powerful solutions in battery charging

Operating Instructions for ECOTEC Access Battery Charger

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General Safety

The charger may only be used for the specified battery types.

This battery charger is supplied with pre-set charging curves that are adapted for the battery types listed in figure 1. Always contact the battery manufacturer to verify that the charging curve is appropriate.

Hydrogen gas is generated when charging batteries, which can cause an explosion.

During and immediately after charging, batteries may not be placed in the vicinity of sparks or open flame.

Do not use the battery charger if it is damaged. Do not touch damaged components. Turn off the input AC voltage immediately and contact service personnel.

The battery charger has high voltage inside the charger case that can cause personal injury or death. The metal casing may only be opened by authorized service personnel.

Disconnect the battery and input AC power before carrying out maintenance or cleaning the battery charger.

The Battery charger must be connected to an earth grounded AC input source.

Batteries should only be charged in a well ventilated area.

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Installation

Initial Installation

The AC input source to which the charger is to be connected must be capable of supplying the current specified on the charger nameplate.

> ⚠ **CAUTION: TO REDUCE THE RISK OF FIRE, USE THIS CHARGER ONLY ON CIRCUITS WITH BRANCH CIRCUIT PROTECTION (CIRCUIT BREAKER OR FUSE) IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE, ANSI/NFPA 70 AND ALL LOCAL CODES AND ORDINANCES.**

To properly determine the required AC input service conductor and branch circuit protection refer to all **National and Local electrical codes.** Refer to National Electric Code, ANSI/NFPA 70 sections 310-16, 240-3, 215-3, 210-20, 384-16, 110-14, 210-19, 215-2, 230-42 and table 310-16 for US National Electric Code conductor sizing and overcurrent protection device requirements and information. In some applications other National Electric Code requirements may apply.

Please note that “knockouts” for AC power entry are provided in the bottom of the unit as shown below. Due to the painted panel the outline of the knockouts may be hard to see in low light conditions.

Access 8/XX & Access 10/XX

Access 16/XX & Access 20/XX

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On units with model numbers Access 8/XX and Access 10/XX input connections are made to the fuse block and ground stud above the power entry knockouts. On units with Model numbers Access 16/XX and 20/XX input connections are made to the terminal block and ground stud above the power entry knockout.

With many different local codes that modify the requirements, it can be difficult to determine the proper conductor and overcurrent protection device requirements. Always follow the guidance of your local Electrical Inspector.

Do not operate this charger if it has been dropped or is visibly damaged in any manner; return to manufacturer for service.

The battery charger should be installed indoors in a low humidity, non-condensing and low dust/airborne particle environment.

If several battery chargers are to be installed next to each other, they may not be located so that warm exhaust air from one battery charger blows into the air intake of another battery charger. This is accomplished by always allowing for **at least 12 inches** of space on both sides, bottom and the top around the charger. This includes other chargers and/or equipment, walls or other obstructions.

WARNING: SPARKS OR MOLTON METAL FALLING FROM THE CHARGER CAN CAUSE FIRE OR EXPLOSION.

- **INSTALL OVER NONCOMBUSTIBLE MATERIAL SUCH AS METAL OR CONCRETE.**
- **KEEP THE CHARGING ARE CLEAR OF COMBUSTIBLE MATERIAL.**

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Install the battery charger so that gasses from charging battery do not get sucked in by the battery charger fan.

The battery charger must be mounted vertically suspended on a wall, post, struts or available shelf mount bracket. When mounted on a wall the charger should be placed vertically to provide the most efficient cooling. Mounting the charger other than vertically will result in a "**Charger Not Upright**" fault condition that can be corrected by moving it to an upright position. This charger **is not intended to be mounted on mobile equipment.**

Wall Mounting - It is not necessary to disassemble the charger to mount it to a wall or other flush surface. A bracket for this type of mounting is included with each charger. For flush mounting on a flat wall, use the brief directions below.

Mount the bracket shown below securely to your wall. Total weight could be up to 125 lbs per charger. Size mounting hardware accordingly.

Charger on bracket →

Bracket on wall ↓

Once the charger is hanging from the bracket, mark the position of the lower charger mounting holes on the wall.

Remove the charger and install anchors and/or fasteners on to the wall, re-hang the charger and secure the lower charger holes to the wall with appropriate fasteners .

For mounting on charger stands or battery racks, the available stands can be used, or frequently customers use 2 sections "uni-strut" rails mounted on the stand or rack to mount to the mounting holes on the rear of the charger. Longer sections of

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uni-strut can be used to mount several chargers side by side. Always be sure to allow 12” between chargers.

WARNING: TO REDUCE THE RISK OF AN ELECTRIC SHOCK, KEEP THE CHARGER DRY. DO NOT EXPOSE IT TO RAIN, CONDENSATION OR STANDING WATER. STORE IN A CLEAN AND DRY LOCATION.

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Please note that the product described in this manual contains a radio transmitter that complies with Part 15 of the FCC rules and is licensed as listed below:

FCC ID: B7WACCESS
Canada IC: 10687A-ACCESS

WARNING! Changes/modifications not approved by the responsible party could void the user's authority to operate the equipment. This transmitter must not be relocated or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC and IC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated keeping the radiator at least 20cm or more away from person's body (excluding extremities: hands, wrists, feet and ankles).

AVERTISSEMENT! Les changements/modifications non approuvés par le parti responsible pourraient invalider l'autorité de l'utilisateur à faire fonctionner l'équipement. Cet émetteur ne doit pas être relocalisé ou être utilisé avec une autre antenne ou émetteur.'

Cet équipement est conforme aux limites d'exposition de émissions de IC, FCC présentées pour un environnement non contrôlé. Cet equipement devrait être installé de façon à ce que l'antenne soit éloigné de 20 centimètres ou plus du corps humain (en excluant les extrémités : les mains, les poignets, les pieds et les chevilles).

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Operation

Charger Control Panel

The charger control panel and display is used to configure the charger to match the battery type, AH size, Voltage and application. Details regarding configuration of the charger can be found in the "Programming" section of this manual.

WARNING: IN THE EVENT OF DANGER, SWITCH OFF THE AC INPUT POWER BY SHUTTING THE INPUT BRANCH CIRCUIT BREAKER OFF, TURNING THE BRANCH CIRCUIT DISCONNECT TO THE OFF POSITION OR UNPLUGGING THE CHARGER FROM THE WALL SOCKET

The charger can be set to charge several types, sizes and applications of batteries using the control panel and LCD display. Be sure to properly program the charger to meet your battery manufacturer's specifications before connecting the battery to the charger.

Connecting the Battery

1. Check the wiring and connectors for visible signs of damage.
2. Connect the battery to the battery charger.
3. The battery charger automatically starts charging a few seconds after the battery is connected.
4. The charging status is shown in the display user interface and on the charger control panel display.
5. A green battery symbol is lit when the battery is fully charged. The battery charger then continuous with maintenance charger (if included in selected charge profile).

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Note: The green battery symbol might not show up immediately if a fully charged battery is connected. The delay time could be lengthy, depending on charger programming.

Disconnecting a battery

DANGER: EXPLOSIVE GASES ARE PRODUCED BY THE BATTERY. DO NOT SMOKE, USE OPEN FLAME OR CAUSE SPARKING NEAR BATTERY

WARNING: THE CHARGING PROCESS MUST BE HALTED BY PRESSING THE STOP BUTTON ON THE CHARGER WHEN DISCONNECTING THE BATTERY FROM THE CHARGER. IF THE BATTERY IS DISCONNECTED DURING THE CHARGING PROCESS SPARKS MAY BE GENERATED THAT COULD CAUSE AN EXPLOSION

1 Stop the battery charging process by pressing the STOP button on the charger control panel.

2 Disconnect the battery from the battery charger.

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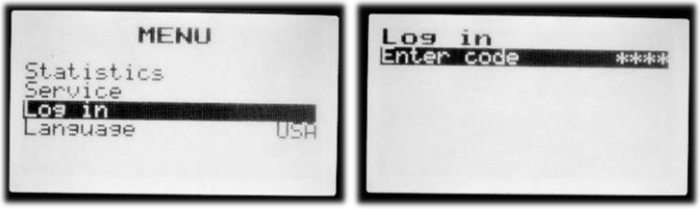
Configuration & Programming

The charger front panel can be used to program charger functions and charging parameters. The charger display and programming buttons are shown in Fig. 1 below.

Figure 1

The programming menus are selected and navigated using the “OK”, “ESC” and arrow buttons. The programming menus can be entered by pressing the “OK” button.

Top Menu and Logging In



All programmable functions require the entry of a first level password before the settings can be modified. When selecting a programmable parameter, the user will be prompted for the first level password. **The first level password is 2451.** However the user can also login from the top level menu screen shown in the left hand screen on the previous page. Using the arrow keys scroll to “Log in”, press OK and the screen

on the right will appear. Press OK again and the cursor will move over the left hand digit location. Press the up arrow until the number 2 is visible. Press the right arrow once and the cursor will be on the second digit. Press 4. Repeat for the third digit (5) and fourth (1) digit. Once logged in, use the arrow buttons go to the Service menu and press OK to enter the menu and program the desired parameters.

Service Menu Review and Programming

The two Service menu screens are shown above. Scrolling down the first menu page with the down arrow key will automatically jump to the second screen menu page once the bottom of the page is reached. To navigate back to the first menu page, scroll up using the up arrow.

Charger Info

The Charger Info screen provides circuit board serial number, Main Firmware program number and revision level and Radio Firmware program number and revision level.

Charging Parameters

The Charging parameter screen allows programming of the following

Source Selects the source for battery info (User Defined (User Def), Battery Module or Dual)

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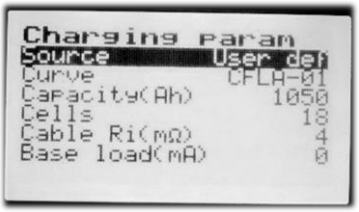
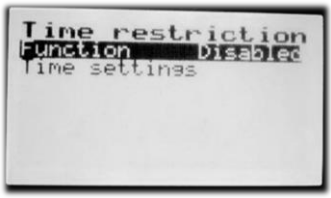
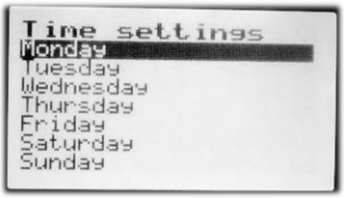
Curve	Selects the charging curve (CFLA-01, CIMX-01, OP25-01, OP30-01, OP35-01, OP40-01) see appendix A
Capacity	Battery Capacity rating in AH
Cells	Number of Battery Cells
Cable Ri	Cable drop compensation level
Base Load	Level of minimum vehicle current draw in a system with the vehicle “hard wired” to the battery during charging



Time Restrictions

Charging can be restricted for up to 3 different, variable time periods each week day. The start and stop of each period can be adjusted for each day.





The function can be enabled by selecting (OK) the function and using the arrow keys to enable the selecting (OK) again. Selecting the Time settings screen allows you to navigate to each week day’s settings. Each day up to 3 restricted charging time periods can be selected and programmed using the screen for that day.

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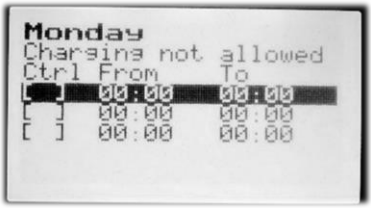
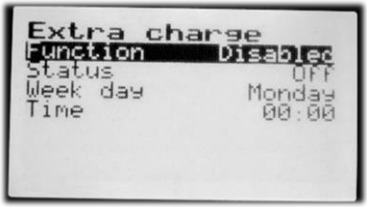


Extra Charge

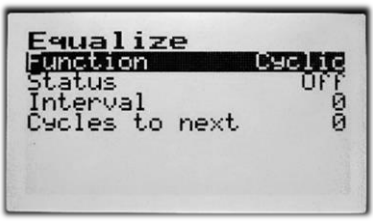


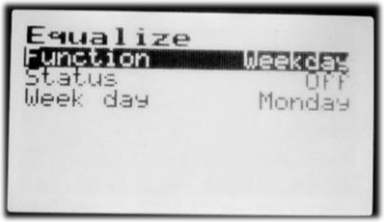
The Extra Charge function can provide a “topping off” charge period to full charge the battery if there is a regularly scheduled weekly idle period of greater than 24 hours. Enabling this function and selecting the day of week and time of day that the “topping off” cycle will cause the charger to restart and charge like the battery had been disconnected and reconnected (to full charge). Checking the Status function in this menu screen will confirm if the ongoing charge cycle is an “Extra Charge” cycle.

BBC (Best Battery Choice)

See Appendix B.

Equalize





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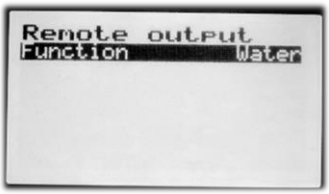
The Equalize function enables equalize charging based on two different criteria, Cyclic Weekday.
Weekday equalizing will cause the charger to initiate a 3-Hour Equalize charge anytime when the battery is connected to the charger and the charge cycle has finished on the programmed weekday. The charge cycle could for example have ended on the prior day, but if the battery is still connected to the charger on the selected day the 3-Hour equalize period will begin at 00:01 (one minute after midnight) on the selected day.
Cycle equalizing is based on the number of full charge cycles that have been completed by the charger since the last equalize cycle.
The number of cycles can be set from 0 to 99 cycles.



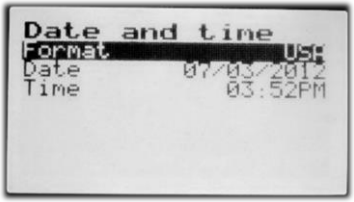
I/O Control

When equipped with Optional I/O PCB, the charger can be configured for AGV systems, Arc-Free Disconnect, Remote Stop and/or water valve control. Contact factory for your individual application details.

Function (Fn) Button

The function button can be programmed for custom application requirements. Contact factory for details.

Date and Time



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Date and time parameters can be programmed in this screen using the arrow, OK and ESC buttons. Formats include USA, ISO/JIS and Euro.

Display

Display Contrast and Backlight intensity can be adjusted from the Display menu screen.

Radio

Radio functions are programmed and displayed in this menu screen.

Function	Enables and disables radio functions
Status	Reports radio connection status
Network Settings	Program auto or manual assignment of network parameters, program Charger ID (0 to 4294967236), program or read the assigned channel and PAN ID.

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Network Info Displays Network Information

Start/Leave Network Starts a new Network or leaves current network.

CAN

This function is not available in standard charger software.

Calibration

Calibration of charger output voltage and current readings. To be adjusted by qualified service personnel only. Contact factory.

Factory Settings

Configuration of charger settings. To be adjusted by qualified service personnel only. Contact factory.

Advanced

Advanced configuration of charger settings. To be adjusted by qualified service personnel only. Contact factory.

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Force Start	Forces charger start, to be used by qualified service personnel only.
Instant Log	Instant view of logged data
Power Group	Assign Power Group number and power levels

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Maintenance &Trouble Shooting

CAUTION: BEFORE PERFORMING ANY MAINTENANCE ON THE CHARGER:

- **If a battery is being charged, stop the charge cycle by pressing the STOP Button**
- **Disconnect the battery from the charger**
- **Remove AC power from the charger**

WARNING: HIGH VOLTAGES EXIST WITH THE CHARGER, WICH CAN CAUSE SEVERE INJURY OF DEATH. SERVICE SHOULD ONLY BE PERFORMED BY QUALIFIED SERVICE PERSONNEL. IMPROPER SERVICING MAY DAMAGE THE CHARGER.

Monthly Preventive Maintenance

- If charger is charging, end the charge cycle by pressing the STOP button.
- Disconnect the battery from the charger.
- Remove AC power from the charger.
- Remove the front charger cover and lower charger I/O cover.
- Using compressed Air remove any dust from the internal components of the charger.
- Visually inspect the visible charger components for signs of discoloration or darkening. Replace if necessary.
- Check all accessible bolted or screwed electrical connections for tightness.
- Check that all exposed cable and wire insulation is in good condition. Replace if necessary.
- Wipe the charger exterior and clear any obstructions from ventilation openings and fans.

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- Check that all fans rotate freely.

Trouble Shooting

Trouble shooting may only be carried out by authorized service personnel.

> ⚠ **WARNING: DO NOT USE THE BATTERY CHARGER IF IT IS DAMAGED. DO NOT TOUCHDAMAGED COMPONENTS. TURN OFF THE INPUT AC POWER SUPPLY IMMEDIATELY AND CONTACT SERVICE.**

Check First

1. When experiencing battery charging problems always check that the battery is free from defects, in good condition and is the correct type, voltage and AH rating for the charging and it's programmed parameters.
2. Check that the battery is correctly connected and that the battery and charger connectors are in good condition.
3. Check that the AC input voltage is correct and that the branch circuit protection (fuses or breakers) have not blown or tripped.
4. Check wiring and connectors for damage.

Safety Shut-Off

Charging is terminated if:

- The recharged number of ampere-hours exceeds a preset value.
- The charging time for any of the charging phases exceeds a preset value.
- Charging voltage and current exceed an approved mean value.

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- The battery is disconnected without the charger being turned off.

Charging is temporarily reduced when:

- The battery charger internal temperature exceeds charger limits
- The battery charger is not in a near vertical position.

Checking Error Messages

When the battery charger's built-in self-testing function detects a fault, this is indicated by the alarm indicator being lit on the charger control panel. The error messages are shown on the charger LCD display. If there is more than one error message, they are automatically scrolled.

Make note of any messages and relate them when calling for service.

Error Messages

Code	***Alarm text***	***Description***
1	Low battery voltage	Battery voltage below low limit. Defined by selected charging curve.
2	High battery voltage	Battery voltage above low limit. Defined by selected charging curve.
3	Time limit exceeded	Time limit defined in selected charging curve.
4	AH limit exceeded	AH limit defined in selected charging curve exceeded
6	Charger not in upright position	Charger is not upright.
7	High battery voltage power unit shut off	Battery voltage is above charger high limit. Defined by selected charging curve
17	Mains feed phase error	An AC input voltage phase is missing from the input supply.
18	Regulator error	Error in power unit control circuits.
19	Low charger temp	Heat sink temperature is above low limit.

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Code	*Alarm Text*	*Description*
20	High charger temp, derating output	Heat sink temperature is above high limit. Charger output is reduced to lower heatsink temperature.
21	High charger temp power unit shut off	Hardware temperature protection is active.

For service assistance and parts ordering, contact:

Ecotec Ltd.
Phone: 937-606-2793
Fax: 937-606-2026
http://www.ecotecbatcharger.com

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Appendix A - Charger Curve Setting

The charger curve (or algorithm) can be set from the Charging Parameter menu of the first page of the Service Menu. There are 6 curve types available in this menu.

Conventional Flooded Lead Acid, CFLA-01 – This curve is designed to recharge a 100% discharged battery in 8 hours, and is intended for use in single shift medium to light duty applications where the battery typically lasts through the full shift and is charged during the off shift periods. It is also intended for use with 2 and 3 shift applications where the battery is removed from the vehicle for charging.

Ionic Mixing Flooded Lead Acid, CIMX-01 – This curve is designed to recharge a 100% discharged battery in 8 hours, and is intended for use in single shift medium to light duty applications where the battery typically lasts through the full shift and is charged during the off shift periods. It is also intended for use with 2 and 3 shift applications where the battery is removed from the vehicle for charging. It differs from the conventional curve by using high rate charging current at a very low duty cycle during the finish charging phase to promote short, temporary high levels of gassing that mix the charger acid and prevent stratification of the acid in the cell.

Opportunity 25A/100AH, OP25-01 – This curve is designed to opportunity charge a battery in the vehicle during break, lunch and shift change periods for 2 shift applications where the level of discharge is typically at or below 1.25 times the 80% rating of the battery (1.25 EBU) per day.

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Opportunity 30A/100AH, OP30-01 – This curve is designed to opportunity charge a battery in the vehicle during break, lunch and shift change periods for 2 shift applications where the level of discharge is typically at or below about 1.37 times the 80% rating of the battery (1.37 EBU) per day.

Opportunity 35A/100AH, OP35-01 – This curve is designed to opportunity charge a battery in the vehicle during break, lunch and shift change periods for 2 shift applications where the level of discharge is typically at or below about 1.49 times the 80% rating of the battery (1.49 EBU) per day.

Opportunity 40A/100AH, OP40-01 – This curve is designed to opportunity charge a battery in the vehicle during break, lunch and shift change periods for 2 or 3 shift applications where the level of discharge is typically at or below 1.60 times the 80% rating of the battery (1.60 EBU) per day.

NOTICE: OPPORTUNITY CHARGING APPLICATIONS REQUIRE THOROUGH INVESTIGATION INTO THE ACTUAL BATTERY USAGE, CHARGE TIME AVAILIABLE AND AMBIENT TEMPERATURE. THE NUMBERS SUGGESTED ABOVE ARE TYPICAL IN NATURE AND DO NOT IMPLY ANY WARRANTY OR GUARANTEE OF OPPORTUNITY CHARGING APPLICATION SUCCESS.

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Appendix B - Best Battery Choice Setup

The Best Battery Choice (BBC) feature allows the implementation of a “first-in-first-out” (FIFO) battery system without the addition of any hardware or software. This allows chargers to be set up in groups by battery type so they can signal to the battery room operator which battery has been off charge the longest and should be used next.

BBC setup steps

1 Enable Radio. See page 13. All chargers must be configured for the same channel.

2 Start network. First charger will require that a new network be started. Select this feature from the Radio menu screen on the first charger that is setup.

3 Join network. The remaining chargers will need to be Joined to the network. Select this feature in the Radio Screen.

4 Enable the BBC Function to Enabled

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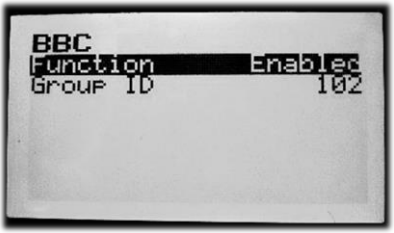
5 Assign the same group ID (0-255) to all chargers for each battery type. Each battery type must be assigned to a unique group.



When the BBC functions are set, all chargers set to the same group, will communicate with each other and only the charger that has been fully charged the longest will light the green charge finished light. When the BBC function is active the main screen will only display either ***Charging*** or ***Ready***.

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Appendix C – Joining Charger to Existing Charger Network

If the charger is connected to a different network, first leave the existing network. Before programming disconnect the battery from the charger.

1 Press OK
2 Scroll to Login and login in using password 2451
3 Select Service and press OK
4 Scroll to Radio menu
5 Scroll to Leave network and press OK

If the charger is not connected to a different network Enable the Radio function

1 Press OK
2 Scroll to Login and login in using password 2451
3 Select Service and press OK
4 Scroll to Radio menu
5 Scroll to Function and press OK
6 Scroll to select Enabled and press OK
7 Press escape to return to Radio menu

Before the charger can be connected to the network an existing network charger must enable joining. Go to the existing networked charger that is closest to the new charger and follow below. ****** (restart here from last step below if necessary).

1 Press OK
2 Scroll to Login and login in using password 2451
3 Select Service and press OK
4 Scroll to Display menu and press OK

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5 Scroll to Backlight and press OK
6 Using arrow keys set Backlight to 60 and press OK
7 Press ESC
8 Scroll to Radio menu
9 Scroll to Join Enable and press OK

As quickly as possible go to the new charger and follow below.

1 If not still in Radio menu, navigate menus as described above to get to the Radio menu.
2 Scroll to Join Network and press OK
3 If prompted, enter Password 2451
4 If the message Success is displayed the charger has joined the network and you are done.
5 If the message Failed is displayed go back to “**” and repeat all steps as quickly as possible to avoid any menu timeouts.

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Appendix D – Joining BMU to Existing Charger Network

These instructions assume that the BMU has been installed on the battery and is properly set. It also assumes that a network has been started and set up on the charger.

1. Confirm that the Charger has been set to BMU or Dual "Source". Press ESC to get to main menu.
2. Using up/down arrows, scroll to "Login" and press OK.
3. Press OK, and using up/down and left/right arrows enter 2451, then press OK.
4. Using up/down arrows, scroll to "Service" and press OK.
5. Scroll to "Charging Param" and press OK>
6. "Source should be set to either BMU or Dual. If not scroll to "Source", press OK and use up/down arrows to select BMU or Dual, then press OK.
7. Once the charger is preset to BMU or Dual source, press ESC to return to the Service menu, and scroll to the "Display" menu and press OK.
8. Scroll to "Backlight" and press OK.
9. Set Backlight to 60 using up/down arrows and press OK. Press escape to return to the Service Menu .
10. Scroll to "Join Enable", and press OK.
11. Within the next minute, connect the battery with the BMU installed to the charger. The charger should start, then stop briefly before restarting.
12. Press ESC until the charger displays the charging display. Verify that the display readout includes the BMU ID number.
13. Done

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Warranty

Access Charger

FOR INDUSTRIAL APPLICATIONS IN NORTH AMERICA

Ecotec warrants each new Ecotec charging system for industrial application and use to be free from defects in material and workmanship. This product warranty applies to the original purchaser of the equipment provided that:

1) The Ecotec charger is installed, operated and maintained in accordance with the Ecotec printed installation and operating instructions.
2) The Ecotec charger is used under normal conditions for the purposes for which it was designed.
3) The Ecotec charger is not subject to misuse, negligence, accident or unauthorized modification. Misuse to include abnormal operating conditions (including exposure to chemicals, flames, extreme dust or extreme temperatures).
4) The Ecotec charger is properly serviced in accordance with Ecotec service guidelines and using Ecotec parts.
5) The Ecotec charger is used in accordance with Ecotec's performance ratings for the equipment.

This warranty is subject to the following provisions:

1) **Products and Parts Warranted:** Subject to the exceptions listed below each new Ecotec charger is warranted for a period of twelve (12) months covering parts and labor from the commencement of warranty period. The exceptions to this warranty is as follows:
   - Electronic PCB's are warranted for thirty-six (36) months covering labor and replacement parts, provided, however, that during the last twenty-four (24) months of this 36 months period the warranty covers replacement parts only – no labor or other services are included.
   - Power transformers are warranted for ten (10) years covering labor and replacement parts, provided, however, that the during the last nine (9) years of this ten year period the warranty covers replacement parts only – no labor or other services are included.

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- Accessories such as BMU's, Temperature sensors and Water level sensors, as applicable, are warranted for 1 year covering parts only.
- Filters, fuses, bulbs, power and communication cables and connectors and vehicle mounted attachments are not warranted unless found defective prior to first use by original purchaser.

2) **Commencement of Warranty Time Periods:** The warranty period shall commence on the date of installation provided, however, that under no circumstances shall this period exceed 30 days from date of shipment by Ecotec.
3) **Limitation of Liability:** Ecotec's liability is limited to the repair of any defects or, at Ecotec's option, the replacement of the defective product with the same or similar product. Purchaser shall assume the responsibility for the removal, re-installation and freight in connection with replacement components. Replacement and exchange parts will be warranted for the remainder of the original Ecotec's charger warranty period or for a period of ninety (90) days, whichever is greater.

   Ecotec shall not be liable for direct or indirect, special or consequential damages in excess of such repair or replacement. In no event shall the purchaser be entitled to recover for contingent expenses resulting from, but not limited to, travel expenses, lodging, duties and taxes, rental or replacement equipment, loss of business or profits or any other commercial losses.
4) **Use of Defective Product:** Continued use of a defective Ecotec charger, unless approved by Ecotec, may void warranty.

Except as stated above, all other warranties and conditions, either expressed or implied, including implied warranties of merchantability and fitness for a particular purpose, are excluded and buyer assumes all risks and liability resulting from use of the goods. Ecotec neither assumes nor authorizes any persons to assume for Ecotec any other liability in connection with the sale or use of the goods sold, and there are no verbal agreements or warranties collateral to or affecting this written warranty.

Warning: At all times, safety must be considered an important factor in the installation, servicing and operation of the Ecotec charger, and only skilled, qualified technical assistance should be utilized.

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