

SENS Energenius® IQ Battery Charger

Software Upgrade Installation Instructions

This procedure provides instructions to update SENS IQ model chargers to the latest software version for Control and Monitor processors. The update may be performed using a code update memory card ordered from SENS or by downloading software from the SENS' website and loading the software using the Black Box Data Recorder card already present on the charger. Please note the software version indicated on the code update memory card or stated on the software downloaded electronically from the website. This upgrade maintains all previous user set points, and no adjustment is necessary after the upgrade. See the Release Notes in the README.txt file for further details.

You will be updating the firmware in both the monitor and control microprocessors. This will involve completely powering off the charger for the duration of the code upgrade, which takes between 10 and 15 minutes. Verify that your system battery is in good condition before proceeding, as the charger will not be available to deliver DC current during software update. ***Once started, the upgrade must be completed before the charger can be returned to service.*** If you would like assistance during software update please contact SENS' customer service at 1-800-742-2326 or service@sens-usa.com.

CAUTION!

This software update is to be installed only by qualified service personnel. This procedure requires opening the electrical enclosure, exposing live parts. All internal parts, including control card components, operate at hazardous voltage or power levels.

The output terminals and output sense circuits connect to the external battery. These parts remain LIVE whenever a battery is connected, even with the DC circuit breaker shut off.

WARNING!

Do not turn off the charger during the upgrade procedure except where specifically instructed below!

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1. Verify Existing Software Version

Before shutting down the charger to install this upgrade, verify the charger's software version to determine whether the upgrade should be installed.

Use the up and down arrow buttons to select the "View Unit Info" screen (Fig. 1). Then use the left and right arrow buttons to reach the "Software" screen (Fig. 2). This shows software versions for both processors as "Mxxxx" for the monitor processor code and "Cxxxx" for the control processor code. If the software versions match the code upgrade memory card or files downloaded electronically, then all code is up to date and the upgrade does not need to be installed. Software versions 01.21 and later can be upgraded with this procedure. Any prior version, including those identified by build date (such as "M160507/C270407"), is not field upgradable. *Do not attempt to update non-upgradable code versions. Contact SENS customer service at 1-800-742-2326 or service@sens-usa.com to obtain an updated control card with boot-loader.*

Fig. 1 Unit Information Screen

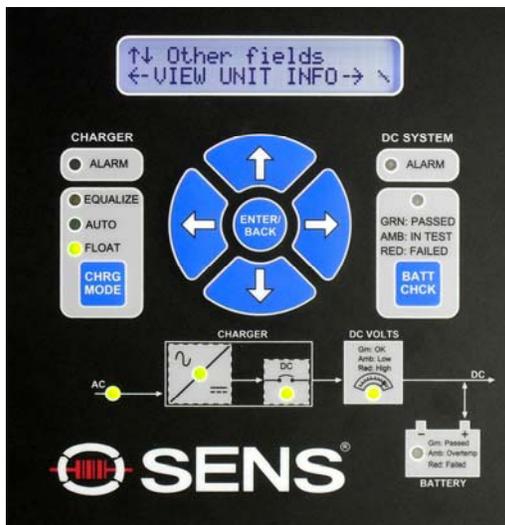
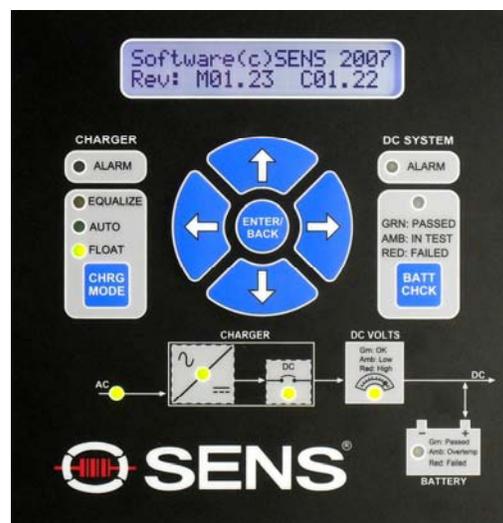


Fig. 2 Software Screen



Note: On some early production chargers, the center button is marked "CLEAR/BACK". The function is identical, only the markings have changed.

2. Shut Off AC and DC Power

Ensure the system battery is connected and capable of supporting critical system loads. For a dual charger system, perform the complete software update on one charger at a time, while leaving the other charger operating. After the first charger is updated and back in operation, shut down the second charger and perform its software update.

Turn off the AC and DC circuit breakers on the charger to be updated. Allow the filter capacitors to discharge. Wait until all front panel LEDs are completely off before opening the charger enclosure.

CAUTION!

Components on the circuit card are connected to the charger output and operate at system battery's voltage. Avoid exposure to hazardous voltages and energy levels by ensuring the charger is shut down and capacitors discharged before opening the enclosure.

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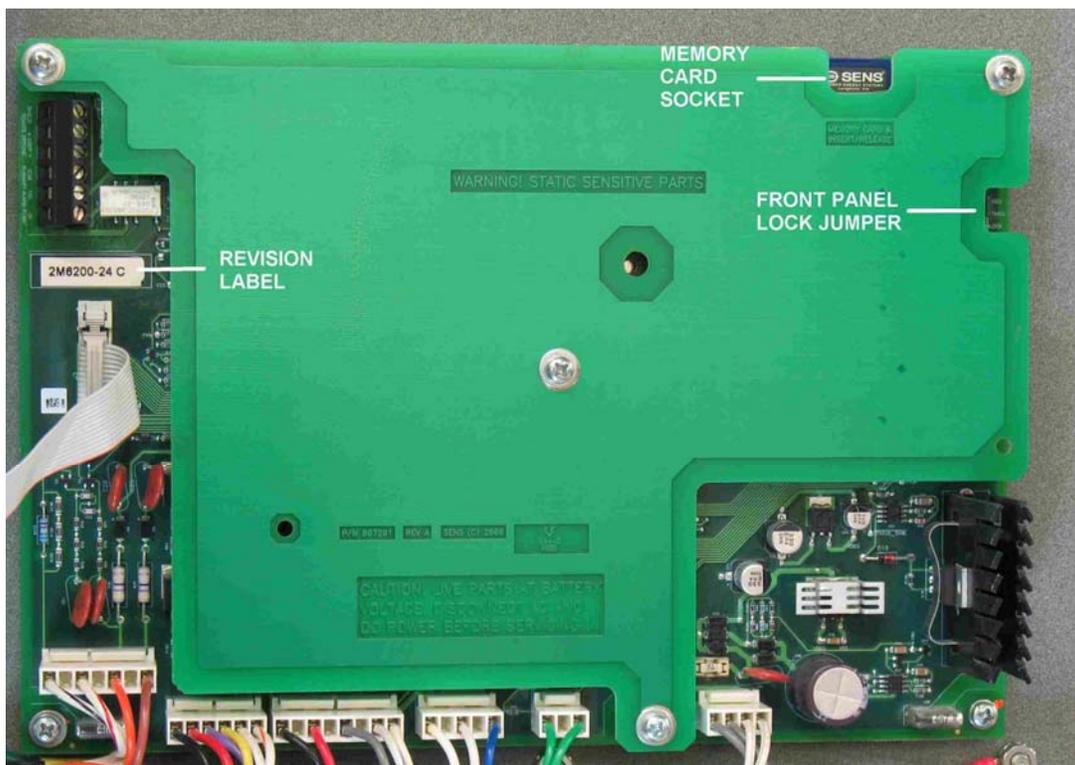
3. Control Card Identification

Release the quarter-turn fasteners on the front door by rotating them counter-clockwise. Open the enclosure and examine the control card mounted to the inside of the door. Locate the card's front panel lock jumper and the memory card socket (Fig. 3). These items will be used during the upgrade.

CAUTION!

Do not remove the card or its protective cover.

Fig. 3 Control Card



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4. Using Black Box Data Recorder Memory Card to Update Software

The Black Box Data Recorder memory card may be used to upgrade software downloaded from SENS' website instead of ordering a code update memory card from SENS.

CAUTION!

READ THIS FIRST before taking any steps to install Energenius IQ software you have downloaded from SENS' website. Failure to follow the steps carefully can result in your battery charger becoming inoperable.

The following steps do not apply to upgrades performed using a SENS-supplied SD memory card with software already loaded.

If desired, to avoid lengthy charger down-time, remove the Black Box Data Recorder card prior to powering off charger (skip procedure step 2 initially and only power charger off after loading code to Black Box Data Recorder card). If removing the card prior to powering off the charger, first scroll down to the OTHERS menu on the User Interface Display and scroll right to "Remove/Install Black Box Data Recorder." Remove the Black Box Data Recorder memory card from the memory card slot by pressing it down until it "clicks" up to the ejected position (Fig. 4).

Download upgrade files from SENS' website to a computer. Unzip the downloaded .zip file. The subsequent steps will not work properly if you try to copy files without unzipping the download archive.

Insert the Black Box Data Recorder memory card into a compatible reader on your computer. Copy only the two .hex files (bootfile.hex and boot-ctl.hex) from the software download to the Black Box Data Recorder memory card.

WARNING!

Do not include any other files and do not rename any files.

Use the Microsoft Windows error check tool to check for errors (in Explorer: right-click the SD card icon, select "Properties", select the "Tools" tab, select "Check Now..." under error-checking, uncheck the option to automatically fix system errors, and click "Start" to test). The tool should report "No problems were found on the device...".

Compare the files on the SD card to the downloaded copies on your computer, using a text file comparison tool such as Winmerge. This should report that all "files are identical."

If Windows reports no file system errors and Winmerge reports the files are identical, then the card has been written correctly.

You may use this same card to upgrade other chargers*, but return it to its original charger in order to preserve the integrity of the data logging files on the card.

IMPORTANT: Black Box Data Recorder cards from chargers with serial number 326180 and above **cannot be used to upgrade chargers with serial numbers below 326180. Cards from serial numbers lower than 326180 **can** be used to upgrade chargers with serial numbers higher than 326180.*

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5. Install Code Upgrade Card

Remove the Black Box Data Recorder card (if still present) from the memory card slot by pressing it down until it “clicks” up to the ejected position (Fig. 4). Install the code upgrade card or Black Box Data Recorder card with loaded software upgrade files in its place, so that it “clicks” into the seated position (Fig. 5). A code update card provided by SENS is identified by its red label (Fig. 6).

Remove the jumper at the front panel lock by pulling it straight away from the card. Replace the jumper in the UNLOCKED position of the front panel lock connector (Fig. 7).

CAUTION!

To avoid exposure to hazardous voltage and energy circuits, close the front door before proceeding.

Fig. 4 Memory card in **EJECTED** position



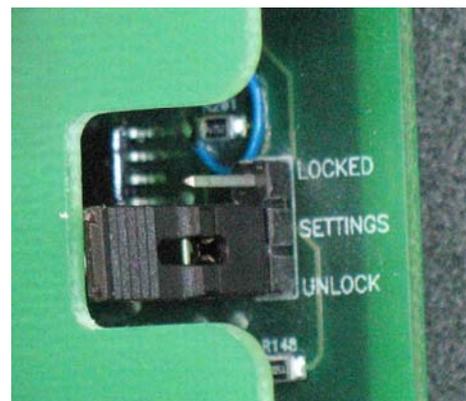
Fig. 5 Memory card in **SEATED** position



Fig. 6 Memory card identification



Fig. 7 Front panel jumper **UNLOCKED**



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6. Update Monitor Processor Code

Leave the DC circuit breaker OFF. Press and hold the UP-arrow button on the front panel while turning the AC circuit breaker ON (Fig. 8). Continue holding the up arrow button until both AUTO and FLOAT mode LEDs light (less than 10 seconds), indicating code loading has started (Fig. 9). **DO NOT TURN OFF THE CHARGER until instructed to do so at the end of this section.** For chargers built before June 2012, the text display will not operate while loading monitor code. A row of black boxes appears as shown in Fig. 9; THIS IS NORMAL.

If the charger starts up before updating the code, verify that:

- The correct code update card is installed and properly seated in the memory card socket (Fig. 6),
- Panel jumper is in the UNLOCKED position (Fig. 7), and
- The UP arrow button is held continuously until code loading begins (Fig. 8).

Monitor code load takes approximately two minutes. The monitor code will then execute to update parameters in the control card's permanent memory ("EEPROM") to operate with the updated software (Fig. 10). Wait until the "Mixed Code" message appears on the status display (Fig. 11).

Turn off the charger AC circuit breaker. Wait until all front panel LEDs are completely off before proceeding.

Fig. 8 Starting monitor processor update

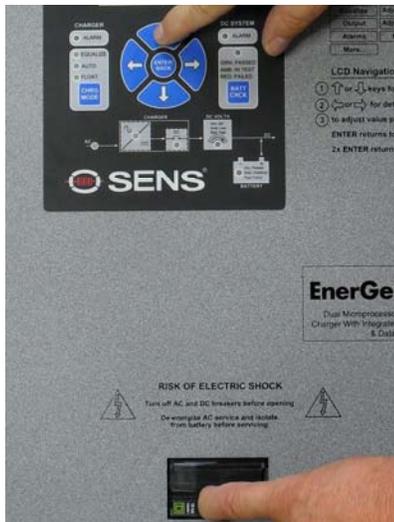


Fig. 9 Monitor update status display

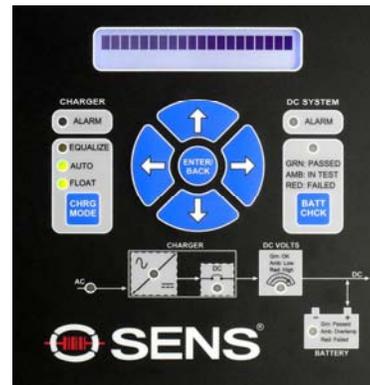
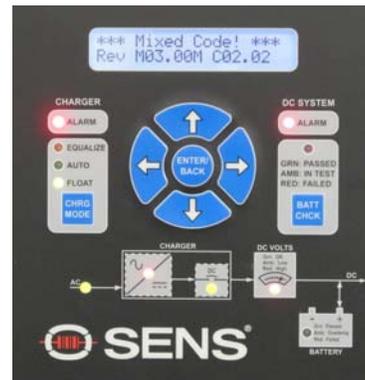


Fig. 10 EEPROM update display



Fig. 11 Mixed Code status display



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7. Update Control Processor Code

Leave the DC circuit breaker OFF. Press and hold the DOWN-arrow button on the front panel while turning the AC circuit breaker ON (Fig. 12). Continue holding the down arrow button until the “Preparing Code Load” message appears (10-30 seconds) (Fig. 13). After code load has started, **DO NOT TURN OFF THE CHARGER until instructed to do so at the end of this section.**

If the charger starts up before updating the code, verify that:

- The correct code update card is installed and properly seated in the memory card socket (Fig. 6),
- Panel jumper is in the UNLOCKED position (Fig. 7), and
- The DOWN arrow button is held continuously (Fig. 12) until “Preparing Code Load” appears (Fig. 13).

Code load will last for approximately one minute (Fig. 14). Wait until the "Finished Loading" message appears on the status display (Fig. 15).

When you see the “Finished Loading” message turn off the charger AC circuit breaker. Wait until all front panel LEDs are completely off before proceeding.

Fig. 12 Starting control processor update



Fig. 13 Preparing code load display

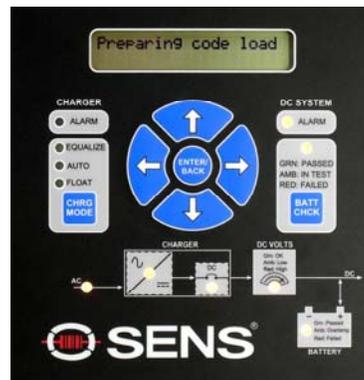
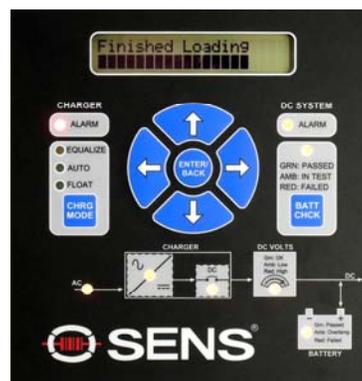


Fig. 14 Control update status display



Fig. 15 Finished loading display



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8. Verify Update and Return to Service

When discharge is complete, open the front door of the charger cabinet.

If using a code upgrade card provided by SENS, remove it from the memory card socket and replace the Black Box Data Recorder memory card (if normally present). If using the Black Box Data Recorder memory card to update with code downloaded from the website, simply leave the card in place. The memory card must be fully seated in the card socket (Fig. 5).

Return the front panel lock jumper to the LOCKED setting (Fig. 16).

Close the door and secure its quarter-turn fasteners by rotating them clockwise.

Turn on the AC circuit breaker, but do not turn on the DC circuit breaker yet. The charger should run normally except for red LEDs indicating DC breaker open, along with the associated master “charger fail” LED.

If the status display indicates the key pad is unlocked (Fig. 17), shut off the AC breaker and wait until all front panel LEDs are completely off. When discharge is complete, open the enclosure and ensure the front panel jumper in the LOCKED position (Fig. 16).

WARNING!

The jumper must be locked during routine operation. This prevents accidental changes to critical charger settings. Incorrect settings may cause overcharging or battery damage.

Navigate using the UP arrow to the “VIEW UNIT INFO” screen. Press the RIGHT arrow key until reaching the “Software” screen (Fig. 18). The second line should show the new software version numbers (as shown on the second line of the SENS-provided code upgrade card or stated on the software downloaded electronically). If your unit does not read this, the code upgrade was not successful. Repeat the upgrade steps from the beginning.

If your charger updated correctly, press the “ENTER/BACK” key^[*] and close the DC breaker. Check the charger output meter indications, and verify that any alarm conditions clear after the DC breaker is turned ON.

[*] The center key is labeled “CLEAR/BACK” on early production units. It functions identically, only the markings have changed.

Fig. 16 Front panel jumper LOCKED

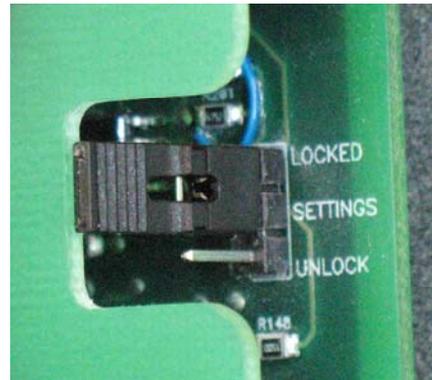


Fig. 17 Status display if UNLOCKED



Fig. 18 Example software version screen

