

Lester Electrical

48 VOLT FULLY AUTOMATIC DUAL MODE BATTERY CHARGER MODEL 16510 TYPE 48EL20-8ET

Specifications

AC Supply:	100-125 or 200-250 volts, 50 or 60 Hertz, single-phase
DC Output:	48 volts, 20 amps
Battery Capacity:	Use only on 48 volt, 24 cell, 180 to 305 ampere-hour (20 hr. rate) liquid electrolyte or sealed "maintenance free" lead acid batteries

PLEASE SAVE THESE IMPORTANT SAFETY AND OPERATING INSTRUCTIONS

For correct operation of the equipment, it is important to read and be familiar with this entire manual before installing and operating the charger.
DO NOT DISCARD THIS MANUAL AFTER READING.



LOOK FOR THIS SYMBOL TO POINT OUT SAFETY PRECAUTIONS. IT MEANS: *BECOME ALERT—YOUR SAFETY IS INVOLVED.* IF YOU DO NOT FOLLOW THESE SAFETY INSTRUCTIONS, INJURY OR PROPERTY DAMAGE CAN OCCUR.

IMPORTANT SAFETY INSTRUCTIONS

Read and understand this entire manual before installing or operating the charger. Follow all of the instructions on the battery charger, battery, and battery powered equipment.

INTRODUCTION

This battery charger provides superior battery performance and life, with low electrical power consumption. The solid state design provides a highly reliable, self-regulating charger with a minimum of moving parts, designed for long, trouble-free service. The Dual-Mode design allows the charger to be used on either liquid electrolyte or sealed "maintenance free" lead acid batteries. Simply set the battery mode switch to the type of battery being charged and the charger output is automatically adjusted to the proper level. When

the battery has reached its maximum state of charge, the solid state control turns the charger off.

INITIAL INSTALLATION

This charger is equipped with an AC voltage selector switch which allows the charger to operate from either 100-125 or 200-250 volt, single phase, 50 or 60 Hertz outlets. The switch is located on the front of the charger.

The battery mode switch, located on the timer kit inside the charger, must be set to the appropriate type of battery being charged. To set the switch, remove the cover and timer kit, and follow the instructions printed on its side. Sealed "maintenance free" batteries are charged to a maximum of 2.38 volts per cell, while liquid electrolyte batteries will normally be charged to 2.5-2.6 volts per cell. After the switch has been properly

set, place the timer kit back into the charger and replace the screws. Then place the cover back on the charger and replace the screws.

⚠ CAUTION: BE SURE BOTH THE AC VOLTAGE SELECTOR SWITCH AND THE BATTERY MODE SWITCH ARE PROPERLY SET BEFORE USING THE CHARGER. CHARGER MAY BE DAMAGED, OR BATTERY MAY BURST, CAUSING PERSONAL INJURY IF SWITCHES ARE NOT SET PROPERLY.

Locate the charger in an accessible spot where the AC supply cord can be easily reached. Provide adequate ventilation for the charger. The convection cooled design requires an unobstructed flow of cooling air for proper operation. Keep all charger ventilation openings at least two inches (2") (5cm) away from all other objects. Do not allow clothing, blankets, or other material to cover charger.

⚠ WARNING: TO REDUCE THE RISK OF FIRE, DO NOT USE CHARGER NEAR FLAMMABLE MATERIALS OR VAPORS.

⚠ DANGER: RISK OF ELECTRIC SHOCK! CONNECT THE AC SUPPLY CORD DIRECTLY TO A GROUNDED, 3-WIRE OUTLET. DO NOT TOUCH UNINSULATED PORTION OF DC OUTPUT TERMINALS OR BATTERY TERMINALS. DO NOT EXPOSE CHARGER TO RAIN OR POWER WASH. REPLACE DEFECTIVE CORDS, WIRES OR CONNECTORS IMMEDIATELY.

Do not operate this charger if it has received a sharp blow, was dropped, pulled off a shelf, or otherwise damaged in any manner. Refer to a qualified service agent.

EXTENSION CORD REQUIREMENTS

Always use a three-conductor, No. 14 AWG (1.5mm) Heavy Duty cord with ground, properly wired, in good electrical condition and keep it as short as possible. Make sure the pins on the plug of the extension cord are the same number, size and shape as the AC plug of the battery charger. The use of an improper extension cord could result in a risk of fire or electrical shock. Locate all cords so they will not be stepped on, tripped over or otherwise subjected to damage or stress.

GROUNDING INSTRUCTIONS

This battery charger must be grounded to reduce the risk of electric shock. This charger is equipped with an AC supply cord having an equipment-

grounding conductor that must be connected to the ground prong of an appropriate plug for the AC voltage being used. This plug must be connected to an appropriate AC outlet which is properly installed and grounded in accordance with the National Electrical Code (U.S.) and all local codes and ordinances.

⚠ DANGER: IMPROPER CONNECTION OF THE EQUIPMENT-GROUNDING CONDUCTOR CAN RESULT IN A RISK OF ELECTRIC SHOCK.

The conductor with insulation having an outer surface that is green, with or without yellow stripe(s), is the equipment-grounding conductor. If repair or replacement of the AC supply cord or plug is necessary, do not connect the equipment-grounding conductor to a live terminal. Refer to a qualified service agent.

NORMAL OPERATION

Instructions printed on the front of the charger are for daily reference.

1. With the AC supply cord disconnected from outlet, connect the DC output cord to the battery. The BLACK wire must be connected to battery negative (-) and the WHITE (or RED) wire to battery positive (+). Make sure all connectors are clean and tight.
2. Connect AC supply cord to a grounded outlet that matches the voltage setting on the charger's AC voltage selector switch.
3. The charger will start after a short delay, "CHARGING" light will glow, the transformer will hum and the ammeter will indicate the charge rate.

⚠ WARNING: LEAD ACID BATTERIES GENERATE GASES THAT CAN BE EXPLOSIVE. USE CHARGER ONLY IN WELL VENTILATED AREAS. DO NOT DISCONNECT CHARGER DC OUTPUT TERMINALS FROM BATTERY WHEN CHARGER IS ON. THE RESULTING ARCING AND BURNING COULD CAUSE THE BATTERY TO EXPLODE. KEEP SPARKS, FLAME AND SMOKING MATERIALS AWAY FROM BATTERY.

If the charger must be stopped, disconnect the AC supply cord from outlet.

4. Monitor the ammeter for correct charge rate. The initial charge rate should be approximately 20 amps. If the battery has not been discharged, or the AC supply voltage is lower than 100/200 volts, the initial charge rate may be less than 20 amps.

The charge rate will decrease as the battery reaches full charge. On a liquid electrolyte battery, the charge rate will decrease to about 8 amps and remain there until the charger turns off. As the battery ages, the charge rate may no longer decrease to the 8 amp finish rate. This is normal and the charger will still determine when the battery is charged to its optimum and then turn off.

When charging a sealed "maintenance free" battery, the charge rate will decrease to less than 1 amp and remain there until the charger turns off. An older battery, even though it is properly charged, will gradually lose capacity and should be replaced when it will no longer perform as required.

5. Charger turns off automatically when battery is fully charged. Charge time varies with battery size and depth of discharge. Allow 12 hours for normal charging. Severely discharged batteries may require up to 18 hours to be properly charged and equalized. After the charger has turned off, disconnect the AC supply cord from outlet.
6. Charger turns off after 18 hours if unable to charge battery and "BATTERY FAULT" light glows. See Troubleshooting.

PROPER CARE OF DEEP-CYCLE BATTERIES

Batteries are subject to severe deep-cycle duty on a daily basis. For this reason, it is important that only deep-cycle batteries be used. Although these batteries are designed to withstand such duty, the following precautions must be observed to obtain good performance and maximum cycle life.

1. Always observe these personal safety precautions when working with lead acid batteries:
 - a. Someone should be within range of your voice or close enough to come to your aid when you work near a battery.
 - b. Have plenty of fresh water and soap nearby in case battery acid contacts skin, clothing or eyes.
 - c. Wear complete eye protection and clothing protection. Avoid touching eyes while working near battery.
 - d. 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.
 - e. Never smoke or allow a spark or flame in vicinity of batteries.

- f. 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.
- g. 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.
- h. Never charge a frozen battery.

 DANGER: TO REDUCE RISK OF ELECTRIC SHOCK, ALWAYS DISCONNECT THE AC SUPPLY CORD FROM ITS OUTLET AND THE DC OUTPUT CORD FROM THE BATTERY BEFORE ATTEMPTING ANY MAINTENANCE OR CLEANING OF THE BATTERY.

2. New batteries should be given a full charge before their first use because it is difficult to know how long batteries have been stored.
3. Limit use of new batteries for first 5 cycles. New batteries are not capable of their rated output until they have been discharged a number of times.
4. Do not excessively discharge batteries. Excessive discharge can cause polarity reversal of individual cells resulting in complete failure shortly thereafter. Limited use of new batteries will minimize the chance of cell reversal.
5. Check the level of the electrolyte in conventional liquid electrolyte acid batteries monthly. Maintain the proper electrolyte level by adding distilled or purified water when necessary. Electrolyte levels lower during discharge and rise during charge. Therefore, it is mandatory that water be added to cells only when they are fully charged; do not overfill. Old batteries require more frequent additions of water than do new batteries.
6. Keep tops of batteries clean and dry to prevent excessive self-discharge. Keep battery terminals reasonably tight.

TROUBLESHOOTING

 CAUTION: DO NOT OPERATE THE CHARGER IF IT IS DAMAGED OR APPEARS TO BE MALFUNCTIONING. PERSONAL INJURY OR DAMAGE TO THE CHARGER OR BATTERIES MAY RESULT. DO NOT DISASSEMBLE THE CHARGER. TAKE IT TO A QUALIFIED SERVICE AGENT WHEN SERVICE OR REPAIR IS REQUIRED. INCORRECT REASSEMBLY MAY

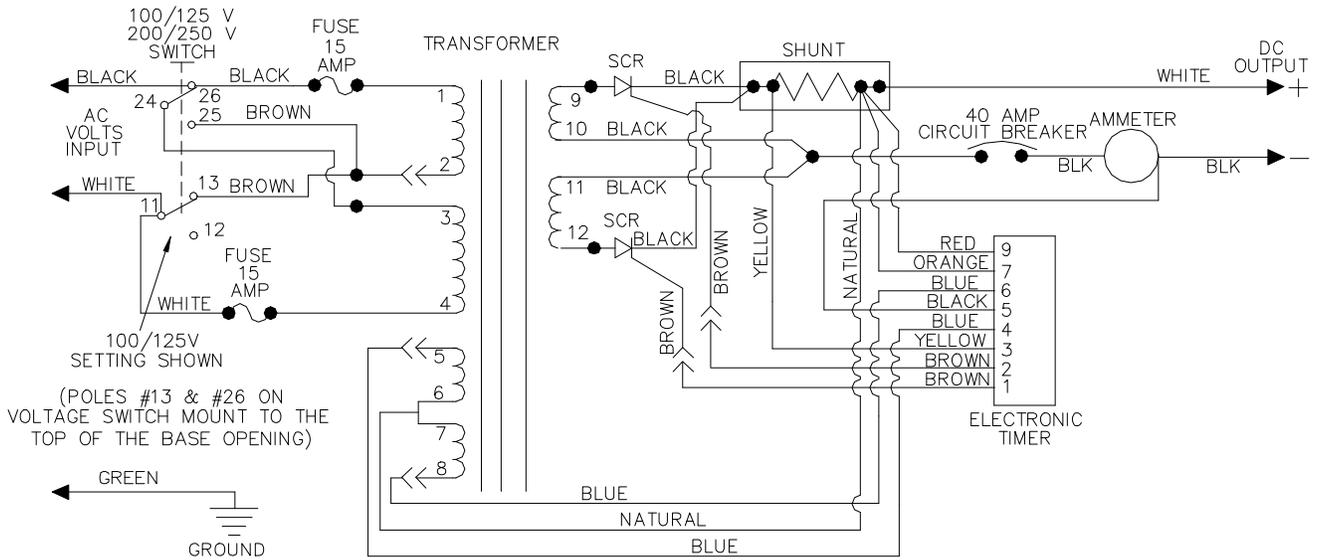
RESULT IN A RISK OF ELECTRIC SHOCK OR FIRE.

1. If the charger does not turn on, check for one of the following:
 - a. Charger is not plugged into a live AC outlet.
 - b. Battery connections are wrong (reverse polarity).
 - c. Battery is no longer serviceable (voltage below 13 volts for 48 volt system).
2. If the charger turns off before the batteries are fully charged, it indicates one of the following:
 - a. The AC power was interrupted during charge.
 - b. The DC cord was accidentally disconnected from the battery during charge.
 - c. The battery has been allowed to sulfate. Charge the battery at least once every three days when the equipment is lightly utilized. Once sulfation is allowed to take place, it may be partially reduced by returning, temporarily, to daily charging.
3. A decrease in equipment range where the battery loses power earlier and earlier in the day indicates one of the following:
 - a. The electrolyte level in conventional liquid electrolyte lead-acid batteries was allowed to drop below the top of the battery plates.

Add distilled water to just cover the top of the plates immediately upon discovery and fill to the proper level with distilled water at the completion of the next charge cycle. Battery capacity lost in this manner is permanent and is not recovered with additional charge cycles.

- b. Use of the equipment before the batteries have been fully charged and the charger turns off. This shortens battery life and hastens the onset of reduced daily range. Battery capacity lost in this manner is permanent and is not recovered with additional charge cycles.
 - c. This is the normal wear out process for all types of deep-cycle motive power batteries.
4. The charger runs 18 hours before turning off, and fault light glows. This indicates one of the following:
 - a. Batteries larger than 250 amp-hour capacity (20 hr. rate) can require more than 18 hours to charge.
 - b. New batteries (5 cycles or less) can require more than 18 hours to charge.
 - c. Overdischarged batteries can require more than 18 hours to charge.

WIRING DIAGRAM



PARTS LIST FOR MODEL 16510 TYPE 48EL20-8ET 100-125 / 200-250 VAC / 50-60 HZ

PART NO.	QTY.	DESCRIPTION
21149S	1	CASE ASSEMBLY
15945S	1	TRANSFORMER ASSEMBLY
16369S	1	AMMETER
16595S	1	ELECTRONIC TIMER ASSEMBLY
18696S	1	SHUNT ASSEMBLY
21249S	2	HEATSINK ASSEMBLY, W/ SCR
21152S	1	CONTROL CABLE ASSEMBLY
02028S	1	BUSHING, INSULATOR, 7W-2 FOR AC CORDSET
02008S	1	BUSHING, INSULATOR, 8P-2, FOR DC CORDSET
21147S	1	CORDSET, AC, 14/3, W/ PLUG
25248S	1	CORDSET, AC, 1.5mm ³ , HARMONIZED, NO PLUG
28113S	1	CORDSET, DC, SY120 PLUG, GRAY
29052S	1	CORDSET, DC, LESTER PLUG, GRAY
21146S	1	CORDSET, DC, NO PLUG
05322S	1	FUSEHOLDER
16499S	2	FUSE, 15 AMP, MDA-15
17558S	1	SWITCH, ROCKER, DPDT
21333S	1	CIRCUIT BREAKER, 40 AMP

LIMITED WARRANTY

Lester Electrical warrants each new Lester Battery Charger for defects in material and workmanship for a period of two (2) years from the date of manufacture of the complete unit. Repairs can be made at the Lester factory. To do so, first obtain a "Return Material Authorization" number by calling the Service Department of Lester Electrical (402 477-8988) or by e-mailing service@lesterelectrical.com and send the defective unit with transportation charges prepaid to:

Lester Electrical
625 West A Street
Lincoln, NE 68522-1794 USA
Attention: Service Department
RMA # _____

For repairs made at other than the Lester factory, Lester will provide only the replacement parts. Defective parts should be sent with transportation charges prepaid to the Lester factory at the address noted above.

If the unit or parts are found in the reasonable judgment of Lester to be defective in material or workmanship, repair or replacement will be made by Lester without charge for parts or labor. Repair or replacement will be at the discretion of Lester, with replacements being made using current models or parts performing the equivalent function. Labor charges other than those incurred at the Lester factory are not covered under this warranty. All expenses associated with delivering defective items to the Lester factory and the expense of returning repaired or replaced items from the Lester factory to the owner will be paid for by the owner. All warranty work accomplished at the Lester factory will be completed with a reasonable time after receipt of defective items.

This warranty does not cover any semiconductor parts, such as diodes, which are vulnerable to electrical overloads beyond the control of Lester. Warranty on parts not manufactured by Lester, which include, but are not limited to, timers and ammeters, is limited to the period specified in the original manufacturer's warranty.

This warranty does not cover any charger that has been subject to misuse, neglect, negligence, or accident, or operated in any way contrary to instructions specified on the charger case and in the owner's manual. No claim of breach of warranty shall be cause for cancellation of the contract of sale of any Lester charger. Lester assumes no responsibility for loss of time, inconvenience, or other damage, consequential or otherwise, resulting from a defective charger. All implied warranties (including merchantability) are limited in duration to the two years from date of manufacture warranty period.

Some states do not allow the exclusion or limitation of incidental or consequential damages; or limitations on how long an implied warranty lasts, so the above limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Lester's obligation under this warranty is strictly and exclusively limited to the repair or replacement of defective items. Lester issues this warranty in good faith and with full confidence in the workmanship and quality of Lester products.