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TT-650

MADE IN U. S. A.

650W SWITCH MODE INDUSTRIAL BATTERY CHARGER

USER'S MANUAL

Important Safety, Installation, Operation, and Maintenance Instructions

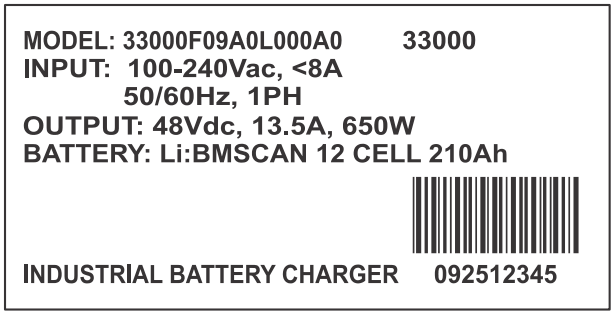
Lester ELECTRICAL

www.LesterElectrical.com

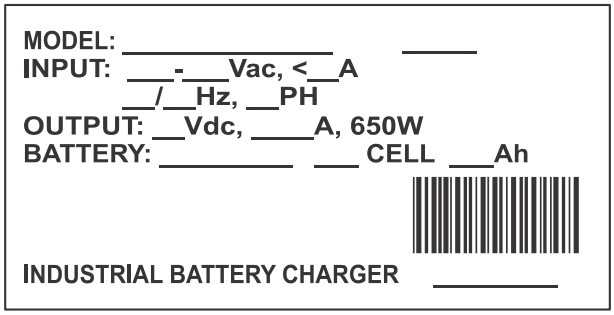
CHARGER RATINGS LABEL

The ratings label is located on the charger and provides the model (MODEL), serial number (located below the barcode at the bottom of the label), AC input ratings (INPUT), and DC output ratings (OUTPUT) of the charger. The BATTERY field indicates the factory-configured active battery profile type. The BATTERY field amp-hour (Ah) rating indicates the full range of battery capacities that are recommended for use with this charger. A different active battery profile may be required to optimize the charging of specific battery capacities within this range. Before (1) using the charger for the first time or (2) using the charger with a battery pack of a different type or capacity.

Example of ratings label shown below.



Please fill in the applicable blank label below with the information from the ratings label on your charger for future reference.



⚠CAUTION: PRIOR TO OPERATING THE CHARGER, VERIFY THAT THE ACTIVE BATTERY PROFILE MATCHES THE BATTERIES IN YOUR EQUIPMENT AND THAT THE SYSTEM SETTINGS MATCH YOUR APPLICATION.

Document any configuration or settings changes that are made by marking the ratings label on your charger or on an additional label or tag attached to the charger.

SAVE THIS MANUAL: Keep it in a location where it is available to anyone who may operate the charger.

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IMPORTANT SAFETY INSTRUCTIONS

1. **SAVE THESE INSTRUCTIONS – This manual contains important safety and operating instructions.**

2. **Before using battery charger, read all instructions and cautionary markings on battery charger, battery, and product using battery.**

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

3. **DANGER: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, CAREFULLY READ AND FOLLOW THESE IMPORTANT SAFETY AND OPERATING INSTRUCTIONS BEFORE INSTALLING OR OPERATING THE CHARGER.**

4. **INSTRUCTIONS IMPORTANTES CONCERNANT LA SECURITÉ.**

5. **WARNING: TO REDUCE THE RISK OF FIRE, INSTALL THIS BATTERY CHARGER ON A SURFACE OF NON-COMBUSTIBLE MATERIAL SUCH AS BRICK, CONCRETE, OR METAL.**

6. **DANGER: RISK OF ELECTRIC SHOCK. DISCONNECT CHARGER FROM BATTERY AND AC POWER BEFORE SERVICING. TURNING OFF THE CHARGER DOES NOT REDUCE THIS RISK.**

7. **DANGER: RISK OF ELECTRIC SHOCK. DO NOT TOUCH UNINSULATED PORTION OF AC OR DC CONNECTORS OR UNINSULATED BATTERY TERMINAL.**

8. **DANGER: RISQUE DE CHOCKS ÉLECTRIQUES. NE PAS TOUCHER LES PARTIES NON ISOLÉES DU CONNECTEUR DE SORTI OU LES BORNES NON ISOLÉES DE L'ACCUMULATEUR.**

9. **CAUTION: CHARGE ONLY RECHARGEABLE BATTERIES OF THE SAME TYPE, VOLTAGE, CELL NUMBER, AND AMP-HOUR CAPACITIES AS SHOWN ON THE LABEL. BATTERY TYPES NOT MATCHING LABEL INFORMATION OR NON-RECHARGEABLE BATTERIES MAY BURST CAUSING PERSONAL INJURY AND DAMAGE.**

10. **ATTENTION: UTILISER POUR CHARGER UNIQUEMENT LES ACCUMULATEURS AU PLOMB À ELECTROLYTE LIQUIDE. D'AUTRES TYPES D'ACCUMULATEURS POURRAIENT ÉCLATER ET CAUSER DES.**

11. **DANGER: TO PREVENT ELECTRICAL SHOCK, DO NOT TOUCH EITHER AC OR DC UNINSULATED PARTS. MAKE SURE ALL ELECTRICAL CONNECTORS ARE IN GOOD WORKING CONDITION. DO NOT USE CONNECTORS THAT ARE CRACKED, CORRODED OR DO NOT MAKE ADEQUATE ELECTRICAL CONTACT. USE OF A DAMAGED OR DEFECTIVE CONNECTOR MAY RESULT IN A RISK OF OVERHEATING OR ELECTRIC SHOCK.**

12. **WARNING: HAZARD OF ELECTRIC SHOCK.**

13. **⚠WARNING: LEAD-ACID BATTERIES GENERATE EXPLOSIVE GASES. PLACE BATTERIES AS FAR AWAY FROM THE CHARGER AS THE OUTPUT LEADS WILL PERMIT DURING CHARGING. TO PREVENT ARCING OR BURNING NEAR BATTERIES, DO NOT DISCONNECT DC CHARGING CORD FROM BATTERIES WHEN THE CHARGER IS OPERATING. KEEP SPARKS, FLAME, AND SMOKING MATERIALS AWAY FROM BATTERIES.**

14. **⚠WARNING: ALWAYS SHIELD EYES WHEN WORKING NEAR BATTERIES. DO NOT PUT WRENCHES OR OTHER METAL OBJECTS ACROSS BATTERY TERMINAL OR BATTERY TOP. ARCING OR EXPLOSION OF THE BATTERY CAN RESULT.**

15. **⚠WARNING: BATTERIES PRODUCE HYDROGEN GAS, WHICH CAN EXPLODE IF IGNITED. NEVER SMOKE, USE AN OPEN FLAME, OR CREATE SPARKS NEAR THE BATTERY. VENTILATE THE AREA WHEN THE BATTERY IS CHARGING IN AN ENCLOSED PLACE.**

16. **⚠WARNING: LEAD-ACID BATTERIES CONTAIN SULFURIC ACID, WHICH MAY CAUSE BURNS. DO NOT GET ACID IN EYES, ON SKIN, OR CLOTHING. IF CONTACT WITH THE EYES OCCURS, FLUSH IMMEDIATELY WITH CLEAN WATER FOR 15 MINUTES AND OBTAIN MEDICAL ATTENTION.**

17. **⚠WARNING: ONLY A QUALIFIED SERVICE TECHNICIAN SHOULD PROGRAM OR SERVICE THIS EQUIPMENT.**

18. **⚠CAUTION: DO NOT OPERATE THE CHARGER IF IT HAS RECEIVED A SHARP BLOW, BEEN DROPPED, OR OTHERWISE DAMAGED. HAVE A QUALIFIED SERVICE TECHNICIAN EXAMINE AND REPAIR AS NEEDED.**

19. **⚠WARNING: DO NOT DISASSEMBLE THE CHARGER. HAVE THE CHARGER EXAMINED BY A QUALIFIED SERVICE TECHNICIAN. INCORRECT RE-ASSEMBLY OF THE CHARGER MAY RESULT IN AN EXPLOSION, ELECTRIC SHOCK, OR FIRE.**

20. **⚠CAUTION: MAKE SURE THE BATTERY SYSTEM HAS THE PROPERLY RATED VOLTAGE, AMP-HOURS, AND TYPE (“WET”, “AGM”, “GEL”, ETC.) FOR THIS CHARGING SYSTEM.**

SAVE THESE INSTRUCTIONS

WICHTIGE SICHERHEITSANWEISUNGEN

1. **BEWAHREN SIE DIESE ANWEISUNGEN AUF. - Dieses Handbuch enthält wichtige Sicherheits- und Betriebsanweisungen.**

2. **Bevor Sie das Ladegerät verwenden, lesen Sie alle Anweisungen und Warnhinweise auf dem Ladegerät, der Batterie und dem Produkt, das die Batterie verwendet.**

ACHTEN SIE AUF DIESES SYMBOL, UM DIE SICHERHEITSVORKEHRUNGEN ZU ERKENNEN. DAS BEDEUTET: *ACHTUNG—DAS BETRIFFT IHRE SICHERHEIT.* WENN SIE DIESE SICHERHEITSHINWEISE NICHT BEFOLGEN, KÖNNEN VERLETZUNGEN ODER SACHSCHÄDEN VERURSACHT WERDEN.

3. **GEFAHR: UM DIE GEFAHR EINES BRANDES ODER EINES ELEKTRISCHEN SCHLAGS ZU REDUZIEREN, LESEN SIE DIESE WICHTIGEN SICHERHEITS- UND BEDIENUNGSANLEITUNGEN SORGFÄLTIG DURCH, BEVOR SIE DAS LADEGERÄT INSTALLIEREN ODER BETREIBEN.**

5. **WARNUNG : UM FEUERGEFAHR ZU VERRINGERN, INSTALLIEREN SIE DIESES BATTERIELADEGERÄT AUF EINER OBERFLÄCHE AUS NICHT BRENNBAREM MATERIAL, WIE ZIEGELN, BETON ODER METALL.**

6. **GEFAHR: STROMSCHLAGGEFAHR. TRENNEN SIE DAS LADEGERÁT VOR DER WARTUNG VON DER BATTERIE UND NETZSTROM. DAS AUSSCHALTEN DES LADEGERÄTS VERRINGERT DIESES RISIKO NICHT.**

7. **GEFAHR: STROMSCHLAGGEFAHR. BERÜHREN SIE NICHT DEN UNINSULIERTEN TEIL VON AC- ODER DC-ANSCHLÜSSEN ODER UNINSULIERTEN BATTERIEANSCHLUSS.**

9. **ACHTUNG: NUR AKKUS DER GLEICHEN ART, SPANNUNG, ZELLENZAHL UND AMPERESTUNDEN-KAPAZITÄT WIE AUF DEM ETIKETT AUFLADEN. BATTERIEARTEN, DIE NICHT DER ETIKETTENINFORMATION ENTSPRECHEN, ODER NICHT-WIEDERAUFLADBARE BATTERIEN KÖNNEN PLATZEN UND KÖRPERVERLETZUNG UND SCHADEN VERURSACHEN.**

11. **GEFAHR: UM EINEN ELEKTRISCHEN SCHLAG ZU VERMEIDEN, BERÜHREN SIE NIEMALS UNINSULIERTE AC-ODER DC-TEILE. VERWENDEN SIE KEINE ANSCHLUSSSTECKER DIE RISSIG ODER KORRIGIERT SIND, ODER DIE SICH NICHT KORREKT ANSTECKEN LASSEN. DIE VERWENDUNG EINES BESCHÄDIGTEN ODER FEHLERHAFTEN STECKVERBINDERS KANN ZU ÜBERHITZUNGS- ODER STROMSCHLAGGEFAHR FÜHREN.**

12. **WARNUNG : STROMSCHLAGGEFAHR.**

13. **⚠WARNUNG : BLEIAKKUS ERZEUGEN EXPLOSIVE GASE. BATTERIEN WÄHREND DES LADEVORGANGS SO WEIT WIE MITTELS DER LEITUNGEN MÖGLICH VOM LADEGERÄT ENTFERNT PLATZIEREN. UM EINE FUNKENBILDUNG ODER EINEN BRAND IN DER NÄHE DER BATTERIEN ZU VERMEIDEN, DAS DC-LADEKABEL NICHT VON DEN BATTERIEN ENTFERNEN, WENN DAS LADEGERÄT IN BETRIEB IST. FUNKEN, FLAMMEN UND RAUCHENDE MATERIALIEN VON DEN BATTERIEN ENTFERNT AUFBEWAHREN.**

14. **⚠WARNUNG : SCHÜTZEN SIE IMMER DIE AUGEN, WENN SIE MIT BATTERIEN ARBEITEN. KEINE SCHLÜSSELANHÄNGER ODER ANDERE METALLGEGENSTÄNDE ÜBER DEN BATTERIEANSCHLUSS ODER DIE BATTERIEPLATTE LEGEN. BOGEN ODER EXPLOSION DER BATTERIE KÖNNEN GESCHEHEN.**

15. **⚠WARNUNG : BATTERIEN ERZEUGEN WASSERSTOFFGAS, DAS EXPLODIEREN KANN, WENN ES ENTZÜNDET WIRD. RAUCHEN SIE NIEMALS, VERWENDEN SIE NIE EINE OFFENE FLAMME ODER ERZEUGEN SIE NIEMALS FUNDEN IN DER NÄHE DER BATTERIE. BELÜFTEN SIE DEN GEGEND, WENN DIE BATTERIE IN EINEM GESCHLOSSENEN ORT AUFGELADEN WIRD.**

16. **⚠WARNUNG : BLEI SÄURE-BATTERIEN ENTHALTEN SCHWEFELSÄURE, WELCHE VERBRENNUNGEN VERURSACHEN KANN. VERMEIDEN SIE KONTAKT MIT DEN AUGEN, DER HAUT ODER DER KLEIDUNG MIT DER SÄURE. FALLS ES KONTAKT MIT DEN AUGEN GEBEN SOLLTE, SPÜLEN SIE DEN AUGEN SOFORT 15 MINUTEN LANG MIT REINEM WASSER UND SUCHEN SIE EINEN ARZT AUF.**

17. **⚠WARNUNG : NUR EIN QUALIFIZIERTER SERVICE-TECHNIKER SOLLTE DIESES GERÄT PROGRAMMIEREN ODER SERVISIEREN.**

18. **⚠ACHTUNG BETREIBEN SIE DAS LADEGERÄT NICHT, WENN ES EINEN SCHWEREN SCHLAG ERHALTEN HAT, FALLEN GELASSEN WURDE ODER ANDERWEITIG BESCHÄDIGT WURDE. BITTEN SIE EINEN QUALIFIZIERTEN WARTUNGSTECHNIKER ES ZU ÜBERPRÜFEN UND ZU REPARIEREN, FALLS ERFORDERLICH.**

19. **⚠WARNUNG : DEMONTIEREN SIE DAS LADEGERÄT NICHT. BITTEN SIE EINEN QUALIFIZIERTEN SERVICE-TECHNIKER DAS LADEGERÄT ZU ÜBERPRÜFEN. FALSCHER WIEDERZUSAMMENBAU DES LADEGERÄTES KANN ZU EXPLOSION, ELEKTROSCHOCK ODER FEUER FÜHREN.**

20. **⚠ACHTUNG VERGEWISSERN SIE SICH, DASS DAS BATTERIESYSTEM FÜR DIESES LADESYSTEM DIE RICHTIG ANGEGEBENE SPANNUNG, AMP-STUNDEN UND TYP ("NASS", "AGM", "GEL", ETC.) HAT.**

ANLEITUNG AUFBEWAHREN.

IMPORTANTES CONSIGNES DE SÉCURITÉ

1. **GARDEZ CES CONSIGNES – Ce manuel contient d' importantes consignes de sécurité et le mode d'emploi.**

2. **Avant l'emploi de ce chargeur de batterie, lisez toutes les consignes et marques d'avertissement sur le chargeur de batterie, la batterie, et le produit utilisant cette batterie.**

CHERCHEZ CE SYMBOLE POUR INDIQUER LES PRÉCAUTIONS DE SECURITÉ. CELA SIGNIFIE: SOYEZ VIGILANT—*VOTRE SÉCURITÉ EN DÉPEND. LE FAIT DE NE PAS* SUIVRE CES CONSIGNES DE SÉCURITÉ PEUT CAUSER DES BLESSURES ET ENDOMMAGER LA PROPRI*ÉTÉ*.

3. **DANGER: POUR RÉDUIRE LE RISQUE D'INCENDIE OU DE DÉCHARGE ÉLECTRIQUE, LISEZ ATTENTIVEMENT ET SUIVEZ CES CONSIGNES DE SÉCURITÉ, ET MODE D'EMPLOI AVANT L'INSTALLATION OU L'USAGE DU CHARGEUR.**

5. **AVERTISSEMENT: POUR RÉDUIRE LE RISQUE D'INCENDIE, INSTALLEZ CE CHARGEUR DE BATTERIE SUR UNE SURFACE EN MATÉRIEL NON-COMBUSTIBLE COMME BRIQUE, BÉTON OU MÉTAL.**

6. **DANGER: RISQUE DE DÉCHARGE ÉLECTRIQUE. DÉBRANCHEZ LE CHARGEUR DE LA BATTERIE ET DU COURANT ALTERNATIF AVANT L'ENTRETIEN. L'ARRÊT DU CHARGEUR NE RÉDUISANT POINT CE RISQUE.**

7. **DANGER: RISQUE DE DÉCHARGE ÉLECTRIQUE. NE TOUCHEZ PAS LES PARTIES NON-ISOLÉES DES CONNECTEURS AC OU DC, OU LE BORNE NON-ISOLÉ DE LA BATTERIE.**

9. **PRÉCAUTION: RECHARGER UNIQUEMENT LES BATTERIES RECHARGEABLES DU MÊME TYPE, DE LA MÊME TENSION, QUI ONT LE MÊME NUMÉRO DE CELLULES ET LA MÊME CAPACITÉ EN AMPÈRES-HEURES QUE LA VALEUR AFFICHÉE SUR L'ÉTIQUETTE. LES TYPES DE BATTERIES QUI NE CORRESPONDENT PAS AUX DONNÉES SUR L'ÉTIQUETTE OU LES BATTERIES NON-RECHARGEABLES PEUVENT EXPLOSER ET PROVOQUER DES BLESSURES OU DES DOMMAGES.**

11. **DANGER: POUR ÉVITER LES DÉCHARGES ÉLECTRIQUS, NE TOUCHEZ PAS LES PARTIES NON-ISOLÉES, NI AC NI DC. ASSUREZ-VOUS QUE TOUS LES CONNECTEURS ÉLECTRIQUES SONT EN BON ÉTAT DE FONCTIONNEMENT. N'UTILISEZ PAS LES CONNECTEURS QUI SONT CRAQUELÉS, CORRODÉS NI NE FAITES CONTACT ÉLECTRIQUE ADÉQUAT. L'EMPLOI D'UN CONNECTEUR ENDOMMAGÉ OU DÉFECTUEUX PEUT PROVOQUER UN RISQUE DE SURCHAUFFE OU DE DÉCHARGE ÉLECTRIQUE.**

12. **AVERTISSEMENT: DANGER DE DÉCHARGE ÉLECTRIQUE.**

13. **⚠AVERTISSEMENT: LES PILES PLOMB-ACIDE GENERENT DES GAZ EXPLOSIFS. PENDANT LE CHARGEMENT, PLACER LES PILES AUSSI LOIN DU CHARGEUR QUE LES FILS DE SORTIE LE PERMETTENT. POUR EVITER TOUT ARC ELECTRIQUE OU TOUTE BRULURE A PROXIMITE DES PILES, NE PAS DEBRANCHER LE CORDON DE RECHARGE CC DES PILES LORSQUE LE CHARGEUR EST EN FONCTION. GARDER LES ETINCELLES, LES FLAMMES ET LES SUBSTANCES FUMIGENES A DISTANCE DES PILES.**

14. **⚠AVERTISSEMENT:N'OUBLIEZ JAMAIS DE PROTÉGER VOS YEUX LORSQUE VOUS TRAVAILLEZ PRÈS DES BATTERIES. NE POSEZ JAMAIS LES CLÉS OU AUTRES OBJETS MÉTALLIQUES À TRAVERS LES BORNES DE LA BATTERIE OU DESSUS LA BATTERIE. CAR CELA PEUT CAUSER UN ARC ÉLECTRIQUE OU UNE EXPLOSION DE LA BATTERIE.**

15. **⚠AVERTISSEMENT: LES BATTERIES PRODUISENT DE L'HYDROGÈNE, QUI PEUT EXPLOSER SI MISE À FEU. NE FUMEZ JAMAIS, NI N'UTILISEZ UNE FLAMME, NI NE CRÉEZ DES ÉTINCELLES PRÈS DE LA BATTERIE. AÉREZ LA PLACE QUAND LA BATTERIE EST EN TRAIN DE CHARGER DANS UN ENDROIT FERMÉ.**

16. **⚠AVERTISSEMENT: LES BATTERIES PLOMB-ACIDE CONTIENNENT DE L'ACIDE SULFURIQUE, QUI PEUT CAUSER DES BRÛLURES. N'ATTRAPEZ PAS L' ACIDE DANS LES YEUX, NI SUR LA PEAU, NI SUR LES VÊTEMENTS. EN CAS DE CONTACT AVEC LES YEUX, RINCEZ IMMÉDIATEMENT AVEC DE L'EAU PROPRE PENDANT 15 MINUTES PUIS ACCEDER AUXSOINS MÉDICAUX.**

17. **⚠AVERTISSEMENT: SEUL UN TECHNICIEN DE SERVICE QUALIFIÉ POURRAIT PROGRAMMER OU RÉVISER CET ÉQUIPEMENT.**

18. **⚠ATTENTION: NE FAITES PAS MARCHER LE CHARGEUR S'IL A SUBI UN COUP VIOLENT, EST TOMBÉ, OU AUTREMENT ENDOMMAGÉ. FAITES-LE VOIR PAR UN TECHNICIEN DE SERVICE QUALIFIÉ, ET LE FAIRE RÉPARER SI BESOIN EST**

19. **⚠AVERTISSEMENT: NE DÉMONTEZ PAS LE CHARGEUR. FAITES-LE VOIR PAR UN TECHNICIEN DE SERVICE QUALIFIÉ. LE RASSEMBLAGE INCORRECT DU CHARGEUR PEUT RÉSULTER EN EXPLOSION, DÉCHARGE ÉLECTRIQUE, OU INCENDIE.**

20. **⚠ATTENTION: ASSUREZ-VOUS QUE LE SYSTÈME DE BATTERIE A LA CORRECTE TENSION NOMINALE, L'AMP-HEURE, ET LE TYPE ("HUMIDE", "AGM", "GEL", ETC.) POUR CE SYSTÈME DE BATTERIE.**

GARDEZ CÉ CONSIGNES

1. INTRODUCTION

This switch mode (high frequency) industrial battery charger features advanced charge and termination algorithms designed to optimize both daily battery capacity and overall battery life. The charger is convection cooled with no moving parts, sealed, and designed to provide maximum reliability. The universal AC input enables the charger to be used with a wide range of AC voltages and frequencies, and the charger includes high efficiency and power factor correction. Interface features of the charger includes one (1) multi-colored LED, Controller Area Network (CAN) communication, Wake circuit, lockout relay, and USB-A port for programing and logging.

The charger was factory-configured with the active battery profile that was requested as part of the original order from Lester Electrical. The charger was also factory-configured for mounting on-board a battery-powered vehicle/machine or for off-board use in a shelf or portable application per the original order from Lester Electrical. Before (1) using the charger for the first time or (2) using the charger with a battery pack of a different type or capacity, verify that the proper active battery profile is selected.

⚠CAUTION: PRIOR TO OPERATING THE CHARGER, VERIFY THAT THE ACTIVE BATTERY PROFILE MATCHES THE BATTERIES IN YOUR EQUIPMENT AND THAT THE SYSTEM SETTINGS MATCH YOUR APPLICATION.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

2. RECEIVING AND INSTALLING THE CHARGER

Unpack the charger and examine it for shipping damage. In the event that shipping damage is found, report it as a claim with the freight company.

⚠WARNING: REPLACE WORN, DAMAGED, OR CUT ELECTRICAL CORDS AND PLUGS IMMEDIATELY.

Do not operate the charger with a damaged AC or DC cable or connector. Do not operate the charger if it has received a sharp blow, was dropped, or was otherwise damaged in any way. Contact your dealer.

⚠WARNING: DO NOT INSTALL THE CHARGER ON OR NEAR FLAMMABLE MATERIALS. POSITION THE CHARGER ON A FOUNDATION OF STONE, BRICK, CONCRETE OR GROUNDED METAL.

⚠WARNING: CHARGERS CAN IGNITE FLAMMABLE MATERIALS AND VAPORS. DO NOT USE NEAR FUELS, GRAIN DUST, SOLVENTS, THINNERS, OR OTHER FLAMMABLES.

Proper installation is important to achieve optimum performance and life from the charger and batteries. No minimum distances are specified for mounting clearances, but allow as much free air space around the charger as possible to improve performance. Please refer to the Specifications Section 12 for operating environmental specifications.

The most favorable mounting orientations of the charger are shown in Figure 2-1. For on-board use, the most favorable way to mount the charger is with the charger base bolted to a 0.1 inch (2.5 mm) minimum thick metal plate. This provides both strong structural mounting and good thermal conductive cooling (examples are shown in Figure 2-1). A poor thermal conductive mounting material such as plastic or wood would be less favorable for cooling.

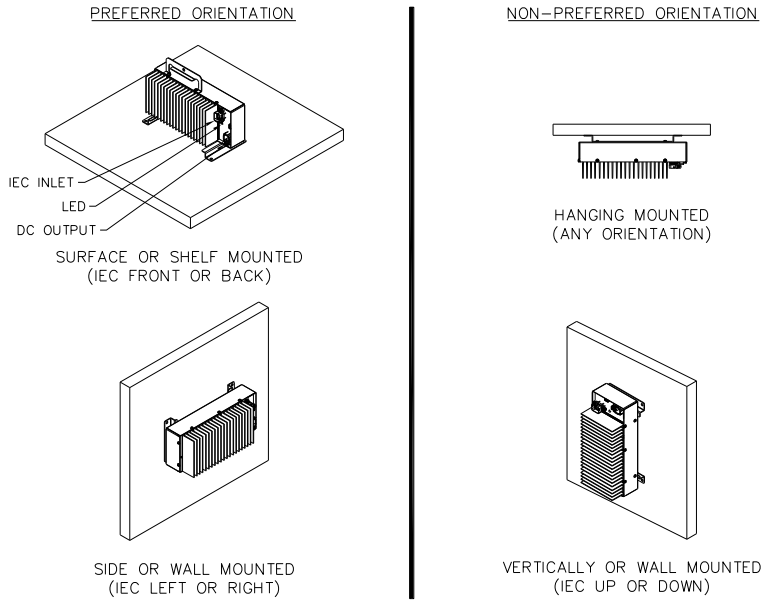


Figure 2-1: Charger Mounting Recommendations

The charger dimensions and mounting hole locations are shown in Figure 2-2. For off-board use, an optional handle is available for ease in carrying.

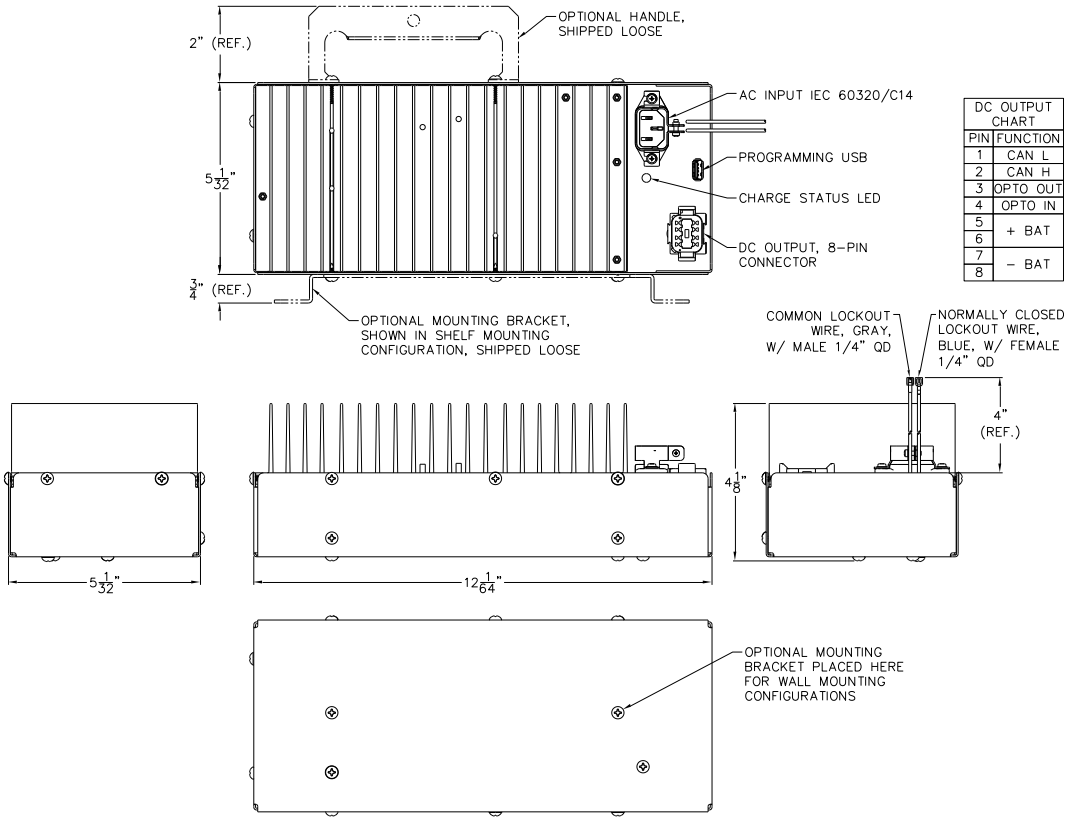


Figure 2-2: Charger Dimensions and Mounting Hole Locations

3. BATTERY TYPE

This charger is compatible with battery profiles for different battery types (including wet/flooded, AGM, and gel) and capacities of batteries. The charger was factory-configured with the active battery profile that was requested as part of the original order from Lester Electrical. Before (1) using the charger for the first time or (2) using the charger with a battery pack of a different type or capacity, verify that the proper active battery profile is selected.

If the active battery profile is changed, mark the charger ratings label or add an additional label or tag.

⚠CAUTION: THIS CHARGER IS FOR USE ONLY WITH BATTERY SYSTEMS OF THE SAME TYPE AS THE ACTIVE BATTERY PROFILE. BATTERIES IMPROPERLY MATCHED WITH THE CHARGER MAY BURST CAUSING PERSONAL INJURY AND DAMAGE TO THE BATTERIES OR CHARGER.

Battery manufacturers frequently use the same battery cases for different battery types. Wet/flooded batteries have removable cell caps. Water electrolyzed by discharging and charging the battery is replaced through these openings. Sealed (AGM and gel) batteries are generally distinguished by non-removable cell caps. The physical appearance of the battery case is frequently the same as a wet battery, though the cell caps are generally not removable. Refer to the battery manufacturer's information panel on the battery case to determine the type battery you have. If the information panel is missing or not legible, do not use the battery.

If you have questions regarding the correct battery profile to use with your particular battery pack, contact your dealer for assistance.

4. OFF-BOARD (SHELF) VERSUS ON-BOARD (BUILT-IN) CHARGERS

This section describes how the charger operates when the charger type is set to Off-Board or On-Board.

The charger was factory-configured with the active battery profile that was requested as part of the original order from Lester Electrical. The charger was also factory-configured for mounting on-board a battery-powered vehicle/machine or for off-board use in a shelf or portable application per the original order from Lester Electrical. Before (1) using the charger for the first time or (2) using the charger with a battery pack of a different type or capacity, verify that the proper active battery profile is selected.

4.1 Off-Board Chargers

Off-board chargers are designed to be used in shelf or portable applications. If the AC input plug is connected to AC power, a new charge cycle automatically starts when the DC output is connected to a battery pack of the proper voltage. Disconnecting and reconnecting AC power while the DC output remains connected to a battery pack WILL NOT automatically start a new charge cycle. Disconnecting the DC output from the battery pack IS REQUIRED to automatically start a new charge cycle.

4.2 On-Board Chargers

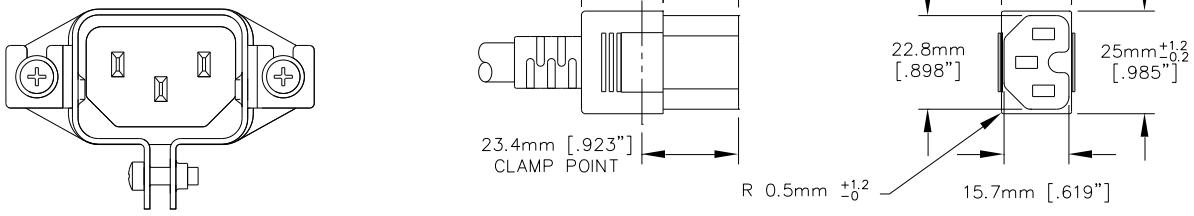
On-board chargers are designed to be mounted on electric vehicles/equipment. If the DC output is connected to a battery pack of the proper voltage, a charge cycle automatically starts when the AC input plug is connected to AC power (unless a safety period of time has not passed since the successful completion of the previous charge cycle). Disconnecting the DC output from the battery pack IS NOT REQUIRED to automatically start a new charge cycle.

5. AC INPUT

⚠CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK OR FIRE, DISCONNECT AC POWER FROM THE CHARGER BEFORE INSTALLING OR REMOVING UNIT.

The charger has an AC input rating of 100-240 volts, 50-60 hertz, single-phase. The charger has an AC operating range of 90-265 volts, 45-65 hertz. Below 90 volts, the charger will terminate to protect itself, but will restart if the voltage rises above 100 volts.

The charger is equipped with an IEC 60320 C14 inlet for the AC input power as shown. This allows the AC power cordset to be selected with a proper plug compatible with local electrical codes. The AC power cordset wiring must be properly sized for safe operation. For 100-120Vac operation use minimum wire size of 18 AWG (1.0 mm^2) and for 220-240Vac operation use a minimum wire size of 18 AWG (1.0 mm^2). An AC cord clamp is also included to retain the AC power cordset IEC 60320 connector when the connector has the dimensions as shown below. Loosen the screw on the clamp before inserting the connector. Fully insert the connector into the charger inlet and then tighten the AC cord clamp screw to secure the AC power cordset to the charger.



CAUTION: IF THE IEC 60320 CONNECTOR DIMENSIONS ARE LARGER THAN SHOWN ABOVE, VERIFY CONNECTOR IS PUSHED ALL THE WAY INTO THE CHARGER INLET OR RISK OF FIRE DUE TO LOOSE CONNECTION MAY OCCUR.

The charger must be grounded to reduce the risk of electric shock and is equipped with an IEC 60320 C14 inlet having an equipment-grounding conductor and a grounding socket. The installed AC power cordset must be plugged into an outlet that is properly installed and grounded in accordance with all applicable electrical codes and ordinances.

If the input plug does not fit the power outlet, contact Lester Electrical for the proper cord set terminating in an attachment plug of the proper configuration for the power outlet.

DANGER: NEVER ALTER THE AC POWER CORDSET OR PLUG PROVIDED. IF IT WILL NOT FIT AN OUTLET, OBTAIN THE CORRECT CHARGER IEC AC POWER CORDSET FOR THE OUTLET, OR HAVE A PROPER OUTLET INSTALLED BY A QUALIFIED ELECTRICIAN. IMPROPER CONNECTION CAN RESULT IN A RISK OF ELECTRIC SHOCK.

If an extension cord is necessary, it must be a 3-conductor, 14 AWG (2.0 mm^2) minimum, heavy-duty cord with ground. It must also be in good electrical condition and as short as possible, 25 ft (7.6 m) maximum. Make sure that the pins on the plug of the extension cord are the same number, size, and shape as the AC power cordset plug on the charger. The use of an improper extension cord could result in a risk of fire or electrical shock.

Locate all cords so that they will not be stepped on, tripped over, or otherwise subjected to damage, stress, or accidentally disconnected.

CAUTION: VERIFY THAT THE AC POWER CORDSET IS FULLY ENGAGED IN THE IEC INLET AND CANNOT BE PULLED LOOSE BEFORE USING THE CHARGER.

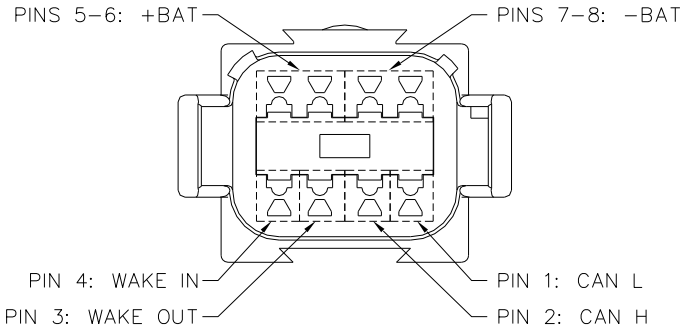
DANGER: RISK OF ELECTRIC SHOCK! CONNECT THE AC SUPPLY CORD DIRECTLY TO A GROUNDED, 3-WIRE OUTLET. DO NOT TOUCH UNINSULATED PORTION OF DC OUTPUT TERMINALS OR BATTERY TERMINALS. REPLACE DEFECTIVE CORDS, WIRES, OR CONNECTORS IMMEDIATELY.

6. DC OUTPUT

⚠WARNING: LEAD-ACID BATTERIES GENERATE EXPLOSIVE GAS. CHARGE ONLY IN WELL VENTILATED AREAS. TO PREVENT ARCING OR BURNING NEAR BATTERIES, DO NOT DISCONNECT THE DC CHARGING CONNECTOR(S) FROM THE BATTERIES WHEN THE CHARGER IS OPERATING. IF THE CHARGE CYCLE MUST BE INTERRUPTED, UNPLUG THE AC POWER CORD BEFORE DISCONNECTING THE DC OUTPUT CONNECTOR(S) FROM THE BATTERIES. KEEP SPARKS, FLAME, AND SMOKING MATERIALS AWAY FROM BATTERIES. TO REDUCE THE RISK OF FIRE, DO NOT USE THE CHARGER NEAR FLAMMABLE MATERIALS OR VAPORS.

Only charge batteries of the same type, voltage, number of cells, and amp-hour capacities listed on the charger ratings label. Before (1) using the charger for the first time or (2) using the charger with a battery pack of a different type or capacity, verify that the proper active battery profile is selected.

The DC output is located on the 8-pin connector on the charger. Two pins are used for +BAT and two pins for –BAT connections. This connector also has two CAN communication and two Wake signals for vehicle interface (see Figure 6).



DC CONNECTOR OUTPUT CHART	
PIN	FUNCTION
1	CAN L
2	CAN H
3	WAKE OUT
4	WAKE IN
5	+ BAT
6	
7	– BAT
8	

Figure 6: DC Output Pin Function Chart

6.1 DC Output Cordset

The DC output cordset includes a connector, plug, or terminals which connects to the vehicle. The polarity of the charger DC connector/plug/terminals must be the same as the battery connector/receptacle/terminals. The BLACK DC cable must be connected to the battery negative (-), and the WHITE or RED DC cable must be connected to the battery positive (+). The charger will not operate if the polarity is reversed.

⚠WARNING: CHARGER DC CORDSET MUST HAVE A MINIMUM EQUIVALENT OF 13 AWG WIRE SIZE (TWO 16 AWG WIRE IN PARALLEL) FOR PROPER HEAT DISSIPATION. TO PREVENT RISK OF FIRE, DO NOT USE SMALLER GAUGE WIRE.

The DC cordset attaches to the external DC connector on the charger. Verify the connectors snap together for proper connection.

7. VEHICLE LOCKOUT CONTROL

Some charger models have a lockout/interlock control signal which can be interfaced with the vehicle/equipment to prevent use/movement of the vehicle while the charger is in use. The lockout control signal is a normally closed relay contact which opens when AC power is connected. Two wires with quick disconnect terminals are used to interface with the vehicle wiring. The lockout control signal is typically interfaced with the vehicle motor speed controller or key switch. If you are uncertain of how to interface the lockout control signal with your vehicle, please contact your vehicle dealer.

8. PROPER CARE OF DEEP-CYCLE LEAD-ACID MOTIVE POWER BATTERIES

Motive power battery packs are subjected to severe deep-cycle duty on a daily basis. Although these batteries are designed to withstand such duty, the following precautions must be observed to obtain good performance and maximum cycle life.

⚠CAUTION: ALWAYS WEAR PROTECTIVE EYE SHIELDS AND CLOTHING WHEN WORKING WITH BATTERIES. BATTERIES CONTAIN ACIDS WHICH CAN CAUSE BODILY HARM. DO NOT PUT WRENCHES OR OTHER METAL OBJECTS ACROSS THE BATTERY TERMINAL OR BATTERY TOP. ARCING OR EXPLOSION OF THE BATTERY CAN RESULT.

1. When installing new batteries, be sure the polarity of each battery and the overall battery pack is correct. Otherwise, battery and/or charger damage can result.
2. New batteries should be given a full charge before their first use because it is difficult to know how long the batteries have been stored.
3. New batteries and older batteries that have been in storage are not capable of their rated output until they have been discharged and charged a number of times. Consult the manufacturer of your batteries for more information.
4. DO NOT EXCESSIVELY DISCHARGE THE BATTERIES. Excessive discharge can cause polarity reversal of individual cells resulting in complete failure shortly thereafter.
5. Maintain the proper electrolyte level of wet (flooded) batteries by adding water when necessary. Distilled or deionized water is best for battery life. Never allow the electrolyte level to fall below the top of the battery plates. Electrolyte levels lower during discharge and rise during charge. Therefore, to prevent the overflow of electrolyte when charging, it is mandatory that water be added to cells AFTER they have been fully charged – do not overfill. Old batteries require more frequent additions of water than new batteries.
6. Hard crystalline sulfates form when batteries in storage are not maintained in a charged active state. Internal self-discharge can bring about the start of this condition in as little as three days in warm temperatures. Batteries not maintained and allowed to sit in storage will self-discharge, sulfate and lose capacity. Repeated charging without using the batteries between charges can recover some of the lost power, range, and life, but some permanent loss should be expected.
7. Cold batteries require more time to fully charge. When the temperature falls below 65°F, the batteries should be placed on charge as soon after use as possible.
8. The tops of batteries and battery hold downs must be kept clean and dry at all times to prevent excessive self-discharge and the flow of current between the battery posts and frame. Electrolyte spilled on batteries never dries or evaporates.
9. All connections to batteries must be maintained clean and tight. Due to heating and discharge rates, bolted connections loosen over time. Re-tighten the connections twice yearly to the torques specified by the battery manufacturers.
10. Follow all operating instructions, cautions, and warnings as specified in this manual, on the charger, in the battery manuals, and in the vehicle manuals.

8.1 Personal Safety Precautions

1. Have someone within the range of your voice and close enough to quickly come to your aid when you work near a lead-acid battery.
2. Ensure that ample fresh water and soap are nearby in case battery acid contacts your skin, clothing, or eyes.
3. Wear complete eye and clothing protection. Avoid touching your eyes while working near a battery.
4. If battery acid contacts your skin or clothing, wash immediately with soap and water. If acid enters your eye, immediately flush your eye with running cold water for at least 10 minutes and get medical attention immediately.
5. NEVER smoke or allow a spark or flame to be in the vicinity of a battery.
6. Be extra cautious to reduce the risk of dropping a metal tool onto a battery. It could spark or short circuit the battery or other electrical components that could cause an explosion.
7. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short-circuit current that is high enough to cause a severe burn.
8. NEVER charge a frozen battery.

9. CHARGER OPERATION

⚠WARNING: TO REDUCE THE RISK OF AN ELECTRIC SHOCK, CONNECT ONLY TO A SINGLE-PHASE, PROPERLY GROUNDED (3-WIRE) OUTLET. REFER TO GROUNDING INSTRUCTIONS.

⚠CAUTION: MAKE SURE THE BATTERY IS A RECHARGEABLE DEEP-CYCLE BATTERY WITH THE PROPER RATED VOLTAGE FOR THIS CHARGER.

⚠DANGER: TO PREVENT ELECTRICAL SHOCK, DO NOT TOUCH UNINSULATED PARTS OF THE CHARGER DC OUTPUT CONNECTOR, BATTERY CONNECTOR, OR BATTERY TERMINALS. MAKE SURE ALL ELECTRICAL CONNECTORS ARE IN GOOD WORKING CONDITION. DO NOT USE CONNECTORS THAT ARE CRACKED, CORRODED, OR DO NOT MAKE ADEQUATE ELECTRICAL CONTACT. USE OF A DAMAGED OR DEFECTIVE CONNECTOR MAY RESULT IN A RISK OF OVERHEATING OR ELECTRIC SHOCK.

⚠WARNING: CHARGER IS NOT TO BE USED WHILE THE BATTERY POWERED EQUIPMENT IS OPERATING.

⚠ATTENTION: NE PAS UTILISER LE CHARGER PENDANT QUE L'EQUIPMENT EST EN MARCHE.

⚠WARNING: LEAD-ACID BATTERIES GENERATE GASES WHICH CAN BE EXPLOSIVE. TO PREVENT ARCING OR BURNING NEAR BATTERIES, DO NOT DISCONNECT THE CHARGER DC OUTPUT FROM THE BATTERIES WHEN THE CHARGER IS OPERATING. KEEP SPARKS, FLAME, AND SMOKING MATERIALS AWAY FROM BATTERIES.

⚠WARNING: ALWAYS SHIELD EYES WHEN WORKING NEAR BATTERIES. DO NOT PUT WRENCHES OR OTHER METAL OBJECTS ACROSS BATTERY TERMINALS OR THE BATTERY TOP. ARCING OR EXPLOSION OF THE BATTERY CAN RESULT!

⚠WARNING: DO NOT DISCONNECT THE CHARGER DC OUTPUT CONNECTOR FROM THE BATTERY CONNECTOR WHILE A CHARGE CYCLE IS IN PROGRESS. THE RESULTING ARCING AND BURNING OF THE CONNECTORS COULD CAUSE THE BATTERIES TO EXPLODE.

⚠CAUTION: TO AVOID DAMAGE TO THE CHARGER DC CABLE AND CONNECTOR AND BATTERY CONNECTOR, DISCONNECT BY GRASPING THE CHARGER CONNECTOR HANDLE OR BODY AND PULLING IT STRAIGHT OUT OF THE BATTERY CONNECTOR. DO NOT PULL ON THE CHARGER CABLE. DO NOT TWIST, ROCK, OR PULL THE CONNECTOR SIDEWAYS.

The instructions printed on the charger are for daily reference.

9.1 Off-Board Charger Operation

Below are general instructions. However, specific charger configurations may include alternate functionality.

If the charger was configured for off-board use, follow these operating instructions:

1. With the charger DC output connector/plug disconnected from the battery connector/receptacle, connect the charger AC power cord to an appropriate AC outlet (if not already connected) and the charger LED will illuminate blue.
2. Connect the charger DC output connector/plug to the battery connector/receptacle. The charger will start automatically, which is indicated by the charger LED beginning to blink yellow slowly.

3. If the charger must be disconnected from the battery while a charge cycle is in progress, first disconnect the AC power cord from the AC outlet. Do not disconnect the charger DC output connector/plug from the battery while a charge cycle is in progress.
4. The charge cycle 80% point is indicated by the charger LED blinking yellow quickly.
5. The Finish charge cycle phase is indicated by the solid yellow illumination of the charger LED. Not all charge profiles include a Finish phase.
6. An extended Balance/Equalize charge cycle phase is indicated by the charger LED blinking green quickly. Not all charge profiles include a Balance/Equalize phase.
7. The charger automatically terminates the charge cycle when a battery reaches full charge, which is indicated by [1] the solid green illumination of the charger LED or [2] the charger LED blinking green slowly indicating a post-charge phase. The required charge time is affected by numerous factors, including battery amp-hour capacity, depth of discharge, battery temperature, and battery age/usage. (See note below.)
8. Before operating the machine/equipment, disconnect the charger DC output connector/plug from the battery connector/receptacle by firmly grasping both connectors and pulling them straight apart.

Note: Some Lithium-Ion batteries disconnect the charger from the batteries when the batteries reach full charge. In these situations, the charger LED will NOT be illuminated green despite the fact that the charge cycle has completed. Please refer to the State of Charge (SOC) display on the batteries to confirm a full charge.

9.2 On-Board Charger Operation

Below are general instructions. However, specific charger configurations may include alternate functionality.

If the charger was configured for <u>on-board</u> use, follow these operating instructions:

1. Ensure that the vehicle/equipment that the charger is mounted on is turned off.
2. With the charger AC power cord disconnected from the AC outlet, connect the charger DC output connector/plug to the battery connector/receptacle (most likely already connected or hard wired).
3. Connect the charger AC power cord to an appropriate live AC outlet which is indicated by the charger LED turning on blue. The charger will start automatically as indicated by the charger LED beginning to blink yellow slowly.
4. If the charger must be disconnected from the battery while a charge cycle is in progress, disconnect the AC power cord from the AC outlet. Do not disconnect the charger DC output connector/plug from the battery while a charge cycle is in progress.
5. The charge cycle 80% point is indicated by the charger LED blinking yellow quickly.
6. The Finish charge cycle phase is indicated by the solid green illumination of the charger LED. Not all charge profiles include a Finish phase.
7. An extended Balance/Equalize charge cycle phase is indicated by charger LED blinking green quickly. Not all charge profiles include a Balance/Equalize phase.
8. The charger automatically terminates the charge cycle when a battery reaches full charge, which is indicated by [1] the solid green illumination of the charger LED or [2] the charger LED beginning to blink green slowly indicating a post-charge phase. The required charge time is affected by numerous factors, including battery amp-hour capacity, depth of discharge, battery temperature, and battery age/usage. (See note below.)
9. Before operating the vehicle/equipment, disconnect the charger AC power cord from the outlet.

Note: Some Lithium-Ion batteries disconnect the charger from the batteries when the batteries reach full charge. In these situations, the charger LED will NOT be illuminated green despite the fact that the charge cycle has completed. Please refer to the State of Charge (SOC) display on the batteries to confirm a full charge.

9.3 Storage Mode Operation

1. Storage Mode is designed to keep your battery maintained during storage periods that last a few weeks to several months at a time.
2. Depending on the battery type and battery profile selected, a storage charge can be a continuous float or a periodic charge mode.
3. Do NOT disconnect the charger from the battery or from the AC power until your machine is needed for use. Disconnecting and reconnecting the charger from the batteries or AC power may start a charge cycle, but disconnection disrupts the storage mode so optimum battery maintenance is not achieved.
4. After several months of storage your batteries should be serviced and the charger reset by disconnecting the DC for Off-Board or the AC for On-Board applications (disconnect AC for a minimum of 10 minutes) before continuing another storage season.

10. LED INDICATOR

The charger has one (1) multi-color LED to indicate charger status and fault information. When the charger is powered on, the LED will change colors during its startup sequence. The general functionality of the LED is outlined below and explained in the table below. However, specific charger configurations may include alternate LED functionality.

10.1 Charger LED Status

The functionality of the LEDs is outlined below and in the following table.

- **AC PRESENT (Blue) -** Indicates charger is connected to a live AC inlet and not actively charging.
- **FAULT (Red) -** Indicates when a charger or battery fault has occurred (see section 10.2 for more information).
- **CHARGING STATUS (Yellow) -** Indicates charge cycle status.
- **CHARGE COMPLETE (Green) -** Indicates when a charge cycle completes successfully, when an extended Balance/Equalize charge cycle phase is active, or when a post-charge phase is active. (See note below.)
- **CAN FUNCTION (Purple) -** Indicates CAN controlled status.
- **PROGRAMMING FUNCTION (Purple) –** Indicates when a USB flash drive is updating charger firmware.

LED COLOR	LED STATUS	DESCRIPTION
Green	Solid On	Charge complete. (See note below.).
Green	Slow Blink	Charge cycle complete. Post Charge phase (constant voltage float, etc). Not all charge profiles include a Post Charge phase.
Green	Fast Blink	Balance/Equalize phase. An extended charge cycle is occurring because a trigger condition has been met (cycle count, etc). Not all charge profiles include a Balance/Equalize phase.
Yellow	Slow Blink	Bulk/Start charge cycle phase (constant power or constant current).
Yellow	Fast Blink	Absorption/Plateau charge cycle phase (constant voltage). Greater than 80% charged.
Yellow	Solid On	Finish charge cycle phase (constant current). Not all charge profiles include a Finish phase.
Blue	Solid On	AC Present and not actively charging.
Purple	Solid On	USB functionality in use or charger is under BMS CAN control.

Note: Some Lithium-Ion batteries disconnect the charger from the batteries when the batteries reach full charge. In these situations, the charger LED will NOT be illuminated green despite the fact that the charge cycle has completed. Please refer to the State of Charge (SOC) display on the batteries to confirm a full charge.

10.2 CHARGER LED FAULTS

The charger will indicate when a fault occurs by using a fault code sequence of 5 colors starting with red. Colors change at 1 second intervals as explained in the table below.

	1st	2nd	3rd	4th	5th	DESCRIPTION
Charger	Red	Yellow	Green	Blue	Purple	NO AC – AC power was lost during charge cycle and will restart when AC power returns.
	Red	Yellow	Green	Blue	Yellow	EEPROM – Charger hardware failure.
	Red	Yellow	Green	Blue	Green	COMMUNICATION – CAN communication failure has occurred.
	Red	Yellow	Green	Purple	Blue	PROFILE MISMATCH – Charger has detected a battery profile problem.
	Red	Yellow	Green	Purple	Yellow	NUMBER OF CHARGERS MISMATCH – Used when paralleling chargers.
	Red	Yellow	Green	Purple	Green	J1939 ADDRESS CLAIM ERROR – CAN communication issue.
	Red	Yellow	Green	Yellow	Purple	INTERNAL COMMUNICATION ERROR – Charger hardware failure.
	Red	Yellow	Green	Yellow	Green	OUTPUT RELAY FAILED – Charger hardware failure.
	Red	Yellow	Blue	Green	Purple	POWER PROCESSOR FAILED – Charger hardware failure.
Battery	Red	Green	Yellow	Blue	Purple	MAX VOLTAGE – Maximum allowable voltage was exceeded.
	Red	Green	Yellow	Blue	Yellow	MIN VOLTAGE – Expected minimum voltage was NOT met after a specified time from the start of the charge cycle.
	Red	Green	Yellow	Blue	Green	MAX AMP-HOURS – Maximum amp-hours for the phase or overall charge cycle was exceeded.
	Red	Green	Yellow	Purple	Blue	MAX TIME – Maximum time for the phase or overall charge cycle was exceeded.
	Red	Green	Yellow	Purple	Yellow	MAX BATTERY TEMPERATURE – External battery temperature sensor increased above limit and stopped charging.
	Red	Green	Yellow	Purple	Green	THERMAL RUNAWAY – Pre-set battery criteria above critical limits and charging stopped.
	Red	Green	Yellow	Green	Purple	BATTERY FAULT – Pre-set battery criteria above critical limits and charging stopped.
BMS	Red	Blue	Yellow	Blue	Purple	CRITICAL EXTERNAL – Battery BMS requesting charge termination.

N/A = Not applicable, LED state does not matter

Disconnecting the charger from the battery always clears a fault. If the charger was factory-configured for on-board use, removing AC power from the charger also clears a fault. If a fault cannot be cleared after taking appropriate corrective action, contact your dealer for troubleshooting and/or service.

11. TROUBLESHOOTING

The charger was fully tested and calibrated before leaving the factory. It was delivered ready to charge. If properly installed, the charger should require very little attention. If improper charger operation occurs, it will require repair by a qualified service technician (see section 10.1 for information regarding a red LED (Fault).

⚠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. CONTACT YOUR DEALER. INCORRECT REASSEMBLY MAY RESULT IN RISK OF ELECTRIC SHOCK OR FIRE.

1. If the charger does not turn on, check for one of the following conditions.
   a. The charger AC power cord is not plugged into a live and/or appropriate AC outlet.
   b. The battery connections are incorrect – battery not connected, reverse polarity, or short circuit.
   c. The battery voltage is too high.
   d. The battery voltage is too low (below 10 volts).

2. If the charger turns off before a battery is fully charged, and a fault condition is not indicated by the Fault LED, this indicates one of the following conditions.
   a. The AC power was interrupted during the charge cycle.
   b. The charger DC output connector was disconnected from the battery during the charge cycle.
   c. The battery has been allowed to sulfate. Charge the battery at least once every three (3) days when the equipment is lightly used. Once sulfation is allowed to take place, it may be partially reduced by returning, temporarily, to daily charging.

3. A decrease in vehicle/equipment range where the battery loses power faster indicates one of the following conditions.
   a. The electrolyte level in a wet lead-acid battery was allowed to drop below the top of the battery plates. If so, add distilled water to <u>just cover the top of the plates</u> immediately upon discovery, and then fill to the proper level with distilled water at the completion of the very next charge cycle.
   b. Use of the vehicle/equipment before the battery has been fully charged and the charger automatically terminates the charge cycle. This shortens battery life and accelerates the onset of reduced daily range.
   c. The normal wear-out pattern for the battery.

4. A charge cycle running longer than anticipated before terminating indicates one of the following conditions.
   a. An overly-discharged battery.
   b. The charger output may have been reduced due to low AC input voltage, high ambient temperature, or obstructions to cooling airflow.
   c. The amp-hour capacity of the battery is greater than the charger can fully charge in the anticipated amount of time.

12. SPECIFICATIONS

See the TT650 datasheet for specifications

13. SERVICE PART LIST

Description	Lester Part Number
Cordset, AC, 16/3, 125V/10A, 78"	39738S
Cordset, AC, 18/3, 125V/10A, 78"	39739S
Handle Kit	44257S
*Mounting Brackets – 650W Summit Mounting Pattern	44262S
*Mounting Brackets – 1050W Summit Mounting Pattern	44263S
9ft, DC Cordset with SB50 Gray Plug	44383S
9ft, DC Cordset with SB50 Red Plug	44381S
9ft, DC Cordset with SB50 Blue Plug	44382S
9ft, DC Cordset with SB175 Gray Plug	44416S
9ft, DC Cordset with SB175 Red Plug	44414S
9ft, DC Cordset with Lester 2-blade Gray Molded Plug	44413S
9ft, DC Cordset with 48V E-Z-GO Powerwise Plug	44384S
9ft, DC Cordset with 48V E-Z-GO Gray Molded Plug	44412S
9ft, DC Cordset with 48V CCI Gray Molded Plug	44387S
9ft, DC Cordset with 48V Yamaha 2-pin Plug	44386S
9ft, DC Cordset with 48V Yamaha 3-pin Plug	44421S
6ft, DC Cordset with Ring Terminals	44329S
3ft, DC Cordset with Ring Terminals, CAN & Wake	44331S
6ft, DC Cordset with Ring Terminals, CAN & Wake	44332S
9ft, DC Cordset with Ring Terminals, CAN & Wake	44333S

*Note: Other mounting bracket options available, contact Sales at Lester Electrical.

NOTES

Represented By:

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