



## Using the Orion BMS With Victron Equipment

**Disclaimer:** The following information is provided as a guide for integrating Orion BMS products with Victron Energy equipment. While the information here is believed to be correct, it is the user's responsibility to verify all aspects of the end application and the suitability of the following. Ewert Energy has no affiliation with Victron and provides this information for informational purposes only and is not responsible for changes in specifications made by the manufacturer. Consult the full user manuals for both products for more details.

The Orion BMS provides integrated support for many Victron Energy products. This means that the BMS itself can communicate directly with Victron equipment in order to provide useful realtime information such as battery voltage, current, limits, temperatures and state of charge. This information can be used by the equipment to make intelligent decisions regarding operation, as well as respond to fault or error conditions in the battery pack itself.

## Supported Victron Equipment

It is recommended to reach out to Victron directly to ensure specific compatibility, however the following product series are known to work:

Blue Solar (MPPT)  
Smart Solar (MPPT)  
MultiPlus (Inverter / Charger)  
Quattro (Inverter / Charger)

Other equipment may be compatible, however this list is intended to include confirmed equipment.

**\*\*IMPORTANT NOTE: The Color Control GX display OR the Venus GX controller OR the Cerbo GX controller are REQUIRED for integration with Orion BMS products.** Victron devices do not directly communicate with CANBUS (the protocol used by Orion BMS products), but the Color Control GX / Venus GX / Cerbo GX devices do have CANBUS inputs on them that

allow for CANBUS data from the BMS to be received and retransmitted onto the proprietary Victron communication protocols. It does not matter which device is used, but at least one of them MUST be used. **The BMS cannot directly connect to the Victron inverters / MPPTs.**

## Theory of Operation

As noted above, the Orion BMS does not communicate directly with the Victron Energy inverter / MPPT devices. Instead, an intermediary device (either the Color Control GX Display or Venus GX / Cerbo GX Controller) is used to act as a bi-directional gateway between CANBUS and Victrons' own proprietary internal communication network protocol. Not only does this device translate between the two protocols, it also is aware of what Victron equipment is present (installed) and is able to discretely control each Victron equipment individually based on the overall published battery limits. In other words, when the BMS tells the Victron system that the battery pack can accept 100A of charge, the gateway device is able to intelligently split this limit up among the various Victron devices available to ensure that limit is not exceeded. The same is true on the discharge side in the event that multiple inverters are being used. This allows for a much more seamless and unified integration of the installation overall.

NOTE: The Victron Color Control GX Display / Venus GX / Cerbo GX devices are only compatible with Victron Energy equipment. If other equipment besides Victron Energy is used (eg: using a Victron Energy inverter with another brand MPPT Charge Controller), the limit integration and control system will not work as described above.

## Equipment Configuration

NOTE: Instructions for installing the Victron Energy equipment and the BMS itself are beyond the scope of this document. Please see the installation manuals for each product for details on how to connect and configure each device separately.

Once the Victron Energy equipment and Orion BMS equipment are both separately installed, the following steps need to be completed in order to setup integration between the Victron Energy equipment and the Orion BMS equipment.

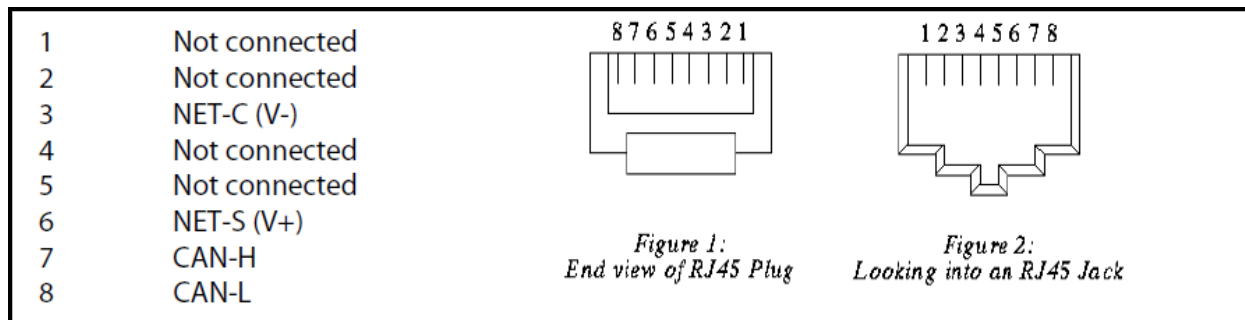
## Configuring the BMS

Support for Victron Energy equipment is integrated directly into the BMS software and enabling this support is simple.

- 1) Open the BMS software configuration utility provided with the BMS.
- 2) Navigate to the “CANBUS Settings” tab (section) of the battery profile settings screen.
- 3) At the bottom of this screen there is a section titled “Enable CANBUS Third Party Devices”. Find the entry entitled “Victron Inverter / MPPT” and click the checkbox next to it. This will automatically load the necessary CANBUS messages that the Victron GX device is expecting into the BMS settings.
- 4) The Victron equipment operates at 500 Kbps for the CANBUS baudrate. In order to interface with the Victron equipment, the CANBUS baudrate on the BMS must be set to 500 Kbps (this option is available on the “CANBUS Settings” tab as well). Note that ALL equipment on the CANBUS must be operating at the same baudrate (500 Kbps). If any equipment on the network operates at a different baudrate it will prevent any CAN traffic from being exchanged.
- 5) Once all changes are complete, send the new profile to the BMS via the “Send Profile To BMS” button in the utility. This will transfer the new changes to the BMS itself.

## Connecting the CANBUS Link

Data is exchanged between the BMS and the Victron Energy equipment via CANBUS. The CANBUS link between the Color Control GX display / Venus GX / Cerbo GX device and the Orion BMS is established over the VE.CAN plug (RJ45). The pin-out for this plug is available below:



Pins 7 and 9 on the RJ-45 connector are the only pins that are used in this connection. Please note that the Color Control GX / Venus GX / Cerbo GX device does not have internal CANBUS termination, so if additional termination is needed, the included blue termination plug (from

Victron) can be used to provide this in the second VE.CAN port. The CANBUS network must have exactly 2 termination resistors installed to operate properly.

On the Orion BMS side, please see the BMS wiring manual for diagrams of which pins correspond to CAN-H and CAN-L. Note that the BMS itself may have CANBUS termination installed internally on some CAN interfaces.

## Configuring the Color Control GX / Venus GX / Cerbo GX Device

NOTE: The Color Control GX / Venus GX / Cerbo GX devices are not produced or sold by Ewert Energy. For specific questions regarding these devices, please contact Victron Energy support.

First, please ensure that the firmware for all Victron Energy equipment is up to date. Details on how to check firmware versions and perform updates are available from the manufacturer directly.

**IMPORTANT NOTE: Inverter firmware must be at least [v424](#) or above, MPPT firmware must be [v1.29](#) or above.** If this is not the case, the Victron Energy equipment may not react correctly to the information sent to it from the Orion BMS.

Next, support must be enabled in the Color Control GX / Venus GX / Cerbo GX device to be expecting CANBUS enabled BMS. By default, no BMS is expected, so this is a critical step.

- 1) On the GX device, navigate to the “System Setup” screen.
- 2) For the line item “Battery Monitor”, select “CAN-bus BMS battery on CAN-bus”. It must NOT be set to “automatic”, as this will let the inverter switch back on if the BMS is removed or powered off.
- 3) Next, at the bottom of “System Setup” make sure that “DVCC” and “SVS - Shared voltage sense” options are both ENABLED. This is what allows the GX device to control current on the inverter / MPPT devices.
- 4) Make sure that the option entitled “Limit charge current” is OFF and that the following line reads “BMS Control ON”. This allows the BMS to control current rather than relying on present limits.
- 5) If solar MPPTs are used, set “Solar charger current control” to ON. This forces any connected MPPT solar charge controllers to respect the current limits sent to it from the BMS. This option may not be able to be set unless Victron MPPTs are present.
- 6) Go back to the main settings screen and then under “Services”, ensure that “CAN-bus Profile” is set to “CAN-bus BMS (500 kbit/s)”.

**NOTE:** Additional configuration settings may need to be changed on the Victron equipment for other purposes, however this document is intended to cover only items pertaining to direct communication / integration between Orion BMS products and Victron Energy equipment.

On the main “Device List” screen of the GX device there should now be an entry for “CAN-bus BMS battery” which is the Orion BMS. The data on that line should be updating as it is received from the BMS.

At this point the system needs to be thoroughly tested to ensure that changes in state on the BMS result in the expected behavior on the inverter / MPPTs.

The following conditions are recommended for testing:

- 1) Verify that when the charge current limit being sent by the BMS is 0A that all charging is prohibited. This can be easily simulated by setting an arbitrarily low maximum cell voltage limit on the BMS.
- 2) Verify that when the discharge current limit being sent by the BMS is 0A that all discharging is prohibited. This can be easily simulated by setting an arbitrarily high minimum cell voltage limit on the BMS.
- 3) Verify that when communication is lost between the BMS and the GX device (Victron equipment) all charging and discharging is prohibited. Neither inverting nor charging should take place in this state.
- 4) Verify that the data reported by the GX display corresponds roughly with what the BMS software utility is reporting (to ensure data is properly being sent to the Victron equipment from the BMS).