

# **LFP CONNECT CARD VICTRON ENERGY USER MANUAL**

The logo for Rolls, featuring the word "Rolls" in a white, elegant script font with a black outline, set against a red background.

**BATTERY ENGINEERING**

Integration of Rolls LFP batteries with Victron Energy devices in a closed-loop configuration using the LFP Connect gateway with installed LFP Connect Card for Victron.

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PN: LFP-CCRD-VCTRN

*Rolls*

## I.0 SAFETY

### 1.1 Warnings, Cautions and Notes

<b>▲ WARNING</b>
Death or Injury
<b>▲ CAUTION</b>
Equipment Damage
<b>▲ NOTE</b>
Additional Information

### 1.2 General Warnings

<b>▲ WARNING</b>
<p><b>HAZARD OF ELECTRICAL SHOCK AND FIRE</b> Connect LFP Connect gateway 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.</p> <p><b>Failure to follow these instructions will result in death or serious injury.</b></p>
<b>▲ CAUTION</b>
<p><b>HAZARD OF EQUIPMENT DAMAGE</b> Do not install LFP Connect gateway outdoors. Do not connect any port of the LFP Connect to a network with power over Ethernet (POE) or to a public telecommunication network. Do not run CAT5 cables or other cables connected to LFP Connect through conduit that could be exposed to lightning strikes.</p> <p><b>Failure to follow these instructions will damage equipment.</b></p>

## 2.0 DOCUMENTATION

This User Manual provides information about the integration of Rolls LFP lithium batteries with Victron Energy devices in a closed-loop configuration using the LFP Connect gateway with installed LFP Connect Card for Victron. Rolls LFP batteries may be used in Energy Storage System (ESS) for self consumption, grid-connected backup and off-grid applications. These instructions apply to off-grid applications.

Note that in a Victron networked system the charging variables will be managed automatically by the Rolls LFP battery BMS and the Venus GX / Color Control GX device. Discharging variables are managed by the set up of the Victron inverter.

### **Victron Energy Reference Documents:**

- Quattro Inverter Charge Manual
- MultiPlusInverter Charge Manual
- SmartSolar / BlueSolar Charge Controller Manual
- Venus GX (VGX) / Color Control GX (CCGX) Manual

### **Rolls Battery Reference Documents:**

- Rolls S48-6650LFP Data Sheet
- Rolls S24-2800LFP Data Sheet
- Rolls LFP Battery Operating Manual
- Rolls LFP Connect User Manual

Visit [rollsbattery.com](http://rollsbattery.com) for the most recent version of published documents.

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 Rolls Battery for any consequences arising out of the use of this material.

**Read Rolls LFP Operating 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.**

## 3.0 OVERVIEW

### 3.1 System Overview

The LFP Connect gateway unlocks the full potential of a Rolls LFP lithium 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.

Rolls LFP lithium batteries must be set up to work with Power Conversion and Monitoring devices in either an open-loop or closed-loop configuration. Rolls LFP 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. In a closed-loop configuration, the battery charge and discharge rates and settings are dynamically controlled by the BMS of the Rolls LFP battery over a connection with the power conversion devices in the network.

To connect with the communication network of a specific brand of inverter charger or solar charge controller, the LFP Connect gateway requires an LFP Connect Card with the appropriate communication port.

### 3.2 Minimum Battery Capacity

Battery charge and discharge rates are managed automatically by the Rolls lithium battery and Victron CCGX device. 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 (92% Efficiency at 48V)	Charger	Single Phase Minimum S48-6650LFP	Three Phase Minimum S48-6650LFP
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

Model	Inverter Peak (92% Efficiency at 24V)	Charger	Single Phase Minimum S24-2800LFP
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

## 4.0 CONFIGURING VICTRON PRODUCTS

### 4.1 VE.Configure Settings

You will need the latest firmware on all connected devices. 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 Rolls LFP battery is interrupted for some reason. During normal operation the charge characteristics are governed automatically by the CCGX via DVCC, with instructions from the connected Rolls LFP 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 CCGX. Restart the CCGX after completion.

General Tab	S24-2800LFP	S48-6650LFP
Overruled by remote <sup>(1)</sup>	Enable	Enable
Enable battery monitor	Enable	Enable
SoC when Bulk finished <sup>(2)</sup>	95%	95%
Total battery capacity (per battery installed)	installed x 110 Ah	installed x 130 Ah
Charge efficiency <sup>(2)</sup>	95%	95%

Inverter Tab	S24-2800LFP	S48-6650LFP
DC input low shut-down <sup>(3)</sup>	24.0 V	48.0 V
DC Input low restart <sup>(4)</sup>	26.0 V	52.0 V
DC input low pre-alarm <sup>(5)</sup>	25.5 V	51.0 V
Enable Rolls LFP <sup>(6)</sup>	Disable	Disable

Charger Tab	S24-2800LFP	S48-6650LFP
Enable charger	Enable	Enable
Battery Type <sup>(2)</sup>	Blank	Blank
Lithium batteries <sup>(2)</sup>	Enable	Enable
Charge curve <sup>(2)</sup>	Select: Fixed	Select: Fixed
Absorption voltage <sup>(2)</sup>	27.2 V	54.4 V
Float voltage <sup>(2)</sup>	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 <sup>(2) (7)</sup>	1.0 < 3.0 Hr	1.0 < 3.0 Hr
Repeated absorption interval <sup>(2)</sup>	7.0 Days	7.0 Days
Absorption time <sup>(2) (7)</sup>	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 Rolls LFP lithium 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 Rolls LFP' has no relation to the Rolls LFP 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.

## 4.2 VE.Direct MPPT Settings

During normal operation the MPPT charge characteristics are governed by the CCGX via DVCC, with instructions from the connected Rolls LFP 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.

MPPT Charge Controller Settings	S24-2800LFP	S48-6650LFP
Battery voltage	24 V	48 V
Max current per battery installed (Recommended < Maximum) <sup>(9)</sup>	installed x (78 A < 110 A)	installed x (92 A < 130 A)
Charger enabled	Enable	Enable
Battery preset	User Defined	User Defined
Absorption voltage	27.2 V	54.8 V
Maximum absorption time <sup>(10)</sup>	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..

## 5.0 INSTALLING & CONNECTING LFP CONNECT TO THE VICTRON NETWORK

### 5.1 Installing the LFP Connect Card for Victron

The LFP Connect Card for Victron is a Slot 0 Type which only inserts into the left side slot on the bottom of the LFP Connect gateway.



Slot 0 Type

#### ▲ NOTE

- The LFP Connect Card type to be used is determine by the brand of power conversion equipment.
- If the LFP Connect Card is in the wrong slot, it will not function.
- If the LFP Connect Card is not firmly seated, it will not function.

## 5.2 Connecting LFP Connect to the Rolls LFP Battery

Connect the LFP Connect gateway to the Rolls LFP battery and power up as described in the Rolls LFP Connect User Manual.

### ▲ CAUTION

#### HAZARD OF ELECTRICAL SHOCK AND FIRE

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

**Failure to follow these instructions can damage equipment.**

### ▲ NOTE

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

## 5.3 Connecting LFP Connect to the Victron Network

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

- MultiPlus / Quattro - version 459 or later.
- CCGX / Venus GX - version 2.32 or later.
- VE.Direct MPPT - version 1.42 or later.

### ▲ NOTE

- VE.Can MPPTs cannot be used and are not yet supported.

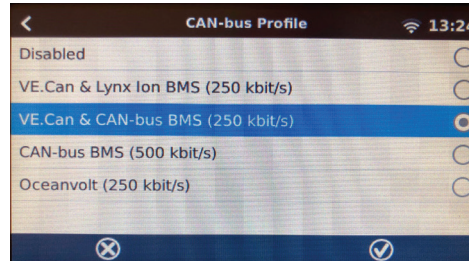
Insert one end of a CAT5 communication cable into the LFP Connect Card port and the other end into one (A) of the two VE.Can ports (A-B) on the back of the Color Control GX (CCGX). Use the terminator provided with the CCGX to terminate the network by plugging it into the second VE.Can port (B).





## 5.2 Connecting LFP Connect to the Rolls LFP Battery

Using the CCGX navigate from the Device List > Settings > Services > Can-bus Profile and select VE.Can & CAN-bus BMS (250 kbit/s).



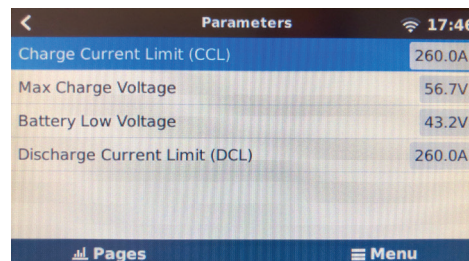
Return to the Device List and the CCGX should display Rolls LFP as one of the devices along with the battery SOC, Voltage and Amps. If you have multiple batteries a single entry will show up, which represents all batteries.



### ▲ NOTE

- If Rolls LFP 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.

## 6.0 SYSTEM SET UP

### 6.1 Synchronizing the Victron System with the Rolls LFP Battery

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

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

To optimize performance of a Victron system the following items need to be manually set using the CCGX.

Navigate from the Device List screen > Settings > System Setup.

From the System Setup menu scroll down to select each item and then set as indicated.

- Battery Monitor: Rolls LFP on CAN-bus
- DVCC - Distributed Voltage and Current Control: ON
- SVS - Shared voltage sense: OFF <sup>(7)</sup>
- STS - Shared temperature sense: OFF
- Limit charge current: ON
- Max charge current: Installed number of Rolls LFP batteries x (S48-6650LFP: 92A < 130A) or (S24-2800LFP: 78 A < 110 A) <sup>(8)</sup>

(7) SVS should be set to OFF (there have been instances of conflict reported by Victron Support when SVS is set to ON and used with a Lithium BMS).

(8) Limit charge current works across the whole system. MPPTs are automatically prioritized over the mains. In case the Rolls LFP 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 LFP Connect gateway.