Model: LTC1 (Standard)
&
LTC1C (CEC)

LIFE*tech*™ MOD1C
Battery Charger with Wireless Communications

Owner's Manual

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

AM-HLTMC-OM
Rev AA January 2018

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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AC LINE VOLTAGE LETTER CODES

The following table describes the letter codes to be used in new 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
T	208	50 / 60	208 VAC only
W	240	50 / 60	240 VAC only

CABINET SIZE/GAUGE LETTER CODES

The following table describes the letter codes to be used in new charger part numbers to indicate the DC output voltage(s) of the charger.

Letter Code	Module Positions	Standard Cable Gauge	Comments
A	1	6 mm^2 / 10 AWG	Stand alone, single phase cabinet
C	3	25 mm^2 / 4 AWG	Three slot, single phase cabinet

SPECIALTY CHARGER OPTIONS LIST

Suffix	Description
C6	6' of AC cord. *
C10	10' of AC cord. *
C12	12' of AC cord. *
L10	10' of DC cable.
L13	13' of DC cable.
L15	15' of DC cable.
L18	18' of DC cable.
L20	20' of DC cable.
L25	25' of DC cable.
L30	30' of DC cable.

***See Technical Specifications, page 34 for AC cord AWG and NEMA plug.**

IMPORTANT SAFETY INSTRUCTIONS

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 battery charger is designed to charge flooded and sealed 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 battery is charging. 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 32º to 113º F; 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.

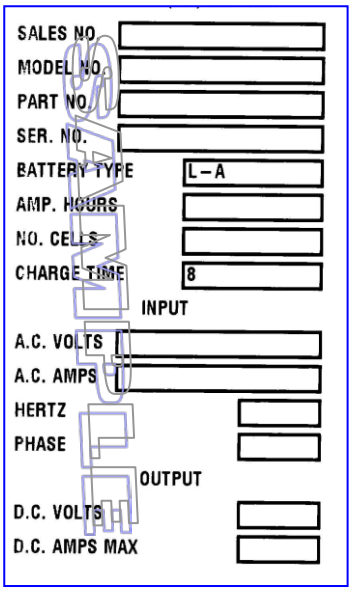
WARNING: The shipping pallet must be removed for proper and safe operation.

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 condisnes 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 créez 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. Eviter 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.

LCM1C 24 A 100 YO

- LCM — Model type
- 1C — Phase
- 24 — Standard or CEC
- A — DC Voltage
- 100 — Cabinet Size
- YO — DC Current
- Input Voltage Code
- Options

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 ampere-hours capacity of this charger. Charging batteries of ampere-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.**

A.C. Volts

The nameplate shows the input voltage accommodated by this charger.
IMPORTANT: The charger will operate only on nominal line voltages stamped on the nameplate.
Failure to select the correct voltage will result in damage to the charger and/or the battery.

A.C. 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 gives the frequency in cycles per second of the AC input voltage. Under no conditions operate charger at a different frequency or from a generator with unstable frequency.

Phase
Number "3" indicates a Three Phase Charger.

D.C. Volts
This gives the nominal DC output voltage of the system.

D.C. Amps Max
This is the nominal DC value of current that this unit will deliver to a battery that is 100% discharged.

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

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.

Mounting Wall 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" from the ground and/or the charger below and the upper part 36" from the ceiling. The minimum distance between two chargers must be 12".
The charger will be installed with the brackets 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^{O}F / 45^{O}C.

Electrical Connections

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

Connecting Input Power

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.

Connect the input power to the appropriate terminals, ***including ground***. 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.

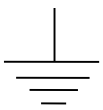
Plug Polarity

The charging cable is connected to the DC output of the charger with the RED lead to positive and BLACK to negative. 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.

Grounding the Charger

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

Connect a grounding conductor to the terminal block provided on the horizontal support panel. Marked as shown:



DESCRIPTION OF OPERATION

General

LIFE*tech*™ MOD1C 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. LIFE*tech*™ MOD1C chargers adapt to the battery's capacity and its discharge level.

LIFE*tech*™ MOD1C chargers can easily be set to charge flooded batteries used in cold or freezer storage applications, ionic 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 graphical TFT 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

BBWC™
This unit, permanently mounted on the battery, ensures that certain battery parameters can be sent to the charger for the purposes of optimizing the charge and monitoring the charging and discharging characteristics.

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.

Ionic Profile
Also called "ionic mixing", this type of charging profile consists of sending short pulses of current to stimulate gas formation in the active material, causing sulfuric acid to be distributed outside the plates. This system of mixing the electrolyte enables more rapid charging of flooded cell batteries subject to very high demands and balances out differences in density, homogenizing the electrolyte across the surface of the plates.

Evolution Profile (EVLTN)
This charging profile is an I-E-I (constant current, constant voltage, constant current) charging profile designed for Absorbed Glass Mat (AGM) type sealed lead-acid batteries.

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

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

OPPOR Profile

The OPPOR 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 complete charge 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.

Complete Charge Time:

This is the time of day for a complete charge.

Note: The factory default complete charge parameters are a 6 hour Equalize every Sunday at 00 hour.

Block Out Time

This function inhibits the charger from charging the battery during the block out time window. If a charge cycle has started before the block out window it is inhibited during the block out window and will automatically restart the charge cycle at the end of the block out window.

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.

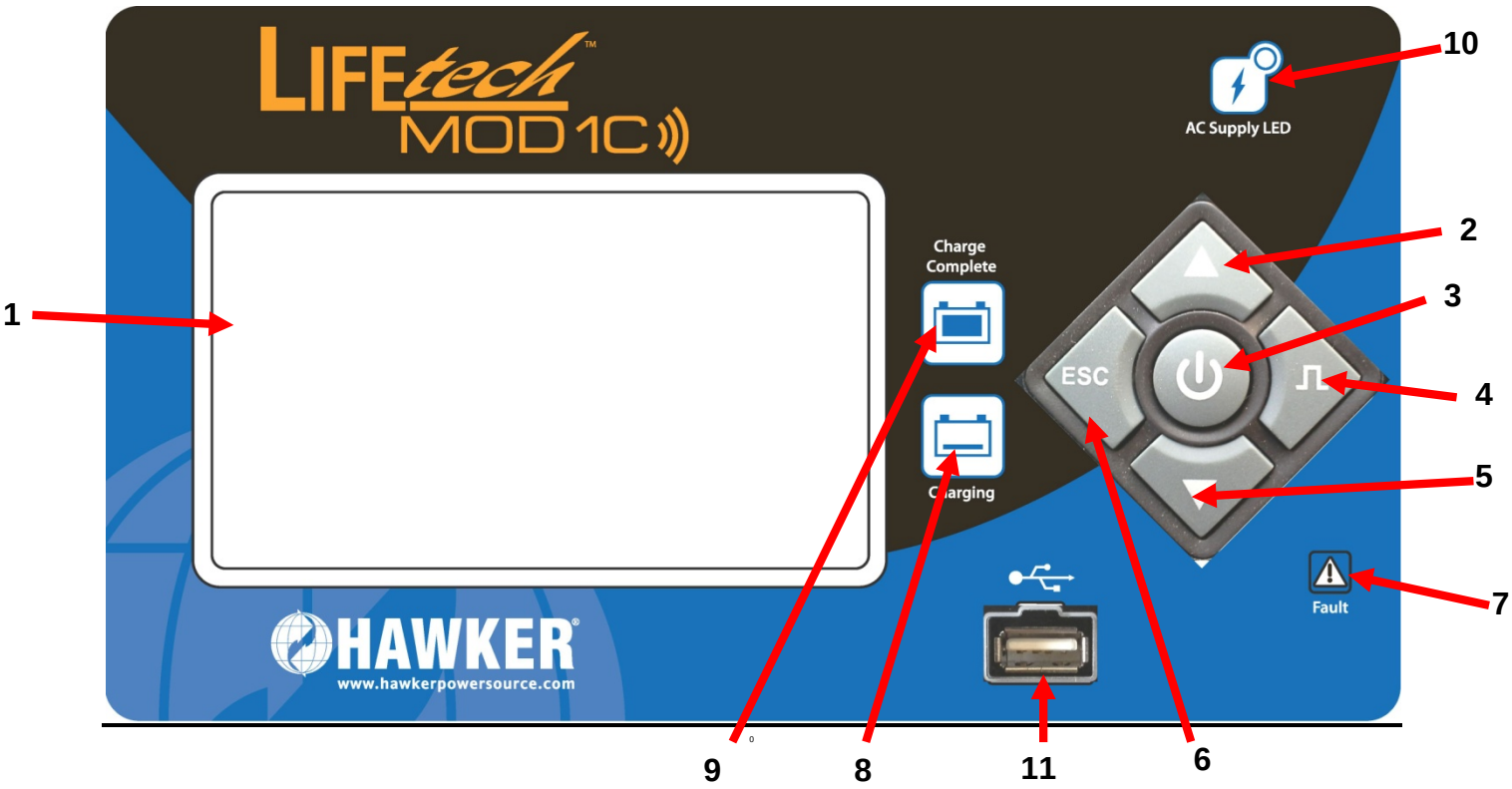
OPERATING INSTRUCTIONS

The LIFE*tech*™ MOD1C 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 (Ionic, Evolution, ENVIROLINK™, Opportunity, Cold Storage, XFCBLC) based on the configuration chosen by the operator. Furthermore, equalization and compensation charges are integrated.

The LIFE*tech*™ MOD1C includes an adapter to communicate to a BBWC™. The BBWC™ is an advanced battery module that measures, tracks, and stores important battery parameters such as temperature, electrolyte level, voltage, and Ah throughput. This data is wirelessly transmitted to the LIFE*tech*™ MOD1C to optimize charging, alerts the operator to battery issues, and safeguard the battery from being permanently damaged.

Control Panel



Ref.	Function	Description
1.	Graphical TFT 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 or no modules installed. 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

Main Menu Display

When the charger is idle, press and hold <ESC>, 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:

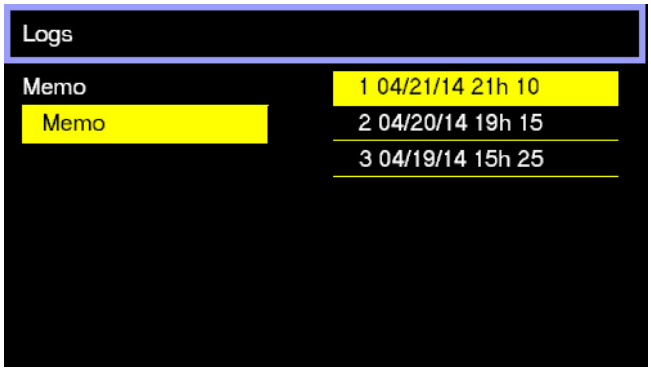
- View status and memorizations (**LOGS** icon).
- Setting of date, language and others (**SETTINGS** icon).
- USB functions (USB icon)
- Management of password (**PASSWORD** icon)
- Viewing of faults, alarms, etc. (**CHARGER** icon).
- Exit main menu (**EXIT** icon).

Logs

Memorizations Display Screen

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

The display shows here that 3 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 Memo using the ▲/▼ buttons.
2. Display the highlighted Memo screen by pressing the button.
3. Display the next Memo screen by pressing▼.
4. Return to the Main Menu by pressing Esc.

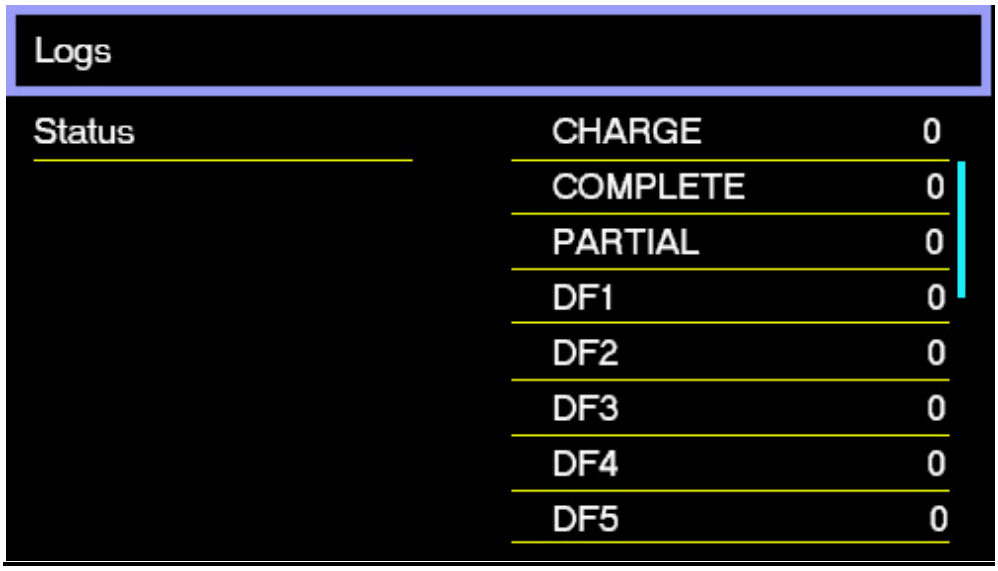
Memorization Data

Memo	Information	Memo	Information
S/N	Battery S/N from BBWC	**I end**	Current at end of charge
Capacity	Rated Battery Capacity (AH)	**Chg Time**	Time of the charge cycle (minutes)
U batt	Rated Battery Voltage (V)	**AH**	Amp-hours returned during charge cycle
Temp	Battery Temperature at start of charge (F)	**Chg end**	Full or partial charge cycle
Techno	Battery Technology	**Default**	Fault Codes
Profile	Selected Profile	**SoC**	Start of Charge Date and Time
% init	State of charge at start of charge (%)	**DBa**	Battery Disconnect Date and Time
U start	Battery Voltage at Start of charge (Vpc)	**U end**	**Battery Voltage at End of charge (Vpc)**

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	Information
Charge	Total number of charges. Corresponds to the total of normally terminated charges and charges terminated with or by faults.
Complete	Number of charges normally terminated.
Partial	Number of charges terminated abnormally.
DF1-5	Number of faults recorded by the charger (see Fault Codes).
TH	Number of charger temperature faults*.
DFC	Number of DFC faults recorded by charger.

Settings

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

Display
Set screen saver function.

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 1hour and 59 minutes.

Daylight Savings
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.

USB

Record Memo

Enables the storage of charge Memorizations and the Status data. The file, in CSV format (useable with Memoreport or Excel), will be stored in the USB stick under the name:
MDDDHHMM.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, provided by Hawker.
To update software insert USB stick into USB slot on the front of the charger. Then highlight Press Start/Stop and hold the button until the screen goes blank.

Save Setting

Save the current charger setting to USB.

Restore Setting

Restore previously saved charger settings

Password

This is where the password is entered to gain access to service level menus by authorized Hawker service personal.

Entering Password

Use the ▲/▼/ ESC/⎍ keys to highlight the correct number. Press the key to select the highlighted number.

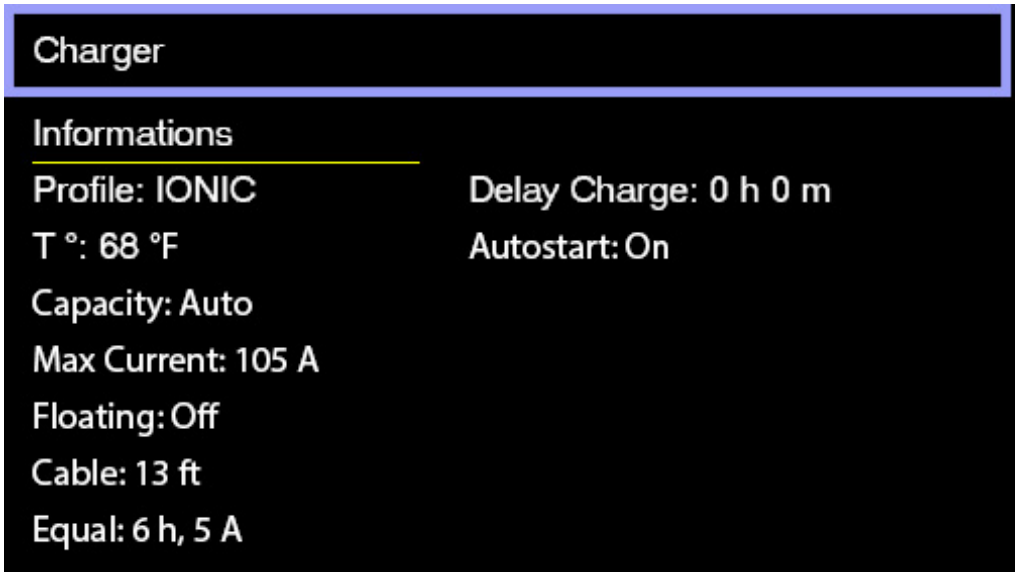
Charger

This menu displays information on the chargers configuration and output current of the charger and the power modules.

Informations

This screen displays the following information on the charger's configuration.

Charger Information Display

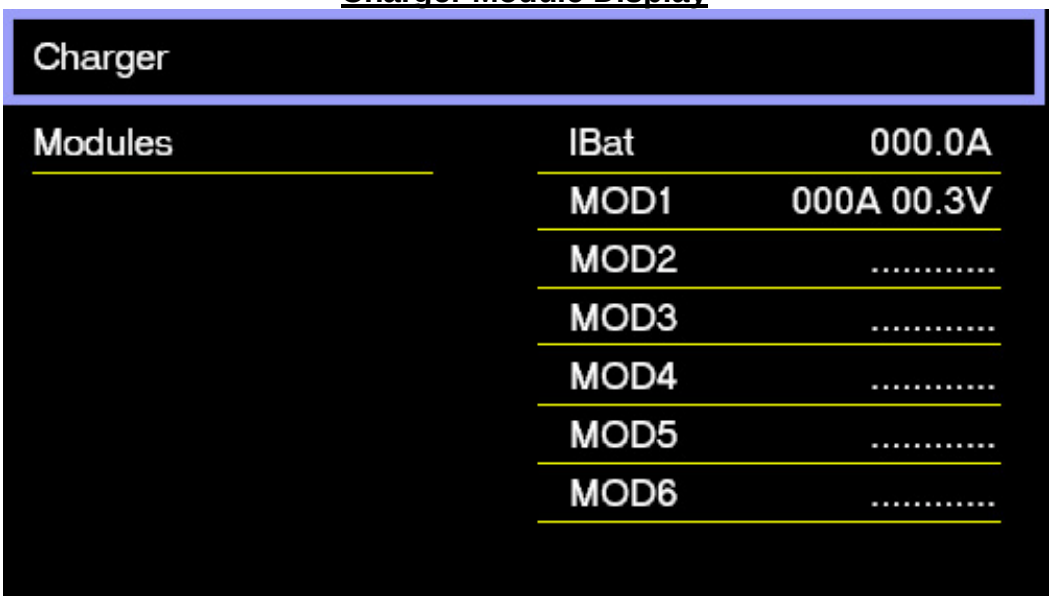


Information	Description
Profile	Selected charging profile.
Temperature	Programmed or BBWC temperature.
Capacity	Automatic or manual.
Max. Current	Maximum current of charger.
Floating	ON/OFF
Cable	Length of DC cable
Equal	Equalize time and current.
Delay Charge	In hours and minutes
Auto Start	ON/OFF

Modules

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

Charger Module Display



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.

Settings

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. The main menu will come up. Select Settings.

Required Setup – The following parameters are default factory settings.

PARAMETERS \ DAYLIGHT SAVINGS	US – CANADA
PARAMETERS \ DISPLAY \ SCREEN SAVER	ON
PARAMETERS \ DISPLAY \ TIME	01H00
PARAMETERS \ SERIAL NUMBER	PER ORDER
CONFIGURATION \ CHARGE \ CHARGE DELAY \ TYPE	OFF
CONFIGURATION \ CHARGE \ CHARGE DELAY \ VALUE HOUR/DELAY	00H00
CONFIGURATION \ CHARGE \ CF FLOODED [CEC]	15% [9%]
CONFIGURATION \ BATTERY \ CAP MANU AUTO	AUTO
CONFIGURATION \ EQUALIZATION \ DELAY	00H00
CONFIGURATION \ EQUALIZATION \ FREQUENCY	SUNDAY
CONFIGURATION \ EQUALIZATION \ REFRESH ON/OFF	OFF
CONFIGURATION \ POWER SUPPLY	PER ORDER
CONFIGURATION \ CHARGE \ IMAX	PER ORDER
PROFILE	**OPP**
CONFIGURATION \ BATTERY \ CAP MANU AUTO	AUTO
CONFIGURATION \ BATTERY \ CAPACITY	PER ORDER
CONFIGURATION \ BATTERY \ TEMPERATURE	86°F
CONFIGURATION \ CHARGE \ DAILY CHARGE \ ON – OFF	ON
CONFIGURATION \ CHARGE \ DAILY CHARGE \ DAILY CHG START	22H00
CONFIGURATION \ CHARGE \ DAILY CHARGE \ DAILY CHG END	04H00
CONFIGURATION \ EQUALIZATION \ MANU CURRENT	0.045*CAP
CONFIGURATION \ EQUALIZATION \ TIME	06H00
PROFILE	**IONIC**
CONFIGURATION \ BATTERY \ TEMPERATURE	86°F
CONFIGURATION \ EQUALIZATION \ MANU CURRENT	0.045*CAP
CONFIGURATION \ EQUALIZATION \ TIME	04H00 (06H00) [06H00 (08H00)]
PROFILE	**COLD**
CONFIGURATION \ BATTERY \ TEMPERATURE	55°F
CONFIGURATION \ EQUALIZATION \ MANU CURRENT	0.045*CAP
CONFIGURATION \ EQUALIZATION \ TIME	04H00 (06H00) [06H00 (08H00)]
CONFIGURATION \ BATTERY \ CAPACITY	PER ORDER
PROFILE	**ENVLNK**
CONFIGURATION \ BATTERY \ TEMPERATURE	86°F
CONFIGURATION \ EQUALIZATION \ MANU CURRENT	0.020*CAP
CONFIGURATION \ EQUALIZATION \ TIME	04H00
CONFIGURATION \ BATTERY \ CAPACITY	PER ORDER
PROFILE	**EVLTN**
CONFIGURATION \ BATTERY \ TEMPERATURE	86°F
CONFIGURATION \ EQUALIZATION \ MANU CURRENT	0.010*CAP
CONFIGURATION \ EQUALIZATION \ TIME	02H00
CONFIGURATION \ BATTERY \ CAPACITY	PER ORDER
PROFILE	**XFCBLC**
CONFIGURATION \ NEXSYS ON/OFF (XFCBLC ON/OFF)	ON
CONFIGURATION \BATTERY \ TEMPERATURE	86°F
CONFIGURATION \BATTERY \ CAPACITY	PER ORDER

Charge

Profile
For selecting the right charging profile for the application:
Ionic, Evolution, ENVIROLINK™, Opportunity, Cold Storage, XFCBLC

Auto Start
On- Charge will automatically start when battery is plugged in.
Off- User must push Stop/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.

Condition 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.

Battery Rest
Set battery rest time in hours

Refresh On/Off
Sets refresh mode on or off.
Once charging is complete, as long as the battery remains connected, refresh charging is automatically initiated to retain the battery's charge.

Battery

NB Cells
Sets number of battery cells: 6,12,18, 24, 36, 40, AUTO

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
Without BBWC: this adjusts the battery AH capacity used by the charger to determine start and finish rates, and will match the AH capacity of the battery being charged.
With BBWC: the battery AH capacity will be automatically transmitted from BBWC.

Battery Temperature
This parameter adjusts the regulation voltages on the charging profile (values between –15°C / 5°F and 65°C / 149°F)***.***
Without BBWC: defines the average operating battery temperature before the charge. It is recommended the average electrolyte temperature be entered, especially in cold areas.
With BBWC: the battery operating temperature will be automatically transmitted from BBWC. The battery temperature will be analyzed during the charge; if it increases too much, the charger will stop to prevent any possible damage.

High temperature
Defines a battery temperature safety limit.
Without BBWC: not used.

With BBWC: If the battery temperature, during the charge, reaches the programmed limit, the charger will stop the charge and wait until the temperature decreases.

LM/EB
Late Make / Early Brake option (extra wire from the backplane to the auxiliary contact of the DC plug)

Cable

Length
Select the length of DC cables from the charger to the battery terminals in 1 foot increments from 4 to 49 ft .

Section
Sets the DC cable gauge. Selections are 10, 8, 6, 4, 2 awg, 1/0, 2/0

Equalization

Manu Current
This defines the equalization or desulphation current for a manual start.

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.

Option

Options Test
Turns on Battery Status (Red/Green) and Electrovalve output briefly to test operation.

Electroval Time
Sets the time the Electrovalve output will be on (0 to 299 seconds) after charge is complete.

Network

Protocol
Select the type of data connection: Jbus (used only by the factory), LAN, BFM.

Baud Rate
Select the speed of the data connection (The values for these settings will depend on the

specific application and should be obtained from a network administrator for the network being used.)

Address Jbus

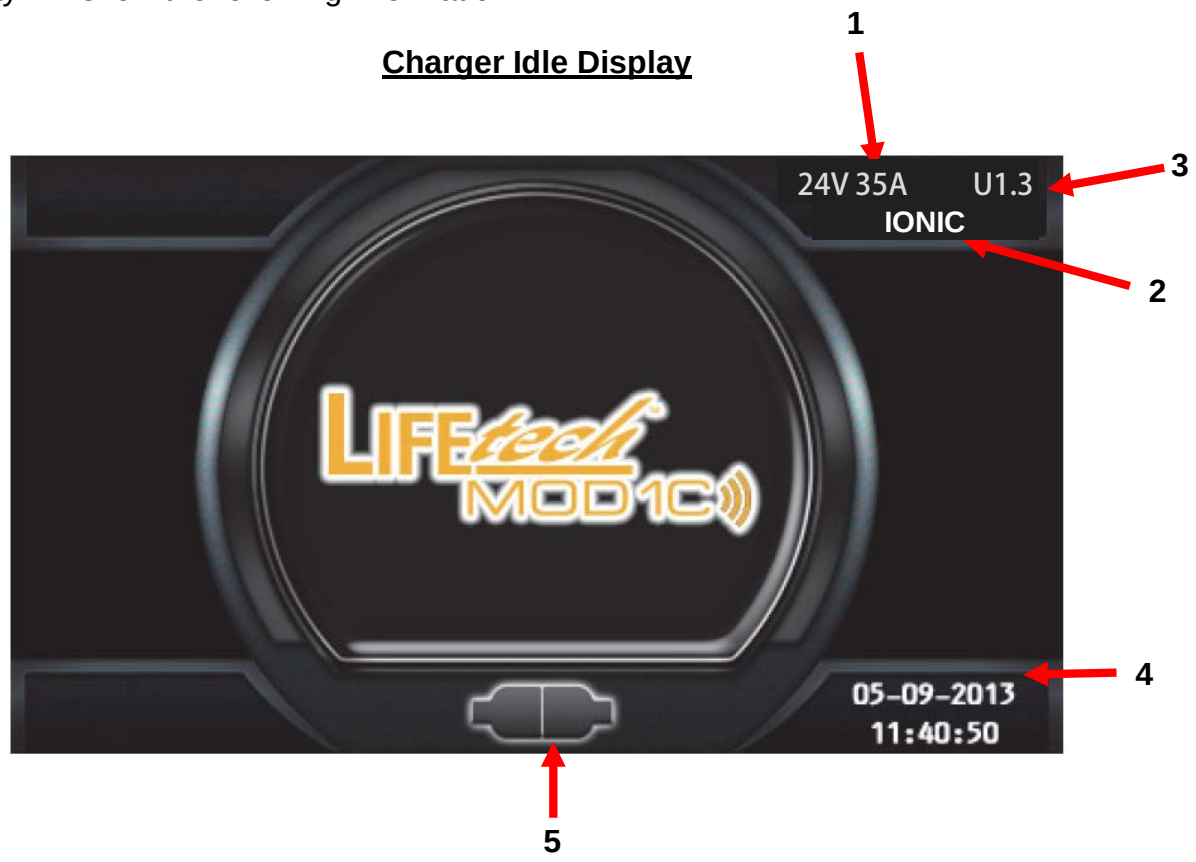
Sets the Jbus address

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



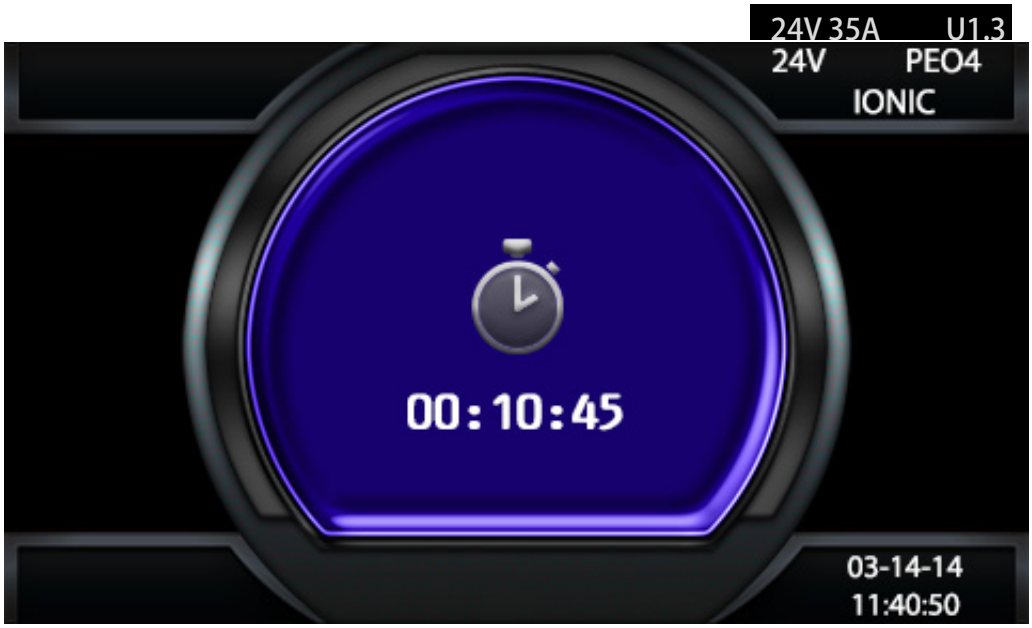
Ref	Description
1	Charger type
2	Selected charge profile
3	Firmware Version
4	System time and date
5	Connect Battery

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.

Count Down Display



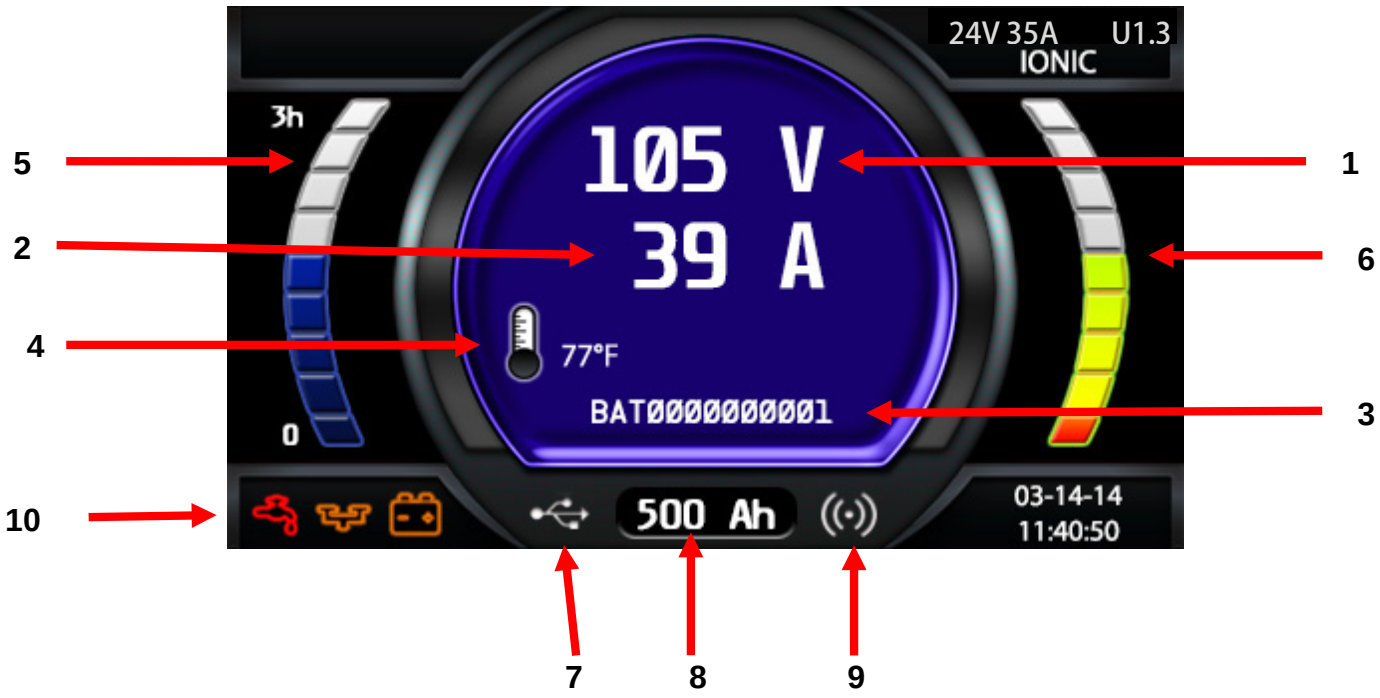
Without a BBWC™
If the BBWC™ adapter is not enabled or no BBWC™ are in range, effective charging starts after a 20 second countdown. The charger uses Profile, Capacity, and Temperature settings programmed in the Configuration menu.

With a BBWC™
If a BBWC™ adapter is present and one or more BBWC™ is in range, the charger will turn on and apply current to the battery. The display will show "SCAN" followed by "LINK". This routine determines which BBWC™ in range is one the battery the charger is

connected to. Once the charger makes the determination it downloads data from BBWC™, displays the battery S/N, updates the profile, capacity, and temperature for charging, and starts the main charge.

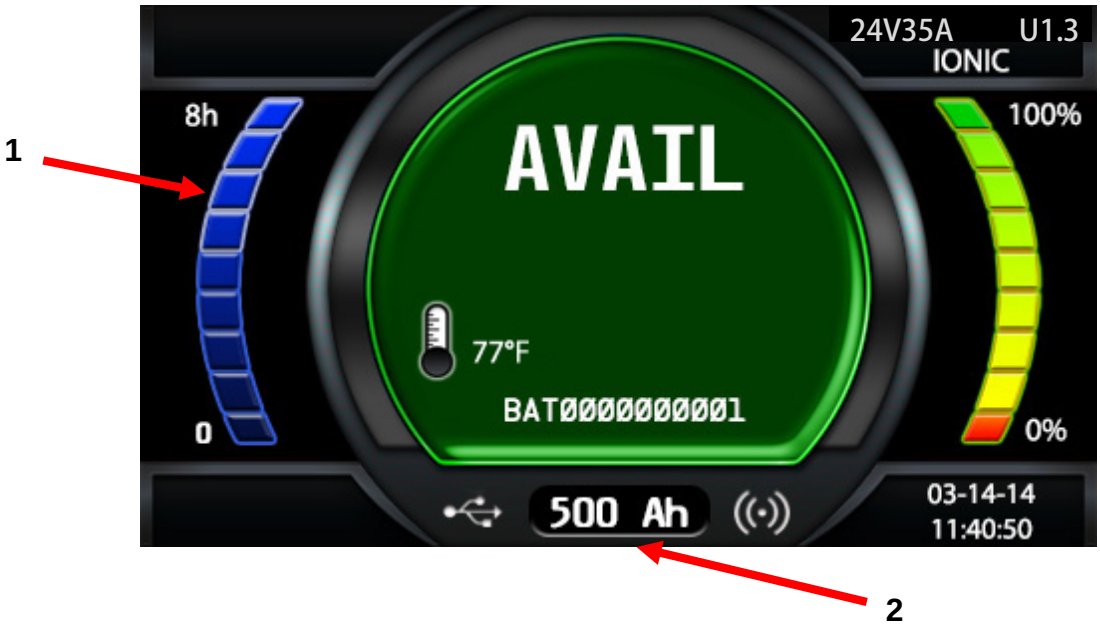
Charge Display

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



Ref	Description
1	Charge Voltage (total V and V/c)
2	Charge Current
3	Battery S/N from BBWC™
4	Battery temperature
5	Charge time
6	Percent of charge
7	USB connection
8	Charge AH
9	BBWC™ link
10	BBWC™ warnings

End of Charge Display



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:

1. Total charging time.
2. 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 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.

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 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 Ionic Equalize is 4 hours on 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

Fault Display

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.

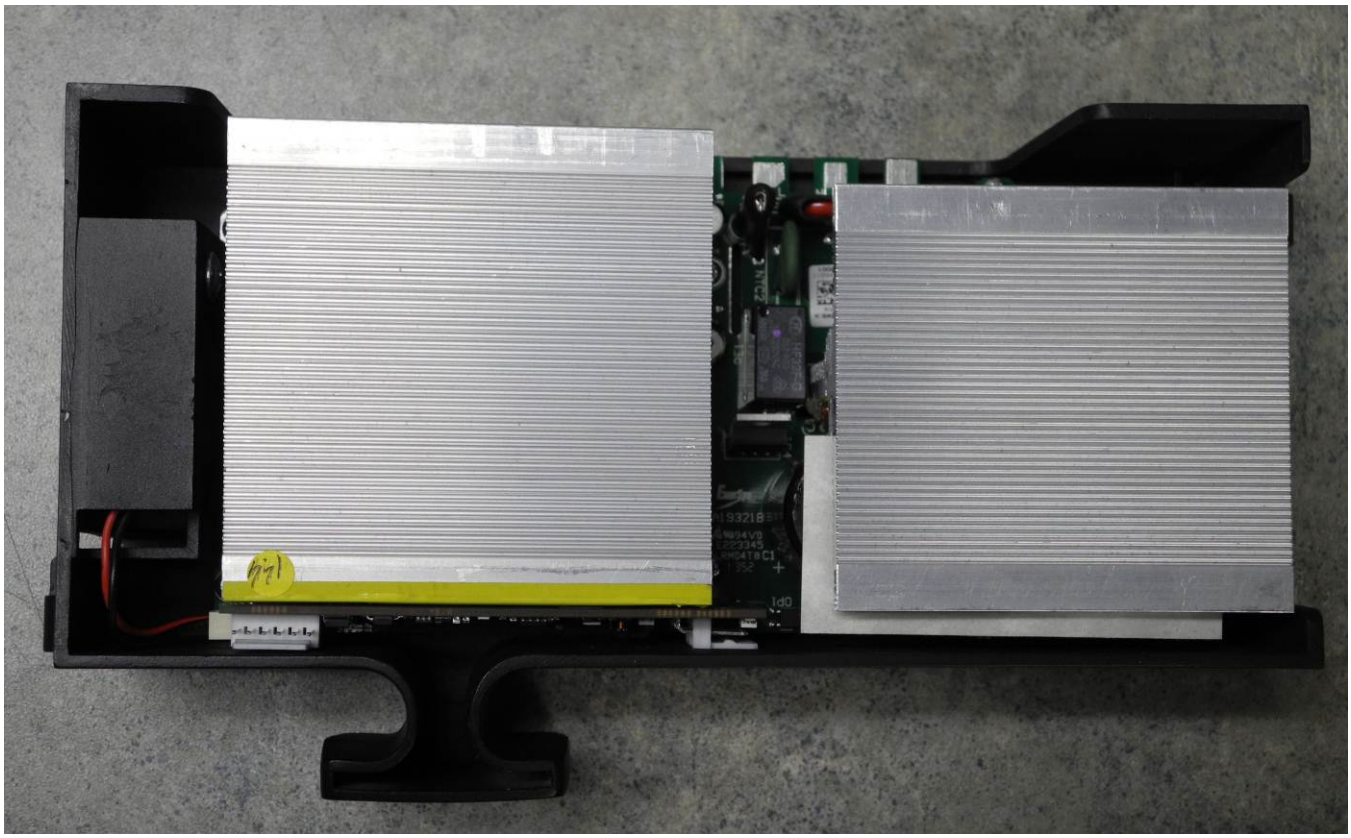
Fault	Critical	Cause	Solution
DF1	Yes	Low output current	Check input voltage and fuses. Call for service.
DF2	Yes	Output fault	Check for proper battery connection (reversed polarity). Check output fuse. Call for service
DF3	Yes	Improper battery	Battery voltage too high (>2.3 Vpc) or too low (<1.6 Vpc). 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.
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.
	No	Low battery electrolyte	Check battery electrolyte level.

BAT TEMP	Yes	Battery temperature reached maximum	Allow battery to cool.
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 or whether there is poor natural ventilation to the charger. If all modules are in thermal fault a TH fault will follow.
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.
DF ID	Yes	Blocking fault – one or more modules are not compatible with the charger configuration (for example 24V charger with one 48V module). This can happen if the user replaces one module with another one with a different voltage setting.	Use correct module(s).
	No	Battery balance fault	Check battery cell voltages.
T°	No	High battery temperature	Allow battery to cool. Battery may need service.

MAINTENANCE & SERVICE

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

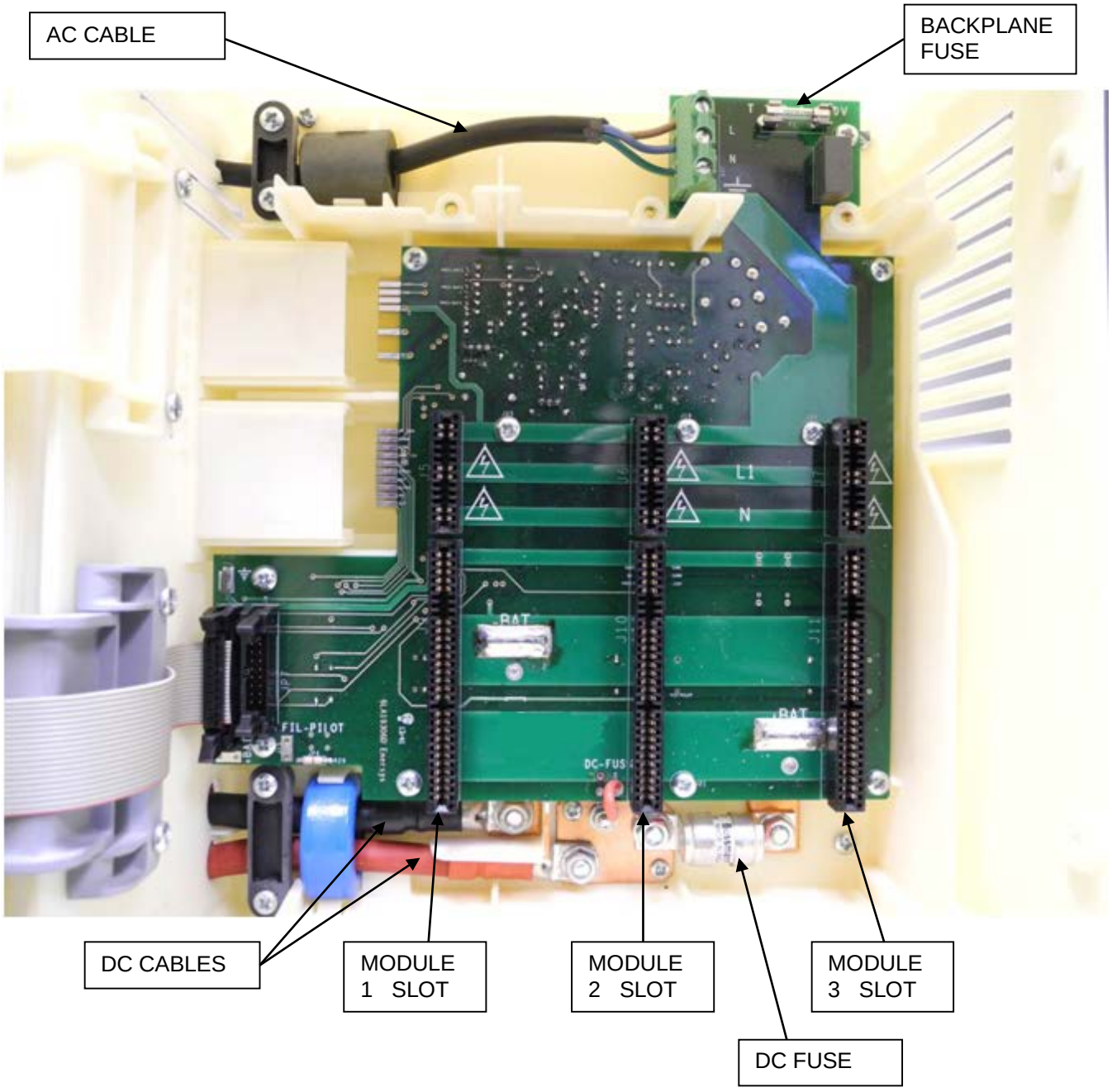
The charger requires a minimum of maintenance. Connections and terminals should be kept clean and tight. The unit (especially the heatsink) should be periodically cleaned with an air hose to prevent any excessive dirt build up on components. Care should be taken not to bump or move any adjustments during 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.



MODULE HEATSINKS

MODULE BOTTOM

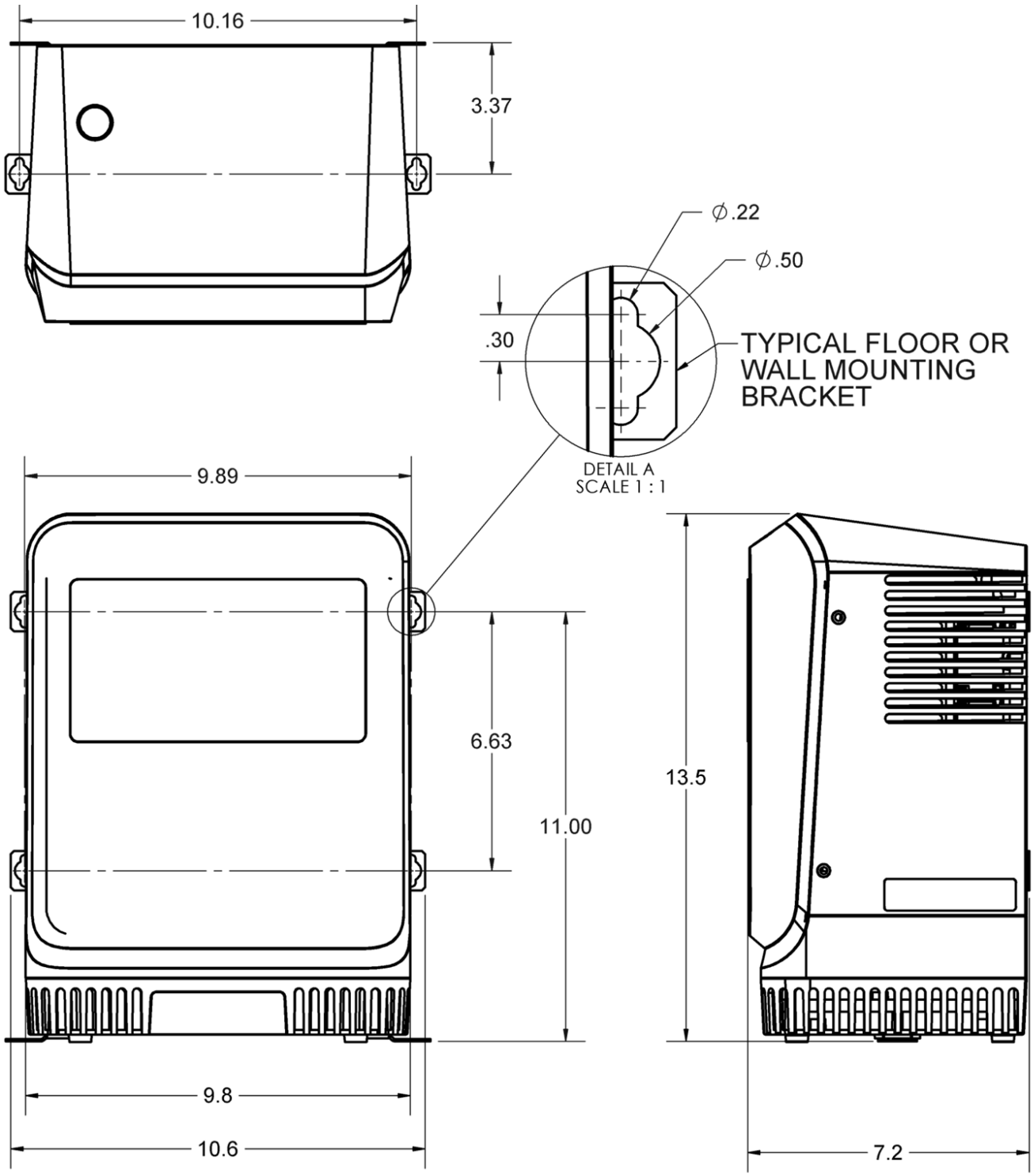
COMPONENT LOCATIONS



PARTS LIST

Part#	Description
X1060-40-LTC1	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

3kW CABINET MOUNTING DIMENSIONS



Dimensions shown are in inches.

STANDARD TECHNICAL SPECIFICATIONS

Part Number	AC Input					DC Output			Max 8 hour Capacity (Ah)	Charger Cable AWG
	Voltage	Max Amps	Phase	Cord AWG	NEMA Plug	Cells	KW	Max Current (A)		
LTC1-12C-70A	120	10	1	14	5-20	6	2	70	440	25 mm^2 / 4 AWG
LTC1-12C-105A	120	14	1			6	3	105	660	25 mm^2 / 4 AWG
LTC1-12C-35T	208	3	1	16	6-15	6	1	35	220	25 mm^2 / 4 AWG
LTC1-12C-70T	208	6	1			6	2	70	440	25 mm^2 / 4 AWG
LTC1-12C-105T	208	9	1			6	3	105	660	25 mm^2 / 4 AWG
LTC1-12C-35W	240	3	1	16	6-15	6	1	35	220	25 mm^2 / 4 AWG
LTC1-12C-70W	240	5	1			6	2	70	440	25 mm^2 / 4 AWG
LTC1-12C-105W	240	7	1			6	3	105	660	25 mm^2 / 4 AWG
LTC1-24C-40A	120	11	1	14	5-20	12	2	40	250	25 mm^2 / 4 AWG
LTC1-24C-60A	120	16	1			12	3	60	375	25 mm^2 / 4 AWG
LTC1-24C-35T	208	5	1	14	6-20	12	1	35	220	25 mm^2 / 4 AWG
LTC1-24C-70T	208	11	1			12	2	70	440	25 mm^2 / 4 AWG
LTC1-24C-105T	208	16	1			12	3	105	660	25 mm^2 / 4 AWG
LTC1-24C-35W	240	5	1	14	6-20	12	1	35	220	25 mm^2 / 4 AWG
LTC1-24C-70W	240	10	1			12	2	70	440	25 mm^2 / 4 AWG
LTC1-24C-105W	240	14	1			12	3	105	660	25 mm^2 / 4 AWG
LTC1-48C-22A	120	12	1	12	5-30	18/24	2	28/22	175/140	25 mm^2 / 4 AWG
LTC1-48C-33A	120	18	1			18/24	3	42/33	265/210	25 mm^2 / 4 AWG
LTC1-48C-18T	208	5	1	12	6-30	18/24	1	24/18	150/115	25 mm^2 / 4 AWG
LTC1-48C-36T	208	12	1			18/24	2	48/36	300/225	25 mm^2 / 4 AWG
LTC1-48C-54T	208	17	1			18/24	3	72/54	450/340	25 mm^2 / 4 AWG
LTC1-48C-18W	240	5	1	14	6-20	18/24	1	24/18	150/115	25 mm^2 / 4 AWG
LTC1-48C-36W	240	10	1			18/24	2	48/36	300/225	25 mm^2 / 4 AWG
LTC1-48C-54W	240	15	1			18/24	3	72/54	450/340	25 mm^2 / 4 AWG

CEC TECHNICAL SPECIFICATIONS

Part Number	AC Input					DC Output			Max 8 hour Capacity (Ah)	Charger Cable AWG
	Voltage	Max Amps	Phase	Cord AWG	NEMA Plug	Cells	KW	Max Current (A)		
LTC1C12C-70A	120	10	1	14	5-20	6	2	70	440	25 mm^2 / 4 AWG
LTC1C12C-105A	120	14	1			6	3	105	660	25 mm^2 / 4 AWG
LTC1C12C-35T	208	3	1	16	6-15	6	1	35	220	25 mm^2 / 4 AWG
LTC1C12C-70T	208	6	1			6	2	70	440	25 mm^2 / 4 AWG
LTC1C12C-105T	208	9	1			6	3	105	660	25 mm^2 / 4 AWG
LTC1C12C-35W	240	3	1	16	6-15	6	1	35	220	25 mm^2 / 4 AWG
LTC1C12C-70W	240	5	1			6	2	70	440	25 mm^2 / 4 AWG
LTC1C12C-105W	240	7	1			6	3	105	660	25 mm^2 / 4 AWG
LTC1C24C-40A	120	11	1	14	5-20	12	2	40	250	25 mm^2 / 4 AWG
LTC1C24C-60A	120	16	1			12	3	60	375	25 mm^2 / 4 AWG
LTC1C24C-35T	208	5	1	14	6-20	12	1	35	220	25 mm^2 / 4 AWG
LTC1C24C-70T	208	11	1			12	2	70	440	25 mm^2 / 4 AWG
LTC1C24C-105T	208	16	1			12	3	105	660	25 mm^2 / 4 AWG
LTC1C24C-35W	240	5	1	14	6-20	12	1	35	220	25 mm^2 / 4 AWG
LTC1C24C-70W	240	10	1			12	2	70	440	25 mm^2 / 4 AWG
LTC1C24C-105W	240	14	1			12	3	105	660	25 mm^2 / 4 AWG
LTC1C48C-22A	120	12	1	12	5-30	18/24	2	28/22	175/140	25 mm^2 / 4 AWG
LTC1C48C-33A	120	18	1			18/24	3	42/33	265/210	25 mm^2 / 4 AWG
LTC1C48C-18T	208	5	1	12	6-30	18/24	1	24/18	150/115	25 mm^2 / 4 AWG
LTC1C48C-36T	208	12	1			18/24	2	48/36	300/225	25 mm^2 / 4 AWG
LTC1C48C-54T	208	17	1			18/24	3	72/54	450/340	25 mm^2 / 4 AWG
LTC1C48C-18W	240	5	1	14	6-20	18/24	1	24/18	150/115	25 mm^2 / 4 AWG
LTC1C48C-36W	240	10	1			18/24	2	48/36	300/225	25 mm^2 / 4 AWG
LTC1C48C-54W	240	15	1			18/24	3	72/54	450/340	25 mm^2 / 4 AWG

MAINTENANCE LOG

1. Modifications to Factory Settings

Date	Variable	Change	Service Technician

2. Service

Date	Description	Service Technician

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AM-HLTMC-OM-Rev AA January 2018