VE.Direct LoRaWAN module manual

1. Introduction

Thank you for purchasing a VE.Direct LoRaWAN module. It allows you to connect other Victron equipment, such as your Battery Monitor (BMV); Solar Charger; or Phoenix Inverter, to the Victron Remote Management (VRM Portal) portal. The portal is available to use free of charge, and from it you can view the status of your installation from anywhere in the world using your desktop device or mobile phone. Here are some examples of the kind of information you will be able to view:

- BMV Battery Monitor demo
- Inverter demo
- MPPT Solar Charger demo

2. LoRaWAN radio frequencies and coverage

The VE.Direct LoRaWAN (Long Range wide area network) module is essentially a radio transmitter which broadcasts data (in this instance information about the status of your Victron installation) to a nearby Internet of Things (IoT) gateway. The gateway should be within about 2km of your location if you live in a town, but could be as far away as 30km if you live in a rural location. This device uses infrastructure provided by 'The Things Network'. Their network of gateways is constantly expanding and you can check coverage in your area here: https://www.thethingsnetwork.org/map.

You can even expand the IoT infrastructure to your area by establishing a new gateway. The hardware cost would be a few hundred Euro's, and you would need a power supply and an internet connection.

2.1 Recommended LoRaWAN gateways

- https://www.lorixone.io/en/products

2.2 Bandwidth and frequencies

Note that whilst it's free to use, and long range, LoRaWAN is not high bandwidth. Therefore data is only sent once an hour ...some less important data is only sent once every 24 hours. (See below for more information.)

Frequencies used by the LoRaWAN module differ by region and country. We stock two different versions:

- ASS030538010 - VE.Direct LoRaWAN EU863-870 module
- ASS030540010 - VE.Direct LoRaWAN US902-928 module
- ASS030542010 - VE.Direct LoRaWAN AU915-928 module (expected Dec 2017 or Jan 2018)

The EU version can be used in most of Europe and certain countries in Africa. The US model can be used in the Americas. Here is a list of frequency plans and regulations, arranged by country.

3. Product compatibility

This module has one VE.Direct port and is compatible with:

- All MPPT Solar Charge Controllers which have a VE.Direct Port
- BMV Battery Monitor 700 series
- BMV Battery Monitor 710 Smart series
- Phoenix Inverter VE.Direct models

The module is not compatible with our **Peak Power Packs** - even though they have a VE.Direct Port.

More information is also available on our website:
https://www.victronenergy.com/panel-systems-remote-monitoring/ve-direct-lorawan

4. Installation

What's in the box?:

- VE.Direct LoRaWAN module, with 1.5m VE.Direct cable
- Antenna
- 1.5m power cable with 3A inline fuse and M10 eyelets.
- Quick-install guide

Assembly instructions:

1. Screw the antenna onto the LoRaWAN Module
2. Mount the LoRaWAN Module close to the device you wish to monitor
3. Connect the VE.Direct cable between devices
4. Connect the DC Power (8V - 68V)
5. After a short wait the LED will blink green indicating that all is OK
6. Go to the VRM Portal to add your installation

5. Details

Data transmission

After power-up, the module will gather information from the VE.Direct device. Once received it connects to the LoRaWAN network, and then sends all available data to the VRM Portal.

After this first transmission, it will send the most important data hourly:

__ BMV Battery Monitor__

- Battery Voltage
- Battery Current
- Battery Power
- State of Charge
- Alarm status & reason

MPPT Solar Charger

- Solar Power
- Battery Voltage
- Battery Current
- Battery Power
- Error code (see here for the definitions)
- Charge state (Off, Bulk, Absorption, Equalize, Float)

Phoenix VE.Direct Inverters

- Battery Voltage
- AC Output current
- Alarm status & reason
- Mode (On/Off/Eco)

Note that data may not always arrive at the VRM Portal every hour. Transmission over the air can fail - even when your LoRaWAN device is mounted close to a gateway. This is normal and part of the LoRaWAN concept.

LED Codes

LED Status	Definition
Blinking blue	Connecting to LoRaWAN. If your module keeps blinking blue, check LoRaWAN Network coverage.
Blinking green	Everything is OK and a connection has been made both to LoRaWAN and to the VE.Direct device.
Blinking yellow	You're connected to LoRaWAN, but not to the VE.Direct device: Check the cable & power to the VE.Direct device.
Continuous red	Error. The module will automatically reboot within ten seconds.

Current draw

- 15 mA @ 12V
- 8,5 mA @ 24V
- 5,5 mA @ 48V

6. FAQ

Will the module store data and send it out later when the gateway is in range?

- No.

Can the firmware of the module be updated?

- No.

How can I connect multiple VE.Direct devices to one LoRaWAN module?

- You can't.

Can I connect both this module and something else to the VE.Direct port at the same time?

- No you can't.

Can the module be used to remotely switch the load output of an MPPT?

- No.

Can the module be used to remotely update firmware of the BMV, MPPT, or Inverter?

- No.

Can the module be used to remotely change the configuration of the BMV, MPPT or Inverter?

- No.

Can the module be used to remotely perform any other action?

- No.

Is a Color Control (CCGX) or Venus GX required?

- No, the data will be sent straight to the VRM Portal.

The Peak Power Pack has a VE.Direct port, will the device work with that?

- No.

I connected the module to a BMV, and then later connected it to an MPPT - but I can't see the new data …why not?

- Make sure you power-cycle the LoRaWAN module by switching it off whilst connecting it to a different VE Direct device. Or wait for a minimum of 24 hours.

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