

# OPERATOR'S MANUAL

# DieHard®

**Microprocessor Controlled,  
Fully Automatic Operation  
Battery Charger  
with Engine Starter**

**Plus Battery and Alternator  
Tester**

2-AMP SLOW CHARGE  
12-AMP FAST CHARGE  
30-AMP RAPID CHARGE  
80-AMP ENGINE START

**FOR 6 AND 12-VOLT  
BATTERIES**

**Model No.  
200.71225**



## **CAUTION:**

Read all Safety Rules and Operating Instructions,  
and follow them with each use of this product.

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**Sears, Roebuck and Co., Hoffman Estates, IL 60179 U.S.A.**

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### DIEHARD ONE-YEAR FULL WARRANTY

When operated and maintained according to all supplied instructions, if this DieHard product fails due to a defect in material or workmanship within one year from the date of purchase, return it to any Sears store or other DieHard outlet in the United States for free replacement.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Sears, Roebuck and Co., Hoffman Estates, IL 60179

FOR CUSTOMER ASSISTANCE OR REPLACEMENT PARTS,  
CALL TOLL-FREE FROM 7 AM TO 4:30 PM CT  
MONDAY THROUGH FRIDAY: 1-800-SEARS-64 (1-800-732-7764)

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**IMPORTANT: READ AND SAVE THIS SAFETY AND INSTRUCTION MANUAL.**

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**1. IMPORTANT SAFETY INSTRUCTIONS**

- 1.1** SAVE THESE INSTRUCTIONS – This manual contains important safety and operating instructions. The DieHard model 71225 Manual Battery Charger, offers a wide range of features to accommodate the needs for home or light commercial use. This manual will show you how to use your charger safely and effectively. Please read and follow these instructions and precautions carefully.
- 1.2** Do not expose charger to rain or snow.
- 1.3** 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.
- 1.4** To reduce risk of damage to electric plug and cord, pull by plug rather than cord when disconnecting charger.
- 1.5** An extension cord should not be used unless absolutely necessary. Use of improper extension cord could result in a risk of fire and electric shock. If an extension cord must be used, make sure:
- That pins on plug of extension cord are the same number, size, and shape as those of plug on charger;
  - That extension cord is properly wired and in good electrical condition and;
  - That wire size is large enough for AC ampere rating of charger as specified in Table 8.2.
- 1.6** Do not operate charger with damaged cord or plug; take to a qualified service person. (Call customer service at: 800-SEARS-64.)
- 1.7** Do not operate charger if it has received a sharp blow, been dropped, or otherwise damaged in any way; take it to a qualified serviceman. (Call customer service at: 800-SEARS-64.)
- 1.8** Do not disassemble charger; take it to a qualified serviceman when service or repair is required. Incorrect reassembly may result in a risk of electric shock or fire. (Call customer service at: 800-SEARS-64.)
- 1.9** To reduce risk of electric shock, unplug charger from outlet before attempting any maintenance or cleaning. Turning off controls will not reduce this risk.
- 1.10** **WARNING:** Pursuant to California Proposition 65, this product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

**WARNING – RISK OF EXPLOSIVE GASES.**

**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 YOU FOLLOW THE INSTRUCTIONS EACH TIME YOU USE THE CHARGER.**

**TO REDUCE RISK OF BATTERY EXPLOSION, FOLLOW THESE INSTRUCTIONS AND THOSE PUBLISHED BY BATTERY MANUFACTURER AND MANUFACTURER OF ANY EQUIPMENT YOU INTEND TO USE IN VICINITY OF BATTERY. REVIEW CAUTIONARY MARKING ON THESE PRODUCTS AND ON ENGINE.**

## **2. PERSONAL PRECAUTIONS**

- 2.1** Consider having someone close enough by to come to your aid when you work near a lead-acid battery.
- 2.2** Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing, or eyes.
- 2.3** Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
- 2.4** If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 10 minutes and get medical attention immediately.
- 2.5** NEVER smoke or allow a spark or flame in vicinity of battery or engine.
- 2.6** 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.
- 2.7** 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 current high enough to weld a ring or the like to metal, causing a severe burn.
- 2.8** Use 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 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.
- 2.9** NEVER charge a frozen battery.
- 2.10** **WARNING:** Pursuant to California Proposition 65, this product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

### **3. PREPARING TO CHARGE**

- 3.1** If necessary to remove battery from vehicle to charge, always remove grounded terminal from battery first. Make sure all accessories in the vehicle are off, so as not to cause an arc.
- 3.2** Be sure area around battery is well ventilated while battery is being charged.
- 3.3** Clean battery terminals. Be careful to keep corrosion from coming in contact with eyes.
- 3.4** Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead acid batteries, carefully follow manufacturer's recharging instructions.
- 3.5** Study all battery manufacturer's specific precautions while charging and recommended rates of charge.
- 3.6** Determine voltage of battery by referring to vehicle owner's manual and make sure that output voltage selector switch is set at correct voltage. If charger has adjustable charge rate, charge battery initially at lowest rate.

### **4. CHARGER LOCATION**

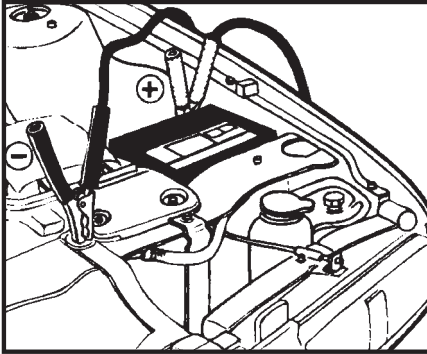
- 4.1** Locate charger as far away from battery as DC cables permit.
- 4.2** Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
- 4.3** Never allow battery acid to drip on charger when reading electrolyte specific gravity or filling battery.
- 4.4** Do not operate charger in a closed-in area or restrict ventilation in any way.
- 4.5** Do not set a battery on top of charger.

### **5. DC CONNECTION PRECAUTIONS**

- 5.1** Connect and disconnect DC output clips only after setting any charger switches to "off" position and removing AC cord from electric outlet. Never allow clips to touch each other.
- 5.2** Attach clips to battery and chassis, as indicated in 6.5, 6.6, and 7.2 through 7.4.

**6. 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:**

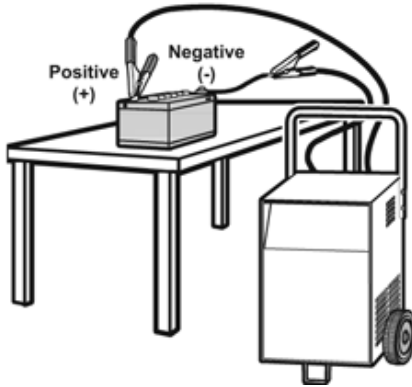


**NEGATIVE GROUNDED SYSTEM**

- 6.1** Position AC and DC cords to reduce risk of damage by hood, door, or moving engine part.
- 6.2** Stay clear of fan blades, belts, pulleys, and other parts that can cause injury to persons.
- 6.3** Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has larger diameter than NEGATIVE (NEG, N, -) post.
- 6.4** Determine which post of battery is grounded (connected) to the chassis. If negative post is grounded to chassis (as in most vehicles), see (6.5). If positive post is grounded to the chassis, see (6.6).
- 6.5** For negative-grounded vehicle, connect POSITIVE (RED) clip from battery charger to POSITIVE (POS, P, +) ungrounded post of battery. Connect NEGATIVE (BLACK) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
- 6.6** For positive-grounded vehicle, connect NEGATIVE (BLACK) clip from battery charger to NEGATIVE (NEG, N, -) ungrounded post of battery. Connect POSITIVE (RED) clip to vehicle chassis or engine block away from battery. Do not connect clip to carburetor, fuel lines, or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
- 6.7** When disconnecting charger, turn switches to off, disconnect AC cord, remove clip from vehicle chassis, and then remove clip from battery terminal.
- 6.8** See OPERATING INSTRUCTIONS for length of charge information.

**7. FOLLOW THESE STEPS WHEN BATTERY IS OUTSIDE VEHICLE.**

**A SPARK NEAR THE BATTERY MAY CAUSE BATTERY EXPLOSION.  
TO REDUCE RISK OF A SPARK NEAR BATTERY:**



- 7.1 Check polarity of battery posts. POSITIVE (POS, P, +) battery post usually has a larger diameter than NEGATIVE (NEG, N, -) post.
- 7.2 Attach at least a 24-inch-long 6-gauge (AWG) insulated battery cable to NEGATIVE (NEG, N, -) battery post.
- 7.3 Connect POSITIVE (RED) charger clip to POSITIVE (POS, P, +) post of battery.
- 7.4 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.
- 7.5 Do not face battery when making final connection.
- 7.6 When disconnecting charger, always do so in reverse sequence of connecting procedure and break first connection while as far away from battery as practical.
- 7.7 A marine (boat) battery must be removed and charged on shore. To charge it onboard requires equipment specially designed for marine use.

## 8. BATTERY CHARGING - AC CONNECTIONS

### 8.1 For all grounded cord-connected battery chargers with an input rating less than 15 amperes and intended for use on a nominal 120-volt circuit:

- This battery charger is for use on a nominal 120-volt circuit, and has a grounding plug that looks like the plug illustrated in sketch A in Figure 8.3. A temporary adapter, which looks like the adapter illustrated in sketches B and C, may be used to connect this plug to a two-pole receptacle as shown in sketch B if a properly grounded outlet is not available. The temporary adapter should be used only until a properly grounded outlet can be installed by a qualified electrician.

**DANGER** – Before using adapter as illustrated, be certain that center screw of outlet plate is grounded. The green-colored rigid ear or lug extending from 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.



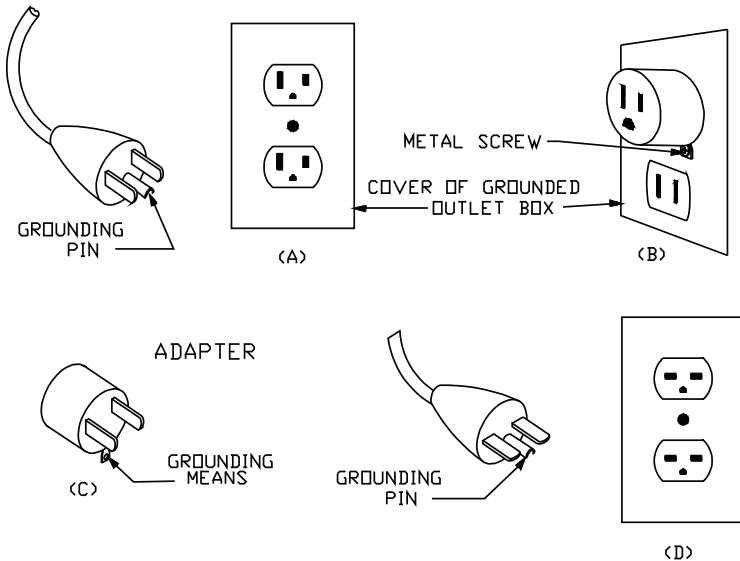
**8.2 Recommended minimum AWG size for extension cords for battery chargers:**

AC input rating, amperes <sup>a</sup>		AWG size of cord Length of cord, feet (m)			
At least	But less than	25 (7.6)	50 (15.2)	100 (30.5)	150 (45.6)
0	2	18	18	18	16
2	3	18	18	16	14
3	4	18	18	16	14
4	5	18	18	14	12
5	6	18	16	14	12
6	8	18	16	12	10
8	10	18	14	12	10
10	12	16	14	10	8
12	14	16	12	10	8
14	16	16	12	10	8
16	18	14	12	8	8
18	20	14	12	8	6

<sup>a</sup>If the input rating of a charger is given in watts rather than in amperes, the corresponding ampere rating is to be determined by dividing the wattage rating by the voltage rating – for example:  
 $1250 \text{ watts} / 125 \text{ volts} = 10 \text{ amperes}$

**8.3**

**Grounding Methods**



AA210

## 9. FEATURES



1. Carrying Handle
2. Charger Status LEDs
3. Display Mode Select Switch
4. Battery Type Select Switch
5. Charge Rate Select Switch
6. Digital Display
7. Battery Clamps

## 10. ASSEMBLY INSTRUCTIONS

Included with your battery charger are two cord wrap cleats for storage of the clamp cables.

- 10.1 To install, align the two tabs to correspond with the two receptacles and push until you hear a snap.

## 11. USING THE ENGINE START FEATURE

Your battery charger can be used to jump start your car if the battery is low. Follow these instructions on how to use the ENGINE START feature.

**IMPORTANT:** Follow all safety instructions and precautions when charging your battery. Wear complete eye protection and clothing protection. Charge your battery in a well-ventilated area.

**IMPORTANT:** Using the ENGINE START feature WITHOUT a battery installed in the vehicle could cause damage to the vehicle's electrical system.

- 11.1 For battery connections, see CHARGING BATTERY IN THE VEHICLE section. With the charger plugged in and connected to the battery of the vehicle, set the CHARGE RATE to 80A START. Only the 80A START, CHARGING, and VOLTAGE LEDs should be lit, unless the 6V REGULAR battery type has been selected. In that case, the 6V REGULAR LED will also be lit.
- 11.2 Crank the engine until it starts or 5 seconds passes. If engine does not start, wait 3 minutes before cranking again.
- 11.3 After the engine starts, unplug the power cord before disconnecting the output clamps from the battery.

#### 11.4 Clean and store the charger in a dry location.

**NOTE:** During the starting sequence listed above, the charger is set to one of three states.

#### 11.5 Engine Starting Notes:

- **Wait for cranking** - The charger waits until the engine is actually being cranked before delivering 80 amps for engine start. The charger delivers charge at a rate of up to 12 amps while waiting and will reset if the engine is not cranked within 15 minutes. (If the charger resets, it sets itself for a 2A charge and 12V REGULAR battery.) While waiting for cranking, the digital display shows the battery voltage (it can't be set to percent).
- **Cranking** - When cranking is detected, the charger will automatically deliver up to its maximum output (at least 80A) as required by the starting system for up to 5 seconds or until the engine cranking stops. The digital display shows a countdown of the remaining crank time in seconds. It starts at 5 and counts down to 0.
- **Cool Down** - After cranking, the charger enters a mandatory 3-minute (180 second) cool down state. During this period, no settings can be changed. The buttons are ignored. The digital display indicates the remaining cool down time in seconds. It starts at 180 and counts down to 0. The 80A START LED blinks once every second. During the cool down period, no current is delivered to the battery. After 3 minutes, the 80A START LED will stop blinking and will light continuously, indicating that another crank cycle can be started. The digital display will change from displaying the countdown back to displaying the battery voltage. The CHARGING LED will then be lit.

## 12. OPERATING INSTRUCTIONS

### OVERVIEW:

Using this battery charger is very simple. First, connect the battery and AC power following the precautions listed in sections 6 and 7. Then select the appropriate BATTERY TYPE and CHARGE RATE for your battery. The charger will then do everything automatically. This section explains a few details.

- 12.1 **CHARGING:** If the charger does not detect a properly connected battery, the CHECK (red) LED will light continuously until such a battery is detected. Charging will not begin while the CHECK LED is on. When charging begins, the CHARGING (yellow) LED will be lit.
- 12.2 **AUTOMATIC CHARGE:** When the 2A, 12A or 30A charge rate is selected, the charger is set to perform an automatic charge. When an automatic charge is performed, the charger switches to the maintain mode (see below) automatically after the battery is charged.
- 12.3 **ABORTED CHARGE:** If charging can't be completed normally, charging will abort. When charging aborts, the charger's output is shut off and the CHECK (red) LED and digital display will blink on and off (at opposite times). In that state, the charger ignores all buttons. To reset after an

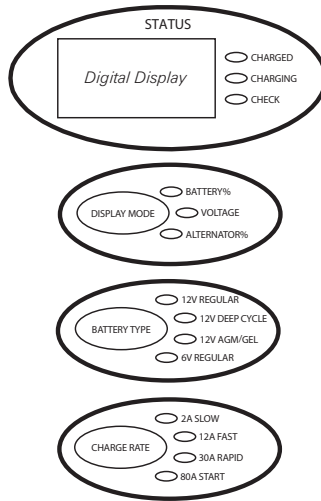
aborted charge, either disconnect the battery or unplug the charger.

- 12.4 DESULFATION MODE:** If a battery is left discharged for an extended period of time, it could become sulfated and not accept a normal charge. If the charger detects a sulfated battery, the charger will switch to a special mode of operation designed for such batteries. Activation of the special desulfation mode is indicated by the CHARGING (yellow) LED blinking. If successful, normal charging will resume after the battery is desulfated. The CHARGING (yellow) LED will then stop blinking and light continuously. Desulfation could take up to 10 hours. If desulfation fails, charging will abort and the CHECK (red) LED will blink.
- 12.5 COMPLETION OF CHARGE:** Charge completion is indicated by the CHARGED (green) LED. When lit, the charger has stopped charging and switched to the Maintain Mode of operation. If the 12V DEEP CYCLE battery type was selected for other charge types, the CHARGED (green) LED comes on when the battery is charged enough for normal use.
- 12.6 MAINTAIN MODE:** When the CHARGED (green) LED is lit, the charger has started Maintain Mode. This mode of operation is also known as Float-Mode Monitoring. In this mode, the charger keeps the battery fully charged by delivering a small current, when necessary. The voltage is maintained at a level determined by the BATTERY TYPE selected.  
**NOTE:** For charge types other than DEEP CYCLE, the CHARGED LED might be lit before Maintain Mode is started.
- 12.7 GENERAL CHARGING NOTES:** The charger is designed to control its cooling fan for efficient operation. Consequently, it is normal for the fan to start and stop when maintaining a fully charged battery. The fan does not run in Tester Mode.

If the charge mode is changed after charging has started (by pressing the CHARGE RATE or BATTERY TYPE button), the charging process will restart.

The voltage displayed during charging is the charging voltage and is usually higher than the battery's resting voltage.

## 13. CHARGER CONTROLS



### 13.1 DISPLAY MODE BUTTON

Use this button to set the function of the digital display to one of the following:

- **BATTERY %:** The digital display shows an estimated charge percent of the battery connected to the charger battery clamps.
- **VOLTAGE:** The digital display shows the voltage at the charger battery clamps in DC volts.
- **ALTERNATOR %:** The digital display shows an estimated output percentage of the vehicle's charging system connected to the charger battery clamps as compared to a properly functioning system.

### 13.2 BATTERY TYPE BUTTON

Use this button to set the type of battery to be charged to one of the following:

- **12V REGULAR:** This battery type is usually used in cars, trucks, and motorcycles. These batteries have vent caps and are often marked "low maintenance" or "maintenance-free."
- **12V DEEP CYCLE:** Deep cycle batteries are usually marked as "deep cycle" or "marine." Deep cycle batteries are usually larger than the other types.
- **12V AGM/GEL:** AGM and Gel cell batteries have sealed cases without vent caps. Such batteries are often smaller than the other types.
- **6V REGULAR:** This battery type is usually used in antique and specialized vehicles. The 6V REGULAR battery type is not selectable for batteries greater than 8.5V DC.

With the exception of AGM and Gel cell batteries, all other battery types

may or may not have vent caps. *Vent caps are located on top of the battery and provide a means to add distilled water when needed.* Batteries should be marked with their type. If charging a battery that is not marked, check the manual of the item that uses the battery.

### 13.3 CHARGE RATE BUTTON

Use this button to set the maximum charge rate to one of the following:

- **2A SLOW CHARGE RATE:** Intended for charging small batteries such as those commonly used in garden tractors, snow mobiles and motorcycles. The 2A rate is not intended to be used as a trickle charger for larger batteries.
- **12A FAST and 30A RAPID CHARGE RATE:** Use for charging automotive, marine, and deep cycle batteries. Not intended for industrial applications.
- **80A START:** Provides 80 amps for cranking an engine with a weak or run down battery. Always use in combination with a battery.

**NOTE:** To turn OFF the charger, unplug the power cord from the wall outlet.

## 14. USING THE BUILT-IN VOLT METER TO TEST BATTERY STATE OF CHARGE

### OVERVIEW

This battery charger has a built-in volt meter to test your battery's state of charge. The charger does not have a built in load tester. As such, a recently charged battery could have a temporarily high voltage due to what is known as "surface charge." The voltage of such a battery will gradually drop during the period immediately after the charging system is disengaged. Consequently, the tester could display inconsistent values for such a battery. For a more accurate reading, the surface charge should be removed by temporarily creating a load on the battery, such as by turning on lights or other accessories.

**14.1 TESTING SEQUENCE:** There are four basic steps required to test the battery state of charge:

1. Connect the charger battery clamps to the battery.
2. Connect the charger power cord to a 120V AC 2-prong wall outlet.
3. If necessary, press the BATTERY TYPE button until the correct type is indicated.
4. Read the voltage on the digital display or press the display mode button to set the tester to BATTERY % to read the voltage as a percent of charge.

- 14.2 TESTER AND CHARGER:** When first turned on, the 71225 operates only as a tester, not as a charger. To continue to use it as only a tester, avoid pressing the CHARGE RATE button. Selecting a charge rate activates the battery charger and deactivates the tester. Pressing the CHARGE RATE button when the 80A Start LED is lit (except during the 180 second cool down) will shut off the charger and activate the tester.
- 14.3 POWER-UP IDLE TIME LIMIT:** If no button is pressed within 15 minutes after the battery is first powered up, the charger will automatically switch from tester to charger, if a battery is connected. In that case, the battery will be set for the 2A charge rate and 12V REGULAR battery type.
- 14.4 TESTER WITHOUT TIME LIMIT:** If either the DISPLAY MODE or BATTERY TYPE button is pressed within the first ten minutes after the battery is powered up, the unit will remain a tester (not a charger) indefinitely, unless a charge rate is selected.
- 14.5 TESTING AFTER CHARGING:** After the unit has been changed from tester to charger (by selecting a charge rate), it remains a charger. To change the battery back to a tester, press the CHARGE RATE switch until all charge rate LEDs are off.
- 14.6 TESTER STATUS LEDs:** When the 71225 is operating as a battery tester, the status LEDs light under the following conditions:
- The CHARGED (green) LED will light if a charged battery is tested.
  - The CHARGING (yellow) LED does not light in the battery test mode.
  - The CHECK (red) LED lights unless a properly connected battery is detected.
  - When the tester display mode is set to VOLTAGE, the CHARGED and CHARGING LEDs won't light.
- 14.7 INITIAL PERCENT CALCULATION:** When a battery % is calculated for the first time after connecting a battery, the digital display will show three dashes (“---”) for a period as long as several seconds while the tester analyzes the battery.

## 15. USING THE BUILT-IN ALTERNATOR TO TEST ALTERNATOR OUTPUT

This battery charger has a built-in alternator tester that displays an estimate of the alternator's relative output compared to normal alternators. The Alternator % values displayed should be taken as general reference, not precise diagnosis. The alternator tester functions the same as the built-in volt meter (see previous section of this manual for details) with a few differences.

## 15.1 TESTING SEQUENCE

There are three basic steps required to use the 71225 as an alternator tester.

- Connect the charger battery clamps to the battery or charging system.
- Connect the charger power cord to a 120V AC wall outlet.
- Start the vehicle and turn on the vehicle's headlights. Read the voltage on the digital display or press the DISPLAY MODE button to set the tester to ALTERNATOR % to read the voltage as a percent of charge.

## 15.2 ALTERNATOR TESTING NOTES

- The DISPLAY MODE cannot be set to ALTERNATOR % during charging.

## 16. BATTERY PERCENT AND CHARGE TIME

This charger adjusts the charging time in order to charge the battery completely, efficiently and safely. The microprocessor automatically makes the necessary decisions. However, this section includes guidelines that can be used to estimate charging times.

The duration of the charging process depends on three factors:

- 16.1 Battery State** – If a battery has only been slightly discharged, it can be charged in less than a few hours. The same battery could take up to 10 hours if very weak. The battery state can be estimated by using the built-in tester. The lower the reading, the longer charging will take.
- 16.2 Battery Rating** – A higher rated battery will take longer to charge than a lower rated battery under the same conditions. A battery is rated in ampere-hours (AH), reserve capacity (RC) and cold cranking amps (CCA). The lower the rating, the quicker the battery will charge.
- 16.3 Charge Rate** – The charge rate is measured in amps. This charger provides charge rates of 2A, 12A and 30A. The 80A rate is for engine start only. The 2A rate is for charging smaller batteries such as those used for motorcycles and garden tractors. Such batteries should not be charged using the 12A or 30A rate. The 12A and 30A rates are for charging larger batteries. In the 30A mode, the charger begins at a low-charge rate and increases the charge rate if it is determined that the battery can accept the higher rate. All charging modes will decrease the charge rate as the battery approaches maximum charge. After the charging process has started, the digital display can be used to determine charging progress by selecting the BATTERY % mode.



#### 16.4 There are some important facts to keep in mind when charging a battery:

- When the display indicates 77% charged, the battery has been charged enough to start most vehicles and has already been charged as much as by many other battery chargers.
- When the display indicates 85% charged, the battery has already been charged at least as much as by most other battery chargers.
- The battery % shown in tester mode is an estimate based on the battery voltage.
- The battery % shown in charger mode is an estimate of the relative charge in the battery compared to the charge it should have if the charging process is allowed to complete and can be used to estimate the relative charge time. The lower the % shown, the longer the charge time for a given battery.
- The battery % shown in charger mode is an indication of the relative progress of the charging process. The higher the battery % displayed, the less charge time remains.
- The more a battery is discharged, the faster it absorbs charge from a charger. That means that the battery % increases faster at the beginning of the charging process than at the end. In other words, it takes longer for the battery to absorb the last few percents of charge than the first several percents.

### 17. CHARGING TIPS

Read this entire manual before using your charger. The tips below serve only as a guide for specific situations.

- 17.1 If your vehicle won't start:** You don't need to fully charge a battery to start your vehicle. If the charger won't start your vehicle using the 80A START rate, try charging the battery using the 30A rate for 10 or 15 minutes. That should charge the battery enough to allow the 80A START rate to start the vehicle. If operating the vehicle continuously for an extended period (such as a long drive), the vehicle could charge the battery back to normal during that period. If the vehicle will only be operated for a short period (short drive), the battery might need to be charged again before it could start the vehicle again.

- 17.2 Reviving your battery:** If you only wish to charge your battery enough to operate the vehicle, you don't need to wait for the entire charging process. When the charger displays a battery % of 77 or more, the battery has usually been charged enough for the vehicle to start and operate normally.
- 17.3 Completing an interrupted charge:** If the charging process has been interrupted and restarted after the charger displays a battery % of 85 or more, the charger could go straight to Maintain Mode. However, if the original charge was started using 30A, the charge can often be completed using the 2A rate.

## 18. MAINTENANCE INSTRUCTIONS

- 18.1** Before performing maintenance, unplug and disconnect battery charger (see sections 6.7 and 7.6).
- 18.2** After use, use a dry cloth to wipe all battery corrosion and other dirt or oil from terminals, cords, and the charger case.
- 18.3** Servicing does not require opening unit, as there are no user-serviceable parts.

## 19. STORAGE INSTRUCTIONS

- 19.1** Store charger unplugged, in an upright condition. Cord will still conduct electricity until it is unplugged from outlet.
- 19.2** Store inside, in a dry, cool place (unless you're using an on-board Marine Charger ).
- 19.3** Do not store clips on handle, clipped together, on or around metal, or clipped to cables.

## 20. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
The battery is connected and the charger is on, but isn't charging.	The charger is in tester mode, not charger mode.	Press the CHARGE RATE button to activate charging and select a charge rate.
Indicator lights are lit in an erratic manner not explained in the "Operating Instructions" section.	<p>You might have accidentally activated a special diagnostic mode.</p> <p>The charger may be defective.</p>	<p>Make sure nothing is touching the control panel, then unplug the charger and plug it in again.</p> <p>Return to place of purchase for replacement.</p>
The CHECK (red) LED always flashes before the battery is completely charged.	<p>The incorrect BATTERY TYPE may have been selected.</p> <p>This will happen if the battery did not reach full charge within 24 hours. May be due to a very large battery or a bank of batteries requiring more power than a 30/12 Amp charger can deliver within 24 hours. The battery may also be faulty.</p>	Reset the charger by unplugging it and plugging it back in place or briefly disconnecting the negative battery clip. Select the desired CHARGE RATE and BATTERY TYPE again, if necessary.
Engine crank time is less than specified.	Starter motor may be drawing more than 80 Amps.	Charge the battery at the 30A rate for 10 to 15 minutes then crank the engine.
The green CHARGED LED lights a few minutes after connecting to the battery.	<p>The battery may be fully charged or recently charged, leaving the battery voltage high enough to appear to be fully charged.</p> <p>The incorrect BATTERY TYPE may have been selected.</p>	<p>If the battery is in a vehicle, turn the headlights on for a few minutes to reduce the battery voltage and try charging again.</p> <p>Reset the charger by unplugging it or briefly disconnecting the negative battery clip. Select the desired CHARGE RATE and BATTERY TYPE again, if necessary.</p>

