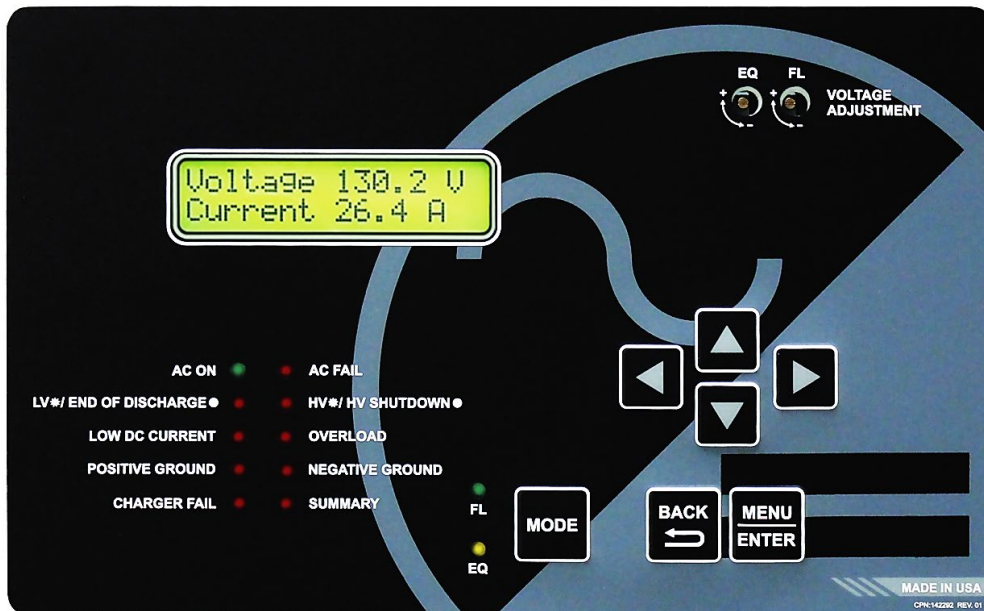




La Marche Manufacturing Company | www.lamarchemfg.com

Option 52 Series

Digital Monitoring Package with Data Logging



Operation Manual

This manual is subject to change without notice. You may obtain the newest version of the manual at www.lamarchemfg.com

Option 52 Series – Operation

General Description

The 52 series option includes the following features:

- User-Interface LCD Display Panel with Twelve LED Indicators
- Alarm Relay Board with 8 sets of Two Form 'C' Dry Contacts per Alarm
- Field Assignable Alarm Relay Contacts
- Events Data Logging and Downloadable Configuration/Settings Files via microSD card
- Ground Detection

1 User Interface Display

The user-interface LCD display panel has 12 LED indicators on the front panel. Two LEDs on the panel are used as status indicators for Float and Equalize mode and ten LEDs on the left side are used to indicate if the corresponding alarm is present (if any). Refer to the figure below. Seven buttons are provided on the display for menu navigation – MODE/EXIT, UP, DOWN, LEFT, RIGHT, BACK, and MENU/ENTER.

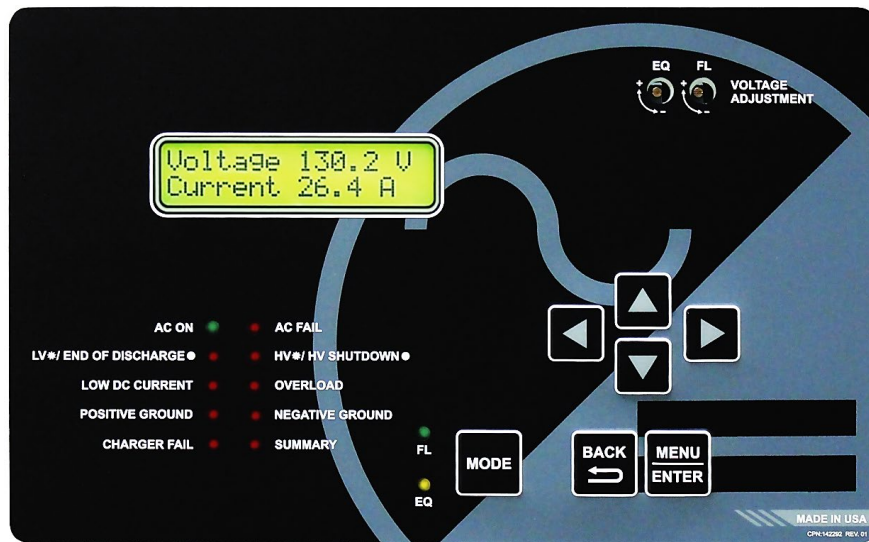


Figure 1 – LCD Display Showing System Output

Pushing the UP or DOWN button changes the display. The following items can be displayed:

Voltage 28.3 V Current 15.2 A	System DC Outputs (Voltage Sensing from output terminals)	POS-GND 26.2 V GND-NEG 26.2 V	Ground Detection Sensitivity *Only available as part of option 19U
Logging Status OK 0.01 Pct	Data Logging Status	POS-GND 0.00 mA GND-NEG 0.00 mA	Ground Detection Sensitivity *Only available as part of option 19U
Date 01/01/2020 Time 13:33:46	Unit Clock Date and Time	Over Temp. Probe 50 C	Equipment Over Temp. Alarm *Only available as part of option 219
PHASE1 241.4 VAC /LINE1 10.3 AAC	Phase 1 AC Metering *Only available as part of option 19V	EQ Timer OFF 8 Hour EQ	Equalize Timer Status and Length
PHASE2 241.3 VAC /LINE2 10.2 AAC	Phase 2 AC Metering *Only available as part of option 19V	Next Auto EQ in: OFF	Time until Next Equalize Cycle
PHASE2 241.3 VAC /LINE2 10.3 AAC	Phase 3 AC Metering *Only available as part of option 19V	EQ Timer Mode P4 Auto EQ on LV1	Selected Equalize Timer Mode

When the charger is in Equalize mode, the display will change to show the DC output voltage and DC output current, as well as the time remaining in the current Equalize charge cycle. Pushing the UP or DOWN button will change the display in Equalize mode as well.

Factory Settings

The adjustable factory settings of the La Marche battery charger with 52 series option are based on the model number, unless otherwise specified. All chargers are set at the factory with the following settings (as shown in Table):

Parameter	Lead Acid	VRLA	Nickel Cadmium	Delay (sec.)
Float Voltage	2.17 V/C	2.25 V/C	1.40 V/C	
Equalize Voltage	2.33 V/C	2.27 V/C	1.55 V/C	
Low DC Voltage	1.98 V/C		1.20 V/C	5
Low DC Voltage Reset	5% above Low DC Voltage threshold			
Low DC Current	1% of shunt size			5
Overload Current	105% of output current rating			5
High DC Voltage	2.45 V/C		1.61 V/C	5
High Voltage Shutdown	2.50 V/C		1.65 V/C	20
End of Discharge	1.75 V/C		1.10 V/C	5
End of Discharge Reset	1.84 V/C		1.15 V/C	
	5% above End of Discharge threshold			
Equalize Timer Mode	Automatic Equalize Off (Mode P0)			
Equalize Time	8 Hours			
AC Power Failure				5
Positive Ground				5
Negative Ground				5

Table 1 – Factory Default Values

NOTES:

1. V/C – Volts/Cell, VRLA – Valve Regulated Lead Acid
2. These recommended parameters are set as factory default settings. If required, change the alarm threshold levels after verifying with battery manufacturer.

1.1 Selecting the Charging Mode

The La Marche battery charger has two different settings for DC output voltage, Float mode and Equalize mode. Float charging mode is used for all normal battery charging needs. Equalize mode is used when it is necessary to Equalize (or balance) the level of charge across all cells present in the battery. Refer to battery manufacturer for recommended Equalize scheduling and parameters.

There are two LEDs on the front panel that indicate the current mode of the charger; the green LED indicates Float mode and the amber LED indicates Equalize mode. If the charger is in Float mode, simply press the MODE button to switch into Equalize mode. If the charger is in Equalize mode, it will automatically switch back to Float mode after the designated Equalize time. Additionally, the charger can manually be switched to Float mode by pressing the MODE button again.

1.1.1 Equalize Timer Modes

The battery charger has five different modes of Equalize charging operation. The Equalize mode can be viewed on the charger display by pressing the DOWN button. The display will show the Equalize timer mode and a short description. The Equalize timer is eight hours by default and the Equalize timer mode is P0 by default for. Both the timer and the mode can be changed via Settings menu (refer to Section 1.2.2 under *Equalize Timer Hours/ Equalize Timer Modes*).

In all of the Equalize modes below, the charger will immediately return to Float mode if the MODE button is pressed or when it completes its full Equalize time.

Mode P0 (Auto EQ OFF)

Mode P0 is a manual Equalize cycle and is the default setting for lead acid and nickel cadmium chargers. When the charger is set for Mode P0, the Equalize cycle must be activated manually by pressing the MODE button. Once activated, the Equalize timer will turn on and the Equalize LED will light. After the timer cycles to zero, the charger will automatically return to Float mode. Equalize mode will not start again until it is manually activated by the user.

Mode P1 (7-Day Auto EQ)

Mode P1 is an automatic Equalize cycle that activates every 7 days. The length of the Equalize cycle is determined by the timer setting. After the timer cycles to zero, the charger will automatically return to Float mode. Equalize mode will restart again after 7 days.

Mode P2 (14-Day Auto EQ)

Mode P2 is an automatic Equalize cycle that activates every 14 days. The length of the Equalize cycle is determined by the timer setting. After the timer cycles to zero, the charger will automatically return to Float mode. Equalize mode will restart again after 14 days.

Mode P3 (30-Day Auto EQ)

Mode P3 is an automatic Equalize cycle that activates every 30 days. The length of the Equalize cycle is determined by the timer setting. After the timer cycles to zero, the charger will automatically return to Float mode. Equalize mode will restart again after 30 days.

Mode P4 (Auto EQ on LV)

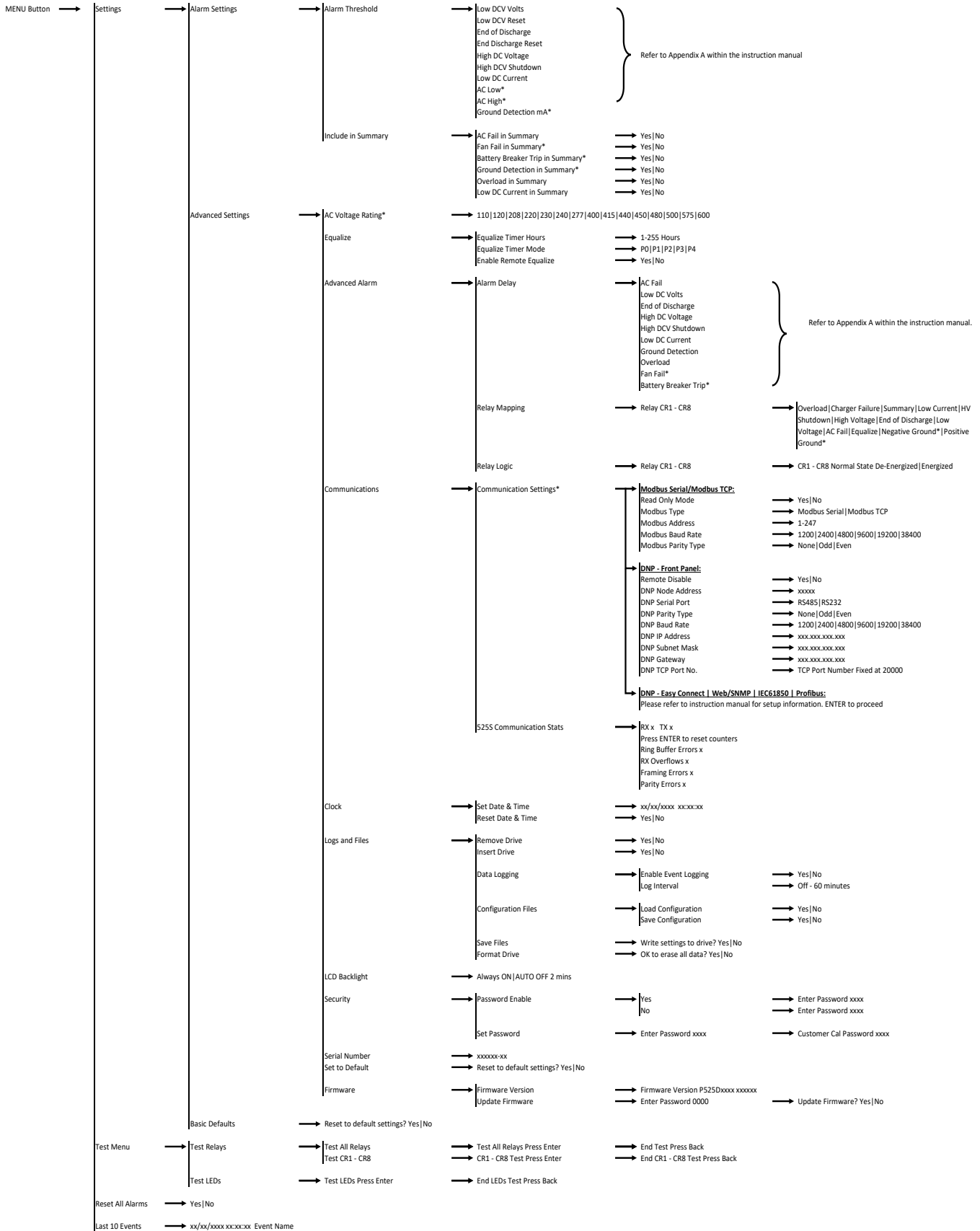
Mode P4 is an automatic Equalize cycle that is triggered when the battery experiences a sizeable discharge. When the DC voltage drops below the Low Voltage alarm threshold and exceeds the Low Voltage alarm time delay, Mode 4 is activated. However, the Equalize timer will only start and run the charger in Equalize mode for the duration set in the Equalize menu after the charger has raised the battery voltage high enough to clear the Low Voltage alarm. When the Equalize timer expires, the charger will immediately return to Float mode.

1.2 Adjusting Parameters

All equipment is shipped from the factory fully checked and adjusted based on the model number. Do not make any adjustments unless the equipment has been powered-up and the settings have been determined to be incorrect. If the settings have been determined to be incorrect, adjustments may be made as detailed below.

In the Settings Menu, the user can access and change various parameters used by the La Marche battery charger. If the user is at the first digit, the BACK button will discard the change and will step back without saving. While changing a setting, the MENU/ENTER button will store the value and step back. At any point, the Settings menu can be exited with or without saving the settings. Press the MODE/EXIT button or BACK button multiple times until "Exit and Save Settings?" displays, and follow the prompts.

***NOTE:** Some chargers may have additional settings included in the Settings menu; contact La Marche for further explanation of settings not mentioned below.*



* Appears only if option is enabled/included

Figure 2 – 52 Series Menu Flowchart

The Settings menu is as follows:

1.2.1 Alarm Settings

The Alarm Settings menu provides access to adjust basic settings related to the alarms. The user can set the threshold values that trigger an alarm and which alarm conditions are included in the Summary alarm. The alarm time delays and the function of alarm relays can be set in Advanced Alarm Settings (see Section 1.2.2). Below are the submenus:

Alarm Thresholds

The Alarm Thresholds setting allows the user to determine the value at which an alarm triggers. The threshold can be changed for the following alarms: High DC Voltage Shutdown, AC Low (option 19V), AC High (option 19V), Low DC Current, Low DC Voltage Alarm Reset, Low DC Voltage, End of Discharge Reset, End of Discharge, High DC Voltage, Ground Detection mA (option 19U) and other optional alarms which may be included on the charger.

When an alarm threshold value is changed and ENTER is pressed, the charger immediately uses these new values. However, if the user exits out of the Settings menu without saving, the threshold values will revert to the previously set thresholds.

Alarms Included in Summary

The "Include in Summary" setting allows the user to choose whether or not to include the Low Current, Ground Detection, AC Failure, Overload, and other optional alarms which may be included on the charger as part of the Summary Alarm.

1.2.2 Advanced Settings

The Advanced Settings Menu allows the user to access and modify other parameters of the charger which are not included in the basic settings menu (refer to the 52 series option flowchart on Section 1.2).

AC Voltage Rating

The AC Voltage Rating menu allows the user to set the expected AC input voltage to account for the AC alarms included in the charger. This menu only appears and applies to chargers with the 19V option included.

Equalize Settings

The "Equalize" menu provides access to set the Equalize Timer Hours, Equalize Timer Mode, and Remote Equalize Settings. Below are the submenus:

Equalize Timer Hours

The Equalize Timer Hours setting changes the amount of time that the charger remains in the Equalize charging cycle once activated. When an Equalize cycle is started, the charger will remain in Equalize mode until the time selected by this setting has passed. The Equalize timer can be set between 1 and 255 hours. By default, the Equalize timer is set for 8 hours.

Equalize Timer Mode

The Equalize Timer Mode determines when the charger will go into an Equalize charging cycle. The timer modes are P0 (Auto EQ OFF), P1 (7 Day Auto EQ), P2 (14 Day Auto EQ), P3 (30 Day Auto EQ), and P4 (Auto EQ on LV). The default setting for the Equalize timer mode is P0 (Auto EQ OFF) for Lead Acid and Nickel Cadmium chargers. Refer to Section 1.1.1 for further details.

Remote Equalize

Remote Equalize enables two or more chargers connected in parallel to enter Equalize simultaneously, if equipped with the remote equalize option. In order for Remote Equalize to function, there must be additional wires connected linking all chargers together. To enable Remote Equalize, select "Enable Remote EQ" in the Equalize Mode menu and select YES.

Advanced Alarm Settings

The "Advanced Alarm Settings" menu provides access to set the Alarm Delay, Relay Mapping, and Relay Logic. The submenus are as follows:

Alarm Delay

The Alarm Delay setting allows the user to determine the time delay between the alarm condition and alarm indication. If an alarm condition returns to normal before the delay time, the alarm will not indicate. The delay can be changed for AC Failure, Low Voltage, End of Discharge, High Voltage Shutdown, High Voltage, Low Current, Overload, and Ground Detection. The delay for all alarms is adjustable between 1-255 seconds. The delay defaults are shown on Table 7.

Relay Mapping

The Relay Mapping setting allows the user to assign alarms to relays provided in the 46R option. Refer to the 46R option manual for further details. The individual relays can be configured with the alarms of the user's choice. The defaults are shown in Section 2. Once the alarm is selected for the relay, the relay will change states once the alarm is active. The relays can be set back to their default alarm configuration by resetting to the default settings in the Settings Menu under the Advanced Settings Menu. Take into consideration multiple alarms/status indicators can be assigned to a relay. The alarms/status indicators which are assignable to a relay are as follow:

- Low DC Voltage
- High DC Voltage
- Low DC Current
- Positive Ground
- Negative Ground
- End of Discharge
- Equalize
- Overload
- Charger Fail
- Summary
- AC Fail
- AC Low (option 19V)
- AC High (option 19V)
- High DC Voltage Shutdown

NOTE: Resetting the charger settings via Advanced Settings Menu will reset all settings in the Settings Menu.

Relay Logic

The Relay Logic setting allows the user to change the setting of each relay to energize or de-energize in their normal state. The individual relays can be configured from their default value to either energize or de-energize the relay when the alarm is active. The default logic for the relays is shown in Section 2. The relays can be set back to their default relay logic by resetting to the default settings in the Settings Menu under the Advanced Settings menu.

NOTE: Resetting the charger settings via Advanced Settings Menu will reset all settings in the Settings Menu.

Communications

Upon selecting "Communications," the user will be given access to MODBUS or DNP3 communication settings, depending on the type of communication option included in the charger, as well as communication statistics. For communication board configuration details, refer to the communication instructions included with the manual.

Clock

The "Clock" setting allows the user to program the real-time clock used by the software. This clock is used in the data logging to timestamp events. In addition, the clock can be reset which returns the clock to the date setting of software revision.

Logs and Files

The "Logs and Files" menu allows the user to access the CHARGER Data Log and make changes to the Data Log settings. It also allows downloading and uploading charger configuration files, as well as updating the firmware and formatting the microSD card. The submenus are as follows:

Remove Drive

The "Remove Drive" option must be used prior to removing the microSD card from an energized charger. This prevents damage to the microSD card data.

Insert Drive

The "Insert Drive" option must be used prior to installing the microSD card into an energized charger. This prevents damage to the microSD card data.

Data Logging

The 52 series option includes data logging as a standard feature. The log file is written as a .csv file. The "Data Logging" menu allows the user to adjust settings related to data logging. For more information on data logging, see Section 3.

Enable Event Logging

The "Enable Event Log" option allows the user to enable Event type logging. By default, Event Logging is enabled.

Log Interval

The "Log Interval" option allows the user to set the interval that data is logged. By default, the interval is set to 60 minutes, but can be adjusted from 1 to 60 minutes.

Configuration Files

The 52 series option enables the user to save and load a configuration .cfg file to an installed microSD card. A saved configuration file can be loaded to multiple chargers with the 52 series option to ease set up time if an installation has more than one charger. Take into consideration all chargers must be of the same model number and firmware version. The "Configuration Files" menu contains the options for saving or loading a configuration .cfg file. In order to properly transfer a configuration file, a microSD card must be formatted first. After the memory card has been formatted, the configuration can be saved.

To load an existing configuration file, insert a microSD card with a previously saved configuration file. Select "Load Configuration" from the "Configuration Files" menu and follow the prompts. After a configuration .cfg file is loaded, it is recommended to check the settings to verify that they are correct for each charger.

To save a configuration file, insert a microSD card into the S2A-525S board, format the memory card, and select "Save Configuration" in the "Configuration Files" menu. If a configuration .cfg file already exists, it will be overwritten.

NOTE: *In order to prevent data loss, the "Remove Drive" option must be selected before physically removing the microSD card.*

Save Files

The "Save Files" menu allows the user to create a read-only customer and factory settings .csv file which is saved into the inserted microSD card. The files contain supportive information on factory settings of the charger and the customer settings of the charger. Should any issues arise and service department is required to be contacted, these files may be downloaded.

Format Drive

To format a memory card for use in the La Marche battery charger, select "Format" from the "Logs and Files" menu and follow the prompts. Formatting a microSD card will erase all data from the card; it is required to use a blank and formatted microSD card for use. Refer to Section 3 under *Formatting the MicroSD Card* for formatting instructions. A memory card only needs to be formatted once. After it has been formatted in a charger, it can be used in any other La Marche battery charger without being formatted again.

LCD Settings

The "LCD Settings" option allows the user to control the LCD backlight. By default, the LCD backlight automatically turns off after two minutes. The user may also set it to be always on.

Security

The "Security" menu allows the user to set a password to enter calibration. By default, the password is disabled. To enable the menu password, enter the Settings Menu by pressing the Menu button on the front panel. Navigate to Advanced Settings → Security → Password Enable. Select YES and enter "0000". Navigate to "Set Password". Set password to desired four-digit pin. Make sure to save this new number as it will be necessary to access the menu after enabling the security feature. If the security feature is decided to be disabled at a later time, reset password to "0000" following the same steps previously mentioned.

NOTE: *If a password is set, no changes can be made within this menu without knowing the password. In case the password is forgotten or lost, consult factory for password reset.*

Serial Number

The "Serial Number" setting allows the user to change the serial number associated with the S2A-525S board. This serial number is the serial number of the La Marche battery charger and is set at the factory for new chargers. If a user receives a replacement S2A-525S board, the serial number will have to be set via calibration.

In order to change the serial number used by the software, select "Serial Number" from the Settings menu and press the MENU/ENTER button. Each digit of the serial number is adjusted individually. Press the LEFT and RIGHT buttons to select digits. If the leftmost digit is selected, pressing left will exit the serial number setting and discard changes. Press the UP and DOWN buttons to increase and decrease the selected digit.

Set to Default

The "Set to Default" option resets all user-adjustable settings to the factory defaults. It is important to note that the factory defaults are not necessarily the correct settings for the specific DC system. Before the charger is shipped, adjustments are made at the factory using the same calibration procedure. If the charger is reset to default, these factory changes may be reset.

Ex: The software default for a 130VDC charger is based on 60 Lead Acid cells, a 62L charger is factory adjusted for a higher voltage. Returning to default will return the charger to a 60L voltage setting.

Firmware Menu

The Firmware Menu allows the user to view the firmware version, as well as update the firmware if desired. The submenus are as follows:

Firmware Version

The menu allows the user to view the current firmware version of the charger.

Update Firmware

The La Marche battery charger firmware can be updated, if equipped with the 52 series option, via a microSD card. To update the firmware, follow the procedure below:

NOTE: *If more than one firmware .bin file is on the microSD card, the bootloader will not program or reprogram the flash and will show a message saying "More than 1 file found!" and will loop forever.*

If no firmware .bin file is on the microSD card and the program flash is empty, the bootloader will loop forever and display the message "No update file found!"

1. Save the settings .csv files by following the steps shown on the previous page under *Save Settings*.
2. Remove the microSD card by entering the Settings Menu: (Menu → Advanced Settings → Logs and Files → Remove Drive).
3. Insert the microSD card into the computer using a microSD card converter.
4. Back up all files in the microSD card to the computer.
5. Format the microSD card by following the steps under *Formatting the microSD Card* on Section 3.
6. Find the firmware .bin file provided and upload it into the microSD card.
7. Safely remove the microSD card from the computer and insert it on the La Marche battery charger's microSD card slot by following the installation instructions in Section 3 under *Installing/Removing the MicroSD Card*.
8. Update the firmware by entering the Settings menu: (Menu → Advanced Settings → Firmware Menu → Update Firmware)
9. Enter the password provided (must contact La Marche Service Department) and select YES when prompted to update the firmware. The charger will start to program itself. Do not interrupt the power or the board while it is programming!
10. Save the settings .csv files once again, as well as the configuration .cfg file by following the steps shown on the previous page under *Save Files*.

Load Basic Default Settings

The "Basic Defaults" menu allows the user to load the factory default settings for all parameters not included in the Advanced Settings menu. Loading basic default settings will not reset any settings included in the advanced section of the Settings menu.

1.3 Test Menu

All equipment is shipped from the factory fully tested and operational. As part of planned maintenance, customers may want to be able to re-test functionality of the alarm LEDs and relays. The test menu allows the user to test both the LEDs on the display board as well as any alarm relay contacts. The submenus are as follows:

1.3.1 Test LEDs

All equipment is shipped from the factory fully tested and operational. As part of planned maintenance, users are provided a re-test functionality of the front panel LEDs. The Test LEDs menu allows the user to run a basic lamp test on the La Marche battery charger. After selecting this menu, press the MENU/ENTER button to light each of the LEDs on the display membrane one by one. To end the LED test, press the BACK button.

NOTE: *Any additional LEDs on auxiliary boards or relays related to the LEDs will not be affected by this LED test.*

1.3.2 Test Relays

The test relays menu allows the user to test the functionality of the alarm relay contacts. The menu allows for each contact to be tested individually, or all at once. When a relay is being tested, its contacts will change state. This means

if a relay is in the alarm state, it will change to the non-alarm state during relay testing and if a relay is in the non-alarm state, it will change to the alarm state during relay testing.

NOTE: The HVSD relay will trigger a charger shutdown when tested via the Test Relays submenu. Proceed with caution.

1.4 Reset All Alarms

The "Reset All Alarms" menu allows the user to clear/reset all alarms.

1.5 Last 10 Events

Displays the last 10 events that have occurred on the front screen of the charger. This is to be used as a quick reference. If more detail is required, refer to Section 3 for the data logging information. The events that are logged are: Alarm Occurrence, Alarm Cleared, Change in Charge Mode, and Charger Reset. Two examples shown below:



2 Alarms

The alarm relay package allows additional monitoring for the status of the alarms via alarm contacts on the S2A-198I relay board. The relay board includes 8 sets of form "C" contacts which are accessible on terminals 1 through 48.

The following alarms are the alarm assignment for each relay (Refer to the figure below):

- **CR1: High DC Voltage Shutdown**
- **CR2: Low DC Current**
- **CR3: High DC Voltage**
- **CR4: Low DC Voltage**
- **CR5: AC Power Failure**
- **CR6: Summary**
- **CR7: Positive Ground**
- **CR8: Negative Ground**

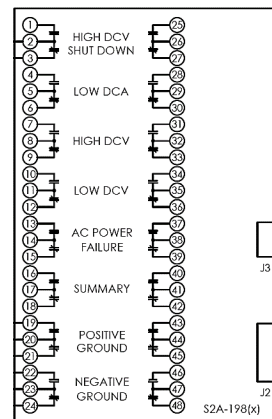


Figure 3 – User Connections to Alarm Contacts

The LCD display will show a message when an alarm is triggered and the corresponding, if applicable. The figure above illustrates the alarm relays provided on the S2A-198 relay board. All alarms contacts for the S2A-198 relay board are designed to be fail-safe. In other words, if both the AC and DC power are removed, each alarm will be indicating in its correct state. Not all alarms have a set of alarm relays assigned and not all alarm relays function the same; refer to Table 2 for the logic of each relay and Table 3 for alarm contact specifications.

S2A-198 Relay Information	
Relay Function	Logic
High DC Voltage Shutdown	Energize on Fail
Low DC Current	De-Energize on Fail
High DC Voltage	Energize on Fail
Low DC Voltage/ End of Discharge	De-Energize on Fail
AC Power Failure	De-Energize on Fail
Summary	De-Energize on Fail
Positive Ground	Energize on Fail
Negative Ground	Energize on Fail

Table 2 – Alarm Relay Logic

Characteristic Data & Contact Capacity	
Load	Resistive Load (P.F. = 1)
Contact Material	Ag (Au clad)
Maximum Allowed Current	2 A
Max. Operating Voltage and Current	0.5 A at 125 VAC
	0.25 A at 125 VDC
	2 A at 30 VDC
Max. Switching Capacity	62.5 VA
	60 W
Min. Permissible Load	10 µA, 10 mVDC

Table 3 – Alarm Contact Specifications

2.1 Alarm Definitions

AC FAIL ALARM will trigger, the green "AC ON" LED will turn off, and the red "AC FAIL" LED will turn on if the AC power to the charger is lost for longer than 5 seconds. The alarm will automatically reset when AC power is restored to the charger. When AC power is lost, the front panel display and indicators will remain powered by the connected batteries.

AC LOW ALARM* will trigger if the AC voltage falls below the specified voltage threshold of the alarm for longer than 5 seconds. The alarm will clear once the low AC voltage condition is no longer present.

AC HIGH ALARM* will trigger if the AC voltage rises above the specified voltage threshold of the alarm for longer than 5 seconds. The alarm will clear once the high AC voltage condition is no longer present.

END OF DISCHARGE ALARM will trigger and the red "LV/END OF DISCHARGE" LED will turn on solid if the DC voltage falls below the specified voltage threshold of the alarm for longer than 5 seconds. The alarm will clear once the low DC voltage condition is no longer present. Some options will define this as an End of Discharge Alarm with a different threshold.

HIGH DC VOLTAGE ALARM will trigger and the red "HV/HV SHUTDOWN" LED will blink if the output DC voltage rises above the specified voltage threshold of the alarm for longer than 5 seconds. The alarm will clear once the high DC voltage condition is no longer present.

HIGH DC VOLTAGE SHUTDOWN ALARM will trigger and the red "HV/HV SHUTDOWN" will turn on solid if the output DC voltage of the charger rises above the alarm threshold for longer than 20 seconds and there is load on the charger. If the High DC Voltage Shutdown alarm activates, the DC output of the charger shuts off to prevent irreversible damage to the battery. This alarm will stay latched until the charger is reset by isolating from all power sources.

LOW DC CURRENT ALARM will trigger and the red "LOW DC CURRENT" LED will turn on if the output DC current of the charger falls below the alarm threshold for longer than 5 seconds. This alarm can be disabled if considered a nuisance alarm.

OVERLOAD ALARM will trigger and the red "OVERLOAD" LED will turn on when the charger is overloaded for longer than 5 seconds. An overload requires two simultaneous conditions; the charger must be in current limit and the voltage has depressed to below the End of Discharge alarm percentage or threshold; typical: 1.75V/C LA, 1.1V/C NC.

NOTE: The overload alarm threshold is not adjustable and is internally set to 105% of the output current rating.

POSITIVE GROUND ALARM will trigger and the red "POSITIVE GROUND" LED will turn on if 1.2mA or greater current is measured between the positive terminal of the battery and earth ground for longer than 5 seconds. The alarm will clear once the positive ground fault is no longer present.

NEGATIVE GROUND ALARM will trigger and the red "NEGATIVE GROUND" LED will turn on if 1.2mA or greater current is measured between the negative terminal of the battery and earth ground for longer than 5 seconds. The alarm will clear once the negative ground fault is no longer present.

CHARGER FAIL ALARM will trigger and the red "CHARGER FAIL" LED will turn on if the Low DC Voltage and Low DC Current alarm are simultaneously active. Alternatively, an active High Voltage Shutdown alarm can trigger the Charger Fail alarm.

SUMMARY ALARM will trigger and the red SUMMARY LED will turn on when any of the following alarms are activated:

- Low DC Voltage
- High DC Voltage
- Fan Fail*
- Positive Ground*
- Negative Ground*
- Battery Breaker Trip*
- Low DC Current*
- AC Failure*
- End of Discharge
- Overload*

** Optional to include in Summary alarm, if option is included with the charger.*

SD CARD REMOVED ALARM is triggered when a microSD card is not detected on the microSD card slot.

Most alarms have adjustable time delays to energize; ranging from 0 through 300 seconds. Refer to Table 1 for the factory setting of each alarm.

**alarm is only available if the option is included.*

2.3 Alarm Connection Procedure

Before making any alarm connections, ensure that the AC power is off at the main breaker. Verify that no voltage is present by using a voltmeter at all AC and DC terminals.

For relays mentioned as ENERGIZED on alarm condition:

If it is desired that the annunciator be active until the alarm triggers, connect the annunciator leads to the **NC** and **C** contacts of the desired alarm (located on the relay alarm contacts on S2A-198I board). If it is desired that the annunciator be deactivated until the alarm triggers, connect the annunciator leads to the **NO** and **C** contacts of the desired alarm.

For relays mentioned as DE-ENERGIZED on alarm condition:

If it is desired that the annunciator be active until the alarm triggers, connect the annunciator leads to the **NO** and **C** contacts of the desired alarm (located on the relay alarm contacts on S2A-198I board). If it is desired that the annunciator be deactivated until the alarm triggers, connect the annunciator leads to the **NC** and **C** contacts of the desired alarm.

3 Data Logging

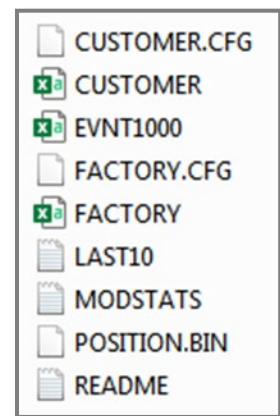
The 52 series option includes data logging as one of its features. The log file is written as a .csv file format which can be opened using Microsoft Excel or any number of free spreadsheet programs. It can even be opened on many modern smartphones. The data logs are written to an included microSD card, which plugs into a slot located at the left side of the S2A-525S board (when looking at the back of the front door/front panel). The data log can be set to log Charger Events, as well as to log all data at a specified interval. By default, the log file is set to Events only.

The microSD card can be removed, following the proper menu prompt, and has various files included as seen on the figure aside. The three data files are CUSTOMER.csv, EVNT1000.csv, and FACTORY.csv, which can be downloaded to a computer for easy review. A microSD card reader adapter will be necessary to interface with a computer.

NOTE: The *position.bin* file is written to the microSD card. This file is important to the function of the data logging and should never be modified or deleted.

The following guidelines should be taken into consideration:

- Only use microSD cards provided by La Marche.
- Do not use the microSD card for any other purpose besides data logging and firmware updating. Data corruption/microSD card damage may occur.
- Do not touch metal contacts on the back side of the microSD card when handling.
- MicroSD card to be used MUST be blank and formatted. To format the microSD card, install it on a PC and run a full format.



Events Only Logging

The Events Only Logging records data only when an event occurs. When an event occurs, all charger data points are written to better understand the cause of said event. The events that are logged are: Alarm Occurrence, Alarm Cleared, Calibration Entered, Calibration Closed, Change in Charge Mode, and Charger Reset.

At any event occurrence, the data log file will record the date, time, DC Voltage, DC Current, as well as the event which occurred.

Interval Logging

Interval Logging records a log file that records data continuously at a specified time interval. In addition, any charger event will be recorded at the time of occurrence. The interval log records all of the same data as is listed above. The default interval when set up is 60 minutes and is adjustable between 1 to 60 minutes with 1-minute increments. Interval Logging can be very beneficial in DC system troubleshooting by keeping a record of all data leading up to a logged event.

Formatting the microSD Card

The microSD card may need to be formatted for the following reasons:

- Installing a new microSD card sourced from a 3rd party
- Data on original microSD card has been found corrupt and non-usable
- Other non-charger data has been detected on the microSD card
- If the La Marche battery charger does not recognize the microSD card

There are two acceptable procedures to format the microSD card. It is important that only these two methods are used, as the La Marche battery charger does not run a Windows-style NTFS, FAT, or FAT-32 based sector partition scheme. If the microSD card has been formatted to one of these partition schemes, the card may have trouble maintaining data after several months of records. It should also be noted the microSD card should not contain pictures, microSD card management software, or any other non-intrinsic charger data.

Please be advised that formatting the microSD card will completely erase any data; make a copy of any desired data on your PC prior to formatting. Formatting will create the microSD card sector partitions; these are the blocks where bytes of data are divided and shared.

MicroSD Card Format Method 1 (Preferred):

The La Marche battery charger can properly format the microSD card with its built-in format function. With the microSD card installed in the charger, press MENU → Settings → Advanced Settings → Logs & Files → Format Drive. The charger will ask you if you want to erase all data, select yes. The microSD card is now ready to be used in the charger.

MicroSD Card Format Method 2 (Requires Internet Connection & Admin Rights):

With the microSD card installed in your PC, go to the following link and follow their directions to install. <https://www.sdcard.org/downloads/formatter/>.

After accepting the terms, it will download a ZIP file containing an installation executable program: "MicroSD Card Formatter"; install the program.

Once installed, insert your microSD card and open the "SD Card Formatter" program (See image below). To format, select the microSD card, check "Overwrite Format", then click "Format". A warning message will be given that formatting will erase all data on the card, click "Yes"; see image. The program will begin to fully format and partition the data sectors. When formatting is complete, an indication message will be received; see the following images.

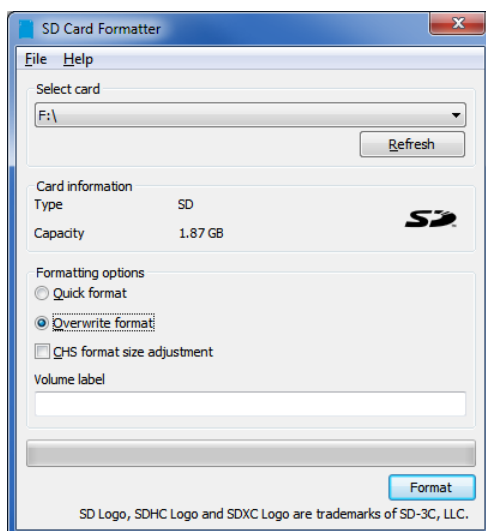


Figure 4 – SD Card Formatter Program with Overwrite Format Checked

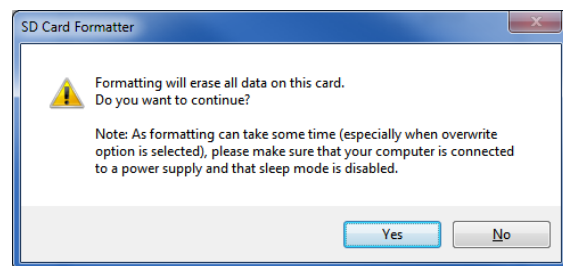


Figure 5 – Warning Message About Erasing Data

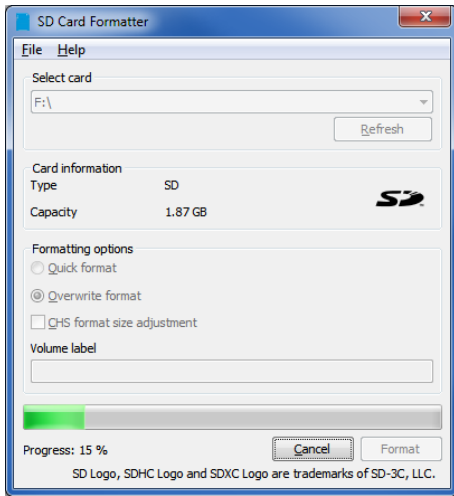


Figure 6 – Formatting in Progress

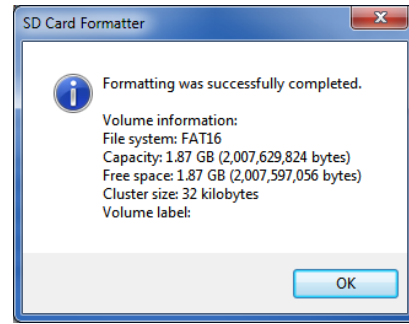


Figure 7 – Formatting Successful Message

After either format method is complete, it is advised to save the charger’s configuration .cfg file to the microSD card. See section 1.2.2 under *Configuration Files* on how to save the configuration .cfg files.

Installing/Removing the MicroSD Card

Installing/Removing the microSD card requires opening the door of the battery charger and the necessary precautions must be considered; dangerous voltage can be present inside the charger. Prior to removing or inserting the microSD card, refer to Section 1.2.2 to install or remove the microSD card. Failure to properly remove or install the microSD card can result in corrupt data or microSD card failure. To remove, prompt the Settings menu for removal, then simply push in to release the microSD card from its mounting slot. To install, prompt the Settings menu for inserting, then simply push in to insert the micro microSD card into its mounting slot.

Reading the Log File

The data log file is written as EVNT1000.csv. There may be other files written to the microSD card as well, but the events and/or interval logging is written entirely to the EVNT1000.csv file.

NOTE: A hidden file, *position.bin*, is written to the microSD card. This file is important to the function of the data logging and should never be modified or deleted.

Simply open the EVNT1000.csv file with the spreadsheet software of choice. The file looks similar to the figure shown below. At any event occurrence (or each specified interval), the data log file will record the date, time, DC Voltage, DC Current, as well as any event that occurred.

LaMarche Mfg. Company A12 Event Log File
 Created on xx/xx/xxxx at 06:47:09
 Charger Serial Number 000000-00
 Firmware P525DSxxxx xxxxxx

Date	Time	DCV (V)	DCA (A)	BATTERY (V)	PROBE #1 (C)	PROBE #2 (C)	Event
xx/xx/xxxx	16:26:36	26.1	0	-----	-----	-----	Power On Reset
xx/xx/xxxx	16:26:36	26.1	0	-----	-----	-----	Using Flash Sector 28
xx/xx/xxxx	16:26:37	26.1	0	-----	-----	-----	Float Mode
xx/xx/xxxx	16:26:41	26.1	0	-----	-----	-----	Low DC Current Alarm FAIL

Figure 8 – Events Log Example

4 Ground Detection

Ground Detection is available on all A12B battery chargers with 52 series option. The purpose of Ground Detection is to determine if the battery or loads have become grounded. If the battery or loads are set up as Floating, it is recommended that Ground Detection be enabled. When Ground Detection is enabled, a positive or negative ground fault indicator will energize upon detection of the specified ground. The Ground Detection circuitry monitors the amount of ground current, whether it is positive or negative, and will alarm when the threshold of 1.2mA is reached (or exceeded).

A12B chargers with 52 series option are shipped from the factory with Ground Detection enabled by default. It is recommended that Ground Detection be disabled if the battery or loads are either positively or negatively grounded. Additionally, the charger will show a ground fault at all times if the system is known to be grounded and the Ground Detection is enabled.

For A12B chargers which are set up in parallel or to load share, only one charger should have Ground Detection enabled. All other chargers must have Ground Detection disabled (See Section below for steps). If an external Ground Detection system is used, the A12B Ground Detection must be disabled.

Adjustable Ground Detection Sensitivity is available for A12B chargers with option 19U. This option allows the user to adjust the Ground Detection alarm threshold from 1.0 mA to 4.0 mA.



WARNING: With Ground Detection enabled, the A12B charger will contribute approximately 5mA from either the positive or negative to ground on a dead short condition.

4.1 Ground Detection Connection Procedure

Before making any connections to the A12B, ensure that the AC Power is off at the main breaker box and that both of the chargers' breakers are off. To disable Ground Detection, have the green Ground Detection jumper landed across terminals 1 and 2 of the **TS-1** terminal located inside the charger. To enable Ground Detection, have the green Ground Detection jumper landed across terminals 1 and 3 of the **TS-1** terminal located inside the charger. Refer to the figure below.

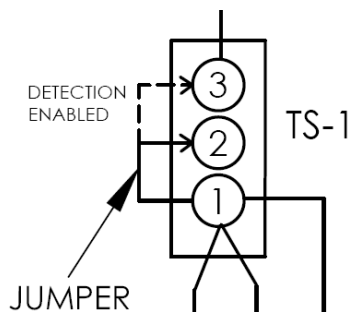


Figure 9 – Ground Detection Connections

5 Display Calibration

In order to calibrate the display voltage and current to match the measured values, two small potentiometers are provided, located on the 525S display driver board. P1 potentiometer is used to calibrate the display voltage and P2 potentiometer is used to calibrate the display current. An LCD display contrast potentiometer (P3) is also provided for contrast adjustment. Please refer to the figure below.

NOTE: Adjusting the potentiometers mentioned will NOT change the output of the charger; only the display values will be changed.

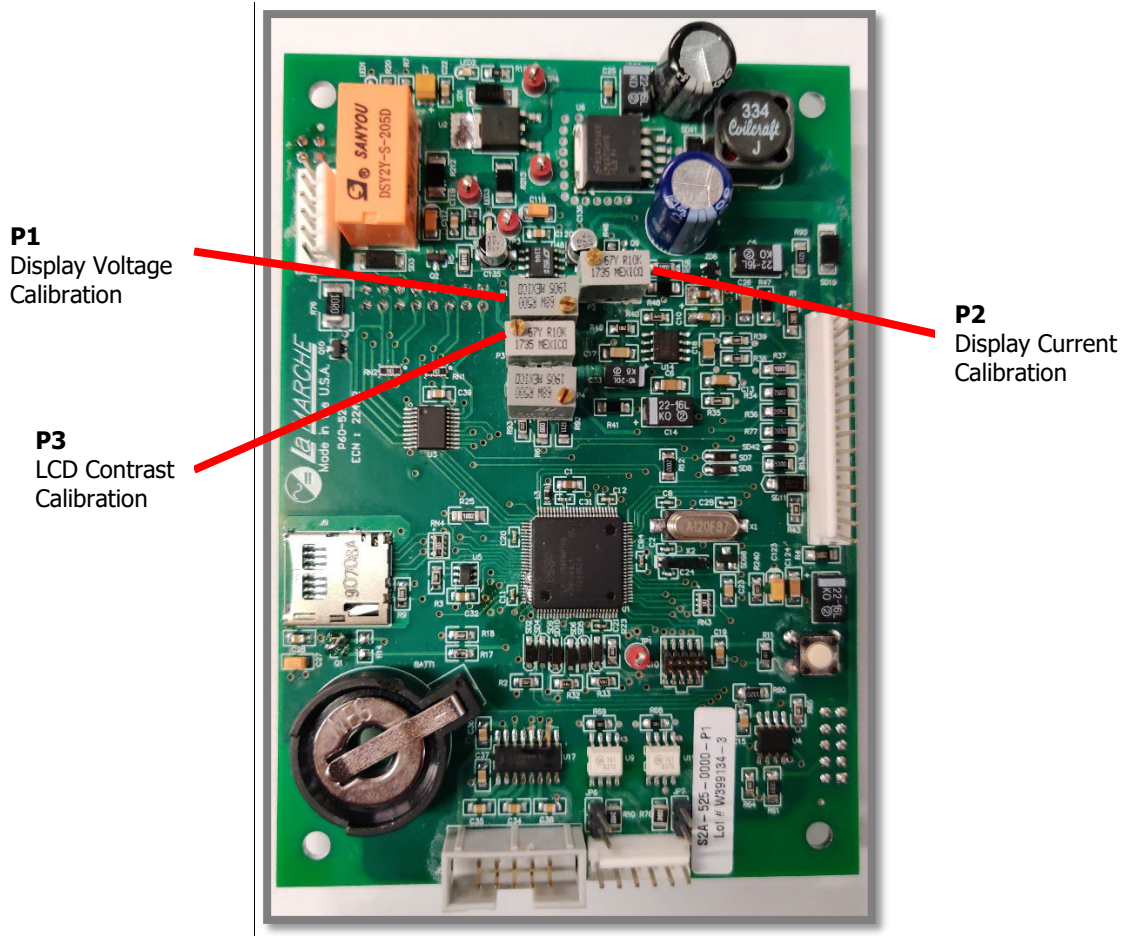


Figure 10 – Display Calibration

Appendix A: Parameter Ranges

Parameter	Lead Acid	Nickel Cadmium
Low DC Voltage	0-2.67 V/C	0-1.78 V/C
End of Discharge		
High DC Voltage		
High Voltage Shutdown		
End of Discharge Reset		
	0-20% above End of Discharge threshold	
Low DC Voltage Reset	0-20% above Low DC Voltage threshold	
AC Low*	0 – 1000V	
AC High*	0 – 1000V	
Low DC Current	OFF – x.xA	
Alarm Delays	1 – 300 seconds	

NOTE: V/C – Volts per Cell.

**Appears only if option is enabled/included*

Appendix B: microSD Card File Retrieval Instructions

The following instructions are for retrieving the files in the microSD card via the Settings Menu. The instructions are as follow:

1. Press the MENU button to enter the Customer Calibration menu, navigate through the following submenus, and select "YES" in the end to save the customer and factory configuration and settings files:

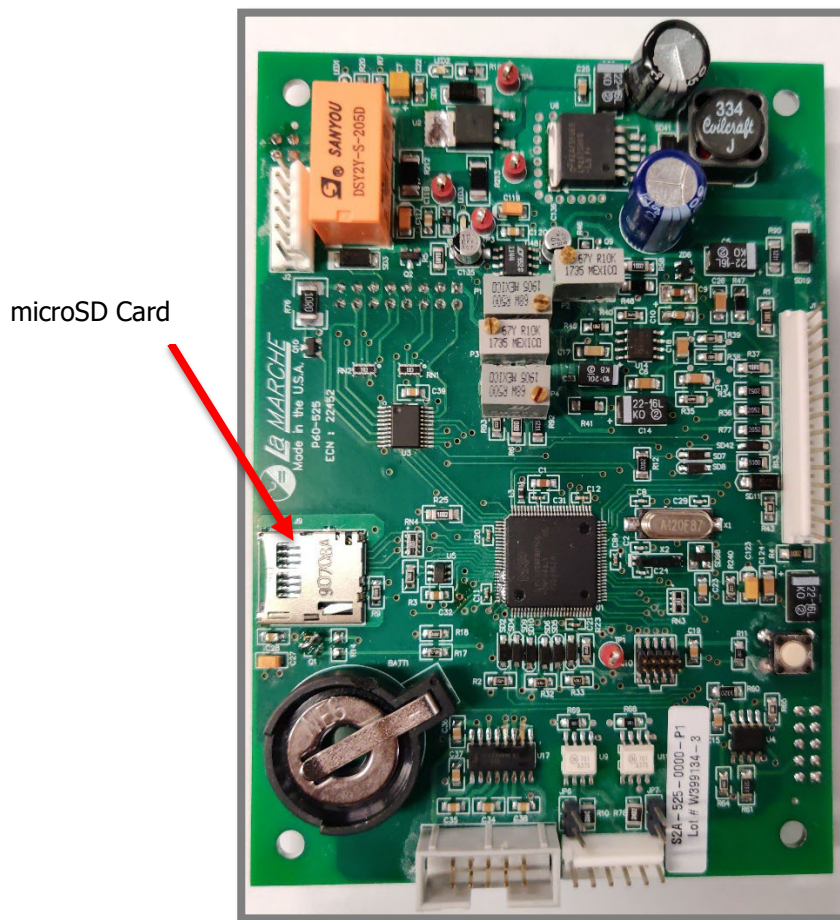
MENU → Settings Menu → Advanced Settings → Logs and Files → Save Files

2. Press the back button and select "Return to Menus" to return to the Logs and Files submenu.
3. Select "Remove Drive" and select "YES" in order to properly remove the microSD card.
4. Open the door of the charger and locate the microSD card mounted in the S2A-525S display board (mounted to the door). Refer to figure below for microSD card location.
5. Safely remove the microSD card and using a microSD card reader and a computer, extract all the files from the microSD card.

NOTE: Do NOT delete any of the files in the microSD card.

6. Press the MENU button to enter the Customer Calibration menu and navigate through the following and select "YES" in the end to safely reinstall the microSD card into the S2A-525S board microSD card slot after prompted:

MENU → Settings Menu → Advanced Settings → Logs and Files → Insert Drive



Appendix C: Document Control and Revision History

Part Number: 142964
Instruction Number: P25-LOPT52SERIES-1
Issue ECN: 22599 – 06/20

23197 – 07/22	23004 – 08/21	22599 – 06/20	