

OWNER'S MANUAL

DieHard®

BATTERY CHARGER 50/15/2 Amp Manual

ENGINE STARTER With Battery Tester and Air Compressor 225/125 Amp

Model No.
200.71233



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

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

00-99-000538/0506

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Please read this Manual before using your Battery Charger

The DieHard model 71233 Manual Battery Charger/Engine Starter with Battery Tester and Air Compressor 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.

For information about troubleshooting, call toll-free from anywhere in the U.S.A. 7 am to 4:30 pm Central Time Monday through Friday.

1-800-SEARS-64 (1-800-732-7764).

Warranty

THREE-YEAR FULL WARRANTY

If this Battery Charger fails due to a defect in material or workmanship within three years 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

Important Safety Instructions

– SAVE THESE INSTRUCTIONS –



WARNING

To reduce the risk of explosion, explosive gases, or injury while using your battery charger, follow the precautions listed below:

- Read **all** instructions and cautions printed on the battery charger, battery, and vehicle or equipment using battery.
- Use charger only on **lead-acid** type rechargeable batteries, such as those used in cars, trucks, tractors, airplanes, vans, RVs, trolling motors, etc. This charger is not intended to supply power to a low voltage electrical system other than in an automotive application.
- **Use only** attachments recommended or sold by manufacturer. The use of attachments not recommended by the manufacturer may result in fire, electric shock, or injury.
- **Do not** disassemble charger. Take it to a qualified service professional if service or repair is required. Incorrect assembly may result in fire or electrical shock.
- To reduce risk of electrical shock, **unplug** the charger from the outlet before attempting any maintenance or cleaning.
- **Always** charge battery in a well ventilated area.

Help us help you

REMEMBER:

- **Place** charger as far away from battery being charged as the charger cables will permit.
- **Do not** expose charger to rain or snow.
- **Never** charge a frozen battery. If battery fluid (electrolyte) becomes frozen, bring battery into a warm area to thaw before you begin charging.
- **Never** allow battery acid to drip on charger when reading specific gravity or filling battery.
- **Never** set a battery on top of the charger.
- **Never** place charger directly above battery being charged. The gases from the battery will corrode and damage the charger.
- **Never** use charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst and cause personal injury.
- **Never** touch the battery clamps together when the charger is energized.
- **Never** operate charger if it has received a hard blow, been dropped, or otherwise damaged. Take it to a qualified professional for inspection and repair.
- **Be sure** to position the charger power cord to prevent it from being stepped on, tripped over, or damaged.
- **Never** pull out the plug by the cord when unplugging the charger. Pulling on the cord may cause damage to the cord or the plug.
- **Do not** operate the charger if it has a damaged power cord or plug. Have the cord replaced.
- **Wear complete eye and clothing protection** when working with lead-acid batteries.
- **Be sure** that someone is within range of your voice to come to your aid if needed while you work with or are near a lead-acid battery.
- **Have plenty of fresh water and soap** nearby for use in case battery acid contacts your eyes, skin, or clothing. If this happens, wash immediately with soap and water. Then get medical attention.
- **Avoid touching your eyes** while working with a battery. Acid particles (corrosion) may get into your eyes. If this occurs, flush eyes immediately with running cold water for at least 10 minutes. Then immediately get medical attention.
- **Remove all personal metal items** from your body, such as rings, bracelets, necklaces, and watches while working with a lead-acid battery. A battery can produce a short circuit current high enough to weld a ring (or the like) to metal, causing a severe burn.
- **Take care** not to drop any metal tool or metal object onto the battery. This may spark or short circuit the battery or another electrical device that may cause an explosion.
- **Always** operate your battery charger in an open, well ventilated area.
- **Never** smoke or allow a spark or flame in the vicinity of the battery or engine. Batteries generate explosive gases.
- **Neutralize** any acid spills thoroughly with baking soda before attempting to clean up.
- **WARNING:** Handling the cord on this product or cords associated with accessories sold with this product, may expose you to lead, a chemical known to the State of California to cause cancer and birth defects or other reproductive harm. **Wash hands after handling.**

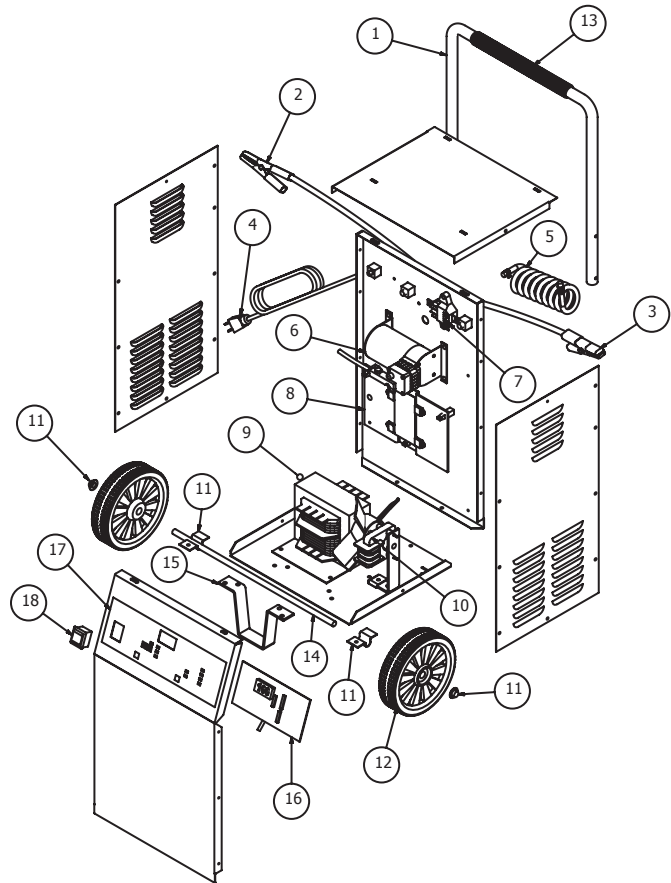
Personal Safety Precautions

For your own personal safety, please follow the following precautions:

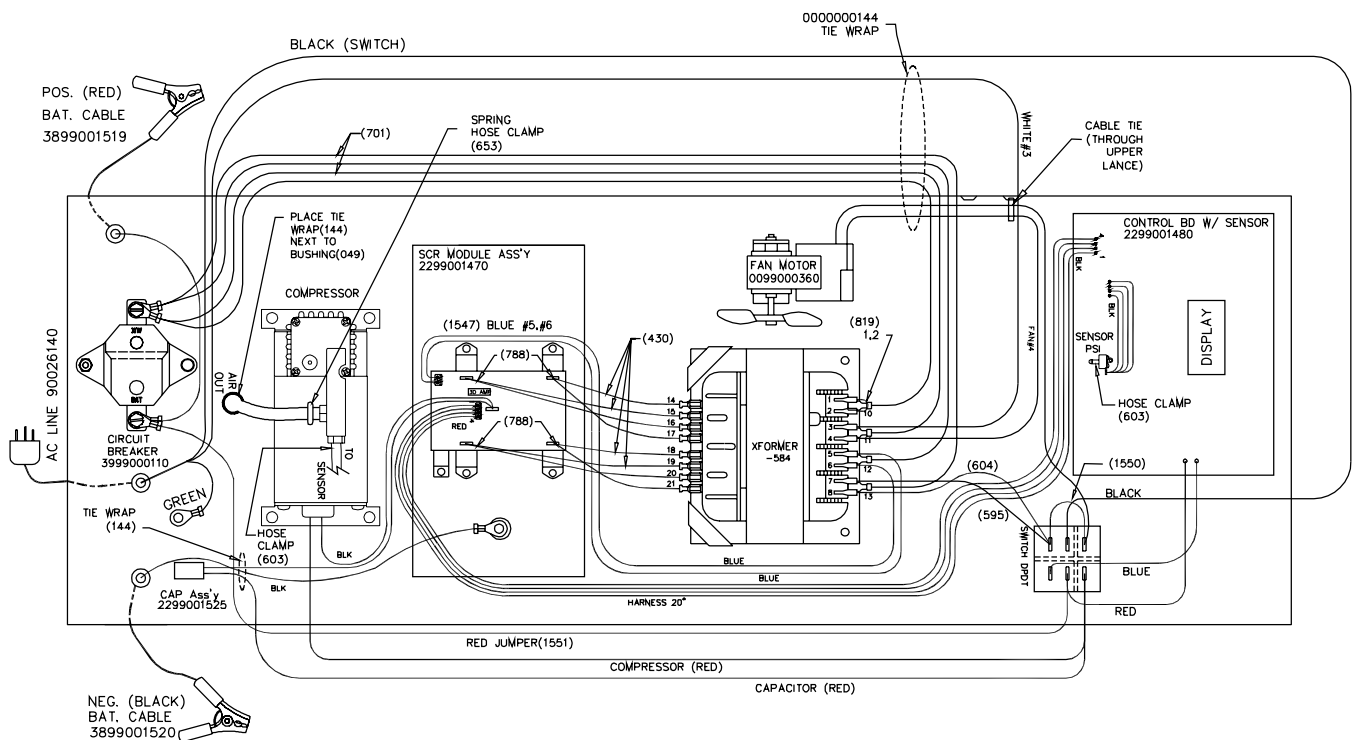
Parts

This section shows an illustration of your battery charger. Use it to become familiar with where all the parts are located, and what they look like.

Replacement Parts List DieHard 71233		
ITEM	DESCRIPTION	PART NUMBER
1	Handle	3599000286
2	Positive (RED) Cable w/clamps	3899001519
3	Negative (BLACK) Cable w/clamps	3899001520
4	Power Cord	90026140
5	Compressor Hose Assembly	2299001478
6	Compressor	2299001479
7	Circuit Breaker	3999000110
8	Power Board/Heatsink Assembly	2299001470
9	Transformer	93026584
10	Fan Motor	0099000360
11	Hardware Kit	2299001076
12	Wheel	0099000080
13	Handle Grip	0399000018
14	Axle	0099000066
15	Mounting Foot	1199003352
16	Control Board w/Air Sensor	2299001480
17	Faceplate	0899002633
18	Rocker Switch ON-OFF-ON	0400000037
19	Owner's Manual	0099000538



Wiring Diagram



Before Using Your Battery Charger

It is important to prepare your charger for use. This section will tell you how to assemble the charger, ground and connect the power cord, and prepare to charge a battery.

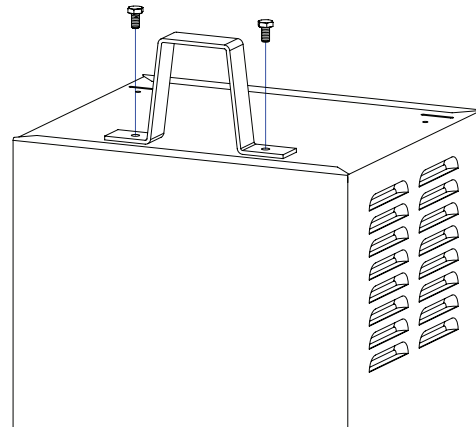
Assembling your charger

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

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

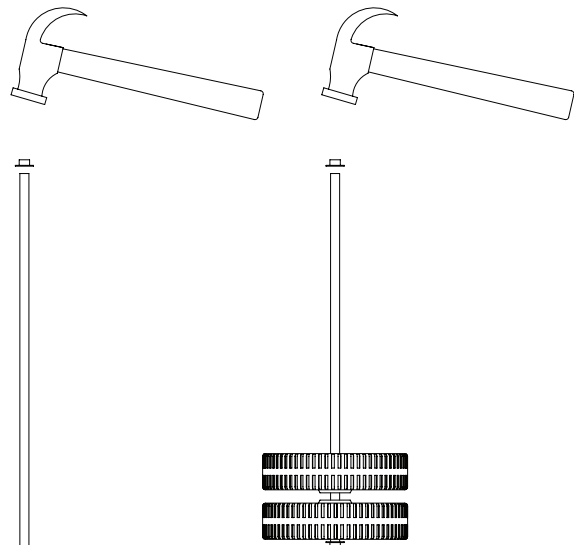
Attach Foot:

Remove charger from packing materials and place charger face down. Attach mounting foot and secure with the two, 1/4-20 thread cutting screws provided.



Axle Assembly:

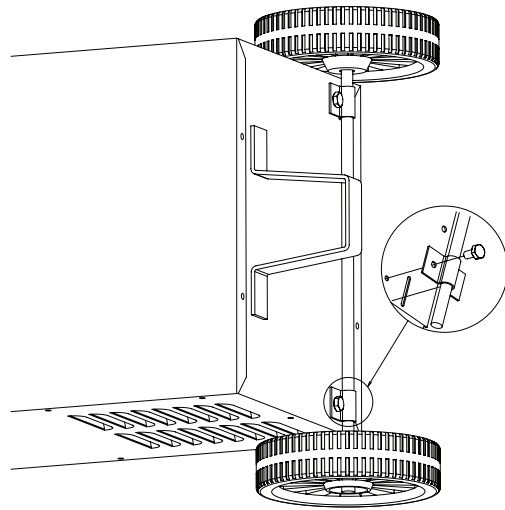
Hold axle upright on floor or work surface. Then, using a hammer, tap one of the axle caps onto the top end of the axle. Be sure to tap the hub on straight. Slide both wheels onto the axle with the hubs facing inward. Tap the other axle cap onto the opposite end of the axle and place the axle assembly onto the bottom of the charger.



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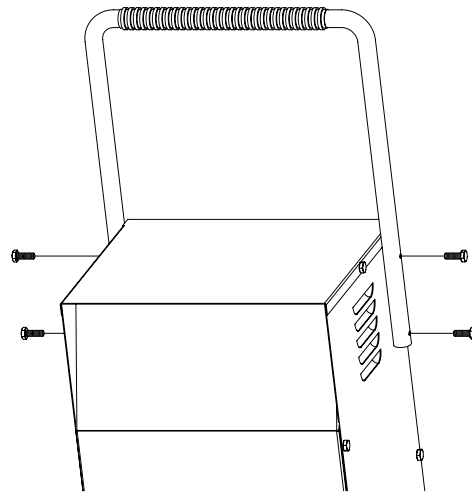
Axle Assembly (continued):

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 each bracket using the two, 10-32 thread cutting screws provided.



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 handle using the same screws.



Plugging it in

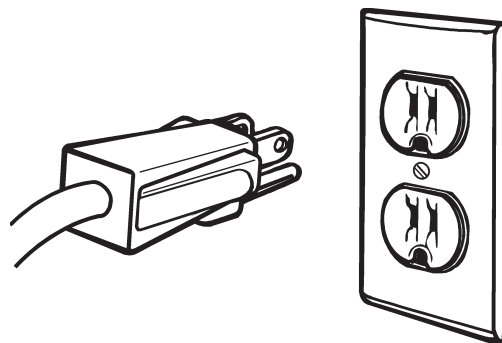
⚠ WARNING

Electrical Shock Hazard

Be sure that power cord fits properly into outlet. If not, have a qualified technician install a proper outlet. Never alter the AC cord or plug provided. Improper connection can result in electrical shock.

Your charger should be grounded to reduce the risk of electrical shock.

Your charger is equipped with an electrical cord that has an equipment grounding conductor and a grounding plug designed to be used on a 120 volt circuit. The plug must be plugged into an outlet that has been properly installed and grounded in accordance with all local codes and ordinances.



Using an extension cord

The use of an extension cord is not recommended. If you must use an extension cord, please make sure that you follow these guidelines:

- Make sure the pins on the plug of the extension cord are the same number, size, and shape as those of the plug on the charger.
- Use only 3-conductor (grounded) extension cord when necessary.
- Check that the extension cord is properly wired and in good electrical condition.

- Use the recommended minimum AWG (American Wire Gauge) to be sure that wire size is large enough for the rating of the charger.

MINIMUM RECOMMENDED EXTENSION CORD				
Length of Cord, in Feet	25	50	100	150
AWG* Size of Cord	16	14	10	8

*AWG=American Wire Gauge

Preparing your battery to be charged

It is important that you read and follow these guidelines while you are preparing to charge your battery.

- Make sure that you have a 12 volt or 6 volt lead-acid battery.
- Clean the battery terminals. Be careful to keep corrosion from getting in or around your eyes or on your hands.
- If you have a battery with removable cell caps, if required, add distilled water to each cell until the battery acid reaches the level indicated by the manufacturer. This will help purge excessive gases from the cells. Be careful not to overfill. If you have a sealed battery without cell caps, no action is necessary. Continue to the next step listed below.
- Take time to read all battery manufacturer's specific precautions, such as removing or not removing cell caps while charging, and recommended rates of charge.

- Wear safety glasses. See additional "Personal Safety Precautions" on page 2.
- Be sure that the area around the battery is well ventilated while it is being charged. If ventilation is poor, any gases emitted from the battery can be manually blown away by using a piece of cardboard or other non-metallic material as a fan.
- If it is necessary to remove the battery from the vehicle to charge it, always remove the grounded terminal from the battery first. A spark may be caused if all accessories in the vehicle are not completely turned off.

NOTE: A marine battery installed in a boat must be removed and charged on shore.

Maintenance and care

A minimal amount of care can keep your battery charger working properly for years.

1. Clean the clamps each time you are finished charging. Wipe off any battery fluid that may have come in contact with the clamps to prevent corrosion.
2. Coil the input and output cords neatly when storing the charger. The cords can be wrapped around the handle of the charger. This will help prevent accidental damage to the cords and charger.
3. Occasional cleaning of the case of the charger with a soft cloth will keep the finish shiny and help prevent corrosion.

Using Your Battery Charger

To obtain the best results from your battery charger, you must know how to use it properly. This section tells how to set the controls and how to charge a battery in and out of the vehicle.

Setting the controls

Follow these instructions to obtain the accurate charge level for your battery.

TOUCH PAD CONTROLS AND DIGITAL DISPLAY

The touch pad controls and digital display for your Timer Controlled 71233 Battery Charger and Engine Starter are located on the front control panel. The digital display shows volts, amps, timer minutes, air pressure *OFF* and *HLd*. The LEDs indicate which function is active. The touch pad controls and digital display are explained in detail by function.

BATTERY CHARGE

The Battery Charger charges 6V and 12V batteries. Verify the nominal voltage of your battery before charging the battery. It is important to read and follow "Charging Your Battery" instructions on page 10. After the clamp connections are made, you can start charging the battery.

1. Connect clamp to battery. Plug the power cord of the charger into a 3-prong grounded AC wall outlet.
2. Push the switch located on the front panel CHARGE SELECTOR/AIR COMPRESSOR to CHARGE/TEST.
3. Push the VOLT AND CHARGE RATE SELECTOR button until the desired voltage and amps LED illuminates. The charging process will begin for the amount of time set on the timer.
4. To turn OFF the charger, push the switch located on the front panel CHARGE SELECTOR/AIR COMPRESSOR to OFF. The charging process will stop.
5. Unplug the power cord from the AC wall outlet.
6. Disconnect the battery charging clamps in the proper order as outlined in "Charging Your Battery" on page 10.

BATTERY TEST

The Battery Test is based on the terminal voltage of the battery. If the battery is installed in the vehicle, make sure the engine and all accessories are turned off before testing.

1. Push the switch located on the front panel to CHARGE/TEST.
2. Press the DISPLAY MODE SELECTOR button and select VOLTAGE.
3. Hook the battery clamps to the battery as outlined in "Charging Your Battery" on page 10.
4. The digital display will show the voltage of the battery:

12V BATTERY VOLTAGES

12.8 or more volts	=	Charged battery
12.2 – 12.8 volts	=	Battery needs charging
12.2 or less volts	=	Discharged battery, needs charging

6V BATTERY VOLTAGES

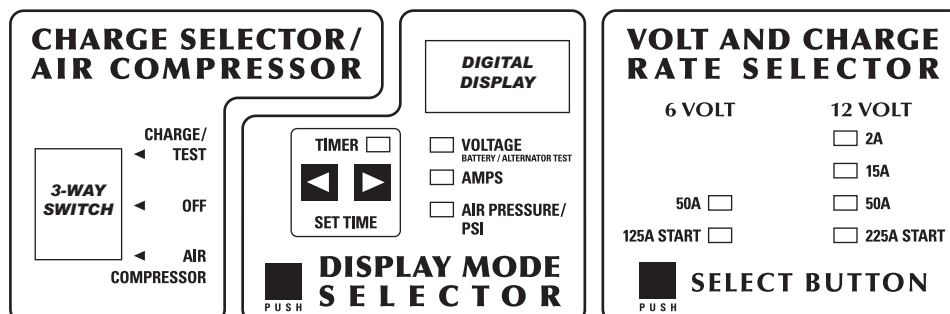
6.4 or more volts	=	Charged battery
6.1 – 6.4 volts	=	Battery needs charging
6.1 or less volts	=	Discharged battery, needs charging

NOTE: If, after charging, the battery does not hold a charge, have the battery tested by a qualified technician.

ALTERNATOR/GENERATOR TEST

1. Push the switch located on the front panel to CHARGE/TEST.
2. Press the DISPLAY MODE SELECTOR button and select VOLTAGE. (The display will show the voltage of the battery.)
3. Hook the battery clamps to the battery, as outlined in "Charging Your Battery" on page 10.
4. Start the engine and while it is at a fast idle, read the digital display.

NOTE: The battery should be in a good state of charge before doing this test.



12V ALTERNATOR/GENERATOR DISPLAY

14 – 15 volts	=	Good condition
12.8 or less volts	=	Check with qualified technician
12.8 - 14 volts or 15 volts or more	=	See vehicle owner's manual

NOTE: If the digital display reads less than 12.8 volts, the charging system may have loose fan belts, a defective voltage regulator or alternator. Additional tests may be required to find the exact cause. Take the vehicle to a qualified service center.

6V ALTERNATOR/GENERATOR DISPLAY

7 – 7.5 volts	=	Good condition
6.4 or less volts	=	Check with qualified technician
6.4 - 7 volts or 7.5 volts or more	=	See vehicle owner's manual

VOLT AND CHARGE RATE SELECTOR

The VOLT AND CHARGE RATE SELECTOR allows you to select the correct battery voltage and amp draw rate to match your charging needs. Read the following operating instructions for making the proper settings for charging a battery.

When you first start charging a battery, the amp reading will be high. As the battery becomes charged, the reading will decrease.

To determine the amount of amps being drawn by the battery:

1. Press the DISPLAY MODE button until the AMPS LED lights.
 - a. As the battery charges at 50 amps, the reading will decrease to 15 or 20 amps at full charge. You should stop charging the battery at this time.
 - b. When charging at 15 amps, the display should show 15 amps for a discharged battery and 7-8 amps for a fully charged battery. You should stop charging the battery at this time.
 - c. At the 2 amp charge rate, little or no display change will occur.

NOTE: The digital display will read \overline{OL} or Overload if more than 50 Amps are supplied to the battery. Overload means too high a charging rate. Lower the charging rate to continue.

To determine an accurate reading of your battery's voltage before you charge:

1. Push the switch located on the front panel CHARGE SELECTOR/AIR COMPRESSOR to CHARGE.
2. Press the DISPLAY MODE button so the VOLT-AGE LED lights.

3. Connect the battery charger as outlined in "Charging Your Battery" on page 10. The voltage will be displayed.
NOTE: If a battery has recently been charged or in a vehicle that has been run recently, turn on the vehicle's headlights for a few minutes before reading the meter to avoid getting a false reading from a surface charge.
4. Turn off vehicle's headlights and read the digital display.
5. To turn OFF the charger, push the switch located on the front panel to OFF. The charger will shut off.
6. Unplug the power cord from the AC wall outlet.
7. Disconnect the battery charging clamps as outlined in "Charging Your Battery" on page 10.

TIMER

The timer is designed to allow the battery to be charged for a designated amount of time. To accurately charge your battery, you must know the size of the battery in ampere hours or reserve capacity in units, as well as the state of charge. Since this information is not known by the charger, the timer limit is set at 2.25 hours to prevent the battery from overcharging to a point where it can be severely damaged. If you do not know the charge state of your battery, set the timer at one hour or less.

TO SET THE TIMER:

1. Press the ◀ symbol for less time and the ▶ symbol for more time.
2. The Timer LED will light and digital display will show the time in minutes.
3. To turn the timer off, press the ◀ symbol until the digital display reads OFF, or, push the CHARGE SELECTOR/AIR COMPRESSOR switch to OFF.

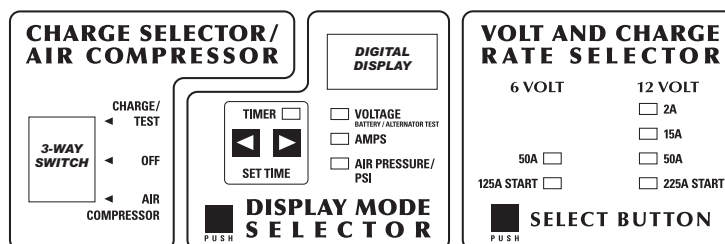
TIMER HOLD

The Timer Hold feature overrides the timer allowing the charger to continue charging for over 2.25 hours. This feature is most often used when the charging rate is 2 or 15 amps. Using this feature requires closely monitoring the charge time and turning off the charger when the battery is fully charged.

NOTE: When the battery is fully charged, the charger and timer will NOT automatically turn off. It is important to monitor the charge level. Not doing so may cause damage to your battery.

To activate the hold feature:

1. Press the ◀ symbol until the Digital Display reads Hld.
2. To release the Timer Hold, press the ▶ until the digital display reads OFF or, push the CHARGE SELECTOR/AIR COMPRESSOR switch to OFF.



Using the compressor

CAUTION – Read instructions of the product being inflated before using the compressor. Avoid over inflation, do not exceed the manufacturer’s recommended pressures. Do not leave the air compressor unattended during use.

NOTE: The 12 volt compressor is rated for 120 PSI. The compressor will not start at pressure greater than 80 PSI.

To use the air compressor:

1. If necessary, unscrew the valve stem cap from the tire.
2. Attach the brass nozzle of the compressor hose and thread onto the tire stem until it is secure.
3. To start the air compressor, push the switch located on the front panel to AIR COMPRESSOR. The Air Pressure/PSI LED will light and the PSI will show in the digital display.

4. The air compressor will run for a maximum of 15 minutes or it may automatically shut down sooner if a high load causes it to overheat. It will then cool for 20 minutes. The digital display will read $H\bar{O}E$. After 20 minutes, the air compressor will automatically restart.
5. If $H\bar{O}E$ reads on the digital display when first using the compressor, leave the charger on for one minute and the compressor will restart.
6. To turn off the air compressor, push the switch located on the front panel to OFF.

ESTIMATED TIME FOR INFLATING

Car Tire P205/75R14	1 - 8 minutes
Truck Tire 265/75R16	2 - 15 minutes
Bike Tire 26 x 1.95 In.	30 seconds to 2 minutes

Read the LED display to ensure proper pressure has been reached. Do not over inflate.

Using the engine start feature

The Engine Start is a feature to help start the engine of your vehicle:

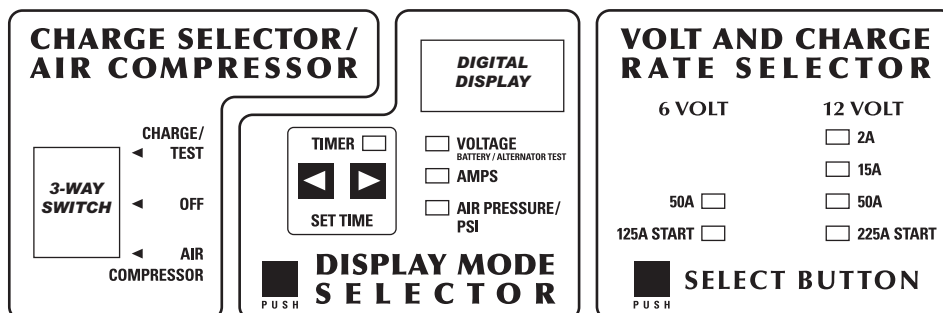
1. Push the switch located on the front panel to CHARGE/TEST.
2. Push SELECT BUTTON and choose 125A START (6 volt) or 225A START (12 volt). The ENGINE START feature will deliver 125 amps to help crank a 6-volt system and 225 amps to help crank a 12-volt system.
3. Push the ► symbol located in the Timer Set Time section until the number 5 is displayed.
4. Crank the engine for **no more than 5 seconds**. If it does not start, **wait three minutes** before cranking again for no more than 5 seconds.

NOTE: During extremely cold weather, or if the battery is severely exhausted, charge the battery for about 5 minutes in the 50 amp setting before cranking the engine.

5. After the engine starts, push the switch located on the front panel to OFF. Unplug the charger power cord from the wall outlet.
6. Disconnect the output clamps from the battery.
7. Clean and store the charger in a dry location.

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, 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.

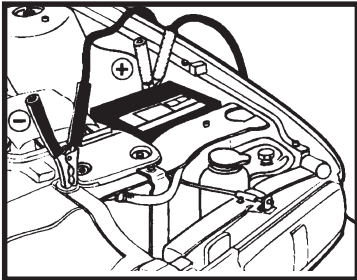


Charging Your Battery

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

Charging your battery in the vehicle:

1. Arrange the power cord and charging cords carefully in order to avoid damage that could be caused by the hood, door, or moving engine parts.
2. Keep hands, hair, clothing and jewelry clear of the fan blades, belts, pulleys, and other parts that can cause injury.
3. Check the polarity of the battery posts using the identification marks on the battery case: POSITIVE (POS,P, +) and NEGATIVE (NEG,N, -).



NEGATIVE GROUNDED SYSTEM

4. Identify which post of the battery is grounded or connected to the chassis. **THE NEGATIVE POST IS NORMALLY THE ONE THAT IS GROUNDED.**
5. **To charge a negative grounded post system:** Connect the red (POSITIVE) battery charger clamp to the ungrounded POSITIVE (POS,P,+) post of the battery. Then connect the black (NEGATIVE) clamp to a heavy metal part of the chassis or engine block, away from the battery. Do not connect clamp to carburetor, fuel lines, or sheet metal parts.

To charge a positive grounded post system:

Connect the black (NEGATIVE) battery charger clamp to the NEGATIVE (NEG,N,-) ungrounded post of the battery. Then connect the red (POSITIVE) clamp to a heavy unpainted metal part of the chassis or engine block, away from the battery. Do not connect clamp to carburetor, fuel lines, or sheet metal parts.

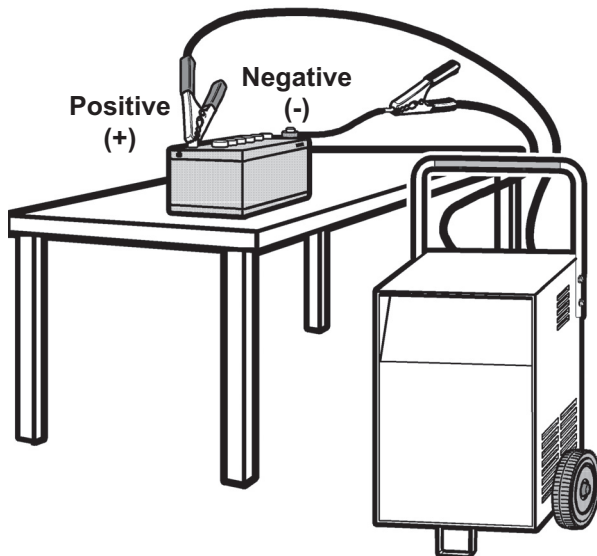
IMPORTANT: Wear safety glasses and face away from the battery while making connections.

6. Twist or rock clamps back and forth to make a solid connection. This will help make better contact and help keep them from slipping off and causing sparks.
7. Make sure the power is set to the OFF position. Then, plug the power cord into a 3-prong AC wall outlet.
8. Push the switch located on the front panel to CHARGE/TEST.
9. Press the VOLT/AMP SELECTOR to the desired charge position. (See "CHARGE RATE" chart on page 12 for correct settings.) Charging starts.
10. Press the TIMER to the desired charge time, from 5–135 minutes. If more than 135 minutes of charging time is needed the HOLD position can be used. When using the HOLD feature the battery being charged must be monitored closely to avoid over charging.
11. When the battery is fully charged, push the switch located on the front panel to OFF. Unplug the charger power cord from the wall outlet.
12. Facing away from the battery, remove the charger clamps in this order: (1) from the vehicle chassis or engine block (2) from the battery post or terminal.
13. Clean and store the battery charger in a dry location.

Charging your battery outside the vehicle:

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

1. Remove battery from vehicle, making sure to disconnect grounded terminal first with all power turned off to the vehicle.
2. Check the polarity of the battery posts as indicated on the battery case: POSITIVE (POS,P,+) and NEGATIVE (NEG,N,-).
NOTE: On top-post batteries, the positive battery terminal usually has a larger diameter than the negative one.
3. Connect the red (POSITIVE) charger clamp to the POSITIVE post of the battery. Be sure to rock the clamp back and forth to make a solid connection.
4. Attach at least a 6-gauge (AWG) insulated battery cable of at least 24-inches in length to the NEGATIVE battery post. This cable will provide a safer connection because any arcing and sparking will not occur directly over the battery. (The battery cable is not provided with the charger but may be purchased at most automotive accessory outlets.)



5. Take the other end of the 6-gauge (AWG) insulated battery cable (at least 24-inches in length), and, standing as far away from the battery as possible, connect the black (NEGATIVE) charger clamp to the free end of the cable. Be sure to rock the clamp back and forth to make a solid connection.
IMPORTANT: Wear safety glasses and face away from battery while you are making the final connection.
6. Make sure the power is set to the OFF position. Then, plug the power cord into a grounded 3-prong AC wall outlet.
7. Push the switch located on the front panel to CHARGE.
8. Press the TIMER to the desired charge time, from 30-135 minutes. If more than 135 minutes of charging time is needed the hold position can be used. When using the HOLD feature the battery being charged must be monitored closely to avoid over-charging.
9. Press the VOLT/AMP SELECTOR to the desired charge position. (See "CHARGE RATE" chart on page 12 for correct settings.)
10. When the battery is fully charged, turn OFF the timer, then push the switch located on the front panel to OFF. Unplug the charger power cord from the wall outlet.
11. Face away from battery and remove the charger clamps from the NEGATIVE end of the cable first, then from the POSITIVE post.
12. Clean and store the battery charger.

Calculating charge times

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** prior to recharging. Add more time for severely discharged batteries.

BATTERY SIZE/RATING			CHARGE RATE/CHARGING TIME - HOURS		
			2 AMP	15 AMP	50 AMP
SMALL BATTERIES	Motorcycle, garden tractor, etc.	6 - 12 AH	2 - 4	NR	NR
		12 - 32 AH	4 - 10	NR	NR
CAR/TRUCKS	200 - 315 CCA	40 - 60 RC	11 - 14	90 - 120 min.	30 - 40 min.
	315 - 550 CCA	60 - 85 RC	14 - 18	120 - 130 min.	40 - 45 min.
	550 - 1000 CCA	85 - 190 RC	18 - 35	2.5 - 4.5	45 - 90 min.
MARINE/DEEP CYCLE		80 RC	18	130 min.	NR
		140 RC	27	3.5	NR
		160 RC	30	4.0	NR
		180 RC	33	4.5	NR

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 (2/15/50 amps).
- Multiply the result by 1.25 and you'll have the time needed, in hours, to bring the battery to full charge.
- Add one additional hour for a deep-cycle battery.

Example:

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

$$\frac{100 \text{ (AH Rating)} \times .50 \text{ (charge needed)} \times 1.25}{15 \text{ (Charger Setting)}} = 4.16666 \text{ hours}$$

$$\frac{100 \times .50}{15} = 3.3333 \times 1.25 = 4.16666$$

You would need to charge your 100-Ampere Hour Battery for a little more than 4 hours at the 15-Amp charge rate using the above example.

Troubleshooting

Performance problems often result from little things that you can fix yourself. Please read through this table for a possible solution if a problem occurs.

PROBLEM	POSSIBLE CAUSE	SOLUTION/REASONS
No reading on Digital Display, charger fan not working.	AC cord and/or extension cord is loose. Poor electrical connection.	Check AC outlet and extension cords for loose fitting plug. Check for open fuse or circuit breaker supplying AC outlet.
No reading on Digital Display. or Digital Display does not change.	Battery severely discharged. DISPLAY MODE SELECTOR and SELECT BUTTON may have been selected incorrectly. Battery severely discharged.	Continue to charge battery for another two hours. If problem continues, call Sears Service at 1-800-SEARS-64. Check if DISPLAY MODE SELECTOR and SELECT BUTTON options are selected correctly. Continue to charge battery for another two hours. If problem continues, call Sears Service at 1-800-SEARS 64.
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 Service Center test the battery. Correct connections. Correct Volt/Amp Selector setting.
Short start cycle when cranking engine.	Drawing more than 225 amps for a period equal to or less than 5 seconds. Failure to wait for 3 minutes (180 seconds) between cranks.	Crank time varies with the amount of current drawn. If cranking draws more than 225 amps, crank time may be less than 5 seconds. Wait 3 minutes before next crank.
Digital Display reads less than selected charge rate when charging a discharged battery.	Extension cord too long or wire gauge is too small. Weak cell or sulfated plate in battery. The battery is only partially discharged.	Use shorter or heavier gauge extension cord. Sulfated battery will eventually take a normal charge after a period of time. If the battery will not take a charge, have a Sears Service Center test the battery. Continue to charge battery.
Charger makes a loud buzz or hum.	Transformer laminations vibrate (buzz).	Continue charging. Buzz is not abnormal.
Digital Display reads HOT when compressor is selected.	Time limit on compressor has expired.	Let compressor cool down for 20 minutes. It will automatically reset. Turn the compressor switch OFF and and compressor will reset after 1 minute.
When using air compressor Digital Display shows $\square L$.	Total pressure exceeds 120 PSI. Pressure exceeds 80 PSI before air compressor starts.	Do Not use air compressor at pressures greater than 120 PSI. Start air compressor first, then attach nozzle to high pressure load (product to be inflated).

**If the above solutions do not eliminate the problem...
call toll-free from anywhere in the U.S.A.
1-800-SEARS-64 (1-800-732-7764)
7 AM to 4:30 PM Central Time Monday through Friday**

For information about troubleshooting, call toll-free from anywhere in the
U.S.A. 7 am to 4:30 pm Central Time Monday through Friday.
1-800-SEARS-64 (1-800-732-7764).

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