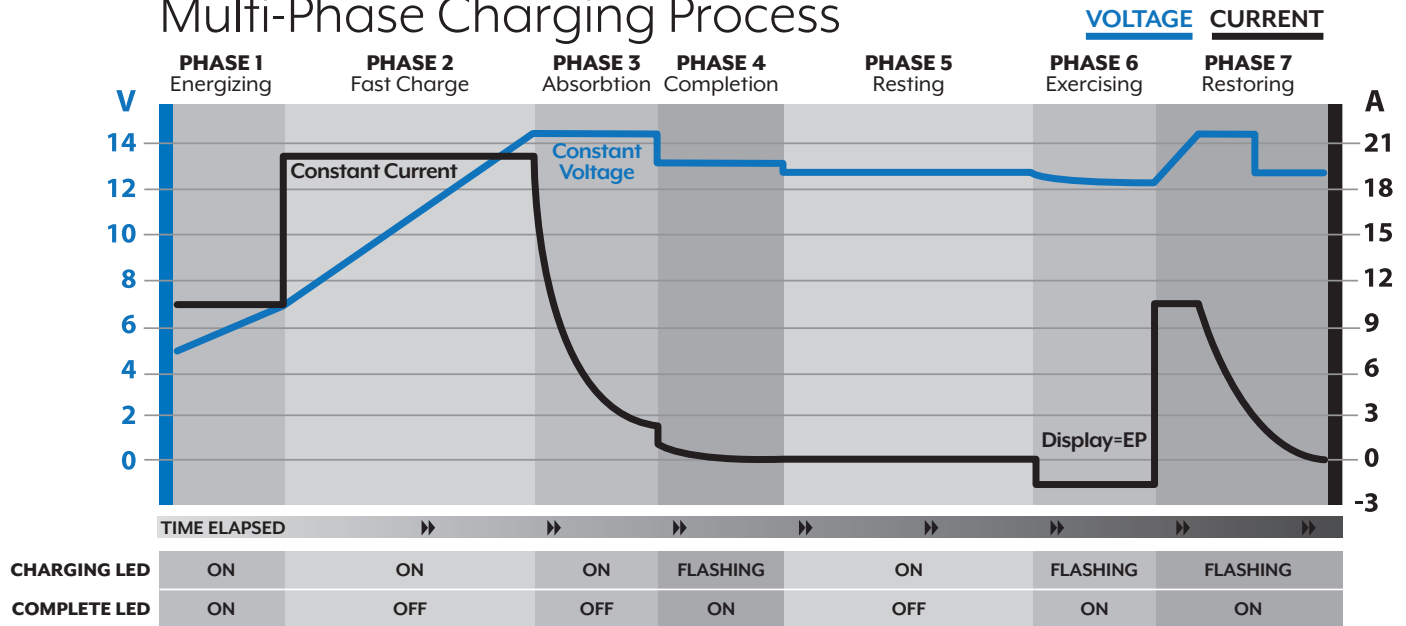
The unit can also be used to supply steady power to maintain system voltage during an on-vehicle repair. When using the charger in Power Supply mode, we recommend that the battery be fully charged. If necessary, run a full charging cycle prior to engaging the Power Supply mode. The Power Supply mode will not activate if the vehicle's battery is below 11.0VDC. Also, this operational mode is intended for use in a wide variety of repair applications, but is not intended for use when flash reprogramming vehicle modules – such reprogramming requires amperages greater than the output of this charger.

Upon making a proper battery connection, plug AC power cord into an AC receptacle. All unit LEDs will light momentarily, then only the LEDs corresponding to charging settings should stay lit. The charger is now in Standby Mode. To activate the Power Supply mode, push the VOLTS button until the LED corresponding to PWR Supply is lit. Note that this will disable all other controls and settings, such as battery type and charge rate settings. Press the START/STOP button to engage the Power Supply mode.

When the unit is operating in Power Supply mode, the display will show "PS" and the green Charging Complete LED will be lit. In this mode, the charger will supply steady power with a goal of maintaining steady system voltage at 14.1VDC, allowing the current supplied to the battery/system to vary as needed from 0-20 amps. If there is an increase in system need, the charger will react to it and supply as much current, up to 20A, as needed to maintain system voltage. If system voltage drops below 13.2VDC, the amber Charging in Progress LED will light in addition to the green Charging Complete LED to alert you that the charger may not be keeping up with system demand.

Like battery charging, if at any time during Power Supply mode operation, you wish to stop the charger, you can push the CHARGER/START/STOP button to return the unit to Standby Mode.

Multi-Phase Charging Process



SHORT CIRCUIT PROTECTION

Guards against shorted connections. ERROR LED will light solid on control panel and power will not be sent to output cables. This condition is triggered if the charger detects less than 1V across the clamps. See Operating Instructions Step 4 Note 2 for details regarding this feature.

OVER-VOLTAGE PROTECTION

Guards against charging errors where the charger is programmed to charge in a different voltage than the detected voltage of the battery. When this safeguard is engaged, the charger display will read "OUP". To reset the charger, disconnect from AC outlet, reset the vehicle connections and reconnect to the AC outlet.

IMPORTANT SAFETY INSTRUCTIONS

1. Do not expose charger to rain or snow.
2. Use of an attachment not recommended or sold by Griot's Garage may result in a risk of fire, electric shock or injury to persons.

3. WARNING – Risk of explosive gases.

- a. 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.
- b. To reduce risk of battery explosion, follow these instructions and those published by the battery manufacturer and the manufacturer of any equipment you intend to use in the vicinity of the battery. Review caution warnings on products and in the engine compartment.

4. **NOTE:** When charging lithium batteries, please note that there are many different lithium battery chemistries. The Lithium charging setting on this charger is specifically for Lithium Iron Phosphate (LiFePO4) batteries and only these lithium batteries. The charger should never be used for charging any other lithium battery type.

ANSWERS TO YOUR QUESTIONS

Should you have any comments or questions about the use of your Microprocessor-Controlled Battery Charger/Maintainer, our Customer Service Department can be reached by phone at 800-345-5789 or by email at info@griotsgarage.com.



Have fun in your garage!