

Victron Energy and BLOOM AES Rackmount Batteries

UNDER CONSTRUCTION - PLEASE VISIT LATER



The BLOOM Lithium Iron Phosphate batteries are compatible with Victron products in various systems.

These instructions are intended to be used in conjunction with the product manuals supplied by BLOOM Power.

For the latest product details, installation, and operation manuals, visit the BLOOM Power website <https://bloompower.com/support/resources>

1. Introduction

The BLOOM LiFePO₄ battery includes a Battery Management System (BMS) that interfaces with the Victron GX device and can support multiple batteries connected in parallel.

These instructions provide information about integrating BLOOM Lithium batteries with Victron Energy devices in a closed-loop configuration using the LYNK II Communication Gateway set to communicate with Victron devices. The AES RACKMOUNT batteries can be used in an Energy Storage System (ESS) for self-consumption, Grid backup, and Off-grid applications.

Configuration, installation, service, and operating tasks should only be performed by qualified personnel in consultation with local authorities having jurisdiction and authorized dealers. Qualified personnel should have training, knowledge, and experience in:

- Installing electrical equipment
- Applying applicable installation codes
- Analyzing and reducing hazards involved in performing electrical work
- Installing and configuring batteries
- Installing and configuring systems activated by relays

No responsibility is assumed by BLOOM for any consequences arising from using this material. Read the AES RACKMOUNT Installation and Operation Manual and safety instructions before installing the battery. Read Victron manuals for guidance on product features, functions, and parameters and for using the product safely.

WARNING: HAZARD OF ELECTRICAL SHOCK AND FIRE

Qualified personnel must complete all wiring to ensure compliance with local codes and regulations.

Failure to follow these instructions can result in death or serious injury.

CAUTION: HAZARD OF EQUIPMENT DAMAGE

- Do not install the LYNK II outdoors.
- Do not connect any port of the LYNK II to a network with power over Ethernet (POE) or to a public telecommunication network.
- Do not run CAT5 cables or other cables connected to LYNK through a conduit that could be exposed to lightning strikes.

Failure to follow these instructions can damage equipment

2. Documentation

The LYNK II Communication Gateway is compatible with the following:

BLOOM Power Batteries

- AES RACKMOUNT 48-48-5120 / 48-48-5120-H

Victron Products

Control Panels

- Cerbo GX
- Color Control GX
- Ekrano GX
- Venus GX

Inverter-Chargers

- Quattro/Quattro II Inverter-Charger
- Multiplus/Multiplus II Inverter-Charger
- SmartSolar MPPT

Victron Energy Reference Documents:

- Quattro Inverter Charger Manual
- MultiPlus Inverter Charger Manual
- SmartSolar / BlueSolar Charger Controller Manual
- GX device (Cerbo GX) Manual

BLOOM Power Reference Documents:

- 808-0039 48-48-5120 AES RACKMOUNT Data Sheet
- 808-0040 48-48-5120-H AES RACKMOUNT (Heated) Data Sheet
- 805-0043 AES RACKMOUNT Installation and Operation Manual
- 805-0033 LYNK II Installation and Operation Manual
- 805-0040 LYNK II Victron (Solar) Manual
- 805-0051 LYNK II Victron (Mobile) Manual
- 805-0059 LYNK LITE Victron (Mobile) Manual

3. Overview

3.1 System Overview

The LYNK II Communication Gateway unlocks the full potential of a BLOOM Lithium battery by enabling the internal Battery Management System (BMS) to provide real-time data in a closed-loop configuration to other devices. This configuration allows hybrid inverter-chargers and solar charge controller systems to optimize control over the charging process in solar applications. LYNK II also enables the remote monitoring of BLOOM Lithium battery SOC and data logging of multiple sites using the data monitoring services offered by off-grid inverter systems. Discover Lithium batteries must be set up to work with power conversion and monitoring devices in either an open-loop or closed-loop configuration.

In an open-loop configuration, charge and discharge settings are set up manually through the controller for the power conversion device at the time of installation.

In a closed-loop configuration, the BLOOM Lithium battery's BMS sends the battery status over a network data connection with the power conversion device. Power conversion devices use the BLOOM Lithium battery BMS data to fine-tune the output of their charger and deliver other functional controls based on battery voltage, temperature, and percent State-of-Charge.

If communication between the BMS and Victron inverter-charger is interrupted, the Victron inverter-charger stops charging until communication is re-established.

3.2 Minimum Battery Capacity

Battery charge and discharge rates are managed automatically by the BLOOM Lithium battery and Victron Energy device. Using large solar arrays with battery banks that are too small can exceed the operating limits of the battery to charge and possibly lead to the BMS triggering over-current protection. Either curtail the charging below the operational limit of installed batteries, or the battery capacity must accept the maximum charge current of the system. This value is derived by adding the charge capacities of all inverter-chargers and solar charge controllers in the system. Additionally, battery peak capacity must support the surge requirements of the load attached to the inverter.

Match all inverter peak power values with the sum of all battery peak battery current values.

120 V Models	Inverter Peak	Max Continuous Discharge	Max Continuous Charge	AES RACKMOUNT Min 48-48-5120/48-48-5120-H
Quattro 48/3000/35 ¹	133 Adc	54 Adc	35 Adc	1
Quattro 48/5000/70 ²	220 Adc	88 Adc	70 Adc	1 ³
Quattro 48/10000/140 ⁴	434 Adc	174 Adc	140 Adc	2 ³
MultiPlus-II 48/3000/35 ⁵	121 Adc	53 Adc	35 Adc	1
MultiPlus-II 48/5000/70 ⁶	195 Adc	87 Adc	70 Adc	1

¹ Calculated based on max 6000W at 120 VAC peak output, 2400W at 120VAC continuous output, efficiency 94.0 %, and 35A DC max charging, as published in Victron Data Sheet as of 24-05-01.

² Calculated based on max 10000W at 120 VAC peak output, 4000W at 120VAC continuous output, efficiency 95.0 %, and 70A DC max charging, as published in Victron Data Sheet as of 24-05-01.

³ Depending on the application, another battery may be required as the battery peak and inverter peak values are on the edge.

⁴ Calculated based on max 20000W at 120 VAC peak output, 8000W at 120VAC continuous output, efficiency 96.0 %, and 70A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁵ Calculated based on max 5500W at 120 VAC peak output, 2400W at 120VAC continuous output, efficiency 95.0 %, and 35A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁶ Calculated based on max 9000W at 120 VAC peak output, 4000W at 120VAC continuous output, efficiency 96.0 %, and 70A DC max charging, as published in Victron Data Sheet as of 24-05-01.

230 V Models	Inverter Peak	Max Continuous Discharge	Max Continuous Charge	AES RACKMOUNT Min 48-48-5120/48-48-5120-H
Quattro 48/5000/70 ¹	220 Adc	88 Adc	70 Adc	1 ^{*2}
Quattro 48/8000/110 ³	347 Adc	139 Adc	110 Adc	2
Quattro 48/10000/140 ⁴	434 Adc	174 Adc	140 Adc	2 ²
Quattro 48/15000/200 ⁵	542 Adc	260 Adc	200 Adc	3
Quattro-II 48/5000/70 ⁶	195 Adc	87 Adc	70 Adc	1
MultiPlus 48/2000/25 ⁷	77 Adc	35 Adc	25 Adc	1
MultiPlus 48/3000/35 ⁸	132 Adc	53 Adc	35 Adc	1
MultiPlus 48/5000/70 ⁹	219 Adc	88 Adc	77 Adc	1 ²
MultiPlus-II (GX) 48/3000/35 ¹⁰	121 Adc	53 Adc	35 Adc	1

230 V Models	Inverter Peak	Max Continuous Discharge	Max Continuous Charge	AES RACKMOUNT Min 48-48-5120/48-48-5120-H
MultiPlus-II (GX) 48/5000/70 ¹¹	195 Adc	87 Adc	70 Adc	1
MultiPlus-II 48/8000/110 ¹²	329 Adc	140 Adc	110 Adc	2
MultiPlus-II 48/10000/140 ¹³	391 Adc	174 Adc	140 Adc	2
MultiPlus-II 48/15000/200 ¹⁴	592 Adc	263 Adc	200 Adc	3
Multi RS Solar 48/6000 Dual Tracker ¹⁵	199 Adc	117 Adc	100 Adc	2
EasySolar-II 48/3000/35 MPPT 250/70 GX ¹⁶	121 Adc	53 Adc	35 Adc	1
EasySolar-II 48/5000/70 MPPT 250/100 GX ¹⁷	195 Adc	87 Adc	70 Adc	1

¹ Calculated based on max 10000W at 230 VAC peak output, 4000W at 230VAC continuous output, efficiency 95.0 %, and 70A DC max charging, as published in Victron Data Sheet as of 24-05-01.

² Depending on the application, another battery may be required as the battery peak and inverter peak values are on the edge.

³ Calculated based on max 16000W at 230 VAC peak output, 6400W at 230VAC continuous output, efficiency 96.0 %, and 110A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁴ Calculated based on max 20000W at 230 VAC peak output, 8000W at 230VAC continuous output, efficiency 96.0 %, and 140A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁵ Calculated based on max 25000W at 230 VAC peak output, 12000W at 230VAC continuous output, efficiency 96.0 %, and 200A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁶ Calculated based on max 9000W at 230 VAC peak output, 4000W at 230VAC continuous output, efficiency 96.0 %, and 70A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁷ Calculated based on max 3500W at 230 VAC peak output, 1600W at 230VAC continuous output, efficiency 95.0 %, and 25A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁸ Calculated based on max 6000W at 230 VAC peak output, 2400W at 230VAC continuous output, efficiency 95.0 %, and 25A DC max charging, as published in Victron Data Sheet as of 24-05-01.

⁹ Calculated based on max 10000W at 230 VAC peak output, 4000W at 230VAC continuous output, efficiency 95.0 %, and 25A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹⁰ Calculated based on max 5500W at 230 VAC peak output, 2400W at 230VAC continuous output, efficiency 95.0 %, and 35A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹¹ Calculated based on max 9000W at 230 VAC peak output, 4000W at 230VAC continuous output,

efficiency 96.0 %, and 70A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹² Calculated based on max 15000W at 230 VAC peak output, 6400W at 230VAC continuous output, efficiency 95.0 %, and 110A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹³ Calculated based on max 18000W at 230 VAC peak output, 8000W at 230VAC continuous output, efficiency 96.0 %, and 35A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹⁴ Calculated based on max 27000W at 230 VAC peak output, 12000W at 230VAC continuous output, efficiency 95.0 %, and 35A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹⁵ Calculated based on max 9000W at 230 VAC peak output, 5300W at 230VAC continuous output, efficiency 94.0 %, and 100A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹⁶ Calculated based on max 5500W at 230 VAC peak output, 2400W at 230VAC continuous output, efficiency 95.0 %, and 100A DC max charging, as published in Victron Data Sheet as of 24-05-01.

¹⁷ Calculated based on max 9000W at 230 VAC peak output, 4000W at 230VAC continuous output, efficiency 96.0 %, and 100A DC max charging, as published in Victron Data Sheet as of 24-05-01.

277 V Models	Inverter Peak	Max Continuous Discharge	Max Continuous Charge	AES RACKMOUNT Min 48-48-5120/48-48-5120-H
Quattro 48/15000/200 ¹	542 Adc	260 Adc	200 Adc	3

¹ Calculated based on max 25000W at 277 VAC peak output, 12000W at 277VAC continuous output, efficiency 96.0 %, and 200A DC max charging, as published in Victron Data Sheet as of 24-05-01.

4 Configuring BLOOM Products

4.1 Configuring the LYNK II

Setting Up Jumpers

Jumpers configure termination for the LYNK Network and the CAN Out pin assignments. Follow the instructions in the LYNK II Installation and Operation Manual (805-0033) for accessing and configuring the header board with jumpers. Detailed pin configurations are included in the LYNK II manual and are repeated here for convenience.

NOTE:

- Disconnect power and all LYNK II Communication Gateway connections before configuring header boards and jumpers.
- The LYNK II Communication Gateway terminates the LYNK Network by default. Unless instructed, do not remove the termination jumper inside the LYNK II Communication Gateway.

Adjust the jumpers on the header board to assign CAN signals (CAN H, CAN L, CAN GND) to the pins of the RJ45 connector.

CAN Out RJ45 Pin	Header Jumper	RJ45 Pin
CAN L	H1 - 6-8	8
CAN H	H1 - 7-9	7
CAN GND	H3 - 1-3	3

<Image of LYNK II Pin assignments for communication with Victron Energy devices>

LYNK ACCESS Software

LYNK ACCESS software for 64-bit Windows 10 / 11 is required to configure the LYNK II settings for closed-loop CAN communication with Victron Energy devices.

1. Download the current version of LYNK ACCESS software from the Discover Energy Systems website to get the most up-to-date suite of available protocol configurations.
2. Using a USB cable with a Type-B mini-plug, connect the 64-bit Windows 10/11 device with the LYNK ACCESS software to the USB port on the LYNK II communication gateway. Ensure the LYNK II is powered and connected to the

correct Victron COM port (VE.Can).

1. Open LYNK ACCESS and confirm that only one LYNK device is connected to the computer.
2. Select the LYNK tab for optional configuration and settings. Select the blue gear icon in the upper right area of the CAN Settings tile.
3. Select the pre-configured Victron protocol and the baud rate (250 or 500 kbps) to complete the closed-loop configuration for LYNK II, then click SAVE.

NOTE: In most cases, the communication speed for the Victron protocol should be 250 kbps to match the networked Victron devices. However, if communication cannot be established at that speed, the Victron device may require a communication speed of 500 kbps.

4.2 Connecting LYNK II to the VE.CAN Network

Setting up the Battery

Refer to the LYNK II Installation and Operation Manual (805-0033) for instructions on network layouts, connections, and terminators of compatible Discover Lithium battery models. Some key points are repeated here for convenience.

- Connect at least one battery to the LYNK Port on the LYNK II.
- A network of batteries will communicate as one battery.
- May connect no more than one network of batteries to the LYNK II.
- Proper system function requires network termination – some batteries and devices may auto-terminate.
- LYNK II requires power from one of three possible sources (13-90 VDC power supply, a USB device, or AEBus Port or LYNK Port enabled Discover Lithium battery).
- BLOOM Lithium batteries must be set to ON to supply power and communicate with LYNK II.

<image of AES RACKMOUNT battery module>

LYNK II and AES RACKMOUNT battery modules are both internally terminated. No external termination is required when installing LYNK II with AES RACKMOUNT battery modules.

Before connecting LYNK II to the VE.Can network, ensure that the Victron GX device uses firmware version 2.89 or later. Also, ensure the CAN out pins on the LYNK II are configured correctly.

Insert one end of a CAT5e or higher communication cable into the LYNK II CAN out port and the other end into one of the two VE.Can ports (A-B) on the back of the Victron device. As the LYNK II is internally terminated, the external terminator provided with the GX is not required.

5 Configuring Victron Products

When the LYNK II is in a closed-loop network using the CANopen protocol, LYNK II will transmit real-time parameters from the BLOOM Lithium battery, including voltage, current, temperature, state of charge, and fault conditions, to a Victron Energy device. LYNK II also transmits charge voltage and current requests from the Discover Lithium battery to the Victron device.

If there is a break in communication between the Victron Energy device and the LYNK II, the Victron device stops charging. Charging only resumes after communication between the Victron device and the LYNK II communication gateway is restored. If communication cannot be restored, you may have to set the system to open loop until an installation professional is available.

As a precautionary measure, it is recommended that the inverter-charger be programmed with the correct voltage-based parameters before setting up the system to operate in a closed-loop configuration. If closed-loop communication fails, after the open loop parameters have been configured, turn the Victron device OFF and ON with the On/Off/Charger Only switch to enable the open-loop settings.

5.1 Setting Up Open-Loop Configuration

Whenever possible, using a closed-loop configuration with Discover batteries and Victron devices is recommended. However, an open-loop configuration may be required if the closed-loop communication system encounters an issue, such as a failure of the LYNK II gateway, cables or connections, or the Victron device.

In such cases, you may have to set the system to open loop until the issue is resolved. The following describes how to set up open-loop on Victron devices.

You will need the latest firmware on all connected devices. The following presumes familiarity with VE Configure software. After setting the voltage-based open-loop parameters using the VE Configure 3 software, 'send' all parameters to the inverter-charger and GX device and then restart the GX device.

Procedure

1. Set the Discover Lithium batteries to ON and set the inverter to ON.
2. Connect your computer to the Victron GX device or inverter.
3. On the computer, start the VE Configure 3 software configuration tool.
4. Enable and disable parameter values according to the tables below.
5. Send the parameters in the following tables to the Victron inverter-charger and GX device.
6. Toggle the On/Off/Charger Only switch to turn the inverter OFF and ON.

VE Configure 3 > General Tab

General Tab	48-48-5120 / 48-48-5120-H
[AC1] Overruled by remote ¹	Enable
[AC2] Overruled by remote ¹	Enable
Dynamic current limiter	Enable
External current sensor connected	Disable
Enable battery monitor	Enable
State of charge when Bulk finished ²	95%
Battery capacity	Number of batteries x 100 Ah
Charge efficiency ²	1.00

¹ Enable is recommended.

² Precautionary setting ignored during regular operation and communicating with BLOOM lithium batteries.

VE Configure 3 > General Tab

General Tab	48-48-5120 / 48-48-5120-H
[AC1] Overruled by remote ¹	Enable
[AC2] Overruled by remote ¹	Enable
Dynamic current limiter	Enable
External current sensor connected	Disable
Enable battery monitor	Enable
State of charge when Bulk finished ²	95%
Battery capacity	Number of batteries x 100 Ah
Charge efficiency ²	1.00

¹ Enable is recommended.

² Precautionary setting ignored during normal operation and communicating with BLOOM lithium batteries.

VE Configure 3 > Inverter Tab

Inverter Tab	48-48-5120 / 48-48-5120-H
DC input low shutdown ¹	48.0V
DC input low restart ²	52.0V
DC input low pre-alarm ³	49.5V
Enable AES ⁴	Disable

¹ The lowest operating voltage allowed. Increase voltage as required.

² Restart voltage after DC input low shutdown. Recommend setting to the minimum value (minimum varies according to the DC Input low shutdown value).

³ 49.5 V / 24.75 V value (approximately 10% SOC) will trigger a low battery warning. Increase or decrease as preferred.

⁴ 'Enable AES' has no relation to the AES RACKMOUNT battery. Refer to Victron manuals for information on the AES setting and function.

VE Configure 3 > Charger Tab

Charger Tab	48-48-5120 / 48-48-5120-H
Enable Charger	Enable
Battery Type ¹	Blank
Lithium batteries ¹	Enable
Charge curve ¹	Select: Fixed
Absorption Voltage ¹	55.2 V
Float Voltage ¹	53.6 V
Charge Current	Installed x 95 Ah
Repeated absorption time ^{1 2}	1.0 < 3.0 Hr
Repeated absorption interval ¹	7.0 Days
Absorption time ^{1 2}	1.0 < 3.0 Hr

¹ Precautionary settings ignored during regular operation and communication with Discover lithium batteries.

² The recommended minimum is 1.0 hour. Multiple batteries may require a longer time to achieve a smooth completion of charge.

5.1 Setting Up Closed-Loop Configuration

Refer to the latest Discover Energy Systems documentation for battery values and the latest Victron documentation for menu navigation and details on the setup procedure.

1. Set the Discover Lithium batteries to ON and the Victron GX device to ON.
2. Using a touch screen or other user interface of the GX device, set the VE.Can port and CAN-Bus BMS communication rate to 250 kbit/s to match the communication speed set up on the LYNK II communication gateway.

Device List > Settings > Services > VE.Can port > CAN-bus profile

- Select **VE.Can & CAN-bus BMS (250 kbit/s)**

(Select Victron solar inverters may operate with CAN-bus BMS 500 kbit/s)

3. Return to the Device List, and the Discover Lithium Battery should now appear as one of the devices.

Device List

NOTE: If Discover does not appear on the Device List, confirm that the CAT5e or higher communication cable is a normal patch type, not a cross-over type. Use manufactured cables to avoid bad crimps and reduce the risk of a poor connection.

5.1.1 Configurable Closed-Loop Settings

During regular operation, the BMS sets the battery's charge parameter limits, which the Victron GX device communicates to the inverter-charger and MPPT.

To optimize the performance of a Victron system, manually set the following DVCC menu items using the Victron GX device and reboot the system.

Device List > Settings > DVCC

DVCC Menu	Setting
DVCC (Distributed Voltage and Current Control)	Forced on
Limit charge current	ON ¹
Maximum charge current ¹	Installed number of Discover Lithium batteries x their rated Maximum Charge current or a lower value if system curtailment is required.
Limit managed battery charge voltage	Disabled
SVS - Shared voltage sense	Forced off ²
STS - Shared temperature sense	Forced off
SCS - Shared current sense	ON
SCS status	(Displays the current status)
Controlling BMS	Automatic Selection

¹ Limit charge current works across the system. MPPTs are automatically prioritized over the mains. In cases where the BMS requests a maximum charge current different from the user-configurable setting, it uses the lesser of the two.

² SVS should be set to OFF (Victron support has reported instances of conflicts when SVS is set to ON with a Lithium BMS).

6.0 Powering Up Equipment

- Make sure none of the BLOOM communication cables are attached.
- Connect MultiPlus/Quattro, GX device, MPPT etc to the batteries safely in accordance with the local electrical requirements/code.
- Connect all Victron communication cables at this time.
- Turn ON the Discover AES Battery press and hold switch on the battery/batteries for 2-3 seconds.
- Turn on Multi/Quattro

If this is the initial set up of the MultiPlus or Quattro apply power to Victron Equipment and update firmware to the devices listed to:

- MultiPlus / Quattro - version 459 or later.
- GX device (Cerbo GX, Venus GX, etc) to include version 2.40 or later.
- VE.Direct MPPT - version 1.42 or later.

This will also presume the VE Bus has already set up if required, such as:

- Dual Phase/Split Phase 180 degrees out
- 3 Phase

4.2 VE.Configure Settings

This section presumes familiarity with VEConfigure software. These settings are for an off-grid application. These parameters once set will become the default values used if communication with the AES battery is interrupted for some reason. During normal operation the charge characteristics are governed automatically by the GX device via DVCC, with instructions from the connected AES battery. However it is necessary to set the discharging parameters for DC input low shut-down found under the Inverter Tab. After setting the parameters, 'send' all parameters to the inverter and GX device. Restart the GX device after completion.

Also keep in mind the settings below are for 1 unit only. If the system is a multiple inverter/charger configuration, determine the max charge current for all units installed does not exceed the Discover battery charge current limit .

General Tab	44-24-2800	42-48-6650
Overruled by remote (1)	Enable	Enable
Enable battery monitor	Enable	Enable
SoC when Bulk finished (2)	95%	95%
Total battery capacity (per battery installed)	installed x 110 Ah	installed x 130 Ah

Charge efficiency (2)| 95% |95%|

Inverter Tab	44-24-2800	42-48-6650
DC input low shut-down (3)	24.0 V	48.0 V
DC Input low restart (4)	26.0 V	52.0 V
DC input low pre-alarm (5)	25.5 V	51.0 V
Enable AES (6)	Disable	Disable

Charger Tab	44-24-2800	42-48-6650
Enable charger	Enable	Enable
Battery Type (2)	Blank	Blank
Lithium batteries (2)	Enable	Enable
Charge curve (2)	Select: Fixed	Select: Fixed
Absorption voltage	(2) 27.2 V	54.4 V
Float voltage (2)	26.8 V	53.6 V
Charge current per battery installed (Recommended < Maximum)	installed x (78 A < 110 A)	installed x (92 A < 130 A)
Repeated absorption time (2) (7)	1.0 < 3.0 Hr	1.0 < 3.0 Hr
Repeated absorption interval (2)	7.0 Days	7.0 Days
Absorption time (2) (7)	1.0 < 3.0 Hr	1.0 < 3.0 Hr

(1) Enabled is recommended. (2) Precautionary setting as they are ignored during normal operation and communication with AES Battery. (3) The lowest operating voltage allowed, increase voltage as required. (4) Restart voltage after DC input low shut-down, recommended to be set to the minimum value (minimum varies according to the DC Input low shut-down value). (5) 51.0 V value (approximately 15% SoC) will trigger low battery warning, increase or decrease as preferred. (6) 'Enable AES' has no relation to the AES Battery, refer to Victron manuals for information on setting and function. (7) The recommended minimum is 1.0 hour. A longer period of time may be required to compensate for multiple batteries to achieve a smooth completion of charge.

NOTE: Confirm the Float Voltage after completing the installation of any Victron 'Assistants', and if necessary reset the Float Voltage back to 26.8 V / 53.6 V.

4.3 VE.Direct MPPT Settings

During normal operation the MPPT charge characteristics are governed by the GX device via DVCC, with instructions from the connected AES battery. The settings below are precautionary. This section presumes familiarity with VictronConnect (Bluetooth App) used to configure, monitor and diagnose Victron MPPT products which feature Blue-tooth, or are equipped with a VE.Direct Port. **NOTE:** VE.Can MPPTs cannot be used and are not yet supported

The max charge current is dictated by the size of MPPTs installed. If multiple MPPTs are installed verify all combined controllers would not exceed the battery limit.

MPPT Charge Controller Settings	44-24-2800	42-48-6650
Battery voltage	24 V	48 V
Max current per battery installed (Recommended < Maximum) (9)	installed x (78 A < 110 A)	installed x (92 A < 130 A)
Charger enabled	Enabled	Enabled
Battery preset	User Defined	User Defined
Absorption voltage	27.2 V	54.8 V
Maximum absorption time (10)	v 1.0 < 3.0 Hr	1.0 < 3.0 Hr
Float voltage	26.8 V	54.0 V
Equalization voltage	26.8 V	54.0 V
Auto equalization	Disabled	Disabled
Temperature compensation	Disabled	Disabled
Low temperature cut off	5 C	5 C

(9) May be set to lower value if necessitated by charger controller size. (10) Duration of absorption period after the bulk charge interval. The recommended minimum is 1.0 hour. A longer period of time may be required to compensate for multiple batteries to achieve a smooth completion of charge.

Turn OFF all Victron equipment. Turn OFF the Discover AES Battery press and hold switch on the battery/batteries for 2-3 seconds

5. Installing LYNK and Connecting LYNK to the Victron Network

5.1 Installing the LYNK Edge Card

The LYNK Edge Card for Victron is a Slot 0 Type which only inserts into the left side slot on the bottom



of the LYNK Communication Gateway.



Slot 0 Type

NOTE: The LYNK Edge Card type to be used is determine by the brand of power conversion equipment.

- If LYNK Edge Card is in the wrong slot, it will not function.
- If LYNK Edge Card is not firmly seated, it will not function.

Choose a clean, dry, easily accessible indoor location. All the communication ports on the LYNK are accessible from the bottom of the device when mounted on a wall or DIN rail. Clearance of at least 50 mm (2 inches) below the device is needed to allow for the bend radius of cables connected to LYNK.

With LYNK disconnected from all devices remove cover and insert the LYNK Edge Card in the correct slot. This card has a RJ45 terminal built into the card. Ensure it is firmly seated into the internal connecting slot. Replace with provided slotted Edge Card cover after mounting LYNK Edge Card.

Install and network the AES LiFePO4 batteries as described in the 805-0015 AES LiFePO4 Battery Manual. Connect the AES LYNK Communication Gateway to the AES LiFePO4 Battery and power up as described in the 805-0017 LYNK Communication Gateway Users Manual.

CAUTION: HAZARD OF EQUIPMENT DAMAGE

- Do not plug the AEBus RJ-45 cable terminator into the 10/100 Ethernet port of the LYNK.
- Do not connect a CAT5 cable from the 10/100 Ethernet port of the LYNK to the WAN or MODEM port of a network router.
- Turn OFF all devices before connecting cables or inserting an Edge Card.

Failure to follow these instructions can damage equipment.

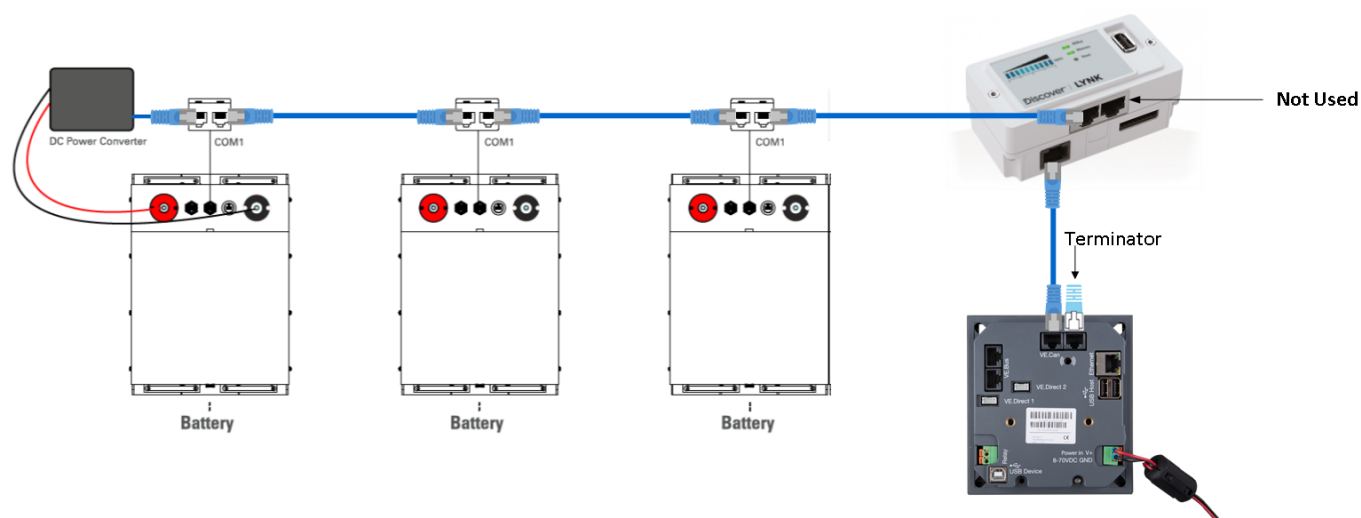
NOTE: Power electronics are not AEBus devices and should not be connected to AEBus.

5.2 Connecting LYNK to the Victron Network

Before connecting LYNK to the Victron Network ensure that the firmware for all Victron devices is up to date.

Insert one end of a CAT5 communication cable into the LYNK Edge Card port and the other end into one of the two VE.Can ports on the back of the GX device (Cerbo GX). Use the terminator provided

with the GX device to terminate the network by plugging it into the second VE.Can port. See diagram below.



Note: Discover DC Power Converter and Lynx Gateway are Internally Terminated

NOTE: Discover DC Power Converter and Lynx Gateway are internally terminated

6. System Set Up

6.1 Synchronizing the Victron System with the AES Battery

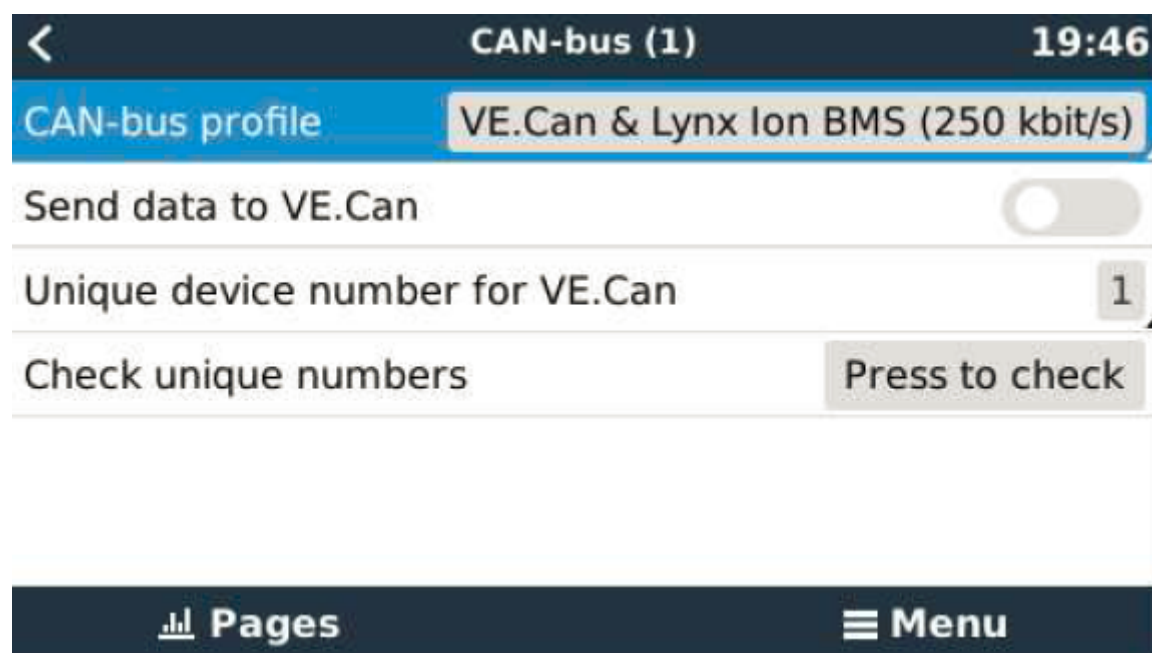
- Turn the Discover AES battery to ON press and hold switch on the battery/batteries for 2-3 seconds.
- Turn on all Victron equipment.

Through the VRM or a physical GX device access the System Setup menu in the Remote Console. Scroll down to select each item and then set as indicated.

* **Select “CAN-bus (1)”**



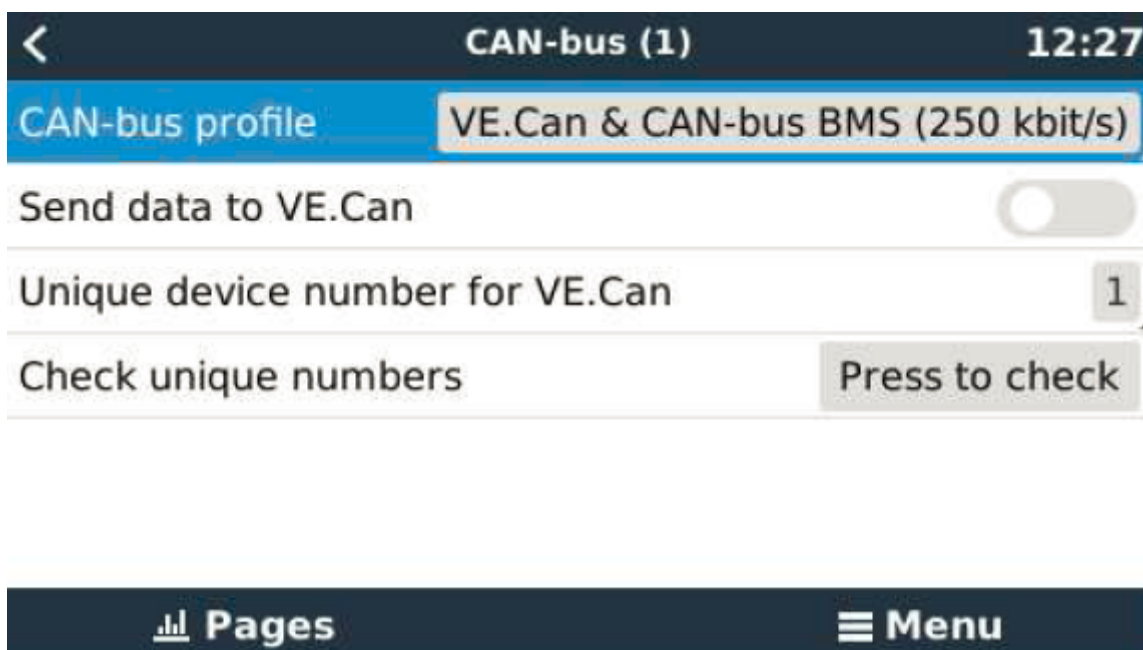
* Select “CAN-bus Profile” to edit



* Within the “CAN-bus Profile” choose “VE CAN & CAN-bus”



* “VE CAN-bus & CAN-bus BMS (250 kbit/s)” should appear on the “CAN-bus(1) menu



Return to the Device List and the GX device should display Discover AES as one of the devices along with the battery SoC, Voltage and Amps. If you have multiple batteries a single entry will show up, which represents all batteries.

NOTE: If Discover does not appear on the Device List, confirm that the CAT5 communication cable is a normal patch type and not a cross over type. Use manufactured cables to avoid bad crimps and reduce the risk of a poor connection.

The parameters option within the battery page shows the actual battery charge limits. If you have multiple batteries a single entry will show up, which represents all batteries.

NOTE: Battery Low Voltage value displayed is the BMS value, the actual discharge voltage limit is governed by the DC input low shut-down setting.

Once the VE.Can and CAN-bus bit rate is set, communication of the AES battery parameters will be automatic.

During normal operation, the charge parameter limits are set by the BMS of the AES battery and communicated through the system by the GX device to the inverter/charger and MPPT.

Navigate from the Device List screen > Settings > System Setup>DVCC From the System Setup menu scroll down to select each item and verify the system automatically updated in the DVCC. Note this was accomplished by the v2.40 Venus OS firmware upgrade to include.

- DVCC - Distributed Voltage and Current Control is forced "ON"

Within the DVCC menu verify:

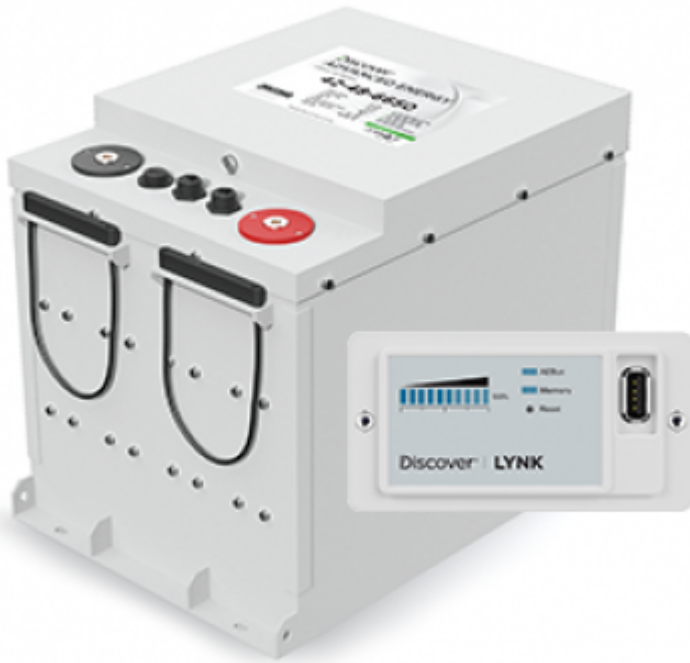
- Limit Charge Current is "ON" **Note** If off-grid or have a generator you might want to turn "ON"
- Max charge current: Installed number of AES batteries x (42-48-6650: 92A < 130A) or (44-24-2800: 78 A < 110 A (8)
- SVS - Shared voltage sense: Forced "OFF"
- STS - Shared temperature sense: Forced "OFF"
- SCS - Shared Current Sense: 'On'
- SCS Status - Should show "Disabled (External Control)"

(8) Limit charge current works across the whole system. MPPTs are automatically prioritized over the mains. In case the AES BMS requests a maximum charge current that is different from the user-configurable setting, the lower of the two will be used. **NOTE:** To avoid conflicting network information and data, do not use a Victron BMV battery monitor when using AES LYNK Communication Gateway.

* Reboot the GX device after completion of all steps



Victron Energy and Discover AES Batteries



The Discover AES range of Lithium Iron Phosphate batteries is compatible with Victron products in various systems.

These instructions are intended to be used in conjunction with the product manual(s) supplied by Discover Battery.

For the latest product details, installation and operation manuals, visit the Discover Battery website <https://discoverbattery.com> » Solutions » Solar » Resources or use this direct link <https://solar.discoverbattery.com/aes-lifepo4-batteries-renewable-energy/>

1. Introduction

The Discover AES LiFePO₄ Battery includes a Battery Management System (BMS) within each battery pack. The BMS interfaces with the Victron GX device and can support multiple batteries connected in parallel.

These instructions provide information about the integration of Discover AES Lithium batteries with Victron Energy devices in a Closed Loop configuration using the AES LYNK Communication Gateway with installed AES LYNK Edge Card for Victron. AES batteries can be used in an Energy Storage System (ESS) for self consumption, Grid backup and Off-grid applications. These instructions apply to an off-grid application.

NOTE: In a Victron networked system the charging variables will be managed automatically by the AES battery BMS and the GX device. Discharging variables are managed by the set up of the Victron inverter.

2. Documentation

Victron Energy Reference Documents:

- Quattro Inverter Charge Manual
- MultiPlus Inverter Charge Manual
- SmartSolar / BlueSolar Charge Controller Manual
- GX device (Cerbo GX) Manual

Discover Reference Documents:

- Discover Energy 808-0004 42-48-6650 Data Sheet
- Discover Energy 808-0005 44-24-2800 Data Sheet
- Discover Energy 805-0015 AES LiFePO4 Battery 44-24-2800 42-48-6650 Manual
- Discover Energy 805-0017 AES LYNK Communication Gateway User Manual
- Discover Energy 805-0020 LYNK Edge Card Victron User Manual

Certain configuration, installations, service, and operating tasks should only be performed by qualified personnel in consultation with local utilities and/or authorized dealers. Qualified personnel should have training, knowledge, and experience in:

- Installing electrical equipment
- Applying applicable installation codes
- Analyzing and reducing hazards involved in performing electrical work
- Installing and configuring batteries

No responsibility is assumed by Discover for any consequences arising out of the use of this material. Read AES Battery Manual and Safety instructions before installing the battery. Read Victron manuals for guidance on product features, functions, parameters and how to use the product safely.

WARNING: HAZARD OF ELECTRICAL SHOCK AND FIRE

- Connect LYNK to only Safety Extra Low Voltage (SELV) circuits and power sources.
- All wiring must be completed by qualified personnel to ensure compliance with applicable installation codes and regulations.

Failure to follow these instructions can result in death or serious injury.

CAUTION: HAZARD OF EQUIPMENT DAMAGE

- Do not install LYNK outdoors.
- Do not connect any port of the LYNK to a network with power over Ethernet (POE) or to a public telecommunication network.
- Do not run CAT5 cables or other cables connected to LYNK through conduit that could be exposed to lightning strikes.

Failure to follow these instructions can damage equipment

3. Overview

3.1 System Overview

The AES LYNK Communication Gateway unlocks the full potential of a Discover AES LiFePO4 Battery by enabling the internal Battery Management System (BMS) to optimize the charge and discharge configurations of the world's best inverter chargers and solar charge controller systems in a closed loop configuration.

AES LiFePO4 batteries must be set up to work with Power Conversion and Monitoring devices in either an Open Loop or Closed Loop configuration.

AES LiFePO4 battery charge and discharge settings in a Open Loop configuration are set up manually through the controller for the Power Conversion device at the time of installation. This is commonly referred to as a 'lead acid drop-in replacement' configuration. For information on Open Loop set up with Victron devices please visit the Discover Battery web site www.discoverbattery.com » Solutions » Solar » Resources » Application Note »> Discover-AES-Lithium-Open-Loop-Integration-Victron-Energy.

In a Closed Loop configuration the battery charge and discharge rates and settings are dynamically controlled by the BMS of the AES LiFePO4 Battery over a connection with the power conversion devices in the network. These instructions are for a Closed Loop configuration.

To connect with the communication network of a specific brand of inverter charger or solar charge controller, the LYNK Communication Gateway requires an AES LYNK Edge Card with the appropriate communication port.

3.2 Minimum Battery Capacity

Battery charge and discharge rates are managed automatically by the AES LiFePO4 Battery and Victron GX device (Cerbo GX). Using very large solar arrays with battery banks that are too small can exceed the operating limits of the battery to charge and possibly lead to the BMS triggering over-current protection. Battery capacity must be sized to accept the maximum charge current of the system, or the the charging devices must be curtailed to charge below the operating limit of the installed batteries. This value is derived by adding together the charge capacities of all inverter/chargers and solar charge controllers in the system. Additionally, battery peak capacity must be sized to support the surge requirements demanded by the load attached to the inverter. Match the sum of all inverter peak power values with the sum of all battery peak battery current values.

Model	Inverter Peak*	Charger	1-Phase Min 42-48-6650	3-Phase Min 42-48-6650
MultiPlus 48/3000/35	136 Adc	35 Adc	1	2
MultiPlus / Quattro 48/5000/70	226 Adc	70 Adc	1	3
Quattro 48/8000/110	362 Adc	110 Adc	2	4
Quattro 48/10000/140	452 Adc	140 Adc	2	5
Quattro 48/15000/200	566 Adc	200 Adc	2	6

*92% Efficiency at 48V

Model	Inverter Peak*	Charger	1-Phase Min 44-44-2800
MultiPlus / Quattro 24/3000/70	271 Adc	70 Adc	1
MultiPlus / Quattro 24/5000/120	452 Adc	120 Adc	2
MultiPlus / Quattro 24/8000/200	724 Adc	200 Adc	3

*92% Efficiency at 24V

4 Configuring Victron Products

4.1 Powering Up Equipment

- Make sure none of the Discover AES communication cables are installed.
- Connect MultiPlus/Quattro, GX device, MPPT etc to the batteries in a safe way in accordance with the local electrical requirements/code.
- Connect all Victron communication cables at this time.
- Turn ON the Discover AES Battery press and hold switch on the battery/batteries for 2-3 seconds.
- Turn on Multi/Quattro

If this is the initial set up of the MultiPlus or Quattro apply power to Victron Equipment and update firmware to the devices listed to:

- MultiPlus / Quattro - version 459 or later.
- GX device (Cerbo GX, Venus GX, etc) to include version 2.40 or later.
- VE.Direct MPPT - version 1.42 or later.

This will also presume the VE Bus has already set up if required, such as:

- Dual Phase/Split Phase 180 degrees out
- 3 Phase

4.2 VE.Configure Settings

This section presumes familiarity with VEConfigure software. These settings are for an off-grid application. These parameters once set will become the default values used if communication with the AES battery is interrupted for some reason. During normal operation the charge characteristics are governed automatically by the GX device via DVCC, with instructions from the connected AES battery. However it is necessary to set the discharging parameters for DC input low shut-down found under the Inverter Tab. After setting the parameters, 'send' all parameters to the inverter and GX device. Restart the GX device after completion.

Also keep in mind the settings below are for 1 unit only. If the system is a multiple inverter/charger configuration, determine the max charge current for all units installed does not exceed the Discover battery charge current limit .

General Tab	44-24-2800	42-48-6650
Overruled by remote (1)	Enable	Enable

General Tab	44-24-2800	42-48-6650
Enable battery monitor	Enable	Enable
SoC when Bulk finished (2)	95%	95%
Total battery capacity (per battery installed)	installed x 110 Ah	installed x 130 Ah

Charge efficiency (2) | 95% | 95% |

Inverter Tab	44-24-2800	42-48-6650
DC input low shut-down (3)	24.0 V	48.0 V
DC Input low restart (4)	26.0 V	52.0 V
DC input low pre-alarm (5)	25.5 V	51.0 V
Enable AES (6)	Disable	Disable

Charger Tab	44-24-2800	42-48-6650
Enable charger	Enable	Enable
Battery Type (2)	Blank	Blank
Lithium batteries (2)	Enable	Enable
Charge curve (2)	Select: Fixed	Select: Fixed
Absorption voltage	(2) 27.2 V	54.4 V
Float voltage (2)	26.8 V	53.6 V
Charge current per battery installed (Recommended < Maximum)	installed x (78 A < 110 A)	installed x (92 A < 130 A)
Repeated absorption time (2) (7)	1.0 < 3.0 Hr	1.0 < 3.0 Hr
Repeated absorption interval (2)	7.0 Days	7.0 Days
Absorption time (2) (7)	1.0 < 3.0 Hr	1.0 < 3.0 Hr

(1) Enabled is recommended. (2) Precautionary setting as they are ignored during normal operation and communication with AES Battery. (3) The lowest operating voltage allowed, increase voltage as required. (4) Restart voltage after DC input low shut-down, recommended to be set to the minimum value (minimum varies according to the DC Input low shut-down value). (5) 51.0 V value (approximately 15% SoC) will trigger low battery warning, increase or decrease as preferred. (6) 'Enable AES' has no relation to the AES Battery, refer to Victron manuals for information on setting and function. (7) The recommended minimum is 1.0 hour. A longer period of time may be required to compensate for multiple batteries to achieve a smooth completion of charge.

NOTE: Confirm the Float Voltage after completing the installation of any Victron 'Assistants', and if necessary reset the Float Voltage back to 26.8 V / 53.6 V.

4.3 VE.Direct MPPT Settings

During normal operation the MPPT charge characteristics are governed by the GX device via DVCC, with instructions from the connected AES battery. The settings below are precautionary. This section presumes familiarity with VictronConnect (Bluetooth App) used to configure, monitor and diagnose Victron MPPT products which feature Blue-tooth, or are equipped with a VE.Direct Port. **NOTE:** VE.Can MPPTs cannot be used and are not yet supported

The max charge current is dictated by the size of MPPTs installed. If multiple MPPTs are installed verify all combined controllers would not exceed the battery limit.

MPPT Charge Controller Settings	44-24-2800	42-48-6650
Battery voltage	24 V	48 V
Max current per battery installed (Recommended < Maximum) (9)	installed x (78 A < 110 A)	installed x (92 A < 130 A)
Charger enabled	Enabled	Enabled
Battery preset	User Defined	User Defined
Absorption voltage	27.2 V	54.8 V
Maximum absorption time (10)	v 1.0 < 3.0 Hr	1.0 < 3.0 Hr
Float voltage	26.8 V	54.0 V
Equalization voltage	26.8 V	54.0 V
Auto equalization	Disabled	Disabled
Temperature compensation	Disabled	Disabled
Low temperature cut off	5 C	5 C

(9) May be set to lower value if necessitated by charger controller size. (10) Duration of absorption period after the bulk charge interval. The recommended minimum is 1.0 hour. A longer period of time may be required to compensate for multiple batteries to achieve a smooth completion of charge.

Turn OFF all Victron equipment. Turn OFF the Discover AES Battery press and hold switch on the battery/batteries for 2-3 seconds

5. Installing LYNK and Connecting LYNK to the Victron Network

5.1 Installing the LYNK Edge Card

The LYNK Edge Card for Victron is a Slot 0 Type which only inserts into the left side slot on the bottom of the LYNK Communication Gateway.



NOTE: The LYNK Edge Card type to be used is determine by the brand of power conversion equipment.

- If LYNK Edge Card is in the wrong slot, it will not function.
- If LYNK Edge Card is not firmly seated, it will not function.

Choose a clean, dry, easily accessible indoor location. All the communication ports on the LYNK are accessible from the bottom of the device when mounted on a wall or DIN rail. Clearance of at least 50 mm (2 inches) below the device is needed to allow for the bend radius of cables connected to LYNK.

With LYNK disconnected from all devices remove cover and insert the LYNK Edge Card in the correct slot. This card has a RJ45 terminal built into the card. Ensure it is firmly seated into the internal connecting slot. Replace with provided slotted Edge Card cover after mounting LYNK Edge Card.

Install and network the AES LiFePO4 batteries as described in the 805-0015 AES LiFePO4 Battery Manual. Connect the AES LYNK Communication Gateway to the AES LiFePO4 Battery and power up as described in the 805-0017 LYNK Communication Gateway Users Manual.

CAUTION: HAZARD OF EQUIPMENT DAMAGE

- Do not plug the AEBus RJ-45 cable terminator into the 10/100 Ethernet port of the LYNK.
- Do not connect a CAT5 cable from the 10/100 Ethernet port of the LYNK to the WAN or MODEM port of a network router.
- Turn OFF all devices before connecting cables or inserting an Edge Card.

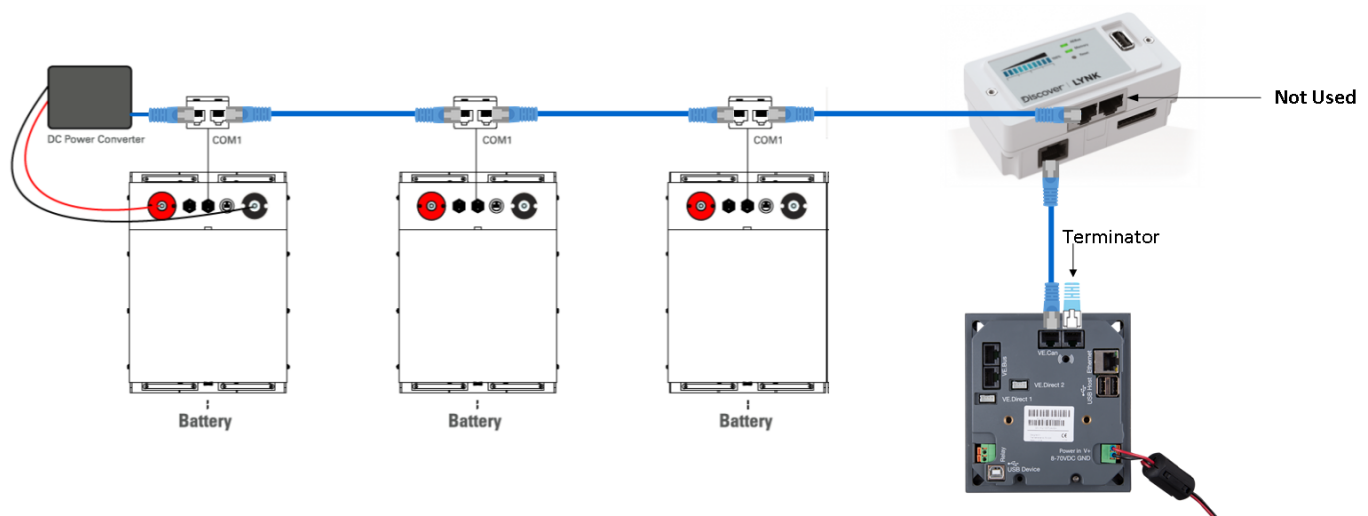
Failure to follow these instructions can damage equipment.

NOTE: Power electronics are not AEBus devices and should not be connected to AEBus.

5.2 Connecting LYNK to the Victron Network

Before connecting LYNK to the Victron Network ensure that the firmware for all Victron devices is up to date.

Insert one end of a CAT5 communication cable into the LYNK Edge Card port and the other end into one of the two VE.Can ports on the back of the GX device (Cerbo GX). Use the terminator provided with the GX device to terminate the network by plugging it into the second VE.Can port. See diagram below.



Note: Discover DC Power Converter and Lynx Gateway are Internally Terminated

NOTE: Discover DC Power Converter and Lynk Gateway are internally terminated

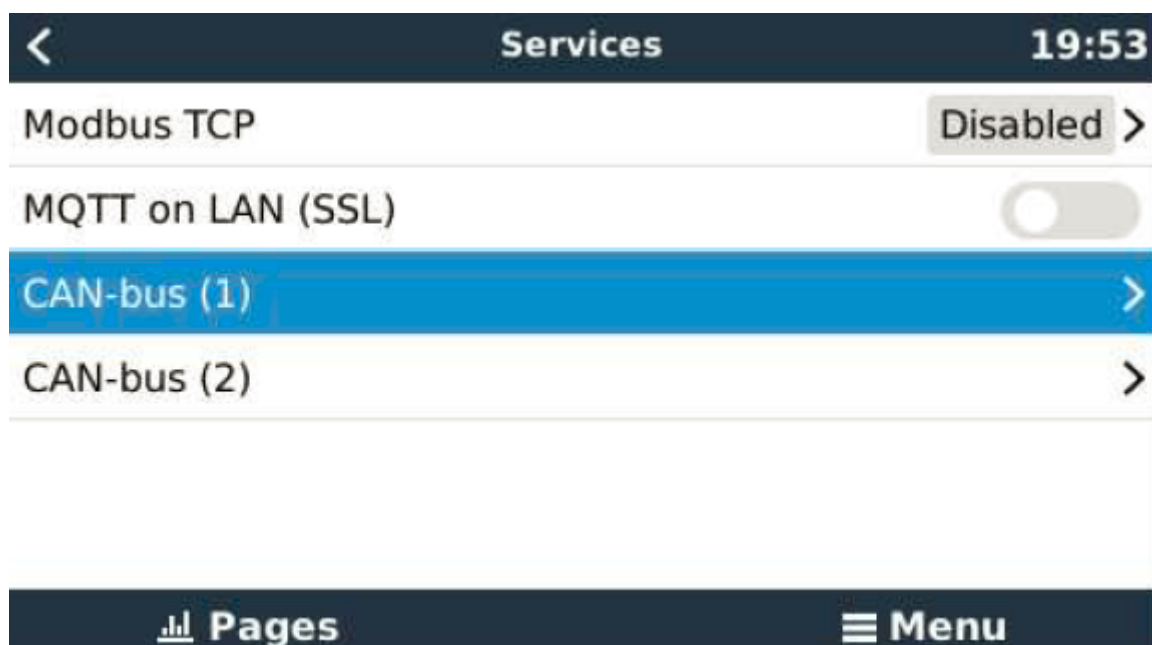
6. System Set Up

6.1 Synchronizing the Victron System with the AES Battery

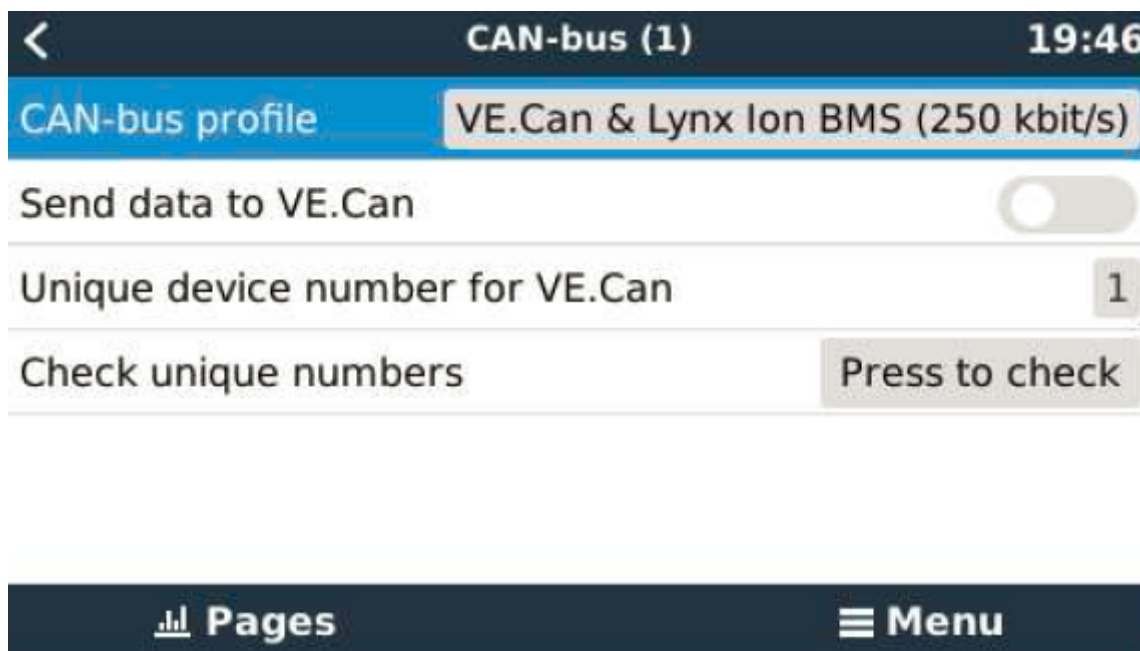
- Turn the Discover AES battery to ON press and hold switch on the battery/batteries for 2-3 seconds.
- Turn on all Victron equipment.

Through the VRM or a physical GX device access the System Setup menu in the Remote Console. Scroll down to select each item and then set as indicated.

* **Select “CAN-bus (1)”**



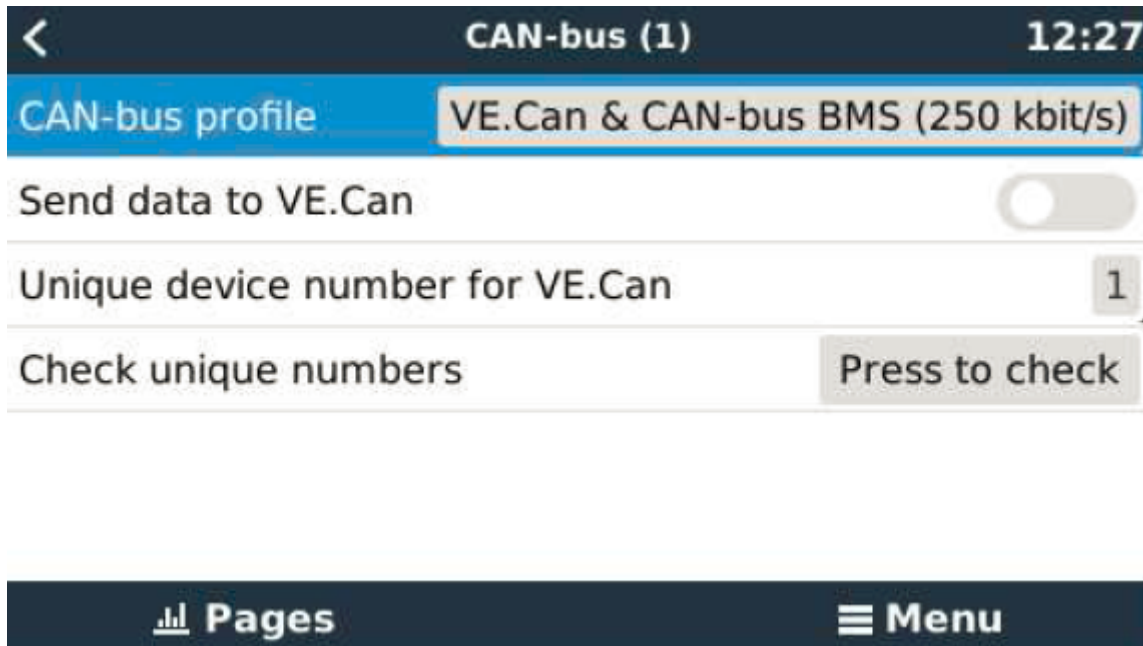
* **Select “CAN-bus Profile” to edit**



* Within the "CAN-bus Profile" choose "VE CAN & CAN-bus"



* "VE CAN-bus & CAN-bus BMS (250 kbit/s)" should appear on the "CAN-bus(1) menu



Return to the Device List and the GX device should display Discover AES as one of the devices along with the battery SoC, Voltage and Amps. If you have multiple batteries a single entry will show up, which represents all batteries.

NOTE: If Discover does not appear on the Device List, confirm that the CAT5 communication cable is a normal patch type and not a cross over type. Use manufactured cables to avoid bad crimps and reduce the risk of a poor connection.

The parameters option within the battery page shows the actual battery charge limits. If you have multiple batteries a single entry will show up, which represents all batteries.

NOTE: Battery Low Voltage value displayed is the BMS value, the actual discharge voltage limit is governed by the DC input low shut-down setting.

Once the VE.Can and CAN-bus bit rate is set, communication of the AES battery parameters will be automatic.

During normal operation, the charge parameter limits are set by the BMS of the AES battery and communicated through the system by the GX device to the inverter/charger and MPPT.

Navigate from the Device List screen > Settings > System Setup>DVCC From the System Setup menu scroll down to select each item and verify the system automatically updated in the DVCC. Note this was accomplished by the v2.40 Venus OS firmware upgrade to include.

- DVCC - Distributed Voltage and Current Control is forced "ON"

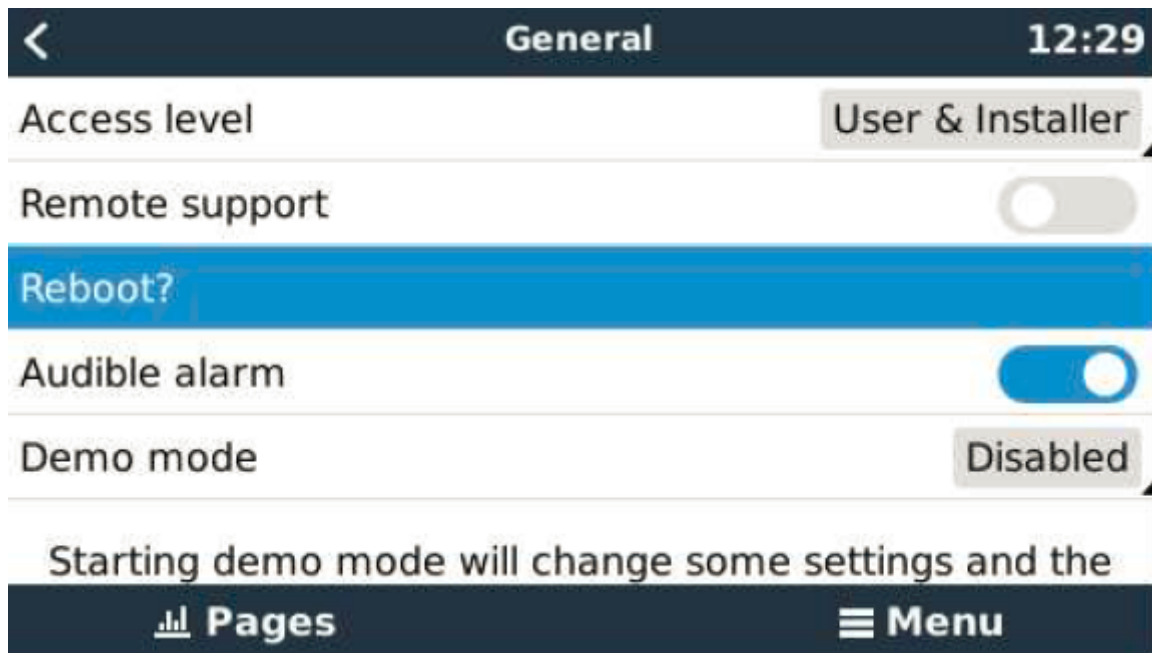
Within the DVCC menu verify:

- Limit Charge Current is "ON" **Note** If off-grid or have a generator you might want to turn "ON"
- Max charge current: Installed number of AES batteries x (42-48-6650: 92A < 130A) or (44-24-2800: 78 A < 110 A (8)
- SVS - Shared voltage sense: Forced "OFF"
- STS - Shared temperature sense: Forced "OFF"
- SCS - Shared Current Sense: 'On'

- SCS Status - Should show "Disabled (External Control)"

(8) Limit charge current works across the whole system. MPPTs are automatically prioritized over the mains. In case the AES BMS requests a maximum charge current that is different from the user-configurable setting, the lower of the two will be used. **NOTE:** To avoid conflicting network information and data, do not use a Victron BMV battery monitor when using AES LYNK Communication Gateway.

* Reboot the GX device after completion of all steps



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