This document describes firmware changes for:
"Lynx Ion BMS"

For updating the Lynx Ion BMS:

- "Lynx Ion BMS Tool" is deprecated. To update and configure the Lynx Ion BMS, install the Diagnostic tool from the MG Download Center and follow instructions given by the Diagnostic tool.
- VUP-file V1.38

Note: when updated by VRM or by VUP file, secondary boot loader changes are not updated.

Change log:

v01.38 - 09-09-2024
Changes:

- *Added support for new battery types.*
- *Updated battery firmware update process to support different processor types.*
- *Updated saving tracked data. Saving tracked data when an fail-safe condition is triggered.*
- *Added RS230 Battery processors self-tests monitoring.*
- *Updated battery registration process on start-up. Previously versions registration of RS-batteries could sometimes get in conflict, resulting in fail-safe.*
- *Updated data request handling from Diagnostic tool towards Master. Request is rejected/stopped when, start-up or shutdown is pending.*
- *Added support for different RS-Batteries in a system, different capacities but same number of cells. Lowest capacity will be used for calculations.*
- *Updated LFP Battery 24V 230Ah and 280Ah cell temperature monitoring. Based on overall batteries cell temperatures, a temperature that deviates will be excluded from the monitoring process but still visible in the Diagnostic tool and Energy monitor. In case a cell temperature deviates, likely an sensor defect, contact the dealer for repair. When a battery has more than 2 cell temperatures that deviate, the master will go to fail-safe mode.*
- *Added LFP Battery 24V cell temperature deviation monitoring.*
- *Updated watchdog clocks source for performance optimization.*
- *Updated handling required discharge/charge energy after fully charge/discharge condition is detected to enable the charge/discharge again. After fully charge more discharge energy was required than expected. Note: before charge/discharge is enabled again also depends on voltages, see battery manual – boundary limits.*

v01.37 - 20-02-2024
Changes:

- *Fixed issue where random CAN-bus message reception was lost due to unexpected internal task handling (introduced in version 1.36).*

v01.36 - 06-02-2024
Changes:

- *Updated HE batteries balance algorithm. Decreased idle time before balance and added always balance condition when cell voltage deviation becomes higher than 25mV.*
- *Updated NMEA2000 services.*
- *Updated MG NMEA2000 MGREGS statuses periodically time and on change condition. See communication guide.*
- *Added variable/higher internal Bluetooth module communication speed.*
- *Updated Bluetooth data registries.*
- *Updated broken pre-charge fuse status handling.*
- *Updated Secondary boot loader, fixed required delay to restart batteries.*
- *Fixed unwanted charger detect wake up in case the setting is disabled.*
- *Updated internal master fan initialization, making sure there is valid measurement data.*

v01.35 - 13-07-2023
Changes:

- *Fixed NMEA2000 SOH data handling. Note: SOH only available for RS-batteries..*
- *Added option to change a NMEA2000 Victron Energy "Lynx Ion BMS" device to a NMEA2000 MG "Master LV" device. Required for integration of the MG SmartLink-MX to existing systems.*
- *Updated NMEA2000 bootloader to support "Lynx Ion BMS" as "Master LV" devices.*
- *Added NMEA2000 bootloader sleep support if update is not completed.*
- *Improved General and SMA CAN-bus protocol, maximum supported system voltage handling.*
- *Added Master supported current monitoring.*
- *Added master current overload detected to VE statuses -> VE_REG_BMS_FLAGS:*
  - Alarm high current, bit 29;

- *Updated proper setting combinations handling.*

v01.34 - 25-04-2023
Changes:
- *Added support for new battery types.*
- *Added new master events:*
  - Number of batteries not supported;
  - Battery leakage detected;
  - Broken fuse detected.
- Added RS battery leakage detection monitoring.
- Added leakage detected warning flag.
- Added battery leakage and humidity warning to programmable relay option "Warning".
- Updated broadcasting VREG settings when changed by tool or app.
- Updated calculation for discharged energy today.
- Updated SMA general warning with all warnings that are not handled.
- Updated battery command sending by master for better command handling by battery.

v01.33 - 28-02-2023
Changes:
- *Updated LFP battery 24V firmware fixing occurrence of temperature measurement problems.*
- *Updated process of loading stored device name memory.*
- *Fixed system stability problem detected on interrupted startup procedure.*

v01.32 - 10-01-2023
Changes:
- *Added support to set device name by NMEA2000.*
- *Fixed SOC synchronization handling.*
- *Fixed event watchdog report storage.*
- *Updated parameter control (DVCC) supporting low current limits in relative big systems.*
- *Added new VE Error reports to VE_REG_BMS_ERROR:*
  - Interlock, 37;
  - Emergency stop, 38;
  - Communication timeout, 39;
  - Safety lock, 40;
  - Terminal over temperature, 41;
- *Added new VE statuses to VE_REG_BMS_FLAGS:*
  - Warning cell imbalance, bit 30;
  - Warning service request, bit 31;
- *Updated all batteries firmware, fixed rounding on negative temperatures.*

v01.31 - 22-08-2022
Changes:
- *Added support for new battery types.*
- *More code improvements, not affecting functionality.*

v01.30 - 28-04-2022
Changes:
- *Updated LFP battery discharged voltage levels for improved battery protection. Adjustment has negligible influence on available battery capacity.*
- *Added support for new battery types.*
- *Added support for positive and negative battery terminal temperature readings if supported by battery.*
- *Updated all battery types firmware with improved measurement data processing.*
- *Updated parameter control (DVCC) for more stability in ESS systems when fully charged.*
- *Fixed unwanted external charger detection when start button is pressed.*
- *More code improvements, not affecting functionality.*

v01.29 - 08-02-2022
Changes:
- *Added support for new battery types.*
- *More code improvements, not affecting functionality.*

v01.28 - 20-12-2021
Changes:
- *Fixed Victron update (VUP) support for new Lynx Ion BMS 1000 PC+.*
- *Fixed Victron GX power supply dip from Lynx Ion BMS IO connector when starting Victron VUP update. Depending how much load there is on the power supply from the Lynx Ion BMS IO connector, it could be the case that the VUP update will not start. The system will reboot/recover automatically after a update failure. Update with Lynx Ion BMS Tool is required to solve this problem.*

Known issue:
- *With version 1.27 there is a small chance that turning off a Lynx Ion BMS is not possible anymore. There is also a small chance that a update is not possible anymore without special tools. Because this*

version has only been online for a few days and the chance that it would become a problem is small, so there is no major issue.

Note: if you had updated to version 1.27 than it is mandatory to update to 1.28 just to be safe.

If updating is not possible please contact support for further instructions.

v01.27 - 07-12-2021
Changes:
- *Added support for new Lynx Ion BMS 1000 PC+.*
- *Updated Pre-charging:*
  - Pre-charge resistor (>48V) has improved protection against overload;
  - Pre-charge NTC (<48V)has extended pre-charge time with 18 seconds if the voltage is still rising after 30 seconds.
- *more code improvements, not affecting functionality.*

v01.26 - 16-08-2021
Changes:
- *Fixed battery strategy handling when changed in operating system.*
- *Fixed SOC storage when Lynx Ion BMS is in combined mode and received stop command.*
- *Updated external CAN-bus SOC synchronization handling. Not processed anymore when contactor is open.*
- *Fixed Powerfinn charger support in external CAN-bus protocol Visedo.*
- *Added External CAN-bus protocol VE-MG-NMEA2000 to support MG-registers that are send every 250ms.*
- *more code improvements, not affecting functionality.*

v01.25 - 16-03-2021
Changes:
- *Added support for new Lynx Ion BMS hardware versions.*
- *Added support for new battery types.*
- *Added programmable relay option for optional external pre-charge circuit.*
- *Added critical over charge current handling for:*
  - LFP batteries;
  - HE batteries;
  - RS batteries;
  See battery manual for the conditions when the system will go to fail-safe shut down.
- *Updated SOC handling while charging. The SOC is limited to 99,9% when charging is still allowed based on the cell voltages. This prevents Victron Energy generator start stop control to stop at 100% SOC when the battery is not fully charged.*
- *Updated CAN-bus error handling.*
- *New firmware for all battery types, fixed CAN-bus bit timing and CAN-bus error handling.*
- *Reduced energy consumption in shutdown state with 30%.*
- *Updated combined battery systems control.*
  - Start and stop command can be send by VE-CAN-bus.
  - Changed green status LED flashes:
    - Short pulse, service mode;
    - on/off toggle, waiting for start command;
    - Long pulse, ready to start when output voltage is the same as the battery voltage.
- *Fixed fail-safe handling while pre-charging.*
- *Minor fix on temperature parameter control (DVCC) when temperature is going back to operating area. Before this was be steps of 2 degree Celsius, now fixed to steps of 1 degree Celsius.*

v01.24 - 14-09-2020
Changes:
- *Added support for new Lynx Ion BMS hardware versions.*
- *Fixed over current warning based on maximum supported Lynx Ion BMS current.*
- *Added "General BMS" CAN-bus protocol.* ***Note, existing SMA protocol location has been replaced by the General BMS protocol. If SMA protocol is required, update settings.***
- *Renamed battery strategy "Default" to "Economic"*.
- *Only for NMC and RS batteries, added battery humidity warning.*

v01.23 - 23-06-2020
Changes:
- *Added support for new battery types.*
- *Added settings for maximum charge and discharge current. This setting will be used by the parameter control (DVCC). Setting can only be changed with the Lynx Ion BMS Tool 2.23.*
- *Fixed contactor and pre-charge failure feedback.*
- *Added new Lynx Ion BMS events:*
  - System voltage measured by Lynx Ion BMS outside configuration batteries voltage window;
  - Lynx Ion BMS invalid measurements detected;

- High internal Lynx Ion BMS temperature;
- Batteries current to high;
- Active balance warning;

- *Fixed minor bug, under voltage check on system startup to give charger time to start charging.*
- *Updated handling settings "battery strategy", on change there is NO master reboot required anymore.*
- *Updated Victron VREG settings and on change handling.*
- *Updated Time to Go calculation, faster response.*
- *Added Bluetooth support, only supported by VictronConnect app.*
  *Note: Bluetooth only available with a device serial number (Unique Identifier, see bottom Lynx Ion BMS Tool) that is equal or higher than "1738****"*
- *Added function to enable/disable Bluetooth with the start/stop button.*
  When master is active, push the start/stop button 3 times, after 1 seconds this will be acknowledged by 3 fast beeps and LED flashes. Bluetooth is enabled or disabled, check VictronConnect app.
- *more code improvements, not affecting functionality.*

v01.22 - 30-12-2019
Changes:

- *Added support for new battery types.*
- *Fixed service warning on batteries without battery terminal temperature.*

v01.21 - 28-11-2019
Changes:

- *Added VE_INTERFACE_BMS_ERROR_UNDER_CHARGE_STANDBY to last error report.*
- *Updated combined battery state at startup. With this update the Lynx Ion BMS will wait 13 seconds before charge or discharge is allowed. With this delay other Lynx Ion BMS's will start automatically because the system voltage should still be stable.*
- *Added support for new battery types.*
- *Added support for new hardware versions.*
- *Fixed bug on the balance control for the New LFP batteries with passive balance.*

v01.20 - 10-09-2019
Changes:

- *Fixed SMA maximum allowed charge and discharge current limit. Maximum was limited to 120.0A and had to be 1200.0A. Note, maximum currents are always limited by the system configuration.*
- *Added new battery types.*
- *Updated Lynx Ion BMS 1000 internal fan control.*
- *more code improvements, not affecting functionality.*

v01.19 - 5-08-2019
Changes:

- *Added HE positive battery terminal temperature monitoring. DVCC will decrease charge and discharge current when terminal temperature comes above 64°C to 69°C.*
- *more code improvements, not affecting functionality.*

v01.18 - 12-06-2019
Changes:

- *Added support for combined Lynx Ion BMS systems, contact supplier for more information.*

Lynx Ion BMS combined is introduced to create a 100% redundant battery system. This redundant battery system consist out of multiple Lynx Ion BMS's connected in parallel to loads/charges. A GX device is required to manage the energy flow using the Distributed Voltage and Current Control (DVCC) feature.

v01.17 - 28-05-2019
Changes:

Low priority:

- *Updated DVCC voltage set-points at system shutdown to actual voltage without offset.*
- *Updated batteries series and parallel check on startup.*
- *Updated internal CAN-bus load/stability.*
- *Updated measurement validation in battery firmware.*

New:

- *Updated VE CAN-bus device state to support combined battery systems.*
- *Added new battery types.*
- *Added new warnings/events:*
  - battery cell voltage deviation.
  - battery cell temperature deviation.

v01.16 - 8-04-2019
Changes:
Low priority:
- *Updated VE-CAN message handling. 11-bit messages are ignored.*
- *Updated Lynx Ion BMS Tool setting tab, added information when cursor positioned on setting.*

New:
- *Added new battery types.*

v01.15 - 17-01-2019
Changes:
Low priority:
- *Fixed the source of problem that caused the "#26 Contactor failure occurred" error on some systems.*
- *Updated DVCC for charging faster to get SOC synchronization.*
- *Updated balancing control for HE batteries from Q1 2017.*
- *Updated battery ratings:*
  - increased HE default maximum allowed charge current from 0.3C to 0.6C.
  - increased HE performance maximum allowed charge current from 0.3C to 1.0C.
  Note: When charging temperature limit is reached the allowed charge current will be reduced automatically.

New:
- *Added highest charge/discharge current and highest/lowest system voltage to daily summary.*
- *Added new battery types.*

v01.14 - 09-11-2018
Changes:
High priority:
- *Fixed device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*
- *Pre-Fixed issue that caused the "#26 Contactor failure occurred" error on some systems.*

Low priority:
- *Fixed battery Active balance control bug.*
- *Fixed battery Active balance failure reset.*
- *Fixed passive balance timer initialization.*
- *Updated battery ratings for HE-battery SOC correction.*
- *more code improvements, not affecting functionality.*

New:
- *Update VUP bootloader to v1.04. This improves the stability of firmware updates during high bus loads.*
  Note: this bootloader update can only be done manually using the "Lynx Ion BMS Tool" and not using VRM remote firmware update.
- *Programmable relay: changed the default function to "Discharge not allowed warning", which is automatically selected by updating to this firmware.*
  This function can be used to notify the customer that the battery is almost discharged or that the temperature is becoming too low/high.
  The customer can react on this signal before the "Allow-To-Discharge" will become inactive.
  The relay is normally closed and will open when the "Discharge not allowed warning" occurs.
- *Report version of VUP bootloader.*

v01.13 - 24-09-2018
Changes:
- *Updated SOC algorithm.*
- *Updated HE-battery fan control:*
  Default mode: fan is enabled above 30°C and disabled below 29°C.
  Performance mode: fan is enabled above 35°C and disabled below 34°C.
- *Added highest and lowest current to value tracking.*
- *Updated DVCC algorithm, optimized voltage control when charged.*
- *Updated active balance algorithm.*
- *Updated automatic shutdown detection when almost discharged and no energy flow detected.*

Known issue:
- *Main contactor check might trigger "#26 Contactor failure occurred" error on some systems. Fixed in v1.14*
- *Firmware update might fail in some situations, but can be restarted. Fixed in v1.14, but requires manual update using the "Lynx Ion BMS Tool".*
- *Device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*

v01.12 - 28-08-2018
Changes:

- *Fixed bug in CAN-bus communication check between Lynx Ion BMS and batteries.*
- *Updated allow-to-charge and allow-to-discharge control.*
- *Updated HE battery balance control.*
- *Updated LED indication when Lynx Ion BMS is updating a battery. Led will flash green and red after each other.*
- *more code improvements, not affecting functionality.*

Known issue:

- *Main contactor check might trigger "#26 Contactor failure occurred" error on some systems. Fixed in v1.14*
- *Firmware update might fail in some situations, but can be restarted. Fixed in v1.14, but requires manual update using the "Lynx Ion BMS Tool".*
- *Device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*

v01.11 - 23-07-2018
Changes:

- *Added user battery identification with the "Lynx Ion BMS tool", see manual.*
- *Added parallel systems SOC synchronization settings.*
- *Fixed cold system pre-charge fault. Pre-charging for maximum 30 seconds.*
- *Fixed average temperature today at daily summary.*
- *Updated HE battery fan control, fans are disabled after startup test when temperature below 31 °C.*
- *Updated Lynx Ion BMS tool CAN device drivers.*
- *Updated HE battery balance control.*
- *more code improvements, not affecting functionality.*

Known issue:

- *Main contactor check might trigger "#26 Contactor failure occurred" error on some systems. Fixed in v1.14*
- *Firmware update might fail in some situations, but can be restarted. Fixed in v1.14, but requires manual update using the "Lynx Ion BMS Tool".*
- *Device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*

v01.10 - 23-02-2018
Changes:

- *Solved VE-CAN bus communication bug when there are more than one Lynx Ion BMS connected to it.*

Known issue:

- *Main contactor check might trigger "#26 Contactor failure occurred" error on some systems. Fixed in v1.14*
- *Firmware update might fail in some situations, but can be restarted. Fixed in v1.14, but requires manual update using the "Lynx Ion BMS Tool".*
- *Device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*

v01.09 - 18-01-2018
Changes:

- *Added critical under cell voltage startup handling. User gets 2 minutes to start charging with at least 4 amps. The lowest cell voltage has to come above warning level within 10 minutes else the system will shut down again.*
- *Added setting for interlock enable. The interlock can be used for an external emergency switch to directly open the main contactor. This requires hardware upgrade, contact dealer.*
- *Added setting to invert: charge allowed relay, charge allowed signal, discharge allowed relay and discharge allowed relay.*
- *Added programmable relay settings and functionalities ("Lynx Ion BMS Tool >= 2.9" required)*
  - Disabled;
  - System activated;
  - Warning;
  - Fail safe;
  - Current;
  - Battery temperature;
  - Battery cell voltage;
  - State of charge.
- *Updated DVCC support*
- *Updated shutdown time from 2 to 8 seconds to support DVCC.*
- *Updated Vreg VREG VE_REG_SOC. This gives the possibility to change the SOC by VREG command.*
- *Updated Vreg VREG VE_REG_RELAY_CONTROL handling.*
- *Updated Vreg VE_REG_LINK_CHARGE_CURRENT_PERCENTAGE from 0 or 100% to controlled %.*
- *Updated Vreg VE_REG_LINK_CHARGE_CURRENT_LIMIT to controlled amps.*
- *Fixed invalid highest and lowest cell voltage/temperature*
- *Fixed invalidation and initialization of battery capacity and configuration.*

- *more code improvements, not affecting functionality.*
- *Note:*
  *Previously version 1.7 is not supporting batteries with serial number HQ1746***** or higher. When problems appear please first always update to the latest release.*

Known issue:
- *Main contactor check might trigger "#26 Contactor failure occurred" error on some systems. Fixed in v1.14*
- *Firmware update might fail in some situations, but can be restarted. Fixed in v1.14, but requires manual update using the "Lynx Ion BMS Tool".*
- *More than one Lynx Ion BMS connected to the VE-CAN result in 100% busload because devices constantly answer to each other, caused by SOC Vreg.*
- *Device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*

v01.08 - 18-09-2017
Changes:
- *Added BOL support*
- *Added Time To Go support*
- *Added dynamic allow to charge algorithm*
- *Modified contactor control, adjusted contactor opening delay from 2 to 5 seconds. To support BOL.*
- *Added support for new battery product ID's*
- *Improved passive balance algorithm*
- *Fixed bit sample timing CAN-bus problem for large systems.*
- *more code improvements, not affecting functionality.*

Known issue:
- *Main contactor check might trigger "#26 Contactor failure occurred" error on some systems. Fixed in v1.14*
- *Firmware update might fail in some situations, but can be restarted. Fixed in v1.14, but requires manual update using the "Lynx Ion BMS Tool".*
- *Device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*

v01.07 - 20-07-2017
Changes:
- *Fixed passive balance bug*
- *more code improvements, not affecting functionality.*

Known issue:
- *Main contactor check might trigger "#26 Contactor failure occurred" error on some systems. Fixed in v1.14*
- *Firmware update might fail in some situations, but can be restarted. Fixed in v1.14, but requires manual update using the "Lynx Ion BMS Tool".*
- *Device disappearing on VE-CAN-bus caused by CAN-bus errors, (produced by Venus GX reboot).*