MANUAL

VE.Net Battery Controller

(VBC)

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Index

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1   Introduction

Victron Energy has established an international reputation as a leading designer and manufacturer of energy systems. Our R&D department is the driving force behind this reputation. It is continually seeking new ways of incorporating the latest technology in our products. Each step forward results in value-added technical and economical features.

1.1   The VE.Net Battery Controller (VBC)

The VE.Net Battery Controller is a device that monitors your battery status. It constantly measures the battery voltage, battery temperature, and battery current, and uses this information to calculate the actual state of charge of your battery.

The VE.Net Battery Controller can be set to operate with all shunts that deliver a current indication between -50 and +50mV. The standard shunt supplied is 500 A / 50 mV.

1.2   Introduction to VE.Net

VE.Net stands for Victron Energy Network. It allows all VE.Net compatible devices to communicate with each other. This means that the charger for example can get information from the battery monitor to optimize the charge current. It is possible to control and monitor all your VE.Net devices from a single VE.Net compatible control panel. This saves space and allows you to control all your devices from one place.

1.3   Why should you monitor your batteries?

The lifetime of your batteries depends on many factors. If the batteries and the load process are monitored you can prevent your batteries from being under- or over charged, or too deep a discharge. A battery controller warns you if there is something wrong with the charge current or with the general condition of the batteries.

1.4   Safety Precautions!

1. Working in vicinity of a lead acid battery is dangerous. Batteries can generate explosive gases during operation. Never smoke or allow a spark or flame in the vicinity of a battery. Provide sufficient ventilation around the battery.

2. Wear eye and clothing protection. Avoid touching eyes while working near batteries. Wash your hands when done.

3. If battery acid contacts skin or clothing, wash immediately with soap and water. If acid enters eye, immediately flood eye with running cold water for at least 15 minutes and get medical attention immediately.

4. Be careful when using metal tools in vicinity of batteries. Dropping a metal tool onto a battery might cause a short-circuit battery and, possibly an explosion.

5. Remove personal metal items such as rings, bracelets, necklaces, and watches when working with a battery. A battery can produce a short-circuit current high enough to melt a ring or the like to metal, causing severe burns.

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2   Installation of your VBC

To install your battery controller you will need:

1. Standard supplied 500A 50mV shunt (other shunts can be used).
2. Standard supplied two wire flexible connection cable AWG21/0.4mm².
3. Standard supplied two wire flexible connection cable AWG21/0.4mm² with inline fuse holder with a 1Amp slow blow fuse.
4. Standard supplied temperature sensor.
5. One UTP cable with two RJ45 connectors (to connect a VE.Net Panel or other VE.Net device) available in 5, 10, 15, 20, 25 and 30 meters.

2.1   Mounting and network cables

The VBC can be mounted on a standard DIN rail. To ensure the best read out we recommend that you use the standard supplied cables and place the controller as close as possible to the batteries. To connect the VE.Net Battery Controller to a VE.Net panel or other device use a standard straight UTP cable with RJ45 connectors. All UTP cables used in a VE.Net together should not exceed 100m in length.

2.2   Wiring

First connect the wiring without the 1Amp fuse. Please follow figure 1 for wiring the VE.Net battery controller. The thick lines represent the main current path cables; these should be of a heavy duty type. After installation, and checking all the connections place the 1A fuse to power the battery controller.

Battery positive
(Load)

Battery negative
(System ground)
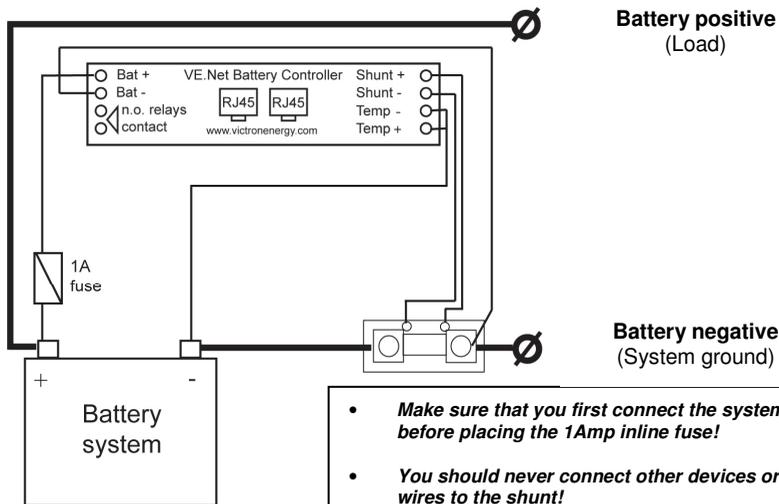
- *Make sure that you first connect the system before placing the 1Amp inline fuse!*

- *You should never connect other devices or wires to the shunt!*

- *First read the Safety Precautions in paragraph 1.4*

Figure 1

2.3 Setup

When the VE.Net Battery Controller is connected to a VE.Net panel, the panel is powered through the UTP (Unshielded Twisted Pair) cable.

Step 1.) Hold "Enter" for 2 seconds to power up the VE.Net Panel. After the panel has started with only the VE.Net Battery Controller connected the screen will display:

Battery Monitor
12.1V   0.0A   99%

The first line shows the name of the connected device, the second line shows the quick status.

Step 2.) Pres "Enter" to enter the Battery Controller menu.

DC Voltage
                12.10V

Step 3.) Press "▼" to scroll through the menu until you see "Setup Controller".

Setup Controller
            [Press Enter]

Step 4.) Press "Enter" to enter the Setup Controller menu.

Battery Capacity
                200Ah

8

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Step 5.) Press "Enter" to start changing this parameter. 200Ah will blink. Use "▼" and "▲" to change it to the capacity of the connected battery bank.

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Battery Capacity
            240Ah
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Step 6.) Press "Enter" to confirm the value. The value will stop blinking and it is saved in the memory of the battery controller.

Step 7.) Repeat step 4 and 5 for other setup parameters. Press "▼" to scroll down to the next parameter. Please refer to chapter 5 of this manual for an explanation of all the setup parameters.

To learn more about the VE.Net Panel refer to the manual included with the VE.Net Panel.

3   Using your VE.Net Battery Controller

3.1   Quick status line

In the root menu of the VE.Net Panel you will see this screen, which consists of the name of the battery controller and the "quick status" line.

Battery voltage →   Battery Monitor
                     12.1V 0.0A   99%   ← State of charge

Battery amps
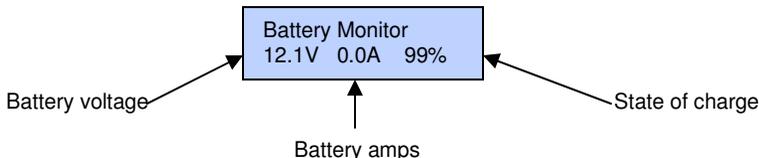
Notes:
1) You can always return to this position by pressing "Cancel" repeatedly.
2) If you can't see the state of charge, the battery controller isn't synchronized yet. Please charge your battery completely to synchronize.

3.2   Read out menu

To go to the Read out menu, press "Enter" when you are looking at the quick status line. In this menu you will find the following read outs:

Read out	
DC Voltage	Displays the actual voltage of the battery.
DC Current	Displays the DC current that flows in or out of the batteries.
Consumed Ah	Displays the used ampere hours since the battery was fully charged.
State of charge	The state of charge is a representation of the energy left in the battery 100% is full and 0% is empty. This is the best way to see when the batteries need to be recharged. Note that most battery types will be damaged if they are discharged below 50%.
Time to go	Displays time left before the batteries need to be recharged at the current load.
Bat. Temperature	Displays the battery temperature.

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4   Alarm relay

The VE.Net Battery Controller is equipped with a relay that can be programmed to signal alarms, or when connected to a generator, to automatically start and stop a generator.

4.1   Where to find the "Setup Alarms"

Battery Monitor
12.1V   0.0A   100%

Step 1.) Press "Enter" to enter the Battery Controller menu.

DC Voltage
                    12.10V

Step 2.) Press "▼" to scroll through the menu until you see "Setup Alarms".
        Note: If you can't find the "Setup Alarms" menu, make sure that your VE.Net Panel is in User and Install mode.

Setup Alarms
        [Press Enter]

Step 3.) Press "Enter" to enter the "Setup Alarms" menu.

4.2   Alarm relay thresholds:

Setup Alarms		Model	Default Value	Range	Step size
Low Voltage	The DC Voltage has to be below this threshold to trigger the Low Voltage alarm.	12V/24V 48V	10.5V 42.0V	8-33 35-59	0.1
Low Voltage Clr	The threshold that has to be reached again to cancel an active Low Voltage alarm.	12V/24V 48V	10.5V 42.0V	8-33 35-59	0.1
Low Volt. Alarm	Enables and disables the low voltage alarm.		Off	on-off	
High Voltage	The DC Voltage has to be above this threshold to trigger the High Voltage alarm.	12V/24V 48V	16V 58V	8-35 35-59	0.1
High Voltage Clr	The threshold that has to be reached again to cancel an active High Voltage alarm.	12V/24V 48V	16V 58V	8-35 35-59	0.1
High Volt. Alarm	Enables and disables the high voltage alarm.		off	on-off	
Low SOC	The low State of Charge threshold that will activate the alarm.		80%	0-100	1
Low SOC Clr	The State of Charge threshold that has to be reached to cancel an active State of Charge alarm.		80%	0-100	1
Low SOC Alarm	Enables and disables the low SOC alarm.		off	on-off	

Note: Unlike other VE.Net devices, the VBC does not send its alarm status to the VPN.

5   Setup parameters

5.1   Where to find the "Setup Controller" menu

Battery Monitor
12.1V 0.0A   100%

Step1.) Press "Enter" to enter the Battery Controller menu.

DC Voltage
12.10V

Step 2.) Press "▼" to scroll through the menu until you see "Setup Controller".
Note: If you can't find the Setup Controller" menu, make sure that your VE.net Panel is in User and Install mode.

Setup Controller
[Press Enter]

Step 3.) Press "Enter" to enter the Setup Controller menu.

5.2   Setup parameters explained:

Setup Controller		Model	Default Value	Range	Step size
Battery Capacity	The battery capacity in amp hours (Ah) at a 20h discharge rate.		200Ah	20-65534	5
Volt charged par	The battery controller considers the battery as fully charged if the voltage is above this level.	12V/24V 48V	13.2V 52.8V	8-33 35-59	0.1
Curr charged par	If the charge current is below this percentage of the battery capacity, the battery can be considered as fully charged.		2%	1-10	1
Charged time par	The minimum time that the above two parameters must be met to consider the battery as fully charged.		4 min	1-4	1
Charge eff. Factor	When a battery is charged, energy is lost. The charge efficiency factor compensates for the lost energy, where 1 is no loss of energy and 0.5 is a 50% loss of energy.		0.9	0.5-1	0.05
Peukert exponent	The recommended discharge efficiency is 1.25. Set to 1.00 to disable the peukert compensation. Contact your battery manufacturer for the Peukert exponent.		1.25	1-1.5	0.01
Bat. Temperature	If the connection to the temperature sensor is lost, this value is used in the calculations.		20 ℃	0-50	1
Temperature coef	This is the percentage the battery capacity changes with temperature.		0.5	0.5-0.95	0.05
Current threshold	This value will be considered as zero amps, to ensure that errors are eliminated.		0.1A	0-5	0.1
Shunt Full Volt	The voltage of the shunt in mV.		50	0-50	1
Shunt Full Amp	The current of the shunt in A.		500	0-50000	5
Volt. multiplier	Enables monitoring of high voltage batteries with the use of a prescaler. This value must be set to the ratio of the prescaler. **Note:** voltage settings must be set to the measured value, they are not multiplied. Prescaler functionality is only available on the 12/24V model.	12/24V 48V	0 N/A	1-20 N/A	0.5 N/A
Resynchronize?	Resets the state of charge manually to 100%.				
Device Name	The name of the battery controller that is used in the VE.Net Panel.				

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6   Historic data

The VE.Net Battery Controller will keep track of the following variables to enable you to get more information on the state and the past use of the batteries. This data will be stored in volatile memory, which means that every time the battery controller is disconnected from the batteries the values will be reset. It is also possible to reset these values in the "Historic Data" menu.

6.1   Where to find the "Historic Data" menu

> Battery Controller
> 12.1V   0.0A   100%

Step 1.) Press "Enter" to enter the Battery Controller menu.

> DC Voltage
>   12.10V

Step 2.) Press "▼" to scroll through the menu until you see 'Historic Data".

> Historic data
>   [Press Enter]

Step 3.) Press "Enter" to enter the Historic data menu

Historic data recorded

Name	Unit	Description
Deepest discharge	Ah	The deepest discharge in Ah.
Depth last disch.	Ah	The depth of the last discharge in Ah. This value will be reset to 0 when the State of Charge reaches 100% again.
Number of Cycles	No.	Every time the battery is discharged below 65% of its rated capacity and charged back to at least 90%, one cycle is counted.
Average discharge	Ah	The average discharge over all the cycles counted
Full discharges	No.	The number of times the battery has been discharged to a 0% state of charge.
Cumulative Ah	Ah	Records all the discharging amp hours. This value gives an indication of the chemical change the battery has endured.
Last full charge	Day	Number of days ago that the battery was fully charged.
Minimum voltage	Volt	Lowest voltage measured since last reset. Can be used to check that the batteries haven't been over discharged.
Maximum voltage	Volt	Maximum voltage measured since last reset. Can be used to check for faulty charges and alternators.

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