

# BE48 VOLTAGE MONITORING RELAY INSTALLATION MANUAL



## SETTING UP THE VOLTAGE MONITORING RELAY

We provide free of charge software that allows you to set up the relay. You will obtain the link to the software after you purchase a the BE48. The Be48 monitoring relay is supplied with a 1-meter long USB cable fitted with USB TYPE 'A' on one side, suitable for a computer, and a USB TYPE 'B' suitable for Be48 on the other side. See the picture.



## PRELIMINARY OPERATIONS

### !! CAUTION !!

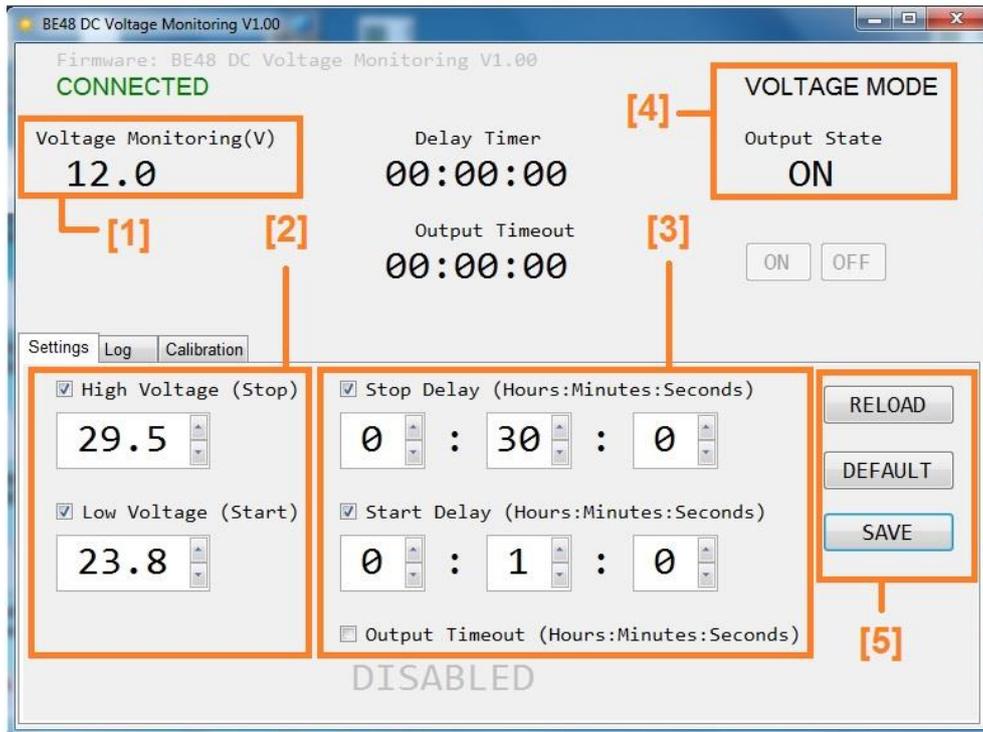
**Make sure that the SUPPLY MINUS you use for the Be48 is at the same potential of your computer. The best safety condition is obtained when the terminal minus of DC supply is grounded. Another option is to use a battery of 12V or 24V or to use a normal isolated power supply. To avoid electric shock verify that there is no significant voltage between the supply minus and the shell of your USB cable.**

## STEP 1 USB CONNECTION

- Provide a DC supply as indicated above in the range of 10..30Vdc / min 200mA.
- Turn OFF the supply.
- Connect DC supply plus to terminal JA1 and DC supply minus to terminal JA2.
- Disable the USB PORT by activating the DIP-SWITCH number 3 to its 'ON' position;
- Turn on the DC supply; the Be48 will turn on all LEDs for a second.
- The green LED DL1 turns on indicating that controller is ready.
- If the green LED DL1 blinks, the power supply is lower than the acceptable level of 8Vdc
- The others indicators may turn on if Be48 has some previous settings.
- Connect the USB cable to the computer and Be48.
- Start the application 'BE48 DC Voltage Monitoring' on your computer.
- When the red message 'CONNECTING..' appears on the screen, turn to 'OFF' the DIP-SWITCH number 3; this operation enables the USB PORT communication.
- The computer screen will indicate. on the top left corner, the green message 'CONNECTED'.

## STEP 2 UNDERSTANDING THE CONFIGURATION SOFTWARE

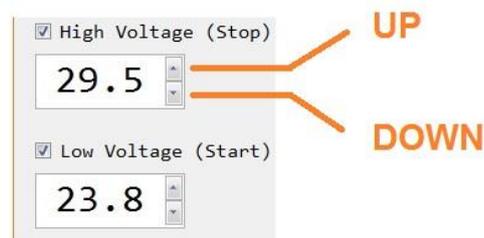
The software in addition to offering the battery system measurement features power supply indication and a set of adjustable settings. There you are an overview of the screen.



**[1] Battery voltage measurement [2] Thresholds settings [3] Timing settings [4] Mode of operation [5] Main buttons**

## STEP 3 VOLTAGE SETTINGS

'Low Voltage Start' is the voltage level of the battery that triggers the timer 'T1' (once 'T1' expires, the output relay turns on). 'High Voltage Stop' is the voltage level of the battery that triggers the timer 'T2' (Once 'T2' expires, the output relay turns off). Set 'Low Voltage Start' and 'High Voltage Stop' according to your needs by using the mouse over the up/down arrows.



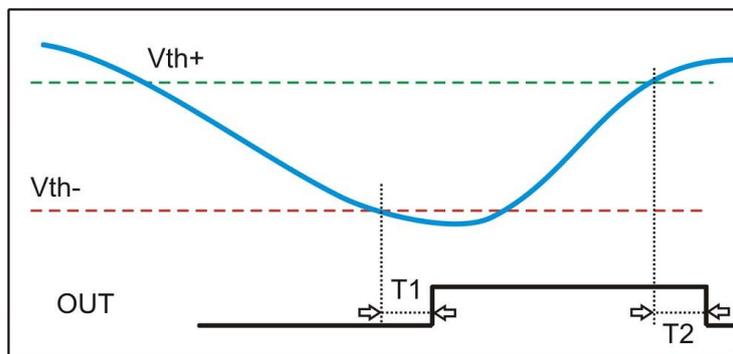
To guarantee stability we recommend that you maintain a minimum difference of at least 2 V between 'Low Voltage Start' and 'High Voltage Stop'. 'High Voltage Stop' must always be set higher than 'Low Voltage Start'.

## STEP 4 TIMING SETTINGS

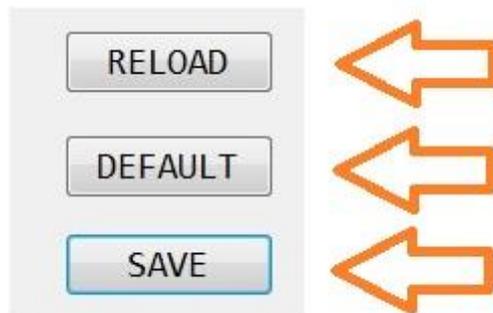
START & STOP delay timers are used to provide flexibility to your application. You can use these timers to avoid false start and stop commands. As a matter of fact, the voltage comparator itself has a fast response and may cause system instability.



In this example, the output relay comparator turns on after one minute (T1) and turns off after 30 minutes (T2). You can put the timers to zero when Be48 is used in particular applications. The range of the timers spans from one second up to 24 hours. This picture makes it clear.



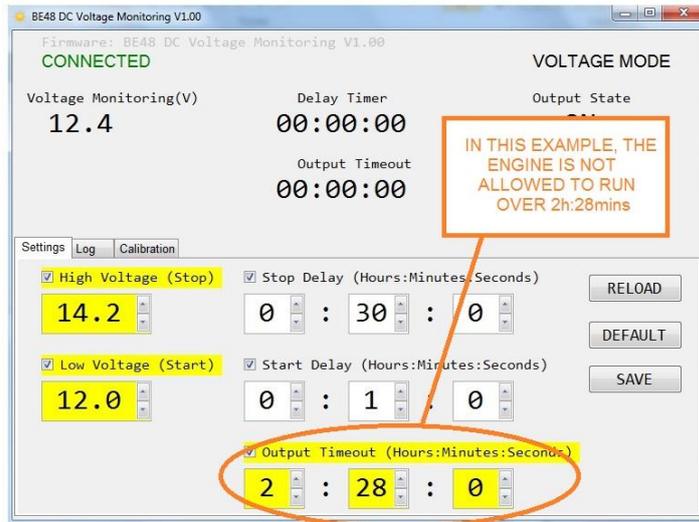
## STEP 5 THE BASIC COMMANDS



The basic available commands are SAVE (to store a parameter), DEFAULT (to use factory settings), and RELOAD (it cancels a modification and restores the previous setting). If you modify a parameter, a yellow background will warn you. Once stored in the memory the yellow background will disappear

## STEP 6 OPTIONAL TIMEOUT SETTING

This additional timer is extremely important when you want to add security to your system. If there is a failure on the charger, you will never be able to charge the battery or you will risk overcharging it. This timer limits, for example, the run time of the engine. Once the BE48 triggers the alarm, you are required to remove the DC power supply by removing the JA plug for a few seconds. This will reset the alarm.



## STEP 7 OPTIONAL VOLTAGE CALIBRATION

### WARNING! CAUTION!

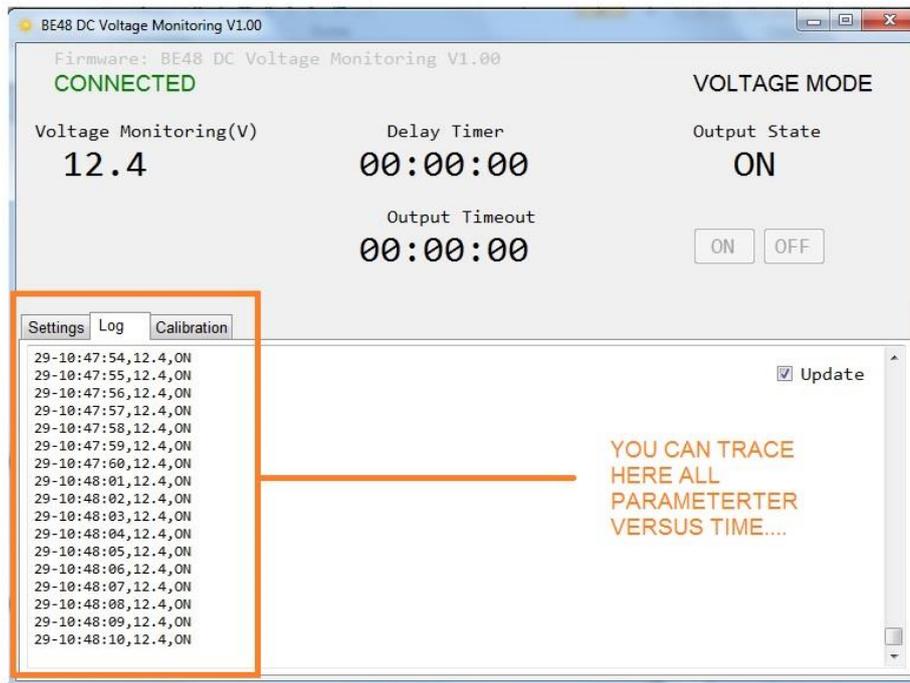
**PAY ATTENTION TO THE COMMON GROUND LOOP WHEN YOU CALIBRATE FOR A BATTERY OVER 60VDC. YOU MAY DAMAGE YOUR COMPUTER. HIGH DC VOLTAGES MAY BE EXTREMELY DANGEROUS. THE CALIBRATION PROCEDURE MUST BE CARRIED OUT BY QUALIFIED PERSONNEL ONLY. WE RECOMMEND THAT YOU PUT PROTECTION FUSES ON THE BATTERY SIDE.**

The factory precision of the measurements is about 1%. If you want more precision, we recommend that you carry out the calibration. Use a precise measurement instrument for the battery and you will take note of the measurement. Push the button [Calibration]. Choose the proper range: 60V or 300V according to your measurement. Use up and down to match the measurement and then push the button 'SAVE'. The Be48 will calculate the correction factor. You will get in a few seconds the reading with approximately 'NO ERROR'. A good calibration will allow you a 0,1% accuracy. The calibration is stored in a NON VOLATILE memory.



## LOG HISTORY

If you want to carry out really accurate testing of the system, the BE48 provides a real-time data logger. By analyzing the **TIMESTAMP** you can find out if the system works as you expect.



## BE48 GENERAL SPECIFICATIONS

**DC Supply:** 8/30Vdc, 50/150mA    **Aux supply output:** 300mA @ DC Supply-0.5V

**Protection:** 300mA thermal fuse    **Dimensions:** 110 X 120 X 22 (mm)

**Mount:** DIN RAIL mount    **Operating temperature:** -25 deg C up to +70 deg C

**Humidity range:** 5% up to 95%    **Weight:** 130 grams

**Specifications:** ECC 89/336, 89/392, 73/23, 93/68, IEC 68-2-6    **Certification:** CE

**LED Indicators:** one Red LED, one Green LED and three yellow LEDs Indicators

**Relay Outputs:** 2 relays (rated at 1A 30VDC / 1A 110VAC)

**Connectors:** removable terminal blocks JA, JD and JF.

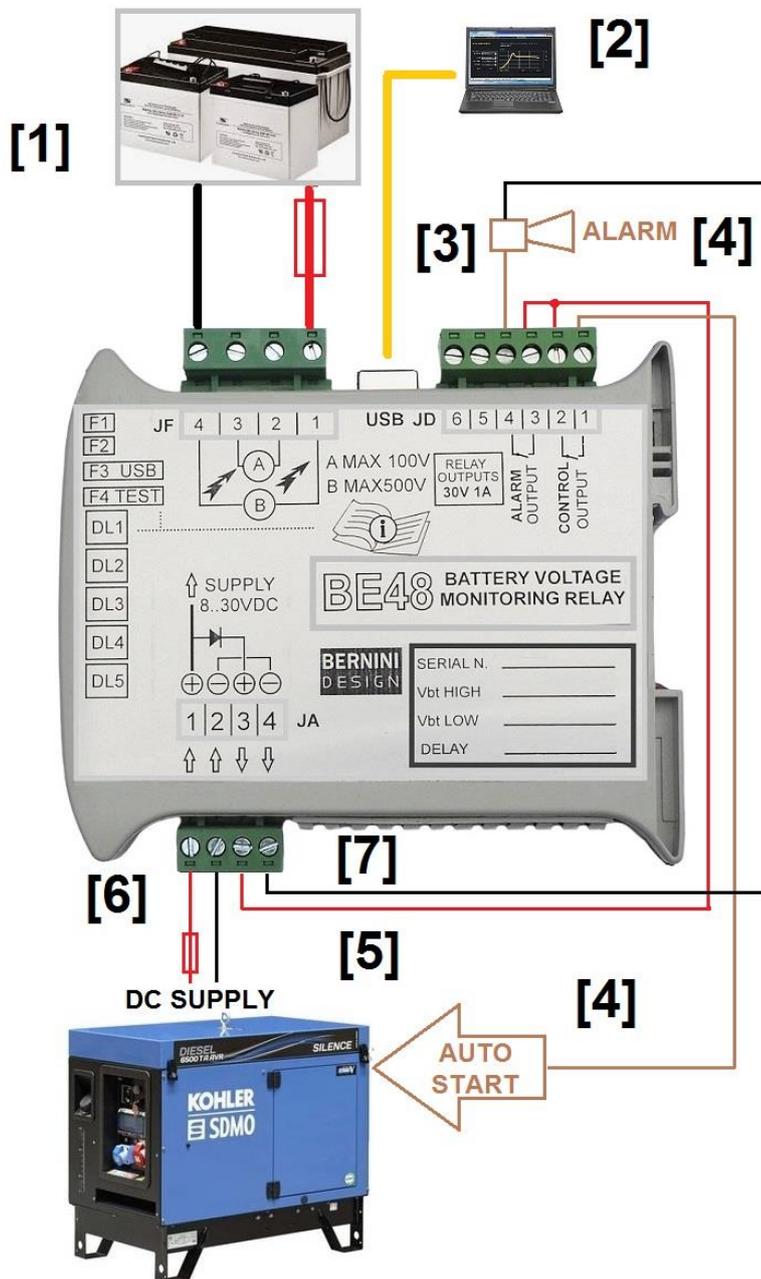
**Configuration:** via USB 2.0 (connector type 'B')

**Battery monitoring:** Vdc: 5-500Vdc    **Impedance input monitoring:** 600KOhm

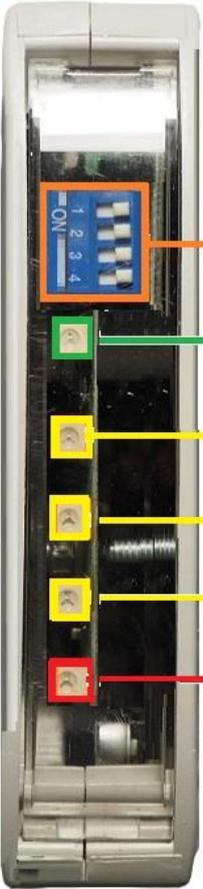
**Not mentioned specifications:** contact [bernini@bernini-design.com](mailto:bernini@bernini-design.com)

## BE48 TYPICAL WIRING DIAGRAM

You can supply the BE48 by using a DC source in between 8 up to 30 Vdc connected to terminals JA1-2 via a protection fuse [6]. The JA3-4 terminals can deliver an electronically limited 300mA current [7]; you can supply auxiliary circuits. The inputs JA1-2 are protected from reverse polarity for an unlimited time. For battery voltage monitoring connect terminals JF2-3 to a voltage between 5VDC to 100VDC via a protection fuse. Does not matter the polarity. If your battery is over 100Vdc, we recommend that you use the terminals JF1-4. Again, polarity does not matter. You can connect the terminals JD3-4 to drive an alarm indicator and use terminal JD1-2 to activate a power generator [5] via its own auto start module [4].



## BE48 LED INDICATORS AND DIP-SWITCHES

 <p><b>BE48 FRONT VIEW</b></p> <p><b>DIP SWITCH</b></p> <p><b>DL1</b></p> <p><b>DL2</b></p> <p><b>DL3</b></p> <p><b>DL4</b></p> <p><b>DL5</b></p>	<p>The DIPSW 1 and 2 are not used in the standard version.</p> <p>The DIP3 is momentarily used to enter the configuration procedure.</p> <p>The DIP4 activates the comparator output relay. You can use it to make a test. As long as the switch is activated (on) the DL4 will continuously blink.</p> <p>The DIPSW 1 and 2 are not used in the standard version.</p> <p>The DIP3 is momentarily used to eneter the configuration procedure.</p> <p>The DIP4 activates the comparator output relay. You can use it to make a test. As long as the switch is activa (on) the DL4 will continuously blink.</p> <p>The DL1 green indicator turns on when the CPU is running. It blinks fast when the DC supply is lower than 8Vdc for at least 5 seconds. In this case, the Be48 turns continuously on the red LED indicator DL5.</p> <p>The DL2 yellow indicator blinks slowly when the battery voltage is lower than the threshold. It blinks fast when the battery voltage is over the threshold. It is continuously on when the voltage is within the settings</p> <p>The DL3 yellow indicator is normally off. It blinks when the timer T1 or timer T2 are counting according to the settings.</p> <p>The DL4 yellow indicator turns on when the output comparator relay JD1-2 is energized. It turns off when the relay output is off. It blinks fast when the BE48 is in TEST MODE (DIPSW4 is in its ON position).</p> <p>The DL5 red indicator turns on in case of alarm time-out (it energizes the relay alarm and de-energizes the output comparator relay)</p> <p>The DL5 turns on when the DC falls below 8VDC for at least 5 seconds. The alarm auto resets when the voltage rises above 8Vdc.</p>
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**[BERNINI DESIGN SRL](#)**

Zona Industriale 46035 Ostiglia Italy bernini@bernini-design.com Tel +39 335 7077148