

LIFEtech™ MOD 1

Model: LTM1



LIFEtech™ MOD1
Battery Charger

Owner's Manual

For local parts, sales, and service, call toll-free **1-800-251-6560**.

AM-HLTM1-OM
Rev AA December 2017

Model:	S/N:	AC Input Voltage
Installed by		Date

IMPORTANT

Read and understand your user's manual before installing, operating, or servicing this product.
DO NOT DESTROY THIS BOOK

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IMPORTANT SAFETY INSTRUCTIONS

WARNING: THE SHIPPING PALLET MUST BE REMOVED FOR PROPER AND SAFE OPERATION.

1. This manual contains important safety and operating instructions. Before using the battery charger, read all instructions, **CAUTIONS** and **WARNINGS** on the battery charger, the battery, and the product using the battery.
2. This charger has been designed to only charge flooded, lead-acid batteries. Read and understand all setup and operating instructions before using the battery charger to prevent damage to the battery and to the charger.
3. **Do not** touch non-insulated parts of the output connector or the battery terminals to prevent electrical shock.
4. During charge, batteries produce hydrogen gas which can explode if ignited. Never smoke, use an open flame, or create sparks in the vicinity of the battery. Ventilate well when the battery is in an enclosed space.
5. **Do not** connect or disconnect the battery plug while the charger is on. Doing so will cause arcing and burning of the connector resulting in charger damage or battery explosion.
6. Lead-acid batteries contain sulfuric acid which causes burns. **Do not** get in eyes, on skin, or on clothing. In cases of contact with eyes, flush immediately with clean water for 15 minutes. Seek medical attention immediately.
7. Only factory qualified personnel can service this equipment. De-energize all AC and DC power connections before servicing the charger.
8. The charger is **not** for outdoor use.
9. Do not expose the charger to moisture. Operating **conditions** should be 32° to 113° F (0° to 45° C); 0 to 70% relative humidity.
10. Do not operate the charger if it has been dropped, received a sharp hit, or otherwise damaged in any way.
11. For continued protection and to reduce the risk of fire, install chargers on a floor of non-combustible material such as stone, brick, or grounded metal.

INSTRUCTIONS DE SÉCURITÉ IMPORTANTES

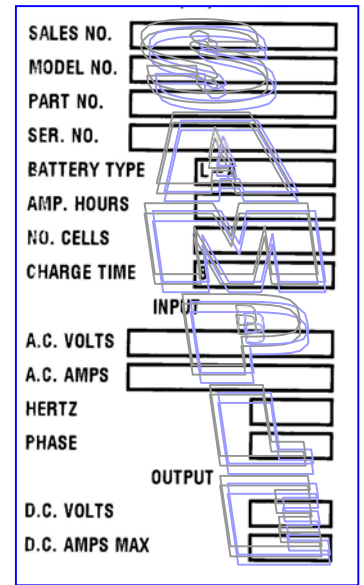
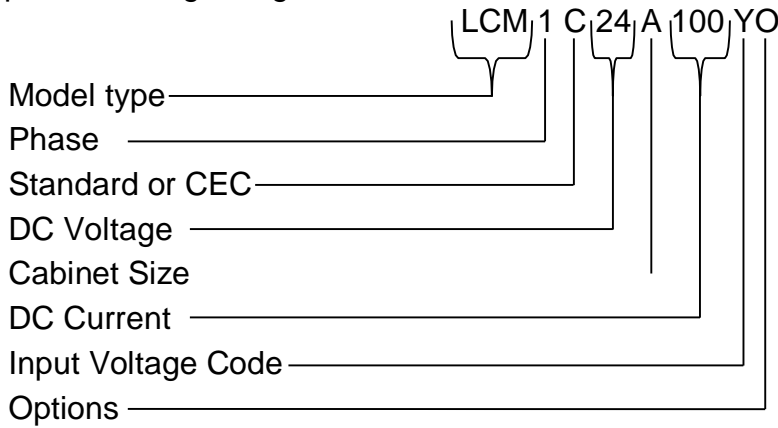
1. Ce manuel contient des informations et des consignes importantes pour l'emploi et l'utilisation du chargeur de batteries industrielles. Avant tout emploi, il est fortement conseillé de lire l'ensemble des instructions, recommandations, et avertissements concernant le chargeur et la batterie.
2. Ce chargeur a été conçu pour la charge des batteries industrielles type plomb-acide dite « ouverte ». (Il ne peut pas être adapté pour les batteries étanches.)
3. Lisez toutes les consignes d'installation et d'utilisation avant d'employer le chargeur de batterie pour empêcher des dommages à la batterie et / ou au chargeur.
4. **Ne pas être en contact avec** les pièces sous-tension non-isolées tels que la prise de charge ou des éléments de connexion de la batterie pour empêcher le choc électrique.
5. Pendant la charge, le dégagement d'hydrogène rend l'emploi de feu strictement interdit «risque d'explosion ». Ne jamais fumer, employer une flamme nue, ou créer les étincelles à proximité de la batterie. Ventiler suffisamment pour éviter toute condensation de gaz dans un espace restreint.
6. **Ne brancher ou débrancher la batterie que si le chargeur est à l'arrêt.** Faire ainsi risque d'endommager la prise de charge pouvant avoir pour conséquence des dommages du chargeur ou l'explosion de la batterie.
7. Les batteries d'acide au plomb contiennent l'acide sulfurique, qui cause des brûlures. Éviter le contact avec les yeux, la peau, ou sur l'habillement. Dans le cas de contact avec les yeux, et faut nettoyer immédiatement avec de l'eau propre pendant 15 minutes et consulter un médecin immédiatement.
8. Seul le personnel qualifié par l'usine peut entretenir cet équipement. Pour le service, veuillez contacter la société EnerSys ou l'un de ces représentant (1-800-251-6560)
9. Avant toute intervention d'entretien ou de réparation il faut s'assurer que le chargeur est hors tension et la batterie est déconnectée.
10. Le chargeur **n'est** pas pour un usage extérieur.
11. Ne pas exposer le chargeur à l'humidité. Les conditions de fonctionnement devraient être 0° à 45°C; humidité relative de 0 à de 70%.
12. Ne pas mettre en fonctionnement le chargeur s'il a reçu un choc mécanique ou tout autre dommage di quel que façon.
13. Pour une protection permanente et pour réduire le risque du feu, installez les chargeurs sur un plancher ou un matériel non-combustible tel qu'un mur plein en béton, en brique, ou l'acier.

TECHNICAL INFORMATION

The nameplate, located on the outside of the charger, should be used to check this application before installation.

Part Number

This number specifies in general the characteristics of this particular charger and for this reason it is required in any discussion or correspondence regarding this unit.



Cabinet Size/Gauge Letter Codes

The following table describes the letter codes to be used in charger part numbers to indicate the number of slots and size of DC cables.

Letter Code	Module Positions	Standard Cable Gauge	Comments
A	1	10 AWG	Stand alone, 1.0 kW cabinet
C	3	4 AWG	Three slot, 1.0 kW cabinet
F	6	2/0	Six slot, 1.0 kW cabinet

AC Line Voltage Letter Codes

The following table describes the letter codes to be used in charger part numbers to indicate the AC line voltage(s) and AC line frequency at which the charger can be operated.

Letter Code	Voltage(s) (Volts rms)	Line Frequency (Hertz)	Comments
A	120	50 / 60	120 VAC only
G	208/220/240	50 / 60	208/220/240 VAC

Specialty Charger Options List

Suffix	Description
C6	6 Ft of #12 AWG AC Cord
C10	10 Ft of #12 AWG AC Cord
C12	12 Ft of #12 AWG AC Cord
L10	10 Ft of DC cable
L13	13 Ft of DC cable
L15	15 Ft of DC cable
L18	18 Ft of DC cable
L20	20 Ft of DC cable
L25	25 Ft of DC cable
L30	30 Ft of DC cable

Serial Number

This number indicates complete information about the specific charger. It must be supplied with the part number on any correspondence or discussion regarding this charger.

Battery Type

The chemical content construction of the battery this unit is designed to charge is given in this part of the nameplate. (L-A = Lead Acid)

Amp. Hours

The information supplied here is the maximum amp-hours capacity of this charger. Charging batteries of amp-hour capacities not specified here might cause the charger to deviate from the specifications.

No. Cells

This portion of the nameplate gives the number of cells this unit will charge. **This number must match exactly with any battery connected to the charger output.**

Charge Time

This is the total charge time in hours.

IMPORTANT: THE CHARGER WILL OPERATE ONLY ON NOMINAL LINE VOLTAGES STAMPED ON THE NAMEPLATE.

Input AC Volts

The nameplate shows the input voltage accommodated by this charger.

Failure to select the correct voltage will result in damage to the charger and/or the battery.

Input AC Amps

The external fusing and/or the line disconnect circuit breaker should be as specified in the National Electrical Code or other local code agencies. (AC fuse values can be found on the decal inside the charger).

Hertz

This charger must be connected to a branch circuit protection in accordance with the National Electrical Code NFPA70 and local codes. (AC fuse values can be found on the decal outside the charger).

Phase

Number "3" indicates a Three Phase Charger, and "1" indicates a Single Phase Charger.

Output DC Volts

This gives the nominal DC output voltage of the system.

Output DC Amps Max

This is the maximum DC current that this unit will deliver to a discharged battery.

CEC

This logo is applied to chargers that are certified with the California Energy Commission in compliance with Appliance Efficiency Regulations:

**cULus**

This logo is applied to chargers that have been tested to applicable standards and requirements by Underwriters Laboratories (UL) and the Canadian Standards Association (CSA):



INSTALLATION

WARNING: THE SHIPPING PALLET MUST BE REMOVED FOR PROPER AND SAFE OPERATION.

Location

For maximum trouble-free service, choose a location which is free of excess moisture, dust and corrosive fumes. Also, avoid locations where temperatures are high or where liquids will drip on the charger. Do not obstruct the ventilating openings or the space under the charger.

Wall Mount Cabinet Chargers

The charger must be mounted on a wall or stand in a vertical position. The lower part of the charger must be at least 24 inches from the ground and/or the charger below and the upper part 36 inches from the ceiling. The minimum distance between two chargers must be 12 inches.

The charger will be installed with four 5/16 inch bolts or with the bracket supplied. See the Wall Mounting Dimensions section at the end of this manual for proper bolt pattern.

NOTE: Ambient temperature at all levels cannot exceed 113° F (45° C).

Electrical Connections

To prevent failure of the charger, be sure it is connected to the correct line voltage.

WARNING: MAKE SURE THE POWER TO THE CHARGER IS OFF AND THE BATTERY IS DISCONNECTED BEFORE CONNECTING THE INPUT POWER TO THE TERMINALS OF THE CHARGER.

Connecting Input Power

Connect the input power to the appropriate terminals, *including ground*. Torque as specified on pages 27 and 28. Follow your local electrical or National Electric Code in making these connections.

AC Connection

The user must provide suitable branch circuit protection and a disconnect method from the AC power supply to the charger to allow for safe servicing.

Plug Polarity

The charging cable is connected to the DC output of the charger with the positive lead marked RED. The output polarity of the charger must be strictly observed when connecting to the battery (read warning above). Improper connection will open the DC fuse.

DANGER: FAILURE TO GROUND THE CHARGER COULD LEAD TO FATAL ELECTRIC SHOCK. Follow National Electric Code for ground wire sizing.

Grounding the Charger

Connect a grounding conductor to the lug provided on the horizontal support panel. This lug is marked as shown:



DESCRIPTION OF OPERATION

General

LIFEtech™MOD1 chargers are microprocessor-controlled. The processor calculates the battery's capacity so that the charging profile can be automatically adapted to the battery's actual state over a wide range of capacities. The charging coefficient is maintained absolutely on all types of batteries. LIFEtech™MOD1 chargers adapt to the battery's capacity and its discharge level.

LIFEtech™MOD1 chargers can easily be set to charge flooded batteries used in cold or freezer storage applications, IEL or opportunity profiles. This battery charger is also designed to charge flooded and sealed lead-acid storage batteries within the range of the cell and ampere-hour rating as marked on the nameplate.

Beginning the Charge

When a battery is connected to the charger, the control board senses voltage and after a 20 second delay, the charger energizes.

Charging

Charging current is determined by the battery voltage and interaction of the charger. Charging current declines automatically as battery voltage rises during the charge. As the battery charges, the LCD display will output various charge parameters including the percentage of battery capacity.

AC Power Fail

If the AC power fails with a battery connected to the charger during a charge cycle, the charger will reset and start a new charge cycle when power is restored. All charger settings as well as the time and date are preserved.

Series Charging

In series charging, the voltages of both batteries add up and must match charger's nameplate rating. The charger's ampere-hour rating must be equal to each of the batteries' ampere-hour rating. Charge cycle will not start unless both batteries are connected.

GLOSSARY

Charging Profile

The charging profile defines the rate of current charge over time. The charger adapts to the battery's age and level of discharge. Controlling the overcharge coefficient, whatever the battery's discharge level, reduces the amount of electricity consumed.

Cold Storage

This is a charging profile that allows the configuration of the charger for use with batteries in cold storage application. The profile is an IEI (constant current, constant voltage, constant current) type with a number of user configurable parameters.

Equalization Charging

Equalization charging, performed after normal charging, balances the electrolyte densities in the battery's cells.

IEI Profile

The profile is an IEI (constant current, constant voltage, constant current) type with a number of user configurable parameters.

ENVIROLINK™ Profile

This special profile is for charging ENVIROLINK™ Valve Regulated Lead-Acid (VRLA) batteries.

TPPL Profile

Advanced lead-acid battery design that provides longer service life, higher power density, longer shelf life, and fast recharge capabilities.

Opportunity Profile

This charge profile is used when opportunity charging is desired. It has a start rate of 25% of the batteries rated amp hour capacity, requires one opportunity recharge in every 24 hours of service and must have an equalize charge done once a week which is programmed to run automatically.

Operation

During opportunity charging the user can plug the battery in and charge it during breaks, lunch or any work stoppage time. Sufficient time should be scheduled after the full charge to allow the battery to completely cool to ambient temperatures before use.

Daily Charge

Is the time of day for a Complete charge.

NOTE: The factory default is complete charge disable, 6 hour Equalize, Sunday at 00 hour.

Refresh Charging

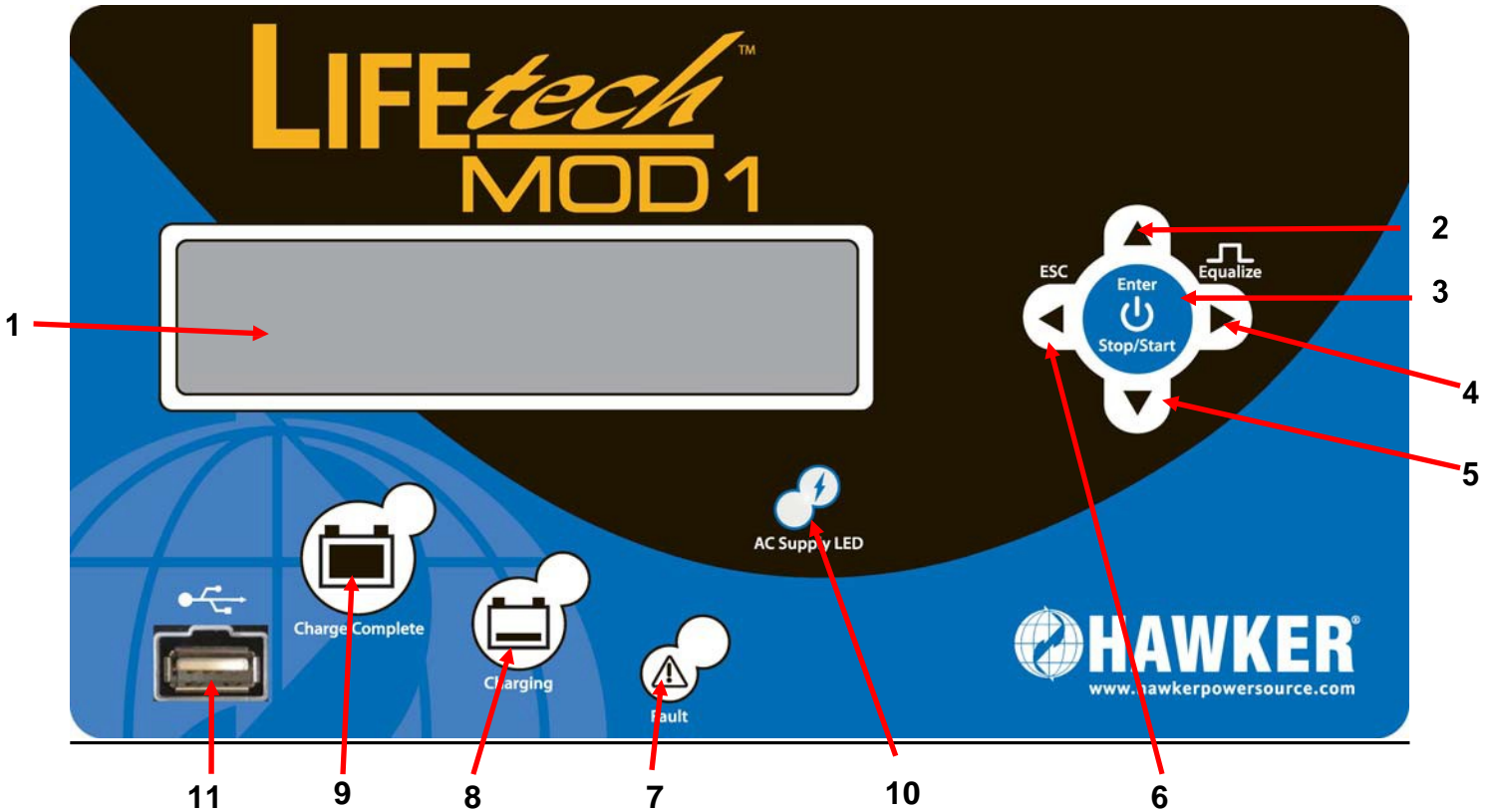
Refresh or maintenance charging enables the battery to be maintained at maximum charge all the time that it is connected to the charger.

OPERATING INSTRUCTIONS

The LIFEtech™MOD1 series of chargers are compatible with batteries at 12, 24, and 36/48 volts (depending on the version supplied).

Battery recognition (voltage, capacity and state of charge) is accomplished automatically by the microprocessor. Several charging profiles are available (Cold Storage, IEI, Opportunity, ENVIROLINK™) based on the configuration chosen by the operator. Furthermore, equalization and compensation charges are integrated.

CONTROL PANEL



Ref.	Function	Description
1.	LCD Display.	Display charger operation info/Menus
2.	Navigate UP button	Navigate menus/Change values
3.	ENTER/STOP&START button	Select menu items/Enter values/Stop and restart battery charge
4.	Navigate RIGHT/EQUALIZE button	Scroll right/Start equalize or desulfation
5.	Navigation DOWN button	Navigate menus/Change values
6.	Navigation LEFT/ESC button	Enter Main Menu/Scroll left/Exit menus
7.	RED fault indicator	OFF = no fault FLASHING = ongoing fault detected ON = fault
8.	YELLOW charging indicator	OFF = charger output is off ON = charging in progress
9.	GREEN charge complete indicator	OFF = charger off or battery not available Flashing = cooling phase ON = battery ready and available
10.	BLUE AC supply indicator	OFF = AC missing ON = AC present
11.	USB port	Download memos/upload software

MENU ACCESS

When the charger is idle, press and hold the <ESC> button, the Main Menu is then displayed. The main menu is automatically exited after 60 seconds of inactivity or can be exited voluntarily by pressing the <ESC> button.

Main Menu

All menus are accessed from Main Menu; a detailed description of each menu is included in the next sections of this manual. The menus that require a password are not displayed until the correct password has been entered.

The menus provide access to the following functions:

- View last 200 charging cycles (**MEMO** menu).
- View of faults, alarms, etc. (**STATUS** menu).
- USB functions (**USB** menu).
- Setting of date, language and others (**PARAMETERS** menu).
- Management of password (**PASSWORD** menu).

MEMORIZATIONS

Memorizations Display Screen

The charger can display the details of the last 200 charge cycles.

The display shows here that charges have been stored in memory (title line). MEMO 1 is the latest charge memorized. After memorizing the two-hundredth charge, the oldest record is deleted and replaced by the next oldest.



Displaying a Charge Cycle

Proceed as follows:

1. Select a record (MEMO x) using the ▲/▼ buttons.
2. Display the first History screen by pressing Enter.
3. Display the second History screen by pressing ▼.
4. Return to the Main Menu by pressing Esc.

The charge history is displayed; use the ▲/▼ to scroll through the parameters.

Memorization Data



Memo	Description
Profile	Selected profile
Capacity	Rated battery capacity (AH)
U batt	Rated battery voltage (V)
Temp	Battery temperature at start of charge (F)
% init	State of charge at start of charge (%)
U start	Battery voltage at start of charge (Vpc)
U end	Battery voltage at end of charge (Vpc)
I end	Current at end of charge

Memo	Description
Chg Time	Time of the charge cycle (minutes)
AHI	Amp-hours returned during charge cycle
SoC	Start of charge date and time
DBa	Battery disconnect date and time
Status	Partial or complete
Fault	Fault Codes
CFC	Termination code (for service tech)

STATUS

This menu displays the status of the charger's internal counters (number of normal and partial charges, faults by type, etc.).

Status Screen

Status	Description
Charge	Total number of charges - corresponds to the total of normally terminated charges and charges terminated with or by faults
	Number of charges normally terminated
	Number of charges terminated abnormally
DF1 etc.	Number of faults recorded by the charger (see Fault Codes)
TH	Number of charger temperature faults

USB

Record Memo

This function enables the storage of charge Memorizations and the Status data. The file, in CSV format, will be stored in the USB stick under the name: MDDHMM.CSV with M: for Memorization, DDD: Day of the year, HH: Hour of file creation, MM: Minute of file creation

Update Software

Update chargers internal software. The software is provided by Hawker.

Save Setting

Save the current charger settings to USB.

Restore Settings

Upload saved charger settings from USB to charger.

PARAMETERS

Date/Hour

Sets date and time of the charger. The clock has a battery backup which will preserve the time when power to the charger is OFF.

Language

Selects the language displayed in the menus.

Region

Selects the format for date, metric (EU) or imperial (US) units for temperature, length and cable gauge.

Display

Set screen saver function.

Contrast

Modifies the display contrast level (20 to 39).

Screen Saver

Enable or Disable the screen saver function.

Delay

Set the time the screen stays illuminated. The delay time is adjustable in minutes up to 1 hour and 59 minutes.

Daylight

Enable or disable automatic clock adjustment for daylight savings time. When enabled, time will move ahead one hour at 02:00 on the second Sunday in March and will move back one hour at 02:00 on the first Sunday of November. The charger must be powered up at the time of the change for it to take effect.

PASSWORD

This is where the password is entered to gain access to service level menus by authorized Hawker® service personnel. The default password is 0099.

CONFIGURATION

This menu allows for configuration of the charger. Password is required to view this menu.

Access

On the Main Menu, select Password and then press <ENTER>. Use the four ESC, EQ, ▼ and ▲ pads to select the numbers corresponding to your password. Then select configuration.

Required Setup – The following parameters must be set including Date and Time:

PARAMETERS \ DAYLIGHT SAVINGS	US – CANADA
PARAMETERS \ SERIAL NUMBER	PER ORDER
CONFIGURATION \ CHARGE \ CHARGE DELAY \ TYPE	DELAY
CONFIGURATION \ CHARGE \ CHARGE DELAY \ VALUE HOUR/DELAY	00H00
CONFIGURATION \ CHARGE \ CF FLOODED	15%
CONFIGURATION \ BATTERY \ CAP MANU AUTO	AUTO
OPP PROFILE	SETTING
BATTERY \ CAP MANU AUTO	MANU
BATTERY \ CAPACITY	PER ORDER
BATTERY \ TEMPERATURE	86°F
CHARGE \ DAILY CHARGE \ ON – OFF	
CHARGE \ DAILY CHARGE \ DAILY CHG START	22H00
CHARGE \ DAILY CHARGE \ DAILY CHG END	04H00
EQUALIZATION \ MANU CURRENT	Note 1
EQUALIZATION \ TIME	06H00
EQUALIZATION \ DELAY	00H00
EQUALIZATION \ FREQUENCY	SUNDAY
EQUALIZATION \ REFRESH ON/OFF	OFF
IEI PROFILE	SETTING
BATTERY \ TEMPERATURE	86°F
EQUALIZATION \ MANU CURRENT	Note 1
EQUALIZATION \ TIME	04H00 (06H00)
EQUALIZATION \ DELAY	00H00
EQUALIZATION \ FREQUENCY	SUNDAY
EQUALIZATION \ REFRESH ON/OFF	OFF
COLD PROFILE	SETTING
BATTERY \ TEMPERATURE	55°F
EQUALIZATION \ MANU CURRENT	Note 1
EQUALIZATION \ TIME	06H00
EQUALIZATION \ DELAY	00H00
EQUALIZATION \ FREQUENCY	SUNDAY
EQUALIZATION \ REFRESH ON/OFF	OFF
BATTERY \ CAPACITY	PER ORDER
ENVIROLINK PROFILE	SETTING
BATTERY \ TEMPERATURE	86°F
EQUALIZATION \ MANU CURRENT	Note 2
EQUALIZATION \ TIME	08H00
EQUALIZATION \ DELAY	00H00
EQUALIZATION \ FREQUENCY	SUNDAY
EQUALIZATION \ REFRESH ON/OFF	OFF
BATTERY \ CAPACITY	PER ORDER

Note 1:
MANU EQUAL CUR = 0.045*CAPACITY for IONIC , OPPOR, and COLD (Flooded) profiles.

Note 2:
MANU EQUAL CUR = 0.020*CAPACITY for ENVIROLINK profiles.

CHARGE

Profile

For selecting the right charging profile for the application:
STDFLD, GELBLC, ENVLK, OPP COLD, XFCBLC.

Auto Start

On- Charge will automatically start when battery is plugged in.
Off- User must push start button for charge to start.

Charge Delay

Type - sets OFF, DELAY, or TIME OF DAY.

Value hour delay - sets the amount or time of day for the delay (00:00 to 24:00).

Delay: Start of charge is delayed for the amount of time stored in VALUE (0 to 24 hours)

Time of Day: Charge will not start until the time of day stored in VALUE (24 hour format).

Daily Charge

On/Off – Sets daily charge on or off.

Daily Chg Start – Sets daily charge start time.

Daily Chg End – Sets daily charge end time.

Block Out Charge

On/Off – Sets block out charge on or off.

Block out Start – Sets daily charge start time.

Block Out End – Sets daily charge end time.

Floating

On/Off- Sets float mode on or off.

Current – Sets float current.

Voltage – Sets float voltage.

This feature can be turned ON or OFF depending on the application. A float charge at the end of standard charge is intended to compensate for consumption by the truck electronics that are left on when truck is not used (typically AGV). The parameter VOLTAGE is in mVpc (millivolts per cell) determines the maximum float voltage. The parameter CURRENT defines the current output during float, the current will automatically decrease to keep the battery voltage at the maximum defined by the VOLTAGE parameter.

Battery Rest

Set battery rest time in hours

Conditional Charge

Set conditional charge %.

The charger will only commence the charge if the battery has reached the limit of **depth of discharge (DoD)** of more than x%. For example if the user wants to charge the battery only if it is discharged more than 30%, the parameter 30 has to be entered in the conditional charge. The 0 value disables the function.

Iphase

Sets gel block phase 3 current percentage

Refresh On/Off

Sets refresh mode on or off.

BATTERY**Cap Man/Auto**

When in Ionic mode, the charger can estimate the capacity of the connected battery automatically "Auto" or the charger will use the capacity entered manually "Manu" in the Capacity menu.

Capacity

Battery AH capacity used by the charger (must be set to "Manu" for Ionic profile) to determine start and finish rates.

Battery Temperature

This parameter adjusts the regulation voltages on the charging profile (values between -15°C / 5°F and 65°C / 149°F).

Cell Size

Sets number of battery cells. 6,12,18,24 Cells

CABLE**Length**

Select the length of DC cables from the charger to the battery terminals in 1 foot increments from 3 to 99 ft .

Section

Sets the DC cable gauge. Selections are 10, 8, 6, 4 awg, 1/O, 2/O

EQUALIZATION

Current

This defines the equalization or desulphation current for a manual start. Manual Equalization is disabled during Opportunity cycles.

Time

Sets the equalization time from 1 to 48 hrs

Delayed start (delay)

Sets the delay between the normal charge and the equalization charge from 0 hr to 23 hrs.

Frequency

Selects one or several periods for carrying out the equalization charge. The user can select one or several days per week.

RST MEMO/STATUS

Resets the Memorizations and charge Status memory.

MODULES

This screen displays the total output current charger and the output voltage and current of each power module.

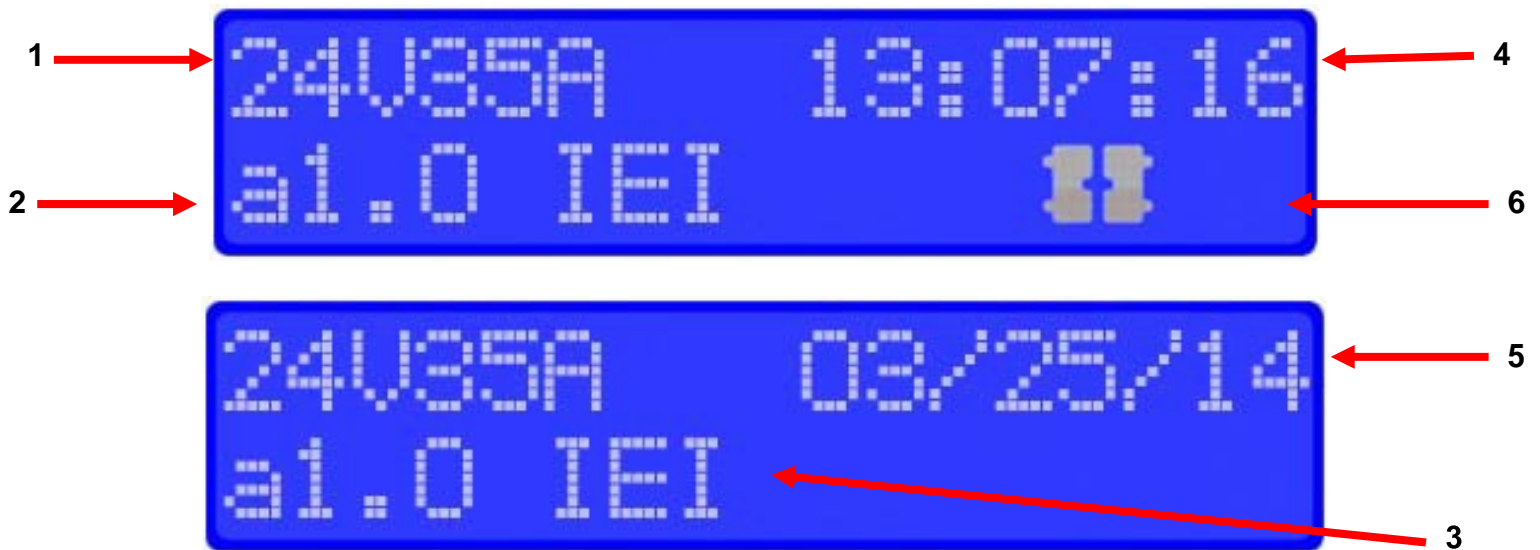
Modules	Information
IBat	Total charger output current.
MOD1	Module one - output current, output voltage.
MOD2	Module two - output current, output voltage.
MOD3	Module three - output current, output voltage.
MOD4	Module four - output current, output voltage.
MOD5	Module five - output current, output voltage.
MOD6	Module six - output current, output voltage.

CHARGING THE BATTERY

At this point, the charger should have been set up by a qualified service person. Charging can only begin with a battery of the proper type, capacity and voltage connected to the charger.

With the charger in wait mode (no battery connected) and without pressing the Stop/Start button, the display will show the following information:

Charger Idle Display



Ref	Description
1	Charger Type
2	Firmware Version
3	Selected Charge Profile
4	System Time
5	System Date
6	Connect Battery

Starting a Charge Cycle

The charger will start automatically when a battery is connected or push the Stop/Start button if the battery is already connected.

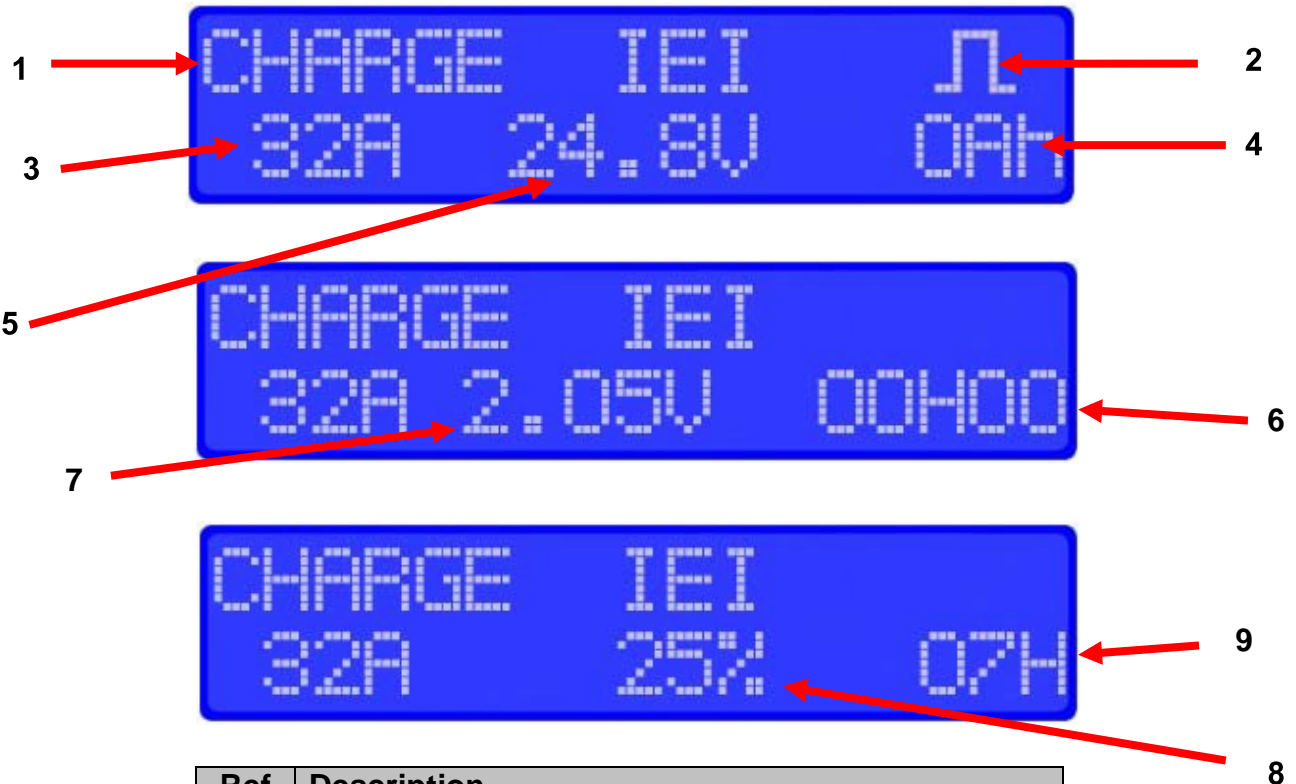
Delayed Start

If the charger was programmed for delayed start, charging will begin following that delay. When the battery is plugged in to the charger, the display shows the time remaining before the programmed charging starts. The factory default delay is 20seconds.

Effective charge

A few moments into the effective charge, the display will begin alternating between the following charging information:

Charge Display



Ref	Description
1	Charge Profile
2	Pending Equalize Symbol (if selected)
3	Charge Current
4	Charge AH
5	Charge Voltage (total V)
6	Charge Time
7	Charge Voltage (V/c)
8	Percent of charge
9	Estimated Remaining Charge Time

End of charge without equalization

The green complete LED comes on after proper end of charge. The green complete LED is on and the display shows AVAIL. The display alternates between:

- Total charging time.
- Amp/hrs restored to the battery.

Any other lit LED indicates a problem during charging. Please refer to paragraph *Control Panel* for more information.

If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge.

The battery is now ready for use. Push the ON/OFF button before unplugging the battery.

End of Charge with Equalization

An Equalize charge can be started manually or automatically.

Manual Equalization Start

1. At the end of charge (green LED on or flashing), press on the <EQUALIZE> button. The equalize button can also be pressed any time during the charge and an equalize charge will be started after charging is complete.

NOTE: When an equalize is manually started, the output current will be set to the value saved in the charger configuration. The factory default value is 23 A.

2. The start of the equalization charge is indicated by the message **EQUAL**. During the equalization charge, the charger displays the output current and alternating, the battery voltage, voltage per cell, remaining time.
3. The battery will be available when the green LED comes back on and the display shows AVAIL.
4. The battery is now ready for use. If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge. Push the ON/OFF button before unplugging the battery.

Automatic Equalization Start

If an equalization day has been programmed in Charger configurations the equalization charge will start automatically on the programmed day of the week after charging is complete.

NOTE: The factory default IEI Equalize, 6 hour Equalize, Sunday at 00 hour.

The battery will be available when the green LED comes back on and the display shows AVAIL. The battery is now ready for use. If the battery remains plugged in and refresh charge has been enabled, refreshes will occur to maintain an optimal charge. Push the ON/OFF button before unplugging the battery.

FAULT CODES

In case of a fault, one of the corresponding fault codes listed below will appear on the display. If it is a critical fault, charging will stop and the red Fault LED will be illuminated.

Fault Display

Fault	Critical	Cause	Solution
DF1	Yes	Low output current	Check input voltage and fuses.
DF2	Yes	Output fault	Check for proper battery connection (reversed polarity). Check output fuse.
DF3	Yes	Improper battery	Battery voltage too high (>2.4 Vpc) or too low (<1.6 Vpc). Use proper charger for battery.
DF4	No	The battery has been discharged more than 80% of its capacity	Prevent future over discharging of battery. Battery charge gauges and lift interrupts may need calibration.
DF5	No	Battery requires inspection	Non critical fault. Check battery cables for condition and size, check for loose connections, check for defective cells.
DF7	No	Inspect battery	Non critical fault. This will cause the charge to terminate early. Battery may require service. Check the battery (Temperature, Specific gravity...). Check the battery condition of use. Check the configuration in the menu (charge cables parameters).
TH	Yes	Charger overheating	Check that fans are working. Verify that ambient temperature is not too high. Inspect to see if charger ventilation is obstructed or impaired.
MOD TH	No	Alternating with charge parameters – one or more module in thermal fault – the charge process continues – the fault module(s) is (are) displayed + red led flashing.	Check that the fan(s) is (are) working correctly and/or that the ambient temperature is not too high or whether there is poor natural ventilation to the charger. If all modules are in thermal fault a TH fault will follow.

Fault	Critical	Cause	Solution
MOD DFC	Yes	Alternating with charge parameters – one or more module in DF1 fault – the charge process continues – the fault module(s) is (are) displayed + red led flashing.	Check power modules. If all modules in DF1 fault a DF1 error will follow.
DEF ID	Yes	Blocking fault – one or more modules are not compatible with the charger configuration (for example 24 V charger with one 48 V module). This can happen if the user replaces one module with another one with a different voltage setting.	Use correct module(s).

MAINTENANCE AND SERVICE

CAUTION: THERE ARE DANGEROUS VOLTAGES WITHIN THE BATTERY CHARGER CABINET. ONLY QUALIFIED PERSONNEL SHOULD ATTEMPT TO ADJUST OR SERVICE THIS BATTERY CHARGER.

The charger requires a minimum of maintenance. Connections and terminals should be kept clean and tight. The unit (especially the module heatsink and fan) should be periodically cleaned with low pressure air to prevent any excessive dirt build up on components. Care should be taken not to bump or move any adjustments during cleaning. Make sure that both the AC lines and the battery are disconnected before cleaning. The frequency of this type of maintenance depends on the environment in which this unit is installed.

TESTING OF COMPONENTS

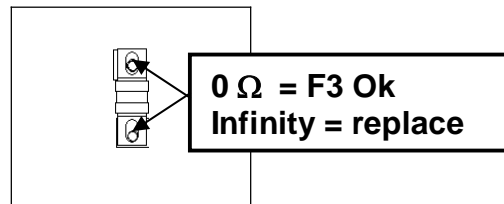
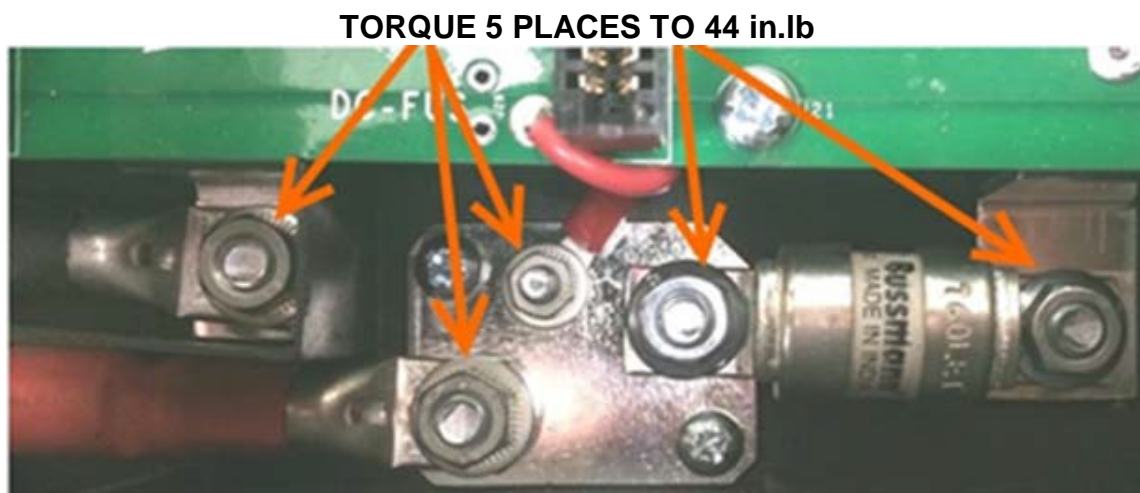
IMPORTANT: DISCONNECT THE BATTERY AND TURN THE AC POWER OFF BEFORE SERVICING.

NOTE: Only qualified personnel should service this battery charger.

DC Output Fuse

Disconnect the AC power and the battery before opening the door.

The checking of output fuse is carried out with the multimeter in Ω position.

**Component Replacement****DC Output Fuse and DC Cables**

Display Board

CAUTION: USE AN ANTI-STATIC WRIST STRAP WHEN REMOVING AND REPLACING CIRCUIT BOARD ASSEMBLIES.

REMOVAL

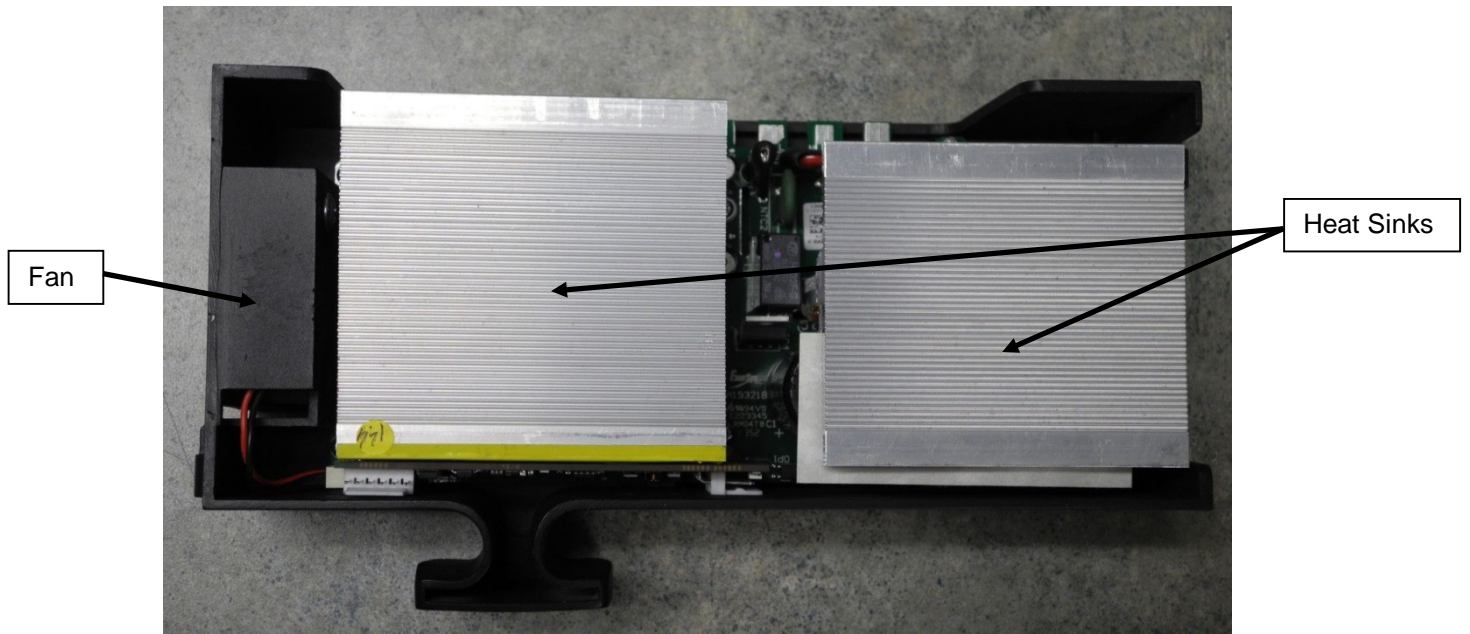
Please follow these steps to remove a Display board.

1. Touch your finger to a ground to remove any static charge.
2. Unplug all connectors from the display board. Some connectors may be secured by screws.
3. Pull the board out from its mounting standoffs.
NOTE: Handle the Display board with care. Do NOT place it on top of the battery or other acid-contaminated surfaces.
4. Place the removed display board into the anti-static bag (or foam) that the replacement board was in.

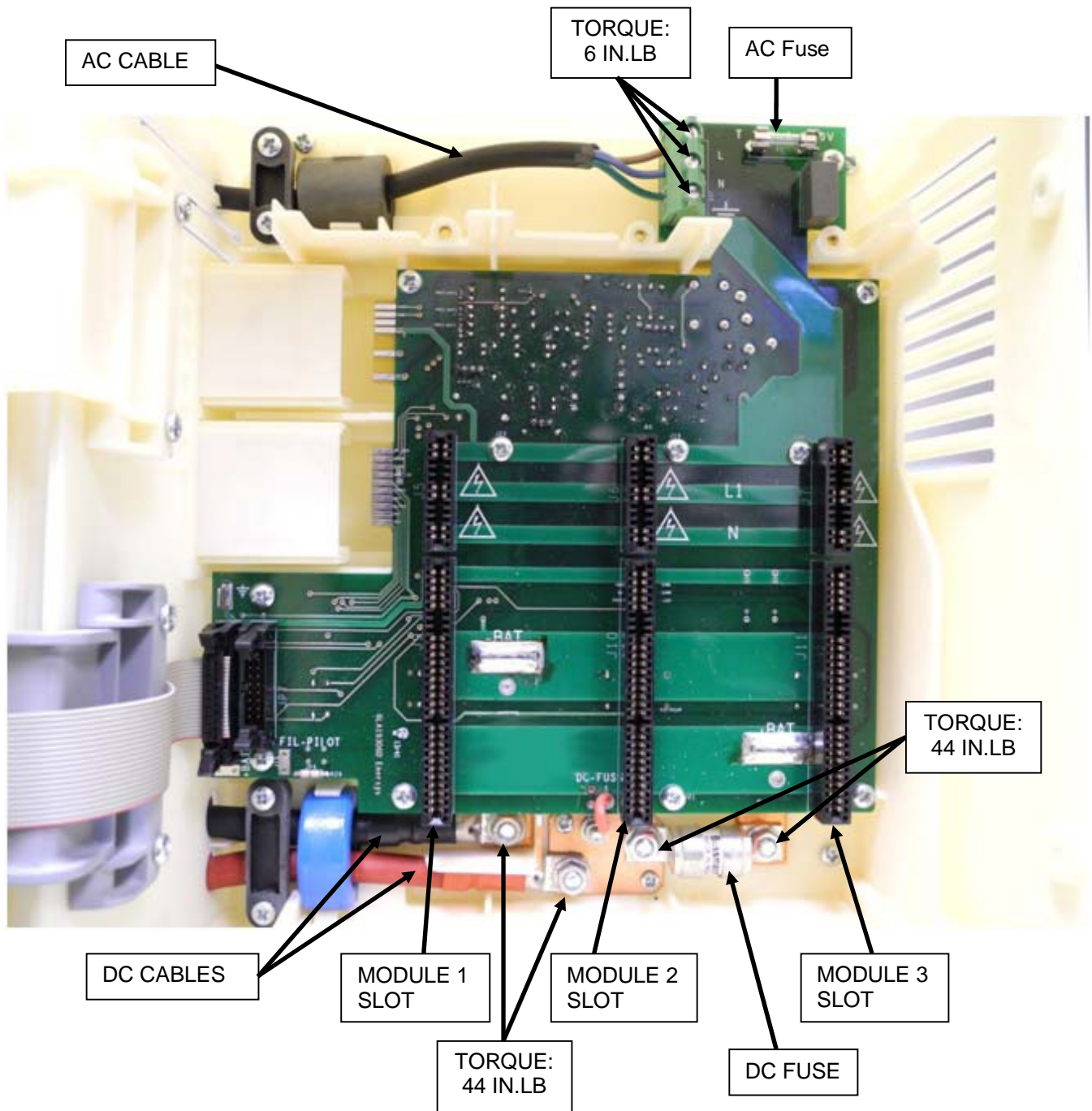
REPLACEMENT

1. Align the board mounting holes to the standoffs, and carefully push the board in until it locks to the standoffs.
2. Carefully attach the connectors back to the replacement board.

1 kW POWER MODULE



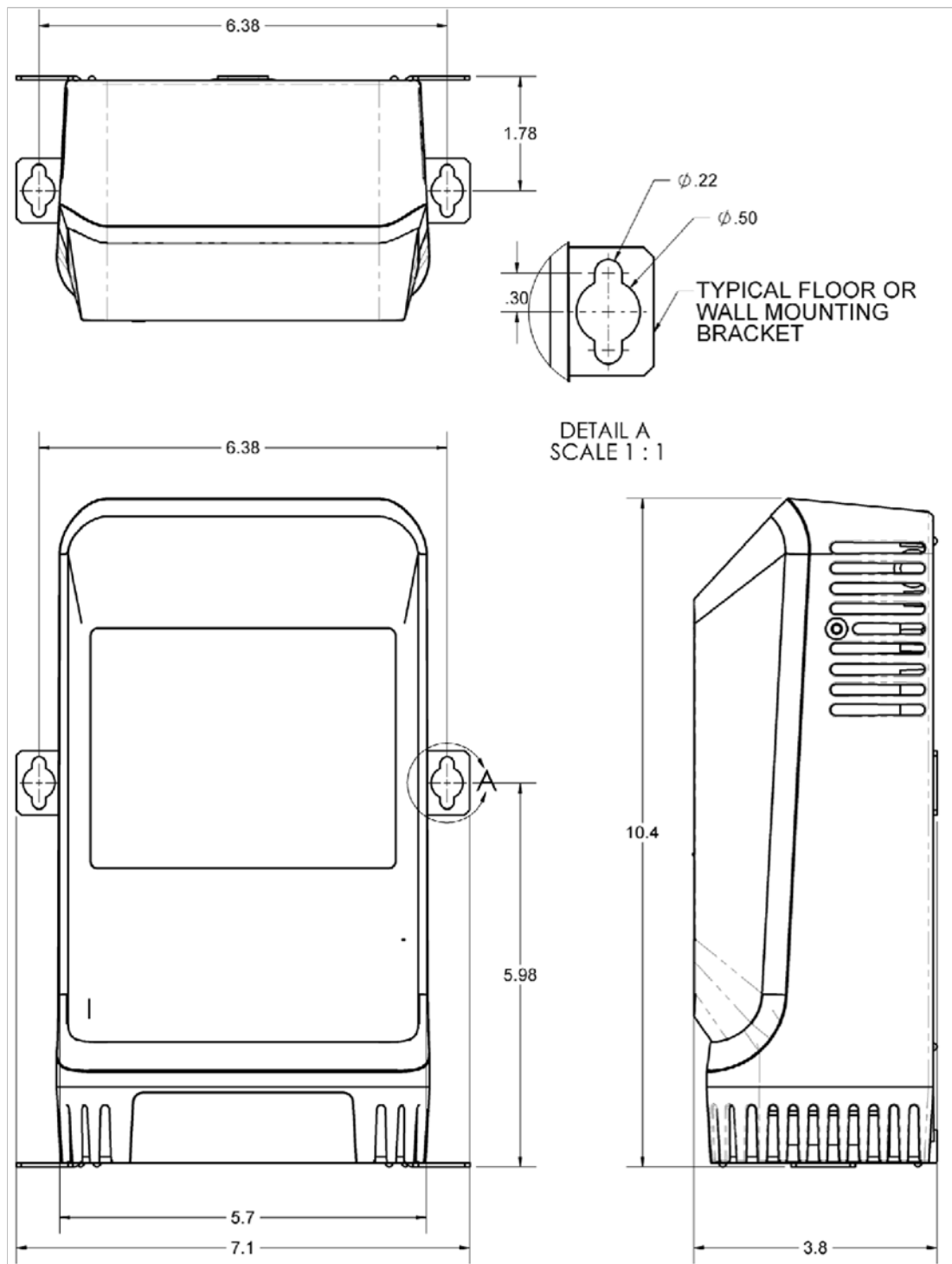
COMPONENT LOCATIONS



PARTS LIST

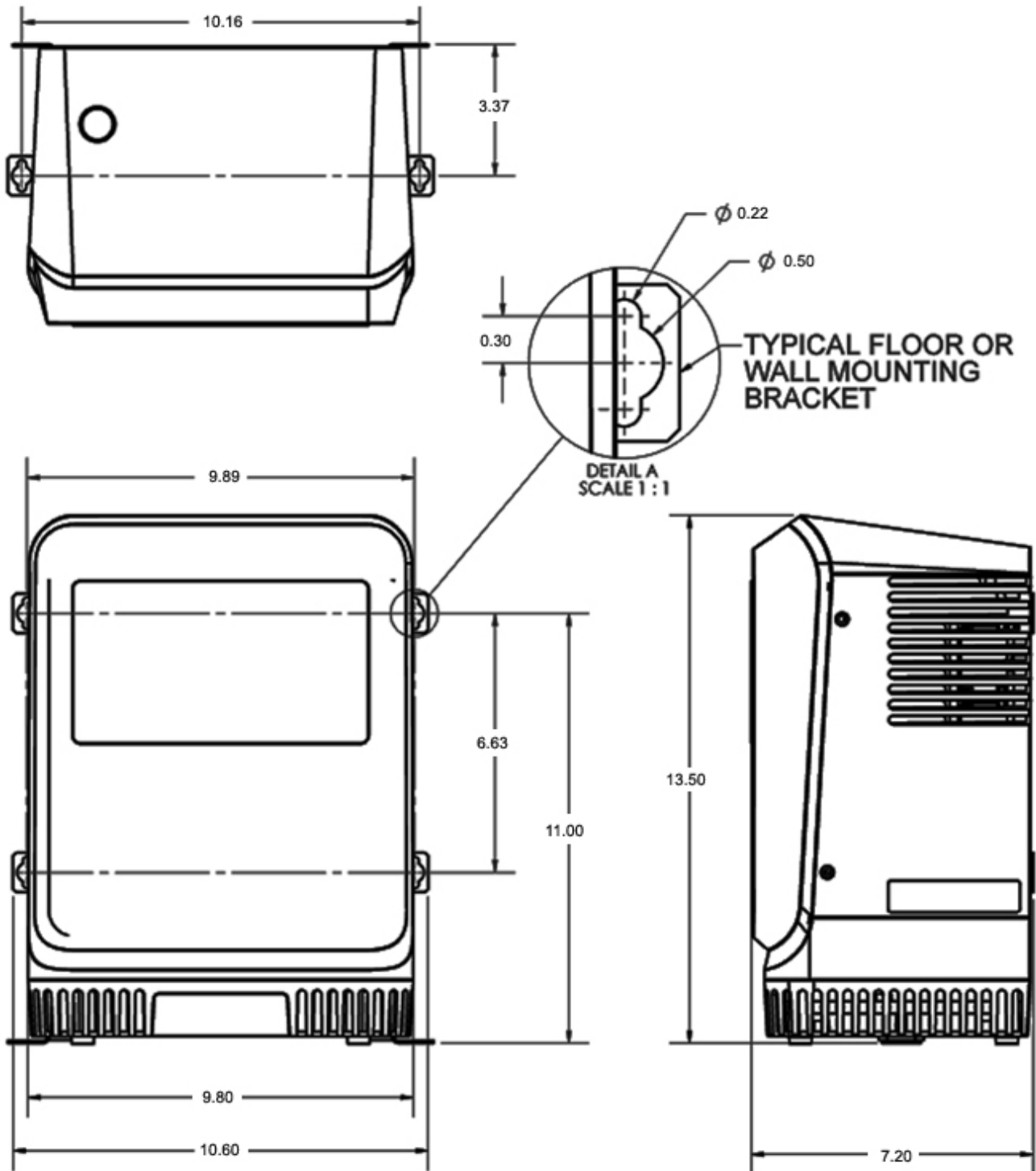
Part#	Description
X1060-19-LTM1	Display Board
X014-6LA10465	DC Fuse 160A
X014-99-1	AC Fuse, 1A, 250V
159-6LA22459	Mounting Clip
X225-6LA20650	Module, 1 KW 12V
X225-6LA20629	Module, 1 KW 24V
X225-6LA20635	Module, 1 KW 48V
124-HF-#4-L10	10' of DC cable.
124-HF-#4-L13	13' of DC cable.
124-HF-#4-L15	15' of DC cable.
124-HF-#4-L18	18' of DC cable.
124-HF-#4-L20	20' of DC cable.
124-HF-#4-L25	25' of DC cable.
124-HF-#4-L30	30' of DC cable.
X225-5-20-14L12	12' of 14 AWG AC cable
X225-5-20-14L6	6' of 14 AWG AC cable
X225-5-30-12L12	12' of 12 AWG AC cable
X225-5-30-12L6	6' of 12 AWG AC cable
X225-6-15-16L12	12' of 16 AWG AC cable
X225-6-15-16L6	6' of 16 AWG AC cable
X225-6-20-14L12	12' of 14 AWG AC cable
X225-6-20-14L6	6' of 14 AWG AC cable
X225-6-30-12L12	12' of 12 AWG AC cable
X225-6-30-12L6	6' of 12 AWG AC cable

1kW CABINET MOUNTING DIMENSIONS



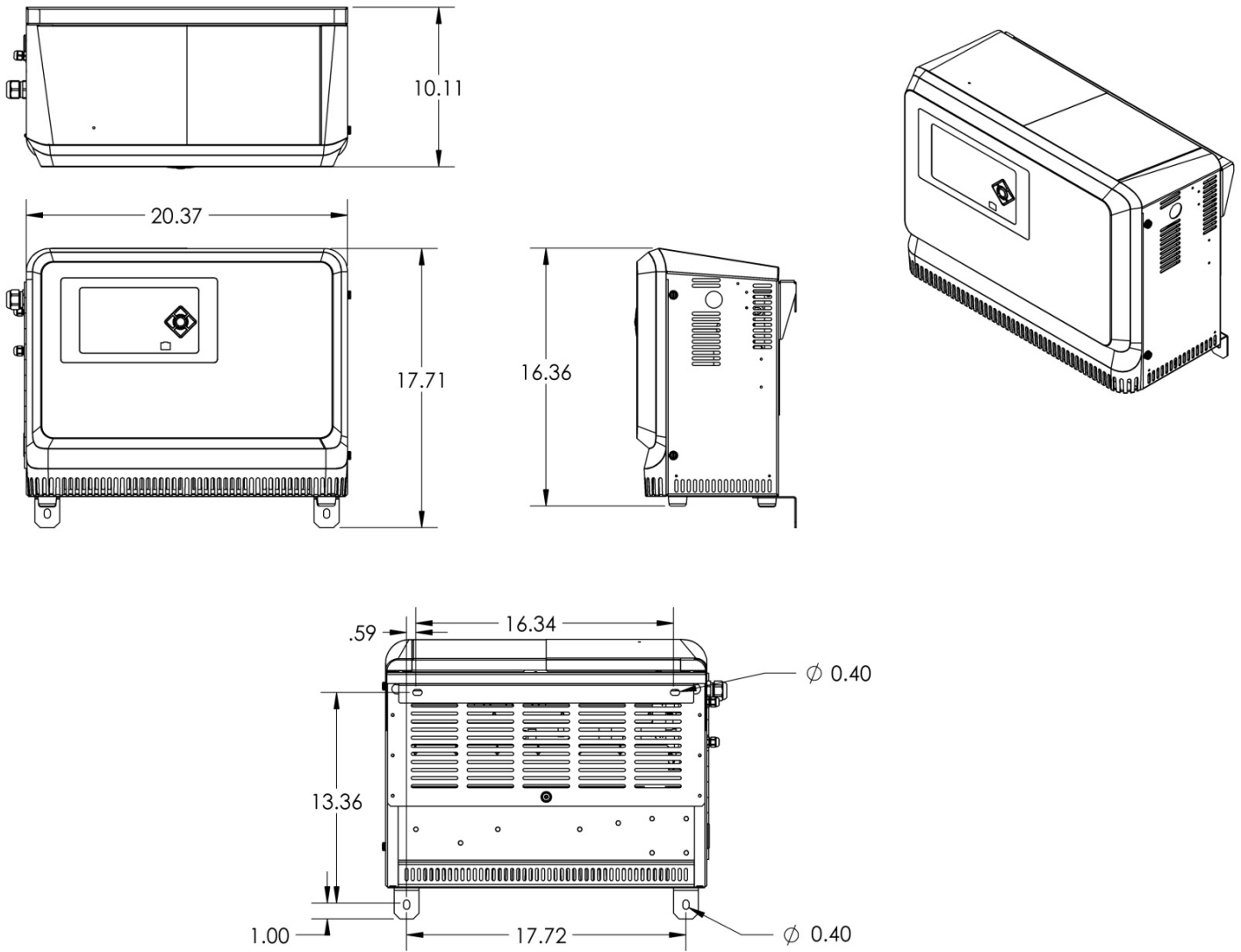
Dimensions shown are in inches

1 kW 3 BAY CABINET MOUNTING DIMENSIONS



Dimensions shown are in inches.

1 kW 6 BAY CABINET MOUNTING DIMENSIONS



Dimensions shown are in inches.

TECHNICAL SPECIFICATIONS

Part Number	AC Input					DC Output			Max 8 hour Capacity (Ah)	Charger Cable AWG
	Voltage	Max Amps	Phase	Wire AWG	NEMA Plug	Cells	KW	Max Current (A)		
LTM1-12A-35A	120	5	1	16	5-15	6	1	35	220	6 mm ² / 10 AWG
LTM1-12A-35G	208	3	1	16	5-15	6	1	35	220	6 mm ² / 10 AWG
LTM1-24A-20A	120	6	1	16	5-15	12	1	20	125	6 mm ² / 10 AWG
LTM1-24A-35G	208	5	1	16	5-15	12	1	35	220	6 mm ² / 10 AWG
LTM1-48A-11A	120	6	1	16	5-15	18/24	1	14/11	90/70	6 mm ² / 10 AWG
LTM1-48A-18G	208	5	1	16	5-15	18/24	1	24/18	150/115	6 mm ² / 10 AWG
LTM1-12C-35A	120	5	1	14	5-20	6	1	35	220	25 mm ² / 4 AWG
LTM1-12C-70A	120	10	1			6	2	70	440	25 mm ² / 4 AWG
LTM1-12C-105A	120	14	1			6	3	105	660	25 mm ² / 4 AWG
LTM1-12C-35G	208	3	1	16	6-15	6	1	35	220	25 mm ² / 4 AWG
LTM1-12C-70G	208	6	1			6	2	70	440	25 mm ² / 4 AWG
LTM1-12C-105G	208	9	1			6	3	105	660	25 mm ² / 4 AWG
LTM1-24C-20A	120	6	1	14	5-20	12	1	20	125	25 mm ² / 4 AWG
LTM1-24C-40A	120	11	1			12	2	40	250	25 mm ² / 4 AWG
LTM1-24C-60A	120	16	1			12	3	60	375	25 mm ² / 4 AWG
LTM1-24C-35G	208	5	1	14	6-20	12	1	35	220	25 mm ² / 4 AWG
LTM1-24C-70G	208	11	1			12	2	70	440	25 mm ² / 4 AWG
LTM1-24C-105G	208	16	1			12	3	105	660	25 mm ² / 4 AWG
LTM1-48C-11A	120	6	1	12	5-30	18/24	1	14/11	90/70	25 mm ² / 4 AWG
LTM1-48C-22A	120	12	1			18/24	2	28/22	175/140	25 mm ² / 4 AWG
LTM1-48C-33A	120	18	1			18/24	3	42/33	265/210	25 mm ² / 4 AWG
LTM1-48C-18G	208	5	1	12	6-30	18/24	1	24/18	150/115	25 mm ² / 4 AWG
LTM1-48C-36G	208	12	1			18/24	2	48/36	300/225	25 mm ² / 4 AWG
LTM1-48C-54G	208	17	1			18/24	3	72/54	450/340	25 mm ² / 4 AWG
LTM1-12F-35A	120	5	1	14	5-20	6	1	35	220	70 mm ² / 2/0 AWG
LTM1-12F-70A	120	10	1			6	2	70	440	70 mm ² / 2/0 AWG
LTM1-12F-105A	120	14	1			6	3	105	660	70 mm ² / 2/0 AWG
LTM1-12F-140A	120	19	1	8	5-50	6	4	140	875	70 mm ² / 2/0 AWG
LTM1-12F-175A	120	24	1			6	5	175	1100	70 mm ² / 2/0 AWG
LTM1-12F-210A	120	29	1			6	6	210	1320	70 mm ² / 2/0 AWG

LTM1-12F-35G	208	3	1	16	6-15	6	1	35	220	70 mm ² / 2/0 AWG
LTM1-12F-70G	208	6	1			6	2	70	440	70 mm ² / 2/0 AWG
LTM1-12F-105G	208	9	1			6	3	105	660	70 mm ² / 2/0 AWG
LTM1-12F-140G	208	12	1	12	6-30	6	4	140	875	70 mm ² / 2/0 AWG
LTM1-12F-175G	208	14	1			6	5	175	1100	70 mm ² / 2/0 AWG
LTM1-12F-210G	208	17	1			6	6	210	1320	70 mm ² / 2/0 AWG
LTM1-24F-20A	120	6	1	14	5-20	12	1	20	125	70 mm ² / 2/0 AWG
LTM1-24F-40A	120	11	1			12	2	40	250	70 mm ² / 2/0 AWG
LTM1-24F-60A	120	16	1			12	3	60	375	70 mm ² / 2/0 AWG
LTM1-24F-80A	120	22	1	8	5-50	12	4	80	500	70 mm ² / 2/0 AWG
LTM1-24F-100A	120	28	1			12	5	100	625	70 mm ² / 2/0 AWG
LTM1-24F-120A	120	33	1			12	6	120	750	70 mm ² / 2/0 AWG
LTM1-24F-35G	208	5	1	14	6-20	12	1	35	220	70 mm ² / 2/0 AWG
LTM1-24F-70G	208	11	1			12	2	70	440	70 mm ² / 2/0 AWG
LTM1-24F-105G	208	16	1			12	3	105	660	70 mm ² / 2/0 AWG
LTM1-24F-140G	208	22	1	8	6-50	12	4	140	875	70 mm ² / 2/0 AWG
LTM1-24F-175G	208	29	1			12	5	175	1100	70 mm ² / 2/0 AWG
LTM1-24F-210G	208	33	1			12	6	210	1320	70 mm ² / 2/0 AWG
LTM1-48F-11A	120	6	1	12	5-30	18/24	1	14/11	90/70	70 mm ² / 2/0 AWG
LTM1-48F-22A	120	12	1			18/24	2	28/22	175/140	70 mm ² / 2/0 AWG
LTM1-48F-33A	120	18	1			18/24	3	42/33	265/210	70 mm ² / 2/0 AWG
LTM1-48F-44A	120	24	1	8	5-50	18/24	4	56/44	350/275	70 mm ² / 2/0 AWG
LTM1-48F-55A	120	30	1			18/24	5	70/55	440/345	70 mm ² / 2/0 AWG
LTM1-48F-66A	120	36	1			18/24	6	84/66	530/420	70 mm ² / 2/0 AWG
LTM1-48C-18G	208	5	1	12	6-30	18/24	1	24/18	150/115	70 mm ² / 2/0 AWG
LTM1-48C-36G	208	12	1			18/24	2	48/36	300/225	70 mm ² / 2/0 AWG
LTM1-48C-54G	208	17	1			18/24	3	72/54	450/340	70 mm ² / 2/0 AWG
LTM1-48F-72G	208	24	1	8	6-50	18/24	4	96/72	600/450	70 mm ² / 2/0 AWG
LTM1-48F-90G	208	29	1			18/24	5	120/90	750/565	70 mm ² / 2/0 AWG
LTM1-48F-108G	208	35	1			18/24	6	144/108	900/675	70 mm ² / 2/0 AWG

Please Note: CEC Compliant chargers will include a C in the part number – example: LTM1C48C-54G.

MAINTENANCE LOG

1. Modifications to Factory Settings

Date	Variable	Change	Service Technician

2. Service

Date	Description	Service Technician



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