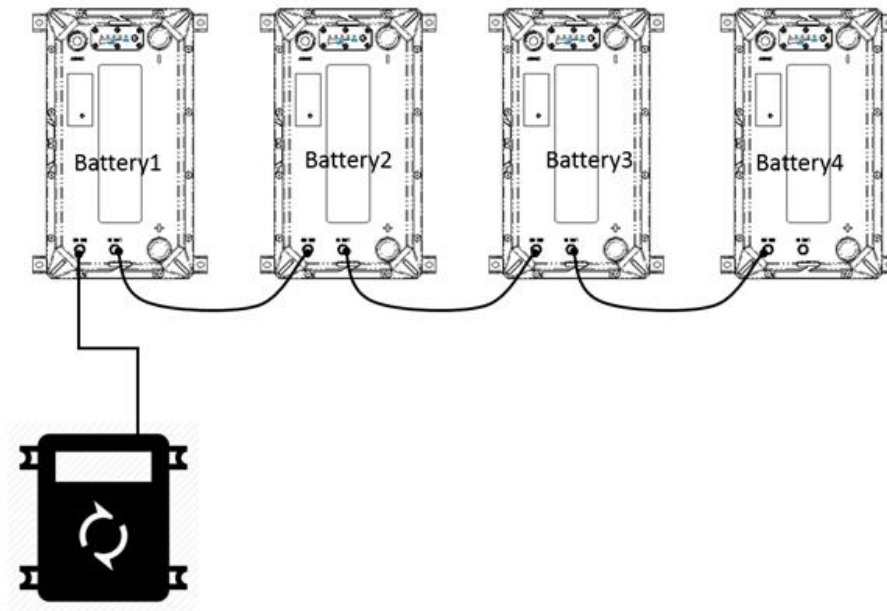# Rechargeable Lithium Battery

Closed loop communication integration manual—Victron Power

Battery Model: R-T12100B/T12200B/T12300B

Version:V00

Edit by :
Jinlong Zhong

1.Demo system checking list

Items	Specification	Qty.	Remarks
R-T12100B battery	12.8V100Ah	4 pcs[i]	Support max. 4 in series and 4 in parallel
BAT to BAT power cable	4 AWG	/	According to the battery configuration
BAT to Inverter power cable	4 AWG	1 pair	Please choose the corresponding power cable pair according to power/current and local connection standard
BAT to BAT communication cable	PIN to PIN 500mm	According to pack numbers	Provided with each battery
BAT to Inverter communication cable	customized according to inverter brand 2000mm	1 pcs	
Battery system DC breaker/isolator	150A or higher	1 pcs	According to local connection requirements.

2. Preconditions

Before you connecting the battery with inverter, make sure the following rules is compiled:

1.The battery system discharge power/current can cover the inverter power, it is recommended to configure the inverter capacity with battery energy in 1: 2 proportion, for example, if you have a 5KW rated inverter, connect 8 pcs of 12.8V100Ah (10KWh) or more batteries.

2. If your system is an off-grid system, make sure your configuration can cover the worst situation to avoid battery to be over-discharged, it is recommended to install a smart generator and MPPT modules(on DC side), we will be reluctant or even refusing to give support to systems that power & energy are sized less than 1:1.

3. Make sure that your installation environment, setting and sequence is following the **User Manual.**

4. Only qualified persons are allowed to install and commission the system.

5. Before the battery communicates with Victron, the battery needs to be networked first. For detailed network operation, refer to 《R-T12100B/T12200B/T12300B User Manual》

3. Connect and Commissioning

3.1 Victron

Victron devices and R-T12100B battery can be used for the following system types:

☐ Energy Storage Systems (ESS) - Self Consumption

☐ Grid Backup (DVCC or ESS)

☐ Off-grid (DVCC)

A GX device is required to establish communication. It is essential to use the CAN-bus connection of the GX device (e.g. Cerbo GX) - this communicates the keep-alive signal, charge and discharge limits, error codes and state of charge (SOC %) between the batteries and the system.

The minimum required firmware version for the GX Device is v2.40. It is highly recommended to use the latest firmware version on all connected devices, including the GX device Inverter/Charger and MPPTs.

CANbus baud rate **500 Kbps** is supported, 250Kbps may add in the future.

If you use a VE.Can MPPT, it must also be with a GX device that has more than one CANbus interface, e.g. the Cerbo GX.

Compatible device:

1.Multi, MultiPlus, MultiGrid, EasySolar & EasySolar-II, Inverter RS & Multi RS and Quattro.

2. VE.Direct/VE.CAN BlueSolar and SmartSolar MPPT Chargers.

3.1.1 Cable connection

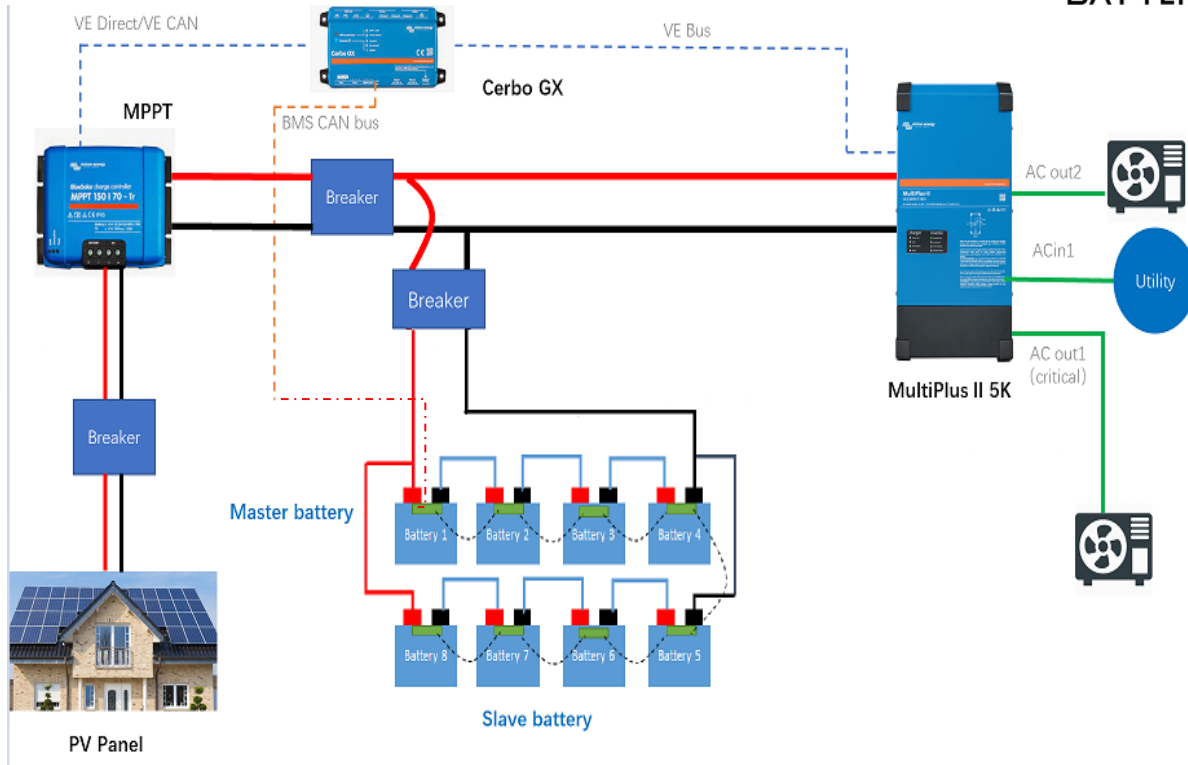3.1.1.1 Keep both inverter and battery completely off.

3.1.1.2 Make the communication cable and connect the system according to the following schematic.

Battery BMS CAN port		Victron GX device (VE.CAN Port / BMS CAN Port)	
Pin1	H	Pin7	H
Pin2	L	Pin8	L

Cable suggested:

TOPBAND official cable (optional）.

⚠CAUTION

This electrical connection in this diagram is only for illustration, please follow the Manual suggestions of related devices and operate in accordance with locally applicable connection requirements, standards, and directives.

3.1.2 Start system

3.1.2.1 Connect the wiring harness according to the User Manual

3.1.2.2 Press the Power on button to switch on all the batteries and then close the battery breaker if there is any.

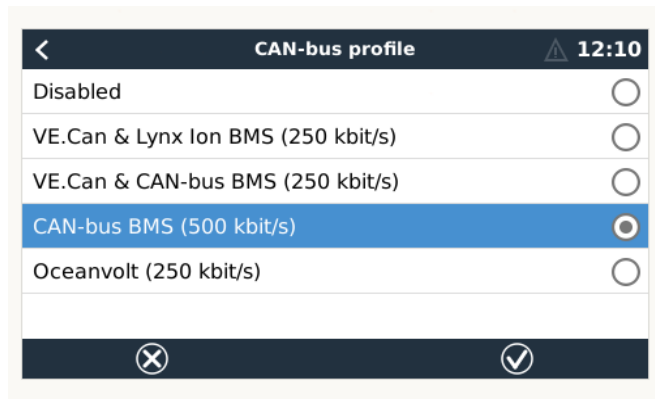3.1.2.3 close inverter soft switch, then turn on DC breaker to start MPPT.

3.1.2.4 Finish inverter setup procedures as section 3.1.3, close the AC and PV input.

3.1.3 Inverter setup

3.1.3.1 Confirm the Venus OS version, the minimum version should be higher than 2.40.
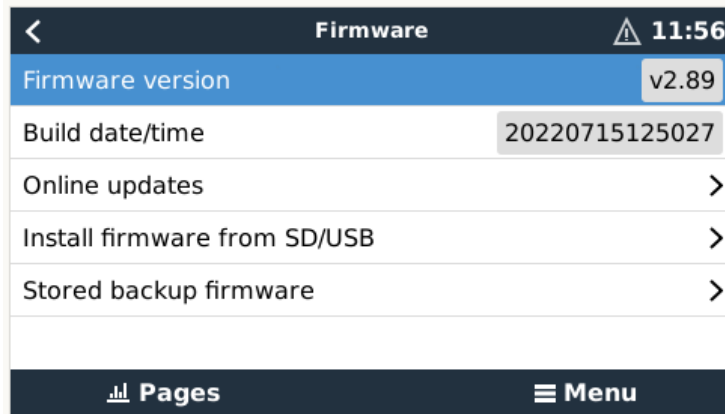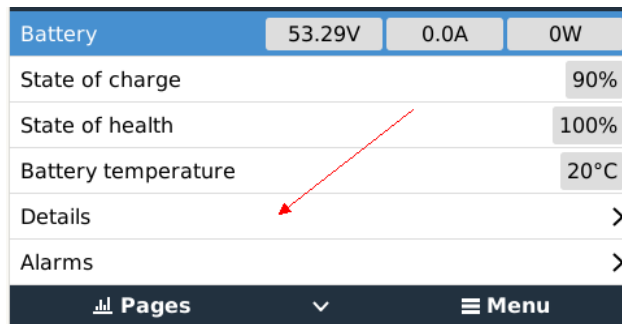
3.1.3.2 Select the baud rate: setting–services–VE.CAN / Can-bus BMS, select the 500 kbps.
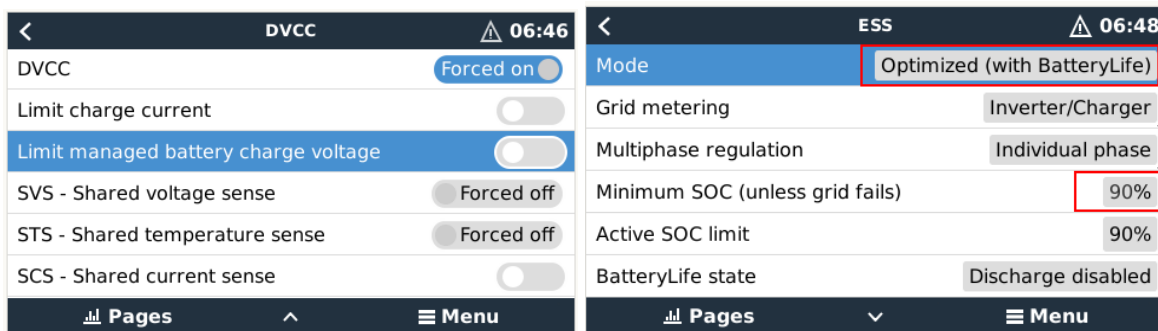

3.1.3.3 Find the battery in the Home Page of the GX device, check the **Online modules** number or **installed capacity (=rated capacity*parallel or series number)** information with actual battery number.
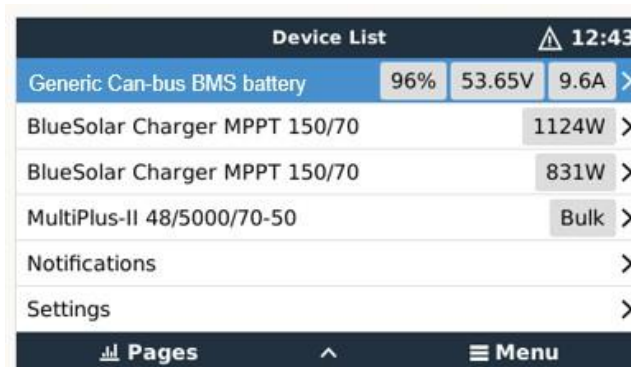
3.1.3.4 Enable DVCC. Set DVCC as in the picture below, if you've configured ESS mode, please enable 'Optimized with Battery life' and Minimum SOC should be ＞10%.

3.1.3.5 Configure MPPT via Victron connect app.

MPPT Parameter	Setting
Battery voltage.	48V
Absorption voltage	56.0V
Float voltage	54.6V
Auto equalization	Off
Others	Keep default or follow Victron manual

3.1.4 VEConfigure Settings

3.1.4.1 General tab

☐ Check the "Enable battery monitor" function

☐ Set the battery capacity to the total capacity of the battery.

☐ The other parameters ("State of charge when bulk finished" and "Charge efficiency") can be left to their default setting.

3.1.4.2 Charge tab

VEConfigure Charge Parameter	Setting
Battery type	Lithium
Charge curve	Fixed
Absorption voltage	56.0 V
Float voltage	54.6 V
Absorption time	1 Hr

3.1.4.3 Inverter tab

VEConfigure Inverter Parameter	Setting
DC input low shut-down	47V
DC input low restart	52V
DC input low pre-alarm*	51.2V

3.1.4.3 ESS assistant setting(if you are using your battery in a grid connected system)
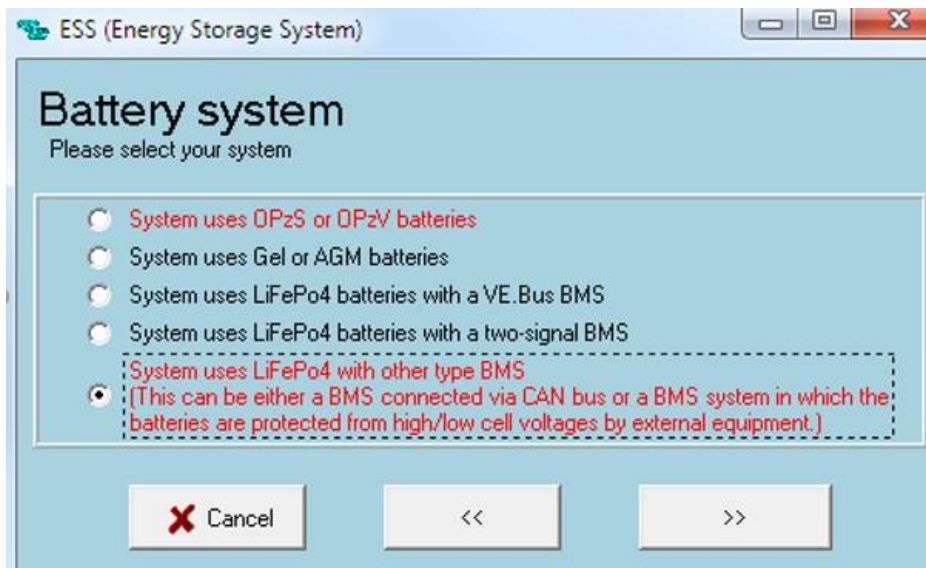
ESS Parameter	Settings
Dynamic cut-off	47V

Sustain voltage.	50V
Restart offset:	1.2V (Default)

Send all the settings to the inverter/charger, it will take efficiency after restart, then the system is running.

Frequently asked question:

1. ***The maximum charge and discharge current/voltage is always changing, the system derating at high or low temperature.***
   Yes, BMS has a dynamic target current and voltage according to different parameters to ensure the battery is working in the optimal status.

2. ***Battery maximum SOC is 98~99% and never goes to 100%SOC during daily cycle use.***
   This is normal and have no influence on capacity, usually BMS will calibrate the SOC to 100% when reached cut-off current or trigger HVP, however, to avoid battery from being overcharged and to extend the cycle life as longer as possible, we leave a room and set a charging profile to let battery not be charged at high voltage near full, please float the battery about 0.5~1 hour to calibrate the SOC.

3. ***GX device triggers 'High voltage' and 'cell unbalance' warning or alarm in rare cases.***
   This exists and happened at new batteries that are not yet balanced, please lower the Maximum charge voltage at DVCC tab and Float (keep battery charged) the battery via grid or generator. If not solved, please contact your supplier.

4. ***When having multiple batteries in parallel connection, the battery on the end can't be fully charged.***
   Pay attention to your wiring diagram, please always follow the manual wiring advises and choose proper cable size and pair.

5. ***When having multiple batteries connected and battery triggers an alarm, the Charge/discharge current limit to Zero, while 'number of battery blocks charge***

or discharge' in the GX devices battery detail tab showing only 1 or 2 batteries, is it wrong?

No, that's normal. Because there exist module(s) that trigger a major Alarm that needs the system to STOP charging or discharging or both.

6. **The current is 0A when connecting with a very small load in the situation of having multiple batteries in parallel, how to solve it?**

   Each BMS has a threshold current of 0.5A (~25W) before it begins to report, this leads to inaccurate display of the current.

7. **SOC is not accurate or suddenly jumps to 100% during charging.**

   This mostly happens in off-grid applications on batteries that have not been calibrated SOC for a long time or situations that are similar to Q6 with inverter in Idle mode or a small DC load like GX devices, we suggest fully charging at once the batteries per month.

8. **The system is still running when the GX shows 'internal failure' Warning.**

   This is our logic and this warning flag indicates there is 1 or more module(s) in communication offline from the system, the system will derate and until communication is recovered.

9. **When using a Cerbo GX, which port should I connect to the battery master? Should I terminate the port again?**

   BMS Can port is recommended, it is not required to insert the terminator again.

---

i