Victron & Pylontech

The combination of Victron products with Pylontech lithium batteries has been tested and certified by the Victron and Pylontech R&D departments.

This manual is intended to be used in conjunction with the manual supplied by Pylontech. It provides additional and specific information regarding integration with Victron systems.

The Pylontech includes a Battery Management System (BMS) with each battery cell module. This interfaces with the Victron Venus-device and can supports multiple battery modules connected in parallel.

Battery	US2000B	US2000B Plus	US3000 Plus
Module capacity	2.4 kWh	2.4 kWh	3.5 kWh

1. Product & system compatibility

1.1 Offgrid, Backup and Energy Storage Systems are possible

Victron + Pylontech can be used for the following system types:

- Energy Storage Systems - Self Consumption (ESS - Start page)
- Grid Backup
- Off-grid

1.2 A Venus-device is required, either Color Control GX (CCGX) or Venus GX (VGX)

It is essential to use the CAN-bus connection of the CCGX or VGX with the batteries for the keep-alive signal, communication of charge and discharge limits, error codes and state of charge.

The minimum required firmware version for the Color Control GX is v2.15. It is highly recommended to use the latest firmware version on all connected devices, including CCGX/VGX, Inverter/Charger and MPPTs. There are regular updates to improve performance and reliability.

1.3 All 48V Multi, MultiPlus, MultiGrid and Quattro are compatible

The minimum firmware version is 422. Though updating to the latest firmware is recommended where possible.

These inverter/charger units must be connected to the Venus-device via the VE.Bus connection port.

In grid connected systems, advanced control functions are configurable in the ESS settings on the Venus-device.

In off-grid systems, the control functions of the Pylontech Battery Management System (BMS) are built into the latest version of the Venus-device.

1.4 All 48V VE.direct BlueSolar and SmartSolar MPPT Chargers are compatible

For proper operation, the Pylontech battery needs to be able to control the charge current of the solar MPPTs. Therefor it is recommended to use Victron 48V compatible MPPTs models with VE.Direct port.

MPPTs with a VE.Direct port

MPPTs are controlled via the Venus-device. Make sure the Venus-device runs v2.15 or later, and the MPPTs to 1.37 or the latest available version.

The MPPT requires connection to the Venus-device to regulate charge currents as the batteries require (due to temperature, etc) To test operation, try disconnecting the Venus-device from the MPPT. After a time-out, the MPPT will stop charging and flash an error code on its LEDs. The error code is error #67: no BMS.

MPPTs with a VE.Can port

Use of VE.Can MPPT's with Pylontech batteries is not documented.

1.5 Battery compatibility

The following batteries are supported:

Pylontech Battery type
US2000B
US2000B Plus
US3000B Plus

Firmware supplied with new batteries works with Victron equipment out of the box and updates are not required.

Working discharge temperature range is from -10 to 50. Charging temperature range is from 0 to 50. If operation is attempted outside the operating range, the battery will disconnect to protect itself.

1.6 Minimum Battery Sizing Recommendations

Each US2000B Plus battery module is approximately 50Ah at 48V, can provide 25A continuous charge and discharge and 100A peak for 1 minute.

The charge and discharge rates are managed automatically by the Pylontech battery and Venus-device.

Using very large solar arrays with battery banks that are too small can exceed the limits of the batteries ability to charge and possibly lead to the BMS triggering over-current alarms.

You must have the minimum number of units to supply the potential current demand of the load connected to the inverter. It is more desirable to have the inverter/charger overload than the battery.

Some suggested battery sizings for common Victron inverter/chargers are listed below. These are

suggestions for reliable operation for single phase off grid and are not specified by Pylontech.

Inverter / Charger Model	Inv continous watts @ 25 degrees	Inv Peak Surge Rating	Number of Pylontech Units	Bat continous discharge rating	Bat peak discharge rating
Multiplus 48/500/6	430	900	1	1200	4800
Multiplus 48/800/9	700	1600	1	1200	4800
Multiplus 48/1200/13	1000	2400	1	1200	4800
Multiplus 48/3000/35	2400	6000	2	2400	9600
Multiplus 48/5000/70	4000	10000	4	4800	19200
Quattro 48/8000/110-100/100	6500	16000	6	7200	28800
Quattro 48/10000/140-100/100	8000	20000	7	8400	33600
Quattro 48/15000/200-100/100	12000	25000	10	12000	48000

2. Wiring of CAN-bus cable between B-Box and Venus-device

Use the *VE.Can to CAN-bus BMS type B Cable*, part number ASS030720018. Plug the side which is labeled Battery BMS into the Pylontech CAN port. Plug the side labeled Victron VE.Can into the Venus-device.

Then, plug a VE.Can terminator in the other VE.Can socket on the Venus-device. Two VE.Can terminators are included with the package of the Venus-device as an accessory, only one is used. Keep the other one as a spare.

More information about the cable can be found in its manual.

Without properly connecting this cable, the battery will not show up on the display of the Venus-device. The battery will also turn itself off after several minutes.

It is important to ensure this connection and display of the battery on the Venus-device display before attempting firmware updates or settings changes on other devices if they depend on the power supply from the battery. Without this connection, the battery may turn off unexpectedly.

4. VEConfigure settings

This section presumes familiarity with VEConfigure software.

4.1 General tab

- Check the “Enable battery monitor” function
- Set the battery capacity to the total capacity of the battery: eg 50Ah times the number of battery modules for the 2000B Plus model.
- The other parameters (“State of charge when bulk finished” and “Charge efficiency”) can be left to their default setting: They are ignored for a Pylontech installation.

4.2 Charge parameters

In normal operation, the charge parameters are controlled by the Pylontech battery and communicated through the system by the Venus-device to the inverter/charger and MPPT. However as a precaution it is advised to set these as suggested below.

Charger tab

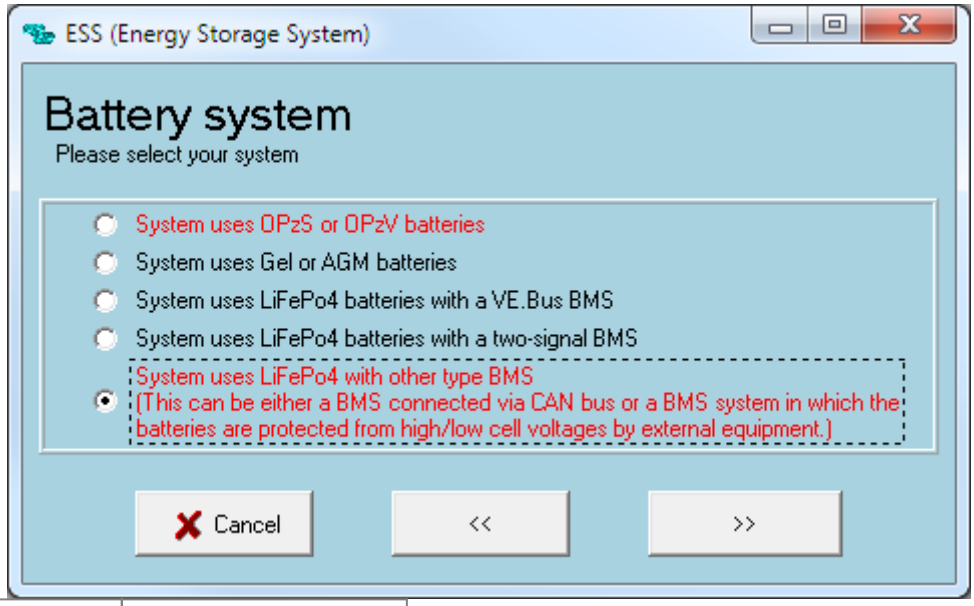
Parameter	Setting
Battery type	Lithium
Charge curve	Fixed
Absorption voltage	53.2 V
Float voltage	53.0 V
Absorption time	1 Hr

Note: make sure to double check the float voltage after completing Assistants, and if necessary set it back to 53.0 V.

Option A: ESS Assistant

If you are using the battery as part of a grid connected ESS system - run the ESS Assistant in VEConfigure.

Select the externally managed Lithium battery option



ESS Parameter	Settings
Sustain voltage.	48V
Dynamic cut-off values	set all values to 46V.
Restart offset:	4V

Option B: Off-grid system using CAN-bus cable.

You will need the latest firmware on all connected devices.

On the Venus-device, go to Settings, System setup:

Venus Settings → System Setup Parameter	Value
DVCC	ON
Shared Voltage Sense	OFF

Minimum discharge State Of Charge (SOC) is 10%.

In the Inverter tab of VEConfigure

VEConfigure Inverter Parameter	Setting
DC input low shut-down	47V
DC input low restart	51V
DC input low pre-alarm*	51V

* The pre-alarm setting is dependant on your preference and on site specific requirements. You may wish for this to be activated earlier in an off grid situation to allow time to start a backup generator. If the system is configured in ESS mode, you may not wish to have this alarm trigger until below the Sustain threshold voltage, as this system is in no danger normally and will 'sustain' without needing to trigger an alarm.

Hardware Protection Points

Low Voltage: When the battery discharges to 44.5V or less, battery protection will turn on. High Voltage: If charging voltage above 54V, battery protection will turn on.

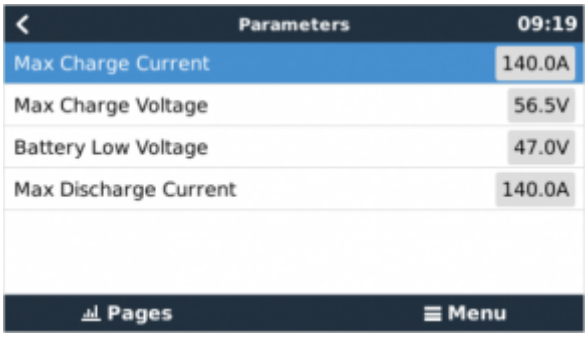
5. Venus-device Configuration

* Select the *CAN-bus BMS (500 kbit/s)* CAN-profile in the CCGX. Menu path: *Settings → Services → CAN-profile*.

- After properly wiring and setting up, the Pylontech will be visible as a battery in the device list:

(if you have multiple batteries a single entry will show up, which represents all batteries).

- The parameters option within the battery page shows the actual battery charge and discharge limits



This parameters page is also a good place to check that all batteries are connected and working properly. In normal working conditions, the current limit is 25A per cell. For example, 100A charge current limit (100 / 25 = 4) means there are 4 Pylontech battery modules connected.

6. Configure VE-Direct MPPT

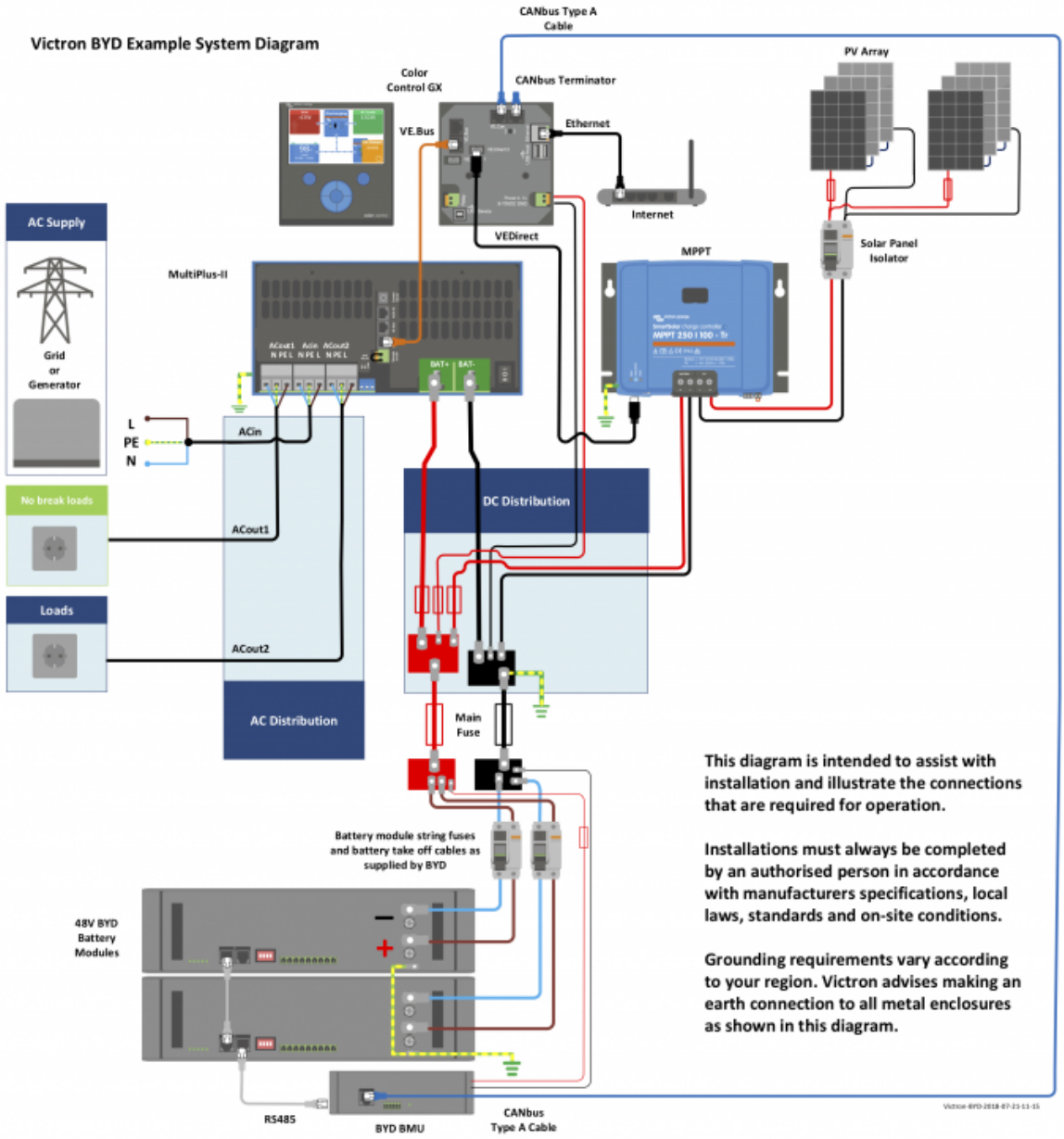
In normal operation the MPPT charge characteristics are governed by the Venus-device connected to the Pylontech battery.

This section presumes familiarity with VictronConnect

The settings below are a precautionary measure.

MPPT Parameter	Setting
Battery voltage.	48V
Absorption voltage	53V

7. Example Wiring Diagram



8. Troubleshooting

If the system is not operating correctly, go through these steps.

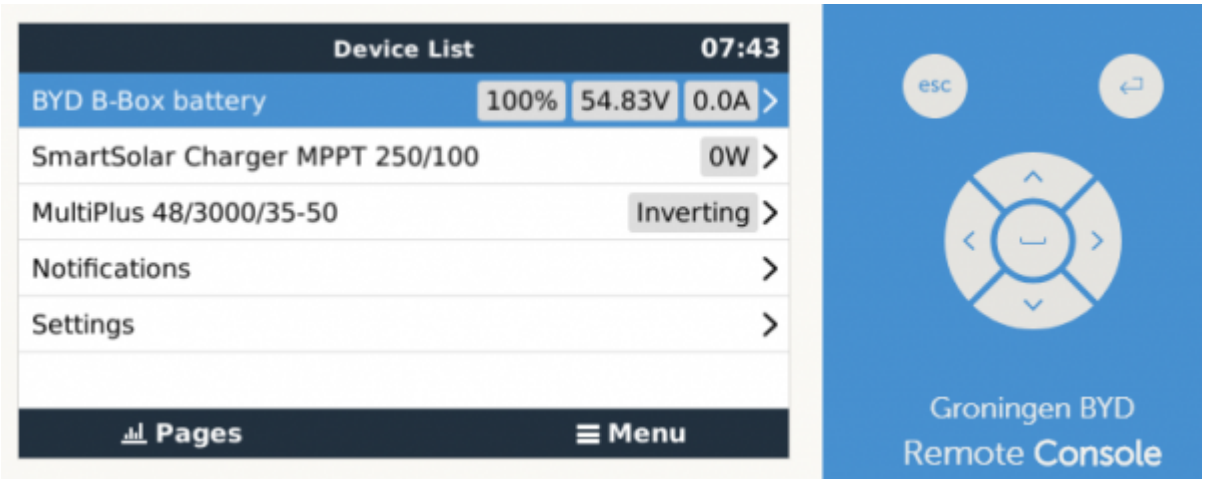
Step 0. If the Inverter/Charger or Venus-device does not switch on

As a safety precaution, the inverter/charger will not switch on if the Venus-device is not on. If you are unable to start the system due to a total system blackout / battery shutdown due to low voltage, you may need to disconnect the VE.BUS connection cable between the inverter/charger and Venus-device.

You can then start the inverter/charger from an external charge source such as a generator or grid

connection. Once the inverter/charger has started, it should supply power to the DC terminals and this should start the Venus-device and Pylontech battery again. You will need to then reconnect the VE.Bus Communications cable back to the inverter/charger and Venus-device.

Step 1. Check that the Pylontech battery is visible on the Venus-device list



If its not visible, check:

- Venus-device firmware version (update to latest version, v2.15 or later)
- CAN-bus communication cabling between Pylontech and Victron system. Make sure that it is in the right way around.
- Pylontech system is up and running (leds are)

Step 2. Check that the Pylontech battery is ready for use

Check the Max Charge Voltage parameter. This voltage parameter is sent, together with the other three parameters, by the Pylontech system via the CAN-bus cable. They are visible on the Venus-device: Device List → Pylontech battery → Parameters menu.

11. Further Information

For information about where to buy or find suitably qualified installers, visit the Where to Buy Page.

Further community discussion about installing and using Pylontech and Victron can found at Victron Community, use the topic label 'Pylontech'.