

BlueTooth Low Energy (BLE) Module for REC BMS




Control your power!

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General description of the BLE:

REC Bluetooth Low Energy (BLE) module is a device that connects to REC BMS devices via RS-485 and transfers data via BLE to your smart device. Battery pack parameters such as voltages, current, temperatures, state of charge and health are displayed. General tab is used to display important parameters while dedicated tabs can be used to display advanced battery pack information. An alarm pop-up sign informs the user in case of any system error or alarm, containing its diagnostics. Charging tab enables the user to set charging voltage and current. Parameters and error logging interval is set in the Settings tab, application logs all battery parameters and makes 24h based folders on the build-in SD card. Data can be easily transferred to connected device for analysis. Both Android and iOS smart device operating systems applications are free and can be download from Google Play Store or App Store. Most of the Android versions (4.0 and higher) and smart phones/tablets are supported by the application.

Table 1: Supported devices.

Supported devices	BMS Serial No.
REC Active BMS	from 1-A-0075
REC 1Q/SI BMS	from 1-Q-0001
REC Master BMS	from 9-M-0050

Default Parameters:

Table 2: General parameter table.

Parameter	Value	Unit
Supply voltage	10 – 80	V
Supply current	V _{cc} = 12.0V	< 25
	V _{cc} = 24.0V	< 13
	V _{cc} = 48.0V	< 7.5
	V _{cc} = 80.0V	< 5.5
Enclosure dimensions (w x l x h)	97 x 40 x 20	mm
Weight (0.5m communication cable)	105	g

System Overview:

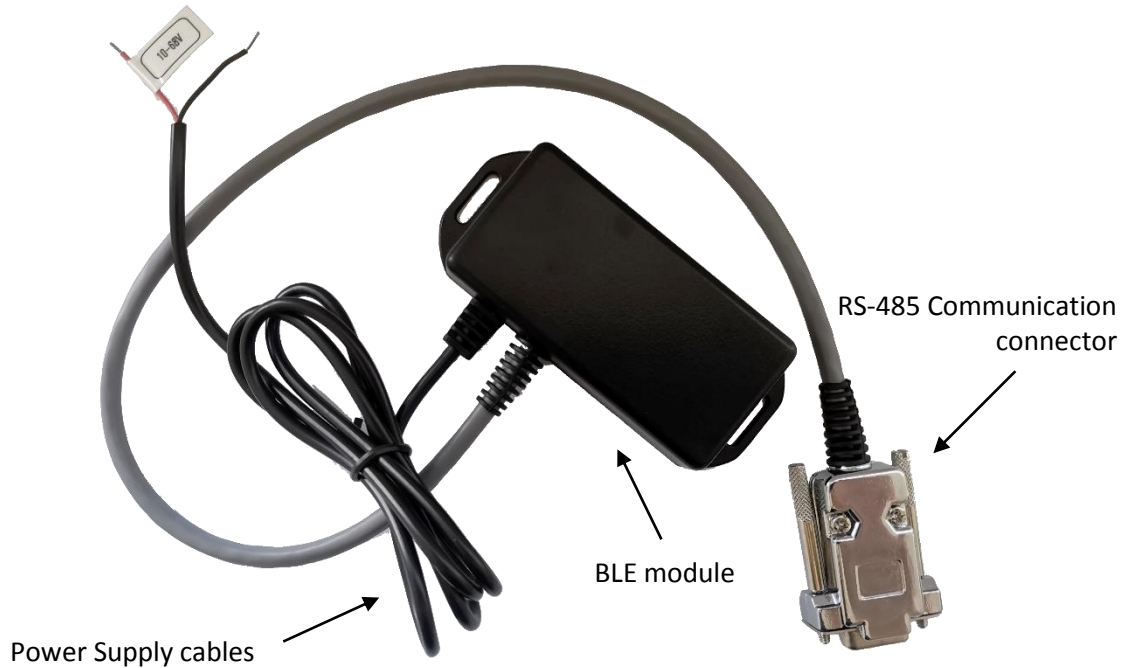


Figure 1: BLE module overview.

Setup:

Connect BLE module to BMS RS-485 (REC 1Q BMS or REC ABMS) or COM (REC Master BMS 9M). Connect the power supply to the BLE module. Download and install REC BMS application from Google Play or App Store. Turn on the Bluetooth on your smart device, search for available devices and pair with the BLE module. Run the application and tap SCAN on the home screen, find and SELECT your BLE and wait for the connection to establish.

RS-485 Communication connector:

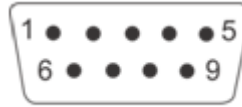


Figure 2: RS-485 DB9 connector front view.

Table 2: RS-485 DB9 connector pin designator.

pin	Designator
1	-
2	AGND
3	B
4	A
5	-
6	+5V to AGND
7	-
8	-
9	-



Figure 3: Available Bluetooth devices.



Figure 4: Paired Bluetooth devices.

Launch the application. Press SCAN to select the BLE device. When the device is selected the application will start to gather data from the BMS. Blue LED icon on top will start to blink signaling data downloading. Broken chain sign on top will alarm the connection with the BMS is lost.

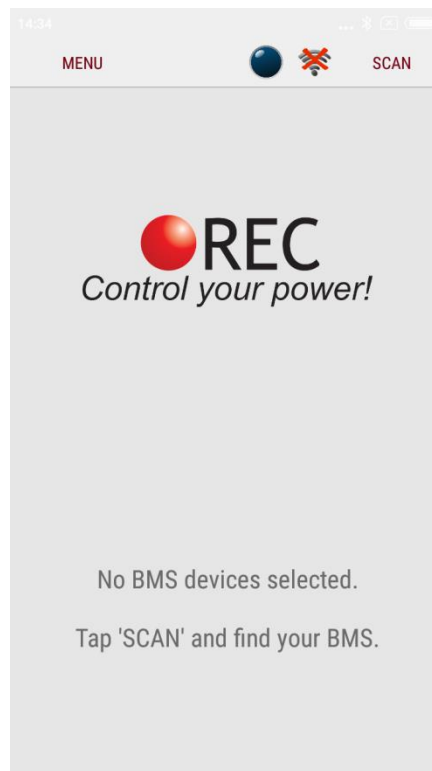



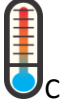






Figure 5: REC BMS application start screen without the connection.

Table 4: BLE Module Tab Description.

Icon	Tab	Description
	General	Shows main parameters of the battery pack including BMS serial, capacity in Ah and used capacity. In case of error exclamation triangle appears. User may press the sign for error description. Numbers near the maximum, minimum cell and temperature describe their location in the battery pack.
	Voltage	Shows each cell's voltage. User can sweep through slave units (if present).
	Impedance	Shows each cell's DC impedance. User can sweep through slave units (if present).
	Cell Temperature	Shows battery pack temperature. User can sweep through slave units (if present).
	BMS Temperature	Shows each BMS temperature (passive balancing).
	Charging	Shows End of Charge voltage and Charging coefficient (if programmed on the BMS). User can change these parameters (only if you are certain of what you are doing).
	Settings	Shows BLE module settings. User can change log interval and disassociate from the module.
	Logs	Shows recorded logs of the system. Logs may be erased or downloaded.

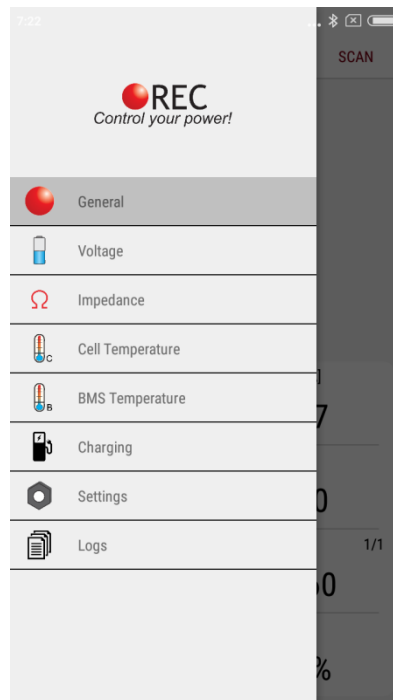


Figure 6: Tab Menu.

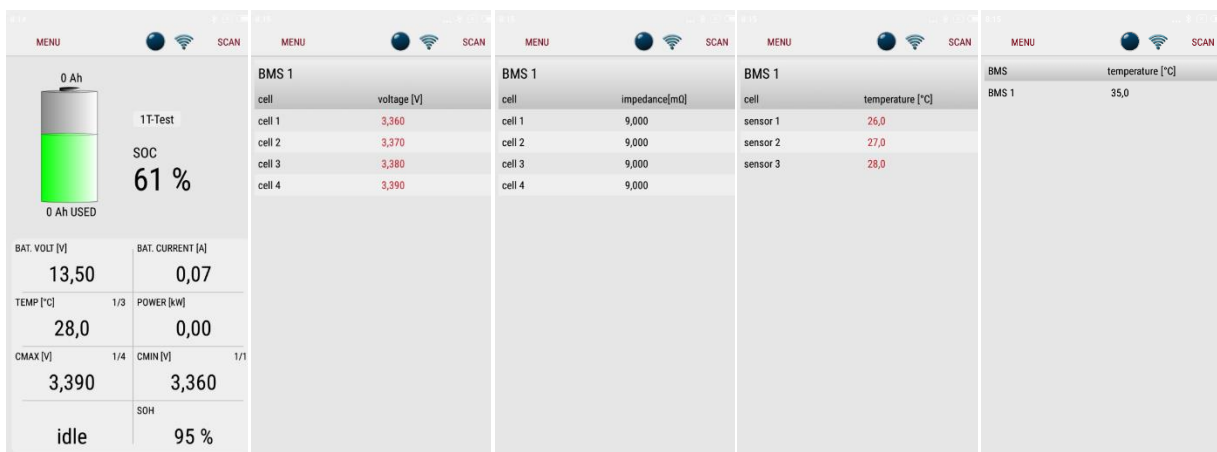


Figure 7: Tabs overview.

In the Tab Charging “End of Charge Voltage” and “Balance Voltage End” parameters of the BMS may be changed in 10 mV intervals. In case there is no need of fully charged battery, life cycles may be increased by lowering the end of charge voltage. We suggest not lowering the threshold below “Balance Voltage Start”. Be aware that SOC may show a little higher value due to the changed threshold in case the Capacity value is not corrected. If a BMS is controlling the charging current a RS-485 instruction “CHCU” may/is programmed to lower the charger maximum power. This can come handy when there is a limited power available (camps,...) without SAE J1772 communication.

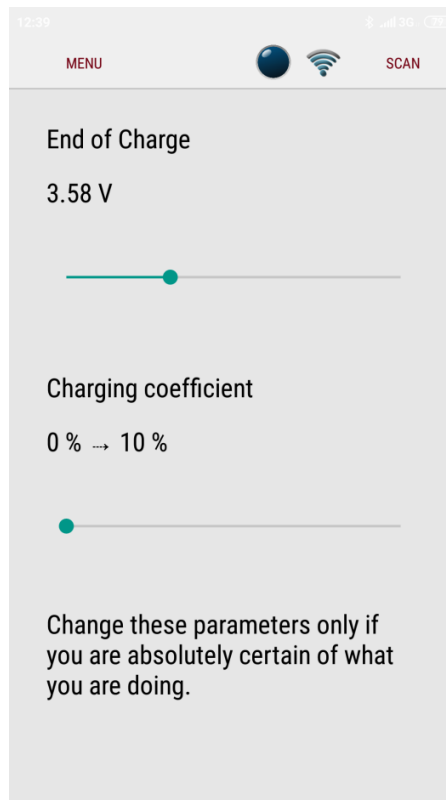


Figure 8: Charging tab.

Settings Tab shows the BMS device, BLE identifier, synchronization and SD card data. User can select logging interval in steps from 5 s to 60 min.

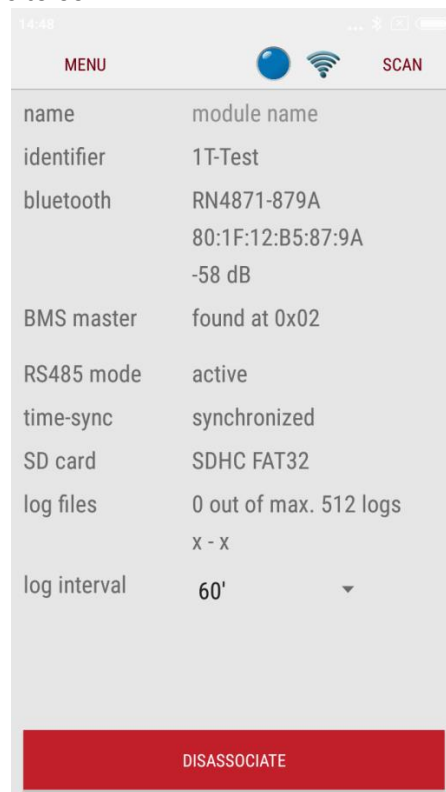


Figure 9: Settings Tab.

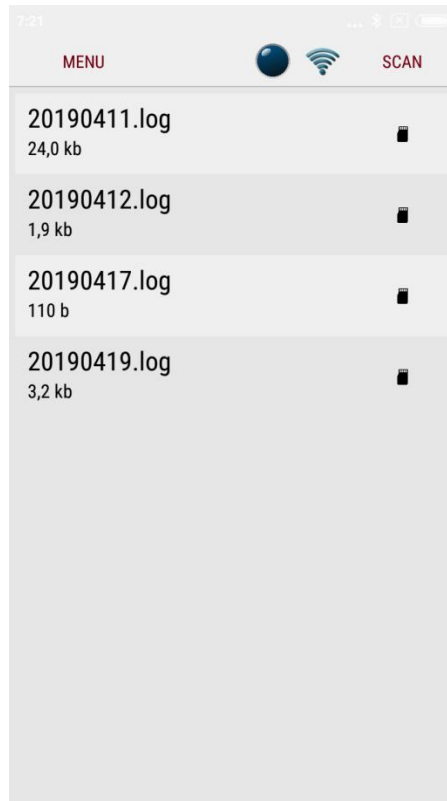


Figure 10: Logs daily data.