

OPERATOR'S MANUAL

DieHard®

BATTERY CHARGER
40/20 Amp
Manual
200 Amp
ENGINE STARTER

Model No.
200.71230



CAUTION:
Read and follow all Safety
Rules and Operating Instructions
Before Every Use of this Product.
SAVE THESE INSTRUCTIONS.

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

00-99-000880/0808

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IMPORTANT: READ AND SAVE THIS SAFETY AND INSTRUCTION MANUAL.

1. IMPORTANT SAFETY INSTRUCTIONS

- 1.1** SAVE THESE INSTRUCTIONS - The DieHard model 71230 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 as this manual contains important safety and operating instructions.
- 1.2** WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.
- 1.3** Do not expose charger to rain or snow.
- 1.4** 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.
- 1.5** To reduce the risk of damage to electric plug or cord, pull by the plug rather than the cord when disconnecting the charger.
- 1.6** 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 an extension cord must be used, make sure:
- That the pins on the 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 and;
 - That the wire size is large enough for the AC ampere rating of the charger as specified in Table 8.3.
- 1.7** Do not operate the charger with a damaged cord or plug; take it to a qualified serviceman. (Call customer service at: 800-SEARS-64).
- 1.8** Do not operate the 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).
- 1.9** Do not disassemble the 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).
- 1.10** To reduce the risk of electric shock, unplug the charger from the outlet before attempting any maintenance or cleaning. Turning off the controls will not reduce this risk.

WARNING – RISK OF EXPLOSIVE GASES.

WORKING IN THE 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 THE 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 THE CAUTIONARY MARKINGS ON THESE PRODUCTS AND ON THE 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 your skin, clothing or eyes.
- 2.3** Wear complete eye protection and clothing protection. Avoid touching your eyes while working near the battery.
- 2.4** If battery acid contacts your skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flood the eye with cold running water for at least 10 minutes and get medical attention immediately.
- 2.5** NEVER smoke or allow a spark or flame in the vicinity of a battery or engine.
- 2.6** Be extra cautious to reduce the risk of dropping a metal tool onto the battery. It might spark or short-circuit the battery or other electrical part that may cause an 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 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 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 it is necessary to remove the battery from the vehicle to charge it, always remove the grounded terminal from the battery first. Make sure all of the accessories in the vehicle are off, so as not to cause an arc.
- 3.2** Be sure the area around the battery is well ventilated while the battery is being charged.
- 3.3** Clean the battery terminals. Be careful to keep corrosion from coming into contact with your eyes.
- 3.4** Add distilled water to each cell until the battery acid reaches the level specified by the battery manufacturer. Do not overfill. For a battery without removable cell caps, such as valve regulated lead-acid batteries, carefully follow the manufacturer's recharging instructions.
- 3.5** Study all of the battery manufacturer's specific precautions while charging and recommended rates of charge.
- 3.6** Determine the voltage of the battery by referring to the vehicle owner's manual and make sure that the output voltage selector switch is set to the correct voltage. If the charger has an adjustable charge rate, charge the battery at the lowest rate first.

4. CHARGER LOCATION

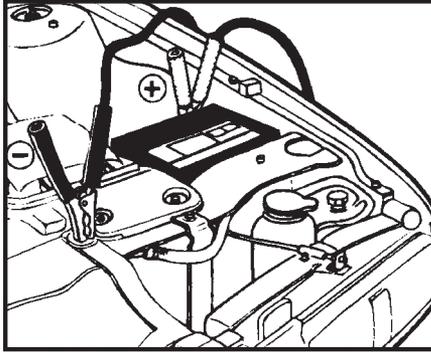
- 4.1** Locate the charger as far away from the battery as the DC cables permit.
- 4.2** Never place the charger directly above the battery being charged; gases from the battery will corrode and damage the charger.
- 4.3** Never allow battery acid to drip onto the charger when reading the electrolyte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

5. DC CONNECTION PRECAUTIONS

- 5.1** Connect and disconnect the DC output clips only after setting all of the charger switches to the "off" position and removing the AC plug from the electrical outlet. Never allow the clips to touch each other.
- 5.2** Attach the clips to the battery and chassis, as indicated in steps 6.5, 6.6, and 7.2 thru 7.4.

6. FOLLOW THESE STEPS WHEN BATTERY IS INSTALLED IN VEHICLE.

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

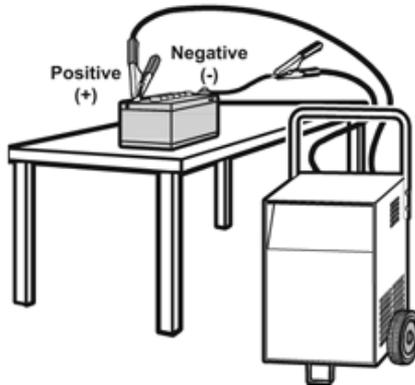


NEGATIVE GROUNDED SYSTEM

- 6.1** Position the AC and DC cables to reduce the risk of damage by the hood, door, or moving engine parts.
- 6.2** Stay clear of fan blades, belts, pulleys and other parts that can cause injury.
- 6.3** Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- 6.4** Determine which post of the battery is grounded (connected) to the chassis. If the negative post is grounded to the chassis (as in most vehicles), see step 6.5. If the positive post is grounded to the chassis, see step 6.6.
- 6.5** For a negative-grounded vehicle, connect the POSITIVE (RED) clip from the battery charger to the POSITIVE (POS, P, +) ungrounded post of the battery. Connect the NEGATIVE (BLACK) clip to the vehicle chassis or engine block away from the battery. Do not connect the clip to the carburetor, fuel lines or sheet-metal body parts. Connect to a heavy gauge metal part of the frame or engine block.
- 6.6** For a positive-grounded vehicle, connect the NEGATIVE (BLACK) clip from the battery charger to the NEGATIVE (NEG, N, -) ungrounded post of the battery. Connect the POSITIVE (RED) clip to the vehicle chassis or engine block away from the battery. Do not connect the clip to the 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 the charger, turn all switches to off, disconnect the AC cord, remove the clip from the vehicle chassis, and then remove the clip from the 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 A BATTERY EXPLOSION. TO REDUCE THE RISK OF A SPARK NEAR THE BATTERY:



- 7.1 Check the polarity of the battery posts. The POSITIVE (POS, P, +) battery post usually has a larger diameter than the NEGATIVE (NEG, N, -) post.
- 7.2 Attach at least a 24-inch-long 6-gauge (AWG) insulated battery cable to the NEGATIVE (NEG, N, -) battery post.
- 7.3 Connect the POSITIVE (RED) charger clip to the POSITIVE (POS, P, +) post of the battery.
- 7.4 Position yourself and the free end of the cable you previously attached to the NEGATIVE (NEG, N, -) battery post as far away from the battery as possible – then connect the NEGATIVE (BLACK) charger clip to the free end of the cable.
- 7.5 Do not face the battery when making the final connection.
- 7.6 When disconnecting the charger, always do so in reverse sequence of the connecting procedure and break the first connection while as far away from the 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:

- **GROUNDING AND AC POWER CORD CONNECTION INSTRUCTIONS**
 - The charger should be grounded to reduce the risk of electric shock. The charger is equipped with an electric cord having an equipment-grounding conductor and a grounding plug. The plug must be plugged into an outlet that is properly installed and grounded in accordance with all local codes and ordinances.
- **DANGER** – Never alter the AC cord or plug provided – if it will not fit the outlet, have the proper outlet installed by a qualified electrician. An improper connection can result in a risk of an electric shock.

8.2 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 8.4. A temporary adaptor, 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 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 the original outlet cover plate screw with a longer screw that will secure the adapter ear or lug to the outlet cover plate and make a ground connection to the grounded outlet.

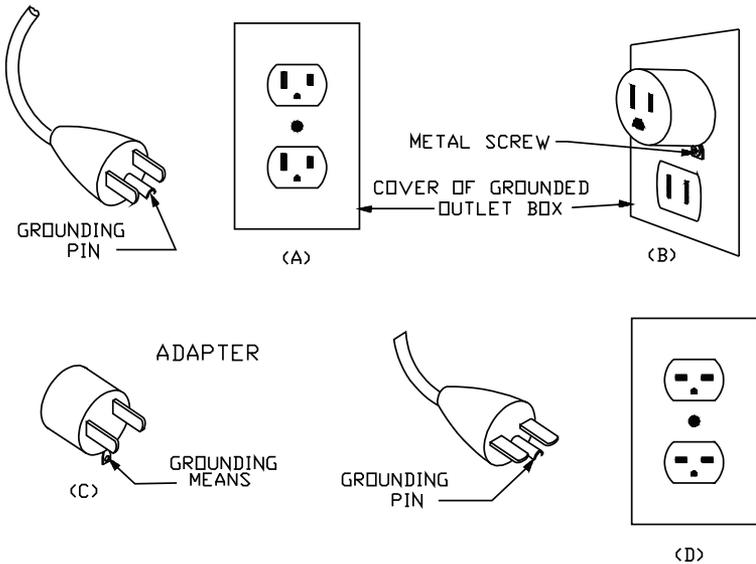
8.3 Recommended minimum AWG size for extension cords for battery chargers:

AC input rating, amperes ^a		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

^aIf 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:
 $1250 \text{ watts} / 125 \text{ volts} = 10 \text{ amperes}$

8.4

Grounding Methods



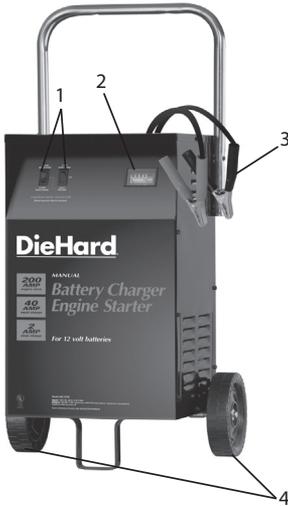
9. PARTS

The Sears service centers offer the following replacement parts for your battery charger. If you are having trouble with your battery charger, please contact a qualified service person to diagnose and/or repair your unit. It is not recommended that the consumer service the internal components of the battery charger, as improper handling or repair could lead to shock, electrocution, damage to the charger, or result in fire. As such, please contact 1-800-SEARS-64 for troubleshooting assistance and 1-800-366-PART for repair or replacement parts.

Replacement Parts List DieHard 71230:

Item	Description	Part Number
1	Handle	35-99-000286
2	Negative (BLK) Cable w/Clamps	38-99-000396
3	Positive (RED) Cable w/Clamps	38-99-000410
4	Power Cord	90-026-096
5	Circuit Breaker Assembly	39-99-000099
6	Rectifier Assembly	22-99-001081
7	Transformer	93-026-532
8	Fan Motor	00-99-000063
10	Wheel	00-99-000080
11	Hub Cap	52-00-000008
12	Axle	00-99-000060
13	Axle Mtg. Brackets	11-99-004366
14	Mounting Foot	11-99-003352
15	Rotary Switch 3 Position	04-99-000052
16	Ammeter	53-99-100088
17	Rocker Switch 2 Position	04-99-000050

10. FEATURES



1. Output Selector Switches
2. Ameter
3. Clamps
4. Wheels

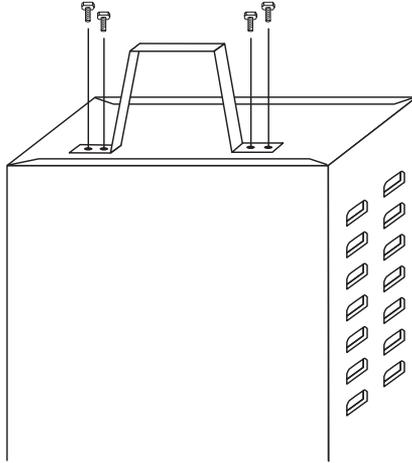
11. ASSEMBLY INSTRUCTIONS

It is important to fully assemble your charger before use. Follow these instructions for assembly:

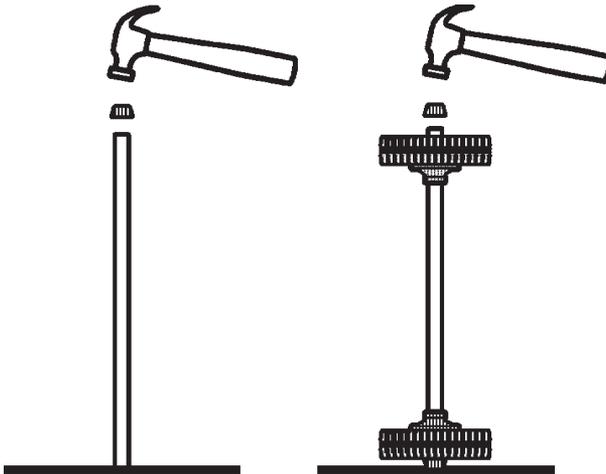
PARTS	TOOLS NEEDED
Two, 10-32, thread cutting screws Four, 1/4-20, thread cutting screws Two wheels One axle Two axle caps Two axle brackets One handle One mounting foot	3/8" wrench (for mounting foot) 5/16" wrench (for wheels) Hammer Phillips screwdriver

11.1 To attach the axle assembly:

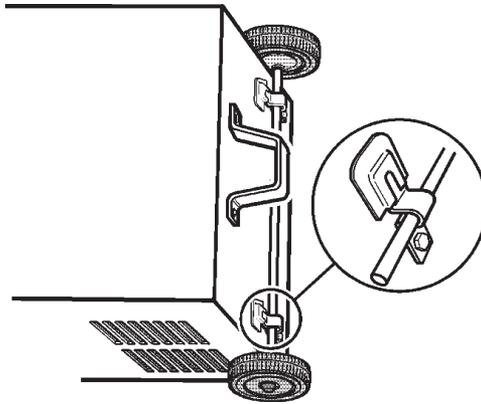
Remove charger from packing materials and place upside down on a flat surface. Attach mounting foot and secure with the four, 1/4-20 thread cutting screws.



11.2 Hold axle upright on floor or work surface. Then, using a hammer, tap one of the plastic axle caps onto the top end of the axle. Be sure to tap the axle cap on straight. Slide both wheels onto the axle with the recessed hubs facing out as shown. Install the second axle cap.

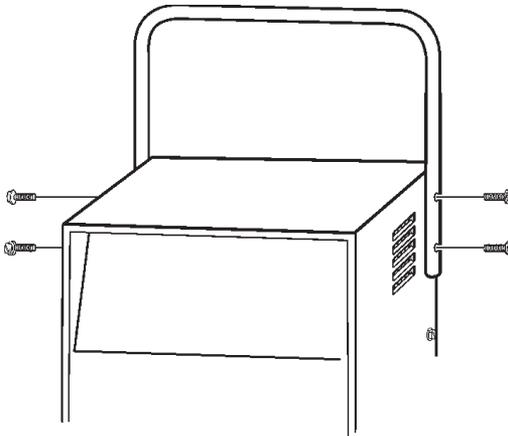


- 11.3** Place the charger on its side. Place one end of each bracket into slot, then place the axle assembly under each bracket. Fasten the other side of the brackets using the two, 10-32 screws provided.

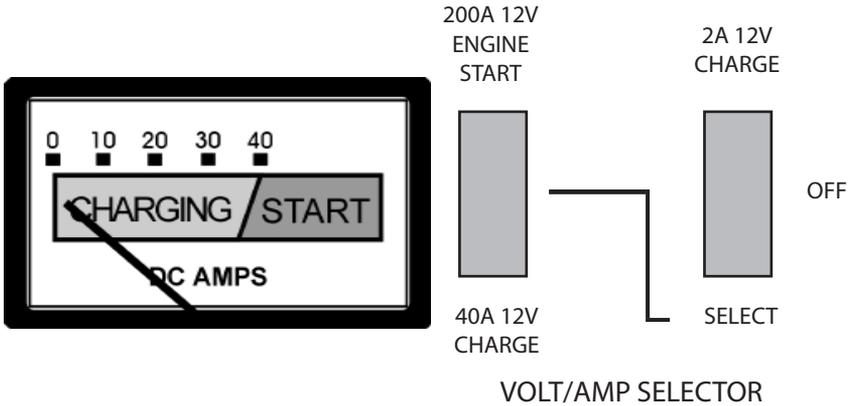


- 11.4** To Attach Handle:

Turn the charger right side up onto its foot and wheels. Remove the two top screws from each side of the charger. Align the handle so the screw holes are aligned with the screw holes on each side of the wheel charger. Attach the handle using the same screws.



12. OPERATING INSTRUCTIONS



12.1 SETTING THE CONTROLS

All controls for your charger are located on the front of the unit. Follow these instructions to obtain the accurate charge level for your battery.

12.2 Output Selector Switches:

Two switches are used to select the rate of charge or function; a 3-position switch on the right, and a 2-position switch to the left of it. Use the 3-position switch to select:

- **2 Amp Trickle Charge:** Use for charging small batteries and warming large batteries. The lower the charge rate, the longer it will take, but the battery is subjected to much less stress.
- **OFF:** Leave the switch in the OFF Position while connecting the charger to the battery and to the AC power outlet.
- **Select:** This setting enables you to select one of the two settings offered by the 2-position switch.
- Use the **40 Amp Charge** rate for a fast charge.
- Use the **200 Amp Engine Start** for cranking the engine. Remember that little or no charging has been done by the charger and your battery will still need further charging by the vehicle charging system once the engine starts.

- 12.3 Ammeter:** Indicates the amount of current measured in amperes that is being drawn by the battery. For example, in the 40 amp charge rate, a typical discharged battery will initially draw approximately 40 amps. As the battery continues to charge, current will taper to 15 to 20 amps at full charge. The Start area of the meter indicates a high rate of current being drawn from the charger. When cranking an engine, the starter motor draws upwards to 200-300 amps. The meter needle will be at the extreme right side of the start area. Sometimes, for the first few minutes of its charge, the battery will draw more than 40 amps; in this case, the needle may be within, but not all the way over, to the right side of the start area.

The 2 amp charge rate may not indicate activity on the meter. The meter does not have the resolution to display this low rate.

13. CALCULATING CHARGE TIME

13.1 The Chart Method

Use the following table to more accurately determine the time it will take to bring a battery to full charge. First, identify where your battery fits into the chart.

- Small batteries — motorcycles, garden tractors, etc. — are usually rated in Ampere Hours (**AH**). For example: 6 to 12 AH, or 12 to 32 AH.
- Batteries in cars and smaller trucks are usually rated in Reserve Capacity (**RC**), Cold-Cranking Amps (**CCA**), or both.
- Marine or deep-cycle batteries are usually rated in Reserve Capacity (**RC**).
- **NR** means that the charger setting is **NOT RECOMMENDED**.

Find your battery's rating on the chart below and note the charge time given for each charger setting. The times given are for batteries with a **50-percent charge rate** prior to recharging. Add more time for severely discharged batteries. Time is given in hours unless otherwise specified.

BATTERY SIZE/RATING			CHARGE RATE/ CHARGING TIME - HOURS	
			2 AMP	40 AMP
SMALL BATTERIES	Motorcycle, garden, tractor, etc.	6 - 12 AH	2 - 4	NR
		12 - 32 AH	4 - 10	NR
CAR/TRUCKS	200 - 315 CCA	40 - 60 RC	11 - 14	30 to 45 min.
	315 - 550 CCA	60 - 85 RC	14 - 18	45 min - 1 hour
	550 - 1000 CCA	85 - 190 RC	18 - 35	1 - 2 hours
MARINE/DEEP CYCLE		80 RC	18	NR
		140 RC	27	NR
		160 RC	30	NR
		180 RC	33	NR

13.2 The Hydrometer or Electronic Method

To find the time needed to fully charge your battery, determine the battery's charge level with a hydrometer or electronic Percent-of-Charge Tester. The following table will help you convert hydrometer readings to percent of charge values.

SPECIFIC GRAVITY	PERCENT OF CHARGE	PERCENT OF CHARGE NEEDED
1.265	100%	0%
1.225	75%	25%
1.155	25%	75%
1.120	0%	100%

When you know the percent of charge and the Amp Hour (AH) rating of your battery, you can calculate the approximate time needed to bring your battery to a full charge.

To **convert** Reserve Capacity to Amp Hours, divide Reserve Capacity by 2, and add 16:

$$\text{Amp Hours} = \frac{\text{Reserve Capacity}}{2} + 16$$

NOTE: The Reserve Capacity can be obtained from the battery specification sheet or the owner's manual.

To calculate time needed for a charge:

- Find the percent of **charge needed**. (A battery at 50 percent charge that will be charged to 100 percent needs another 50 percent (.50)).
- Multiply the Amp Hour rating by the charge needed (.50) and divide by the charger setting (2 or 10 amps).
- Multiply the result by 1.25 and you'll have the approximate time needed, in hours, to bring the battery to full charge.
- Add one additional hour for a deep-cycle battery.

Example:

$$\frac{\text{Amp Hour Rating} \times \text{charge needed}}{\text{Charger Setting}} \times 1.25 = \text{hours of charge}$$

$$\frac{100 \text{ (AH Rating)} \times .50 \text{ (charge needed)}}{50 \text{ (Charger Setting)}} \times 1.25 = 1.25 \text{ hours}$$

$$\frac{100 \times .50}{50} = 1 \times 1.25 = 1.25$$

You will need to charge your 100-Ampere Hour Battery for approximately 1 1/4 hours at the 50-Amp charge rate using the above example.

14. 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.

- 14.1 Set the right-hand OUTPUT SELECTOR switch to the OFF position. Then follow the instructions for connecting the charger to the battery in the Operating Instructions section.
- 14.2 Once the charger is connected, set the right-hand selector switch to SELECT and set the left selector switch to the 200 AMP START position.
- 14.3 Plug the power cord into a grounded AC wall outlet.
- 14.4 Crank the engine for **no more than five seconds**. If the engine does not start, wait four minutes before cranking again.
- 14.5 During extremely cold weather, or if the battery is severely exhausted, charge the battery for about five minutes before cranking the engine.
- 14.6 If the engine still does not start, charge the battery for five more minutes in the 40 AMP position before cranking it again for five seconds.
- 14.7 After the engine starts, unplug the charger power cord from the outlet. Then move the right-hand SELECTOR SWITCH to the OFF position before disconnecting the battery leads.

IMPORTANT: Do not try to start the engine without a battery in it. You could cause damage to the electrical system.

If the engine does turn over, but never starts up, there is not a problem with the starting system, there is a problem somewhere else with the vehicle. STOP cranking the engine until the other problem has been diagnosed and corrected.

15. MAINTENANCE INSTRUCTIONS

- 15.1 Before performing maintenance, unplug and disconnect battery charger (see sections 6.7 or 7.6).
- 15.2 After use, use a dry cloth to wipe all battery corrosion and other dirt or oil from terminals, cords, and the charger case.
- 15.3 Through routine maintenance, ensure all user installed parts are secured.
- 15.4 Servicing does not require opening the unit. There are no user-serviceable parts.

16. STORAGE INSTRUCTIONS

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

17. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION/REASONS
No reading on the ammeter.	Clamps are not making a good connection. 2-amp charge rate is being used.	Check for poor connections to battery and frame. Make sure connecting points are clean. Rock clips back and forth for a better connection. Ammeter may show no activity at the 2-amp charge rate.
No reading on ammeter. Fan inside wheel charger appears to not be working.	No power at receptacle. AC cord and/or extension cord is loose.	Check for open fuse or circuit breaker supplying AC outlet. Check power cord and extension cord for loose fitting plug.
Circuit breaker in charger cycles on and off with a clicking sound.	Shorted battery clamps. Shorted battery. Charger leads reversed. Volt/Amp Selector Switch set to the START position.	Circuit breaker cycles when current draw is too high. Separate the clamps. Check for worn cables and replace if needed. Have a Sears technician test the battery. Correct Connections. Correct Volt/Amp Selector setting.
Short start cycle when cranking engine.	Drawing more than 250 amps for a period of 3 seconds or less. Failure to wait for 4 minutes (240 seconds) between cranks. The charger may be heated up. Battery may be severely discharged.	Crank time varies with the amount of current drawn. If cranking draws more than 250 amps, crank time may be less than 3 seconds. Wait 4 minutes before next crank. The thermal protector may have tripped and needs a little longer to close. Make sure that the charger vents are not blocked. Wait and try again. On a severely discharged battery, charge for 10 to 15 minutes in the 20 amp manual rate to help assist in cranking.

PROBLEM	POSSIBLE CAUSE	SOLUTION/REASONS
Ammeter reads less than selected charge rate when charging a discharged battery.	Extension cord too long or wire gauge too small. Weak cell or sulfated plate in battery. Battery is only partially discharged.	Use shorter or heavier gauge extension cord. Sulfated battery will eventually take a normal charge if left connected. If the battery will not take a charge, have it tested by a Sears technician. Continue charging battery.
Charger makes a loud buzz or hum.	Transformer laminations vibrate (buzz). Shorted diode (hum).	Continue charging. Buzz is not abnormal. Have charger tested by Sears technician.
Ammeter reading stays high.	Battery is severely discharged.	Continue charging battery for two more hours. If problem continues, have the battery checked by a Sears or other qualified service dealer.

