Victron & Sunwoda Energy

1. Product & system compatibility

Battery	SunESS Series	Atrix Series	Monawall series
Appearance			
ESS	yes	yes	yes
Module capacity	5kWh	5kWh	5kWh
Module limit	12	24	24
Max capacity	60kWh	120kWh	120kWh

1.1 Offgrid, Backup and Energy Storage Systems

Victron + Sunwoda Energy can be used for the following system types:

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

1.2 A GX-device is required, eg Cerbo GX

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.

When used with Sunwoda Energy series batteries, the minimum supported firmware version for the GX device is v2.91. It is recommended to use the latest firmware version on new installations and when trouble shooting issues.

1.3 All Multi, MultiPlus, MultiGrid and Quattro are compatible

As long as you are using the appropriate model for the nominal battery voltage, all VE.Bus inverters and inverter/chargers are compatible.

The minimum supported firmware version is 469. Updating to the latest firmware is recommended for new installations, and troubleshooting issues.

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

1.4 All VE.Direct BlueSolar and SmartSolar MPPT Chargers are compatible

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

MPPTs with a VE.Direct port

MPPTs are controlled via the GX device. Make sure the GX device runs v2.91 or later, and the MPPTs to 1.37 or the latest available version.

The MPPT requires connection to the GX device to regulate charge currents as the batteries require.

MPPTs with a VE.Can port

Be aware that some GX devices (e.g. CCGX) only have a single CANBus interface, and that is required for the battery communications. So if you use a new VE.Can MPPT, it must also be with a GX device that has more than one CANbus interface, e.g. the Cerbo GX.

2. Minimum Battery Sizing Recommendations

Once DVCC is enabled on the GX device, the charge and discharge rates are managed by the Sunwoda Energy battery.

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 battery modules to supply the inverters startup inrush surge currents that charge the capacitors when the inverter is first connected, this occurs prior to any loads being connected. There is also the subsequent potential current demands of the loads connected to the inverter. It is much more desirable to have the inverter/charger overload than the battery, as the inverter will automatically recover, whereas the battery may require intervention once in a fault state.

These minimum battery sizings are required for reliable operation.

An example of minimum system sizing based on the **_Atrix battery module_** is below. Each battery module is approximately 100Ah at 51.2V, can provide 50A continuous charging current and 100A continuous discharge current.

Phase	Single Phase	Three Phase	Single Phase	Three Phase
Grid state	On-Grid	On-Grid	Off-grid	Off-grid
MultiPlus 48/500/6	1	1	1	1
MultiPlus 48/800/9	1	1	1	1
MultiPlus 48/1200/13	1	2	1	2
MultiPlus 48/1600/20	1	2	1	2
MultiPlus 48/2000/25	1	2	1	3
MultiPlus 48/3000/35	1	3	2	4
MultiPlus 48/5000/70	2	5	3	6
MultiPlus-II 48/3000/35-32	1	3	2	4
MultiPlus-II 48/5000/70-50	2	5	2	6
MultiPlus-II 48/8000/110-100	3	8	4	10
MultiPlus-II 48/10000/140-100	4	10	4	11
MultiPlus-II 48/15000/200-100	5	15	6	17
MultiPlus-II GX 48/3000/35-32	1	3	2	4
MultiPlus-II GX 48/5000/70-50	2	5	2	6
Quattro 48/5000/70-100/100	2	5	3	6
Quattro 48/8000/110-100/100	3	8	4	10
Quattro 48/10000/140-100/100	4	10	5	13
Quattro 48/15000/200-100/100	5	15	6	16
EasySolar-II 48/3000/35-32 MPPT 250/70 GX	1	3	2	4
EasySolar-II 48/5000/70-50 MPPT 250/100 GX	2	5	2	6
Multi RS Solar 48/6000	2	/	2	/

3. CAN-Bus wiring between the battery and GX Device

You can connect multiple battery modules together to form a single large battery by connecting the RJ-45 cable supplied by Sunwoda Energy using the link ports on the battery. This is shown in more detail in the example wiring diagram and Sunwoda Energy manual.

The batteries will automatically detect and link to each other. Atrix series battery, port COM1 empty battery as the main battery

Type A cable

The Victron *VE.Can to CAN-bus BMS type A Cable*, part number ASS030710018.

Connections

Some GX devices (such as the Cerbo GX), have multiple CAN ports. If your GX device has a BMS-Can port, this should be used. If your GX device ONLY has VE.Can ports, you will need to change the VE.Can port profile to CAN-bus BMS (500 kbit/s) for the battery (and then it cannot be used for other VE.Can devices).

Plug the side labeled Victron VE.Can into the GX device.

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

Without properly connecting this cable, the battery will not show up on the display of the GX device. The battery will also turn itself off.

It is important to ensure this connection and display of the battery on the GX 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. GX Device Settings

The battery is connected to the BMS-CAN port of the GX device, Select the CAN-bus BMS (500 kbit/s) CAN-profile in the GX device. Menu path: Settings → Services → VE.CAN port. The sunwoda battery will be shown in the device list. If you have multiple batteries a single entry will show up, which represents all batteries:

Next, go to Settings, DVCC, and configure as follows:

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

The parameters option within the battery page shows the battery charge and discharge limits as communicated to the DVCC system by the BMS.

The 'charge current limit' (CCL) as shown in the parameters screen (and received from the BMS, by the GX device, via DVCC) will be the ceiling, and the system will try its best not to exceed that (as much as it can - it may spike under momentary peaking conditions).

This parameters page is also a good place to check that all batteries are connected and working properly.

This parameters page is also a good place to check that all batteries are connected and working properly. The battery data sheet specifies the normal working conditions, e.g. the current limit per cell. For example, If each battery is rated to 50A charge current, and the menu shows a 300A charge current limit (300 / 50 = 6) means there are 6 Sunwoda Energy battery modules connected.

In off-grid systems, the inverter will prioritise running the load, and potentially exceed this Discharge Current Limit. This could lead to the battery shutting down, and why it is important to follow the minimum battery sizing guide.

In grid connected ESS systems, the inverter will do its best to respect the Discharge Current Limit and use the grid to supplement the load if required.

Note that 'details' menu of the battery (e.g. Lowest and Highest cell voltages etc) is only supported with recent Sunwoda Energy firmware.

‹		📶 19:33
Lowest cell voltage	--	3.322V
Highest cell voltage	--	3.325V
Minimum cell temperature	--	22°C
Maximum cell temperature	--	25°C
Battery modules	6 online	0 offline
Nr. of modules blocking charge / discharge	0	0
📊 Pages	˅	☰ Menu

GX Device with multiple CAN-bus port configuration

With GX devices that have two CAN-bus interfaces available (eg Cerbo GX and Venus GX), the VE.Can MPPT will remain connected to the VE.Can port,

while the Sunwoda Energy CAN-bus cable should use the specific CAN-bus connections (H, L, GND), or BMS-Can ports.

This allows data from the MPPT and Sunwoda Energy battery simultaneously.

Color Control GX Configuration - Not Recommended

The CCGX only has one available VE.Can interface. It is not possible to connect both CAN products such as VE.Can MPPT (250 kbit/s) and an Sunwoda Energy battery BMS-Can CAN-bus (500 kbit/s) together on the CCGX. As the Sunwoda battery must be connected, you will need to use the port for that. This will mean no data is collected from the VE.Can MPPT, nor can the CCGX control it. This means you are required to use the "Allow to Charge" wire configuration for the MPPT.

For this reason it is recommended to use the Cerbo GX instead.

5. VEConfigure Settings

This section presumes familiarity with VEConfigure software.

Voltages shown are for the 48V model, and should be scaled for the 24V model. The 24V model is an 8-series configuration while the 48V model is a 15-series configuration. Voltages should therefore be scaled by 8/15.

5.1 General tab

- Check the "Enable battery monitor" function
- Set the battery capacity to the total capacity of the battery: eg 100Ah times the number of battery modulesl.
- The other parameters ("State of charge when bulk finished" and "Charge efficiency") can be left to their default setting: They are ignored for a Sunwoda Energy installation.

5.2 Charge Settings

Charger tab

VEConfigure Charge Parameter	Setting
Battery type	Lithium
Charge curve	Fixed
Absorption voltage	55.2 V
Absorption voltage off-grid systems	56.5 V

VEConfigure Charge Parameter	Setting
Float voltage	55 V
Absorption time	1 Hr

Note: make sure to double check the float voltage after completing Assistants, and if necessary set it back to 55.0 V.

Note For off-grid use: ignore the 'bms assistant required' warning.

5.3 Inverter Settings

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.

5.4 ESS System Settings

If you are using the battery as part of a grid connected ESS system, please review the ESS Quickstart guide and Design and Installation Manual.

The settings that are specific to the Sunwoda Energy battery in the VEConfigure ESS Assistant are below:

Select the externally managed Lithium battery option
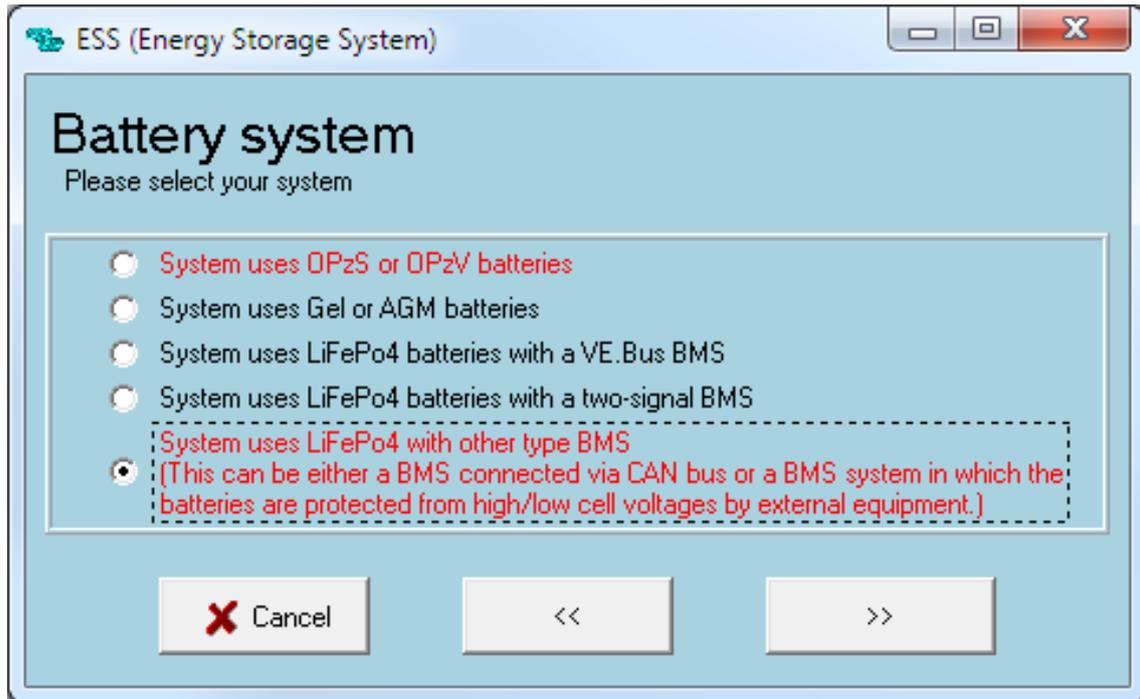
ESS Parameter	Settings
Sustain voltage.	50V
Dynamic cut-off values	set all values to 47V.
Restart offset:	1.2 V (Default)

5.5 Battery Protection

In normal operation, the charge parameter limits are set by the Sunwoda Energy battery and communicated through the system by the GX device to the inverter/charger and MPPT.

- Low Voltage: When the battery discharges to 44.8V or less, battery protection will turn on.
- High Voltage: If charging voltage above 56.8V, battery protection will turn on.
- Working discharge temperature range is from -20 to 50 degrees celsius.
- Charging temperature range is from 0 to 50 degrees celsius.
- Over-charge and Over-discharge Current Limit 102A for 3 seconds

If operation is attempted outside the operating range, the battery will disconnect to protect itself.

6. VE.Direct MPPT Settings

In normal operation the MPPT charge characteristics are governed by the GX device via DVCC, with instructions from the connected Sunwoda Energy battery.

Use Victron Connect for Solar Charger configuration.The settings below are a precautionary measure only:

MPPT Parameter	Setting
Battery voltage.	48V
Absorption voltage	56.5V

7. Example Wiring Diagram
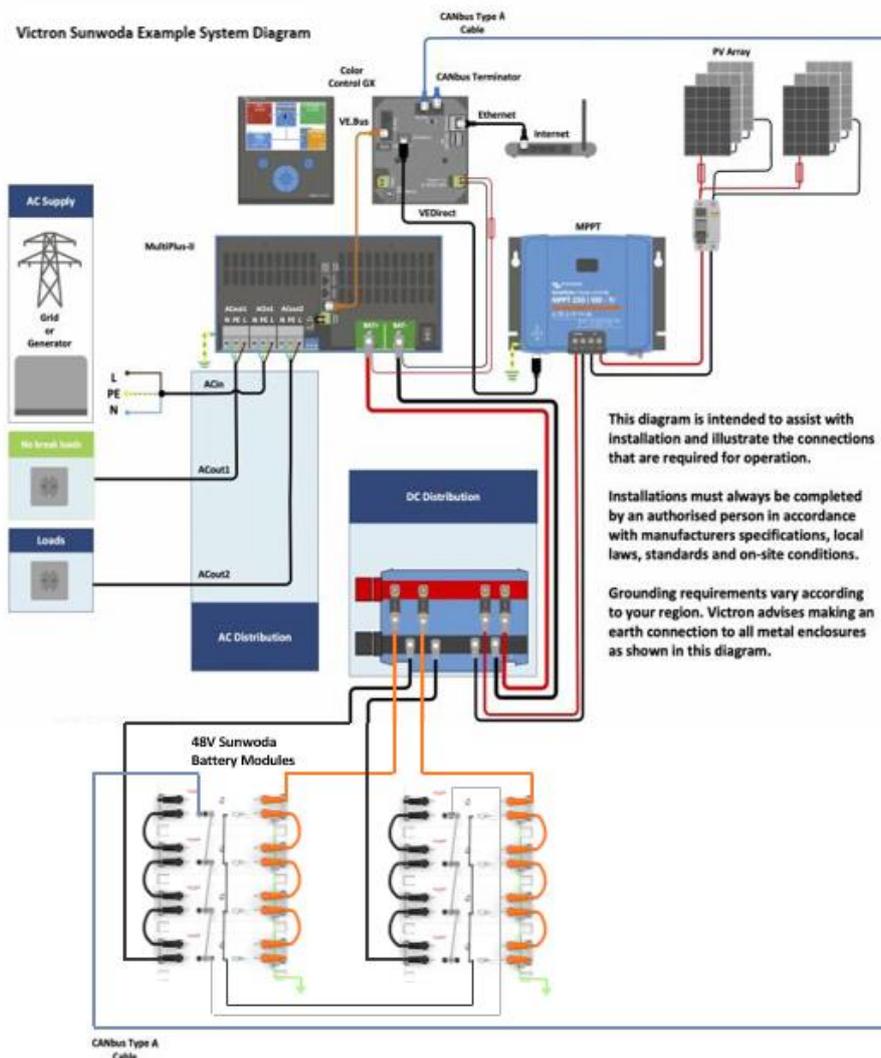
8. Troubleshooting

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

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

When the grid is connected there are two software controls to sustain voltage. The Minimum SOC (while grid is connected) set in the GX device, and the sustain voltage (set in the ESS assistant).

If the grid fails and no AC supply is available, in this deeply discharged state, and the battery has set the Discharge Current Limit (DCL) to 0A, then the inverter will turn off in a software off state. The GX device will remain on, as there is still DC voltage provided by the batteries for a while.

Note in this state an AC PV inverter will not produce any power, and will not start up, as it requires the inverter to create the sine wave to synchronise.

If the AC grid or generator, or DC MPPT is connected, then the battery will begin to charge and then the inverter will start itself again automatically, also resuming charge from an AC PV inverter.

If instead the battery becomes completely discharged the battery will further protect itself by not just sending the 0A discharge limit, but also disconnecting DC voltage from the battery terminals (via internal MOSFETS). As there is no DC voltage available on the terminals any more the GX device will also shut down, and the inverter will also then be hard off (not just software off).

If you then reconnect a DC charge source, or AC input supply (grid or generator), after approximately 2 minutes the inverter will start up again, power the DC bus, powering up the GX device, and then powering up the battery, and the system will recover.

Step 1. Check that the Sunwoda battery is visible on the GX device list

If its not visible, check:

- GX device firmware version (update to latest version, v2.91 or later)
- Sunwoda Energy battery firmware version
- CAN-bus communication cabling between Sunwoda and Victron system. Make sure that it is in the right way around.
- Sunwoda Energy battery system is up and running (LEDs are on)

Step 2. Check that the Sunwoda Energy battery is ready for use

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

Step 3. Check the Sunwoda Energy manual

The Sunwoda Energy manual contains additional diagnostic and troubleshooting information.

9. FAQ and Known Issues

9.1 The maximum charge and discharge current is limited to 50A, but the data sheet tells me the maximum is 100A.

In off-grid, the inverter can draw more than the 50A limit to run the loads, make sure you have sufficient batteries installed to keep the load per battery around this limit.

9.2 During charging ,the Charge Current Limit(CCL) is less than 100A

The battery dynamically adjusts the CCL according to the temperature. When the battery is charged, the temperature is lower than 10℃ or higher than 45℃, the CCL will be less than 50A. The CCL is also limited when the battery is nearly full.

9.3 'High voltage' warning or alarm shown on battery status

The 'high voltage' warning or alarm is not unusual on new batteries that are not yet balanced. To help the batteries balance quickly, keep the batteries fully charged until the errors go away. In an ESS system, set it to 'keep batteries charged', in an off-grid system the fastest way is to either charge / balance the battery before installation, or to fully charge with a generator if not enough solar is available to keep the batteries fully charged.

If you are unable to maintain the target voltage to balance the batteries without the 'high voltage' alarm occurring, you may need to enable and set the "Limit managed battery charge voltage" setting in the DVCC menu of the GX device. Reduce this voltage as necessary until the alarm stops. After sufficient time to balance the batteries, try increasing this value until it can be disabled again for normal operation.

DVCC	🛜 19:39
CAUTION: Read the manual before adjusting	
DVCC	🔵
Limit charge current	⚪
Limit managed battery charge voltage	🔵
Maximum charge voltage	55.2V
SVS - Shared voltage sense	⚪
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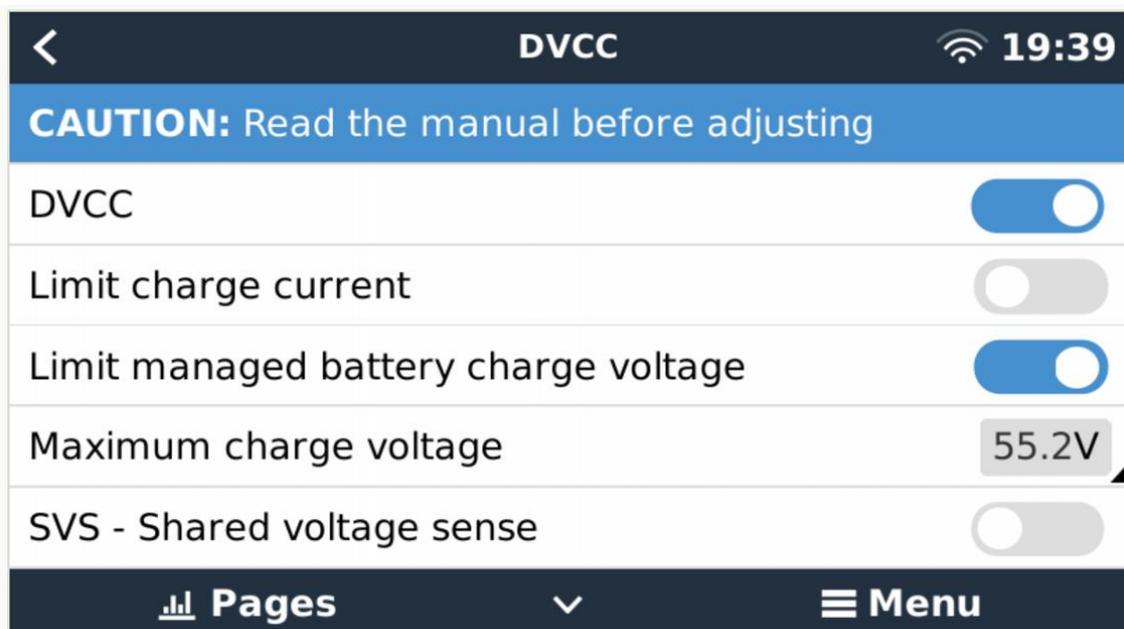
If it is not possible to raise the voltage over time, and eventually disable this manual override:

1: If you have 2 or more batteries in your system, you can try shutting down the system once it is as close to fully charged as possible, and then physically connecting the batteries in smaller groups (or even individually) so that balancing can occur on each individual battery without it being masked by the others connected in parallel. It may help you to see the indicator lights on the battery (if available on that model) to find which battery might be out of balance with the others.

2: Contact your Sunwoda Energy dealer for further assistance (they can provide additional software to see individual cell level data), or assist with other potential solutions.

10. 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 Sunwoda and Victron can found at Victron Community, use the topic label 'Sunwoda'.

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