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Warnings



WARNING!

Li-Ion batteries are very dangerous! Improper use of this equipment may cause a fire.



WARNING!

At least a basic knowledge of electronics and electrical engineering is required to use this equipment.



WARNING!

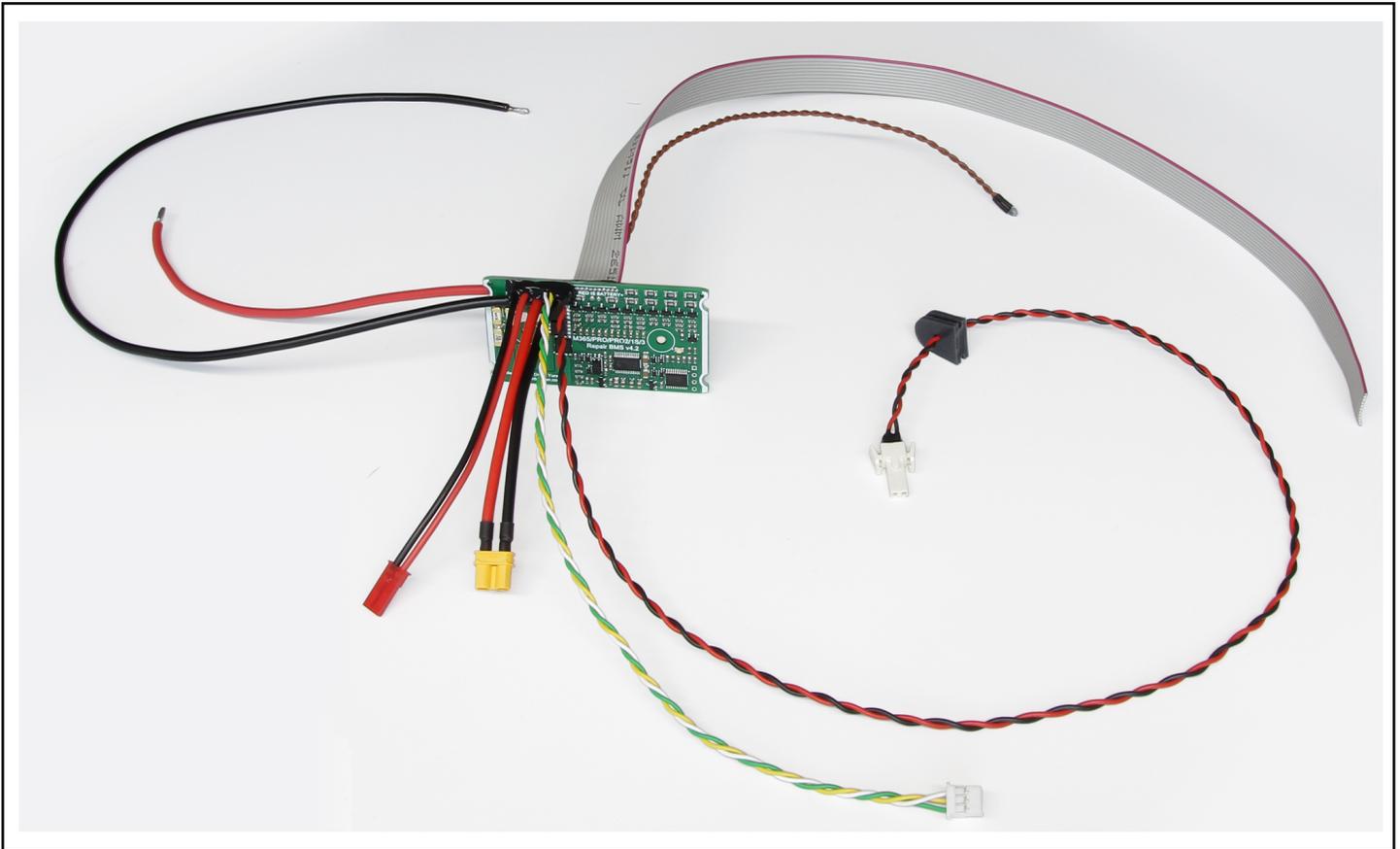
Read and follow the user manual carefully when installing this equipment.

Introduction

Xiaomi electric scooters are of excellent quality, including the battery quality. Batteries are well assembled and high-quality branded electronics equipped. On the one hand, this ensures maximum safety and usability, but on the other hand, Xiaomi batteries are not so easy to repair, as they are not compatible with spare parts widely presented on the market .

Repair BMS is especially designed to be hardware and software compatible with Xiaomi electronics, so you can use it to easily repair original batteries or make custom batteries. A battery equipped with Repair BMS is recognized by Xiaomi electric scooters as original, keeping all the functionality of the scooter. You can also configure some parameters, such as capacity, discharge curve, serial number and maximum current, improving the performance of the scooter.

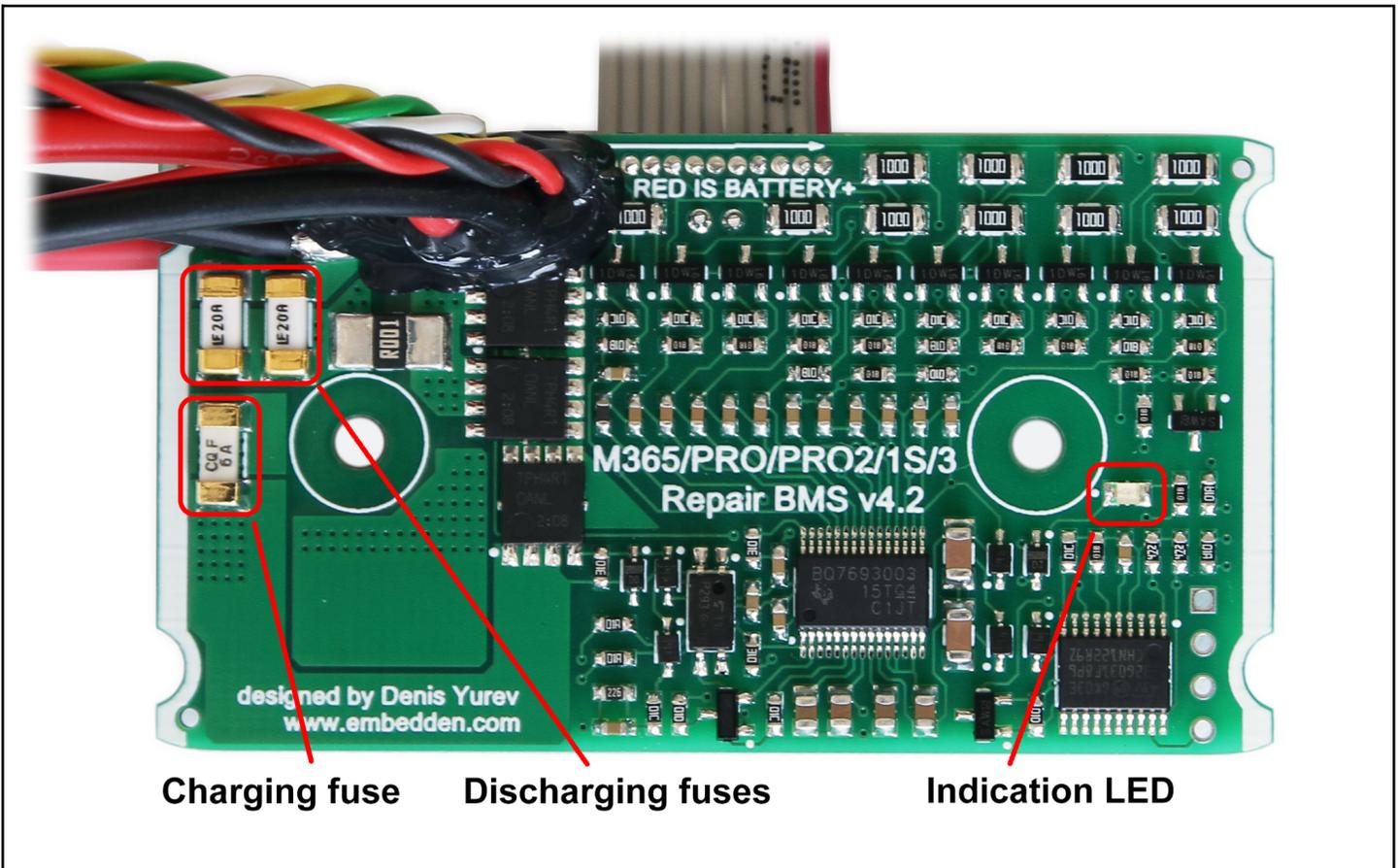
General view and pinout



	Battery - negative lead	Connect to the negative lead of the battery
	Battery - positive lead	Connect to the positive lead of the battery
	Balancing cable	Connect to each parallel of the battery

General view and pinout

	Charging plug	Connect to the charge port of the scooter
	Discharging plug	Connect to the ESC
	Tail light plug	Connect to the tail light of the scooter
	Data plug	Connect to the ESC
	Temperature sensor	This sensor measures the temperature of the battery cells. If the temperature is too high or too low, the BMS disables the battery charging or discharging, preventing cells damage and ensuring maximum safety.



Indication LED	Indicates a normal device operation or error codes. For more information see the " Troubleshooting " section.
Charging fuse	Provides an additional level of emergency protection. Melts if the charging current exceeds 6A, but the software overcurrent protection does not work. Requires replacement if it melts.
Discharging fuses	Provide an additional level of emergency protection. Melt if the discharging current exceeds 40A, but the software overcurrent protection does not work. Require replacement if they melt.

Basic specifications

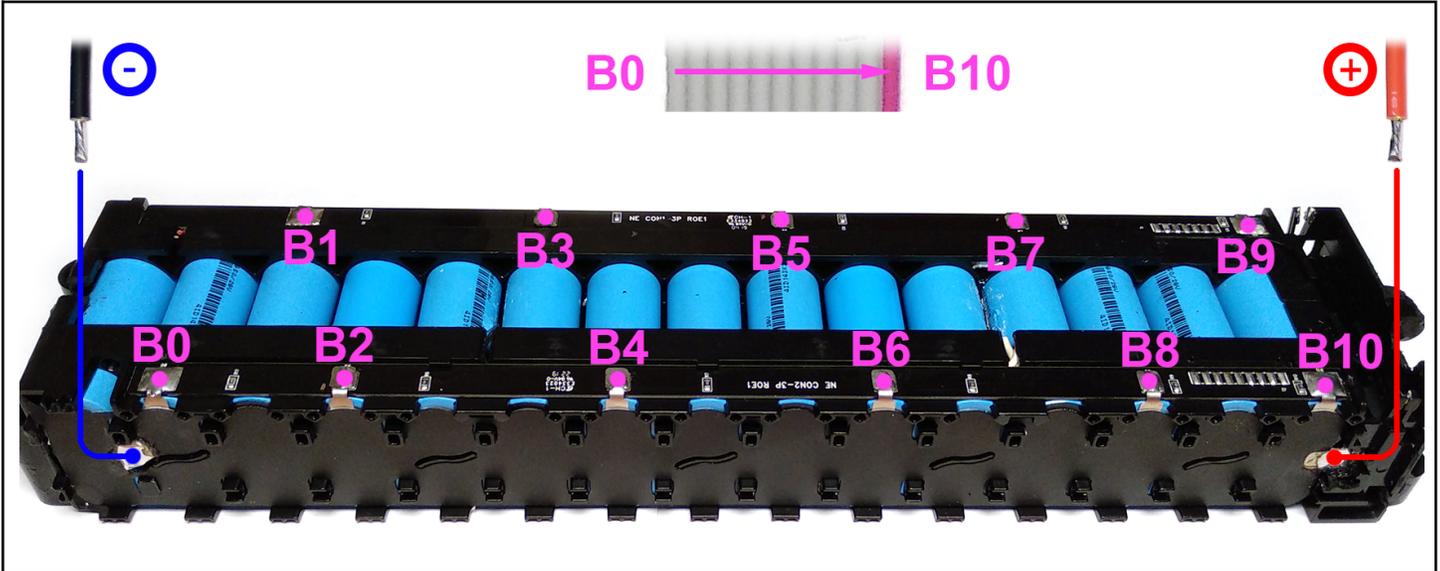
Supported battery types	Li-ion 3.7V
Supported battery configurations	10s
Maximum battery capacity, mA*h	32000
Maximum continuous discharge current, A	33*
Maximum continuous charge current, A	5**
Effective cells balancing current, mA	25

*It's highly recommended to reinforce discharging plugs for 30A+ discharging, as the original plugs are 30A rated. The BMS and wires are strong enough for 33A discharging.

**It's highly recommended to reinforce charging plugs for 3A+ charging, as the original plugs are 3A rated. The BMS and wires are strong enough for 5A charging.

Installation

Xiaomi M187/M365/1S/Essential/3 - wiring diagram

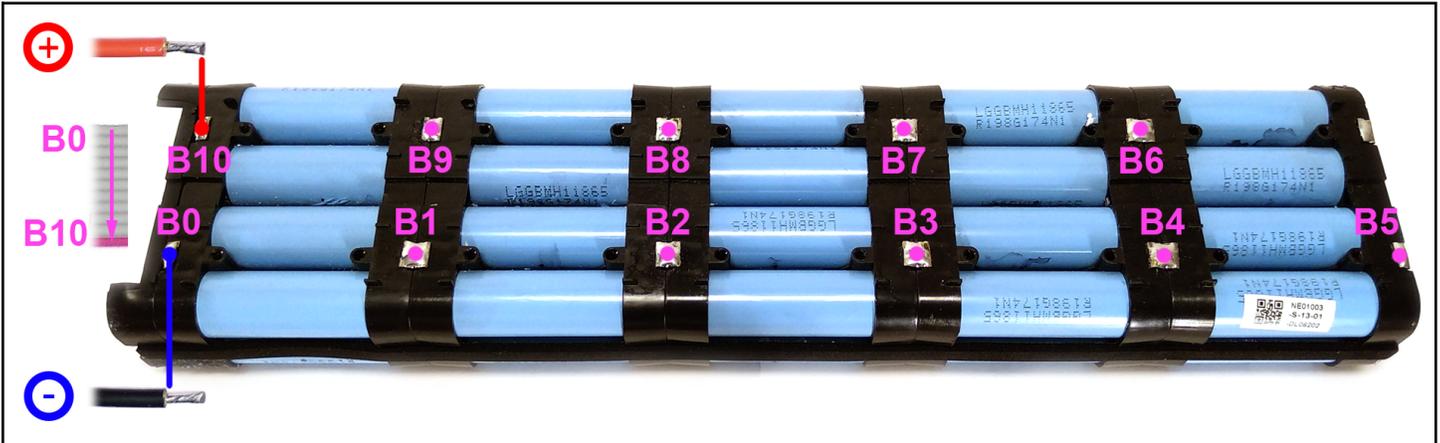


WARNING!

Follow the wiring sequence to avoid the BMS damage.

1. Connect the black power wire of the BMS to the negative lead of the battery pack.
2. Connect the red power wire of the BMS to the positive lead of the battery pack.
3. Connect the balancing wires one by one, starting with B0 and finishing with B10.
4. Mount the temperature sensor next to the cells.
5. Connect the battery to the scooter.
6. Connect the charger to the scooter to start the BMS. The LED indicator blinks if the BMS system has successfully started.

Xiaomi PRO/PRO2 - wiring diagram



WARNING!

Follow the wiring sequence to avoid the BMS damage.

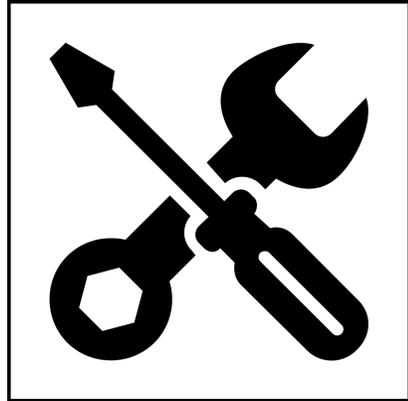
1. Connect the black power wire of the BMS and B0 balancing wire.
2. Connect the balancing wires one by one, starting with B1 and finishing with B9.
3. Connect the red power wire of the BMS and B10 balancing wire.
4. Mount the temperature sensor next to the cells.
5. Connect the battery to the scooter.
6. Connect the charger to the scooter to start the BMS. The LED indicator blinks if the BMS system has successfully started.

Installation video tutorials

[Xiaomi M365 BMS replacement](#)



[Xiaomi M365PRO BMS replacement](#)



Setting up the battery

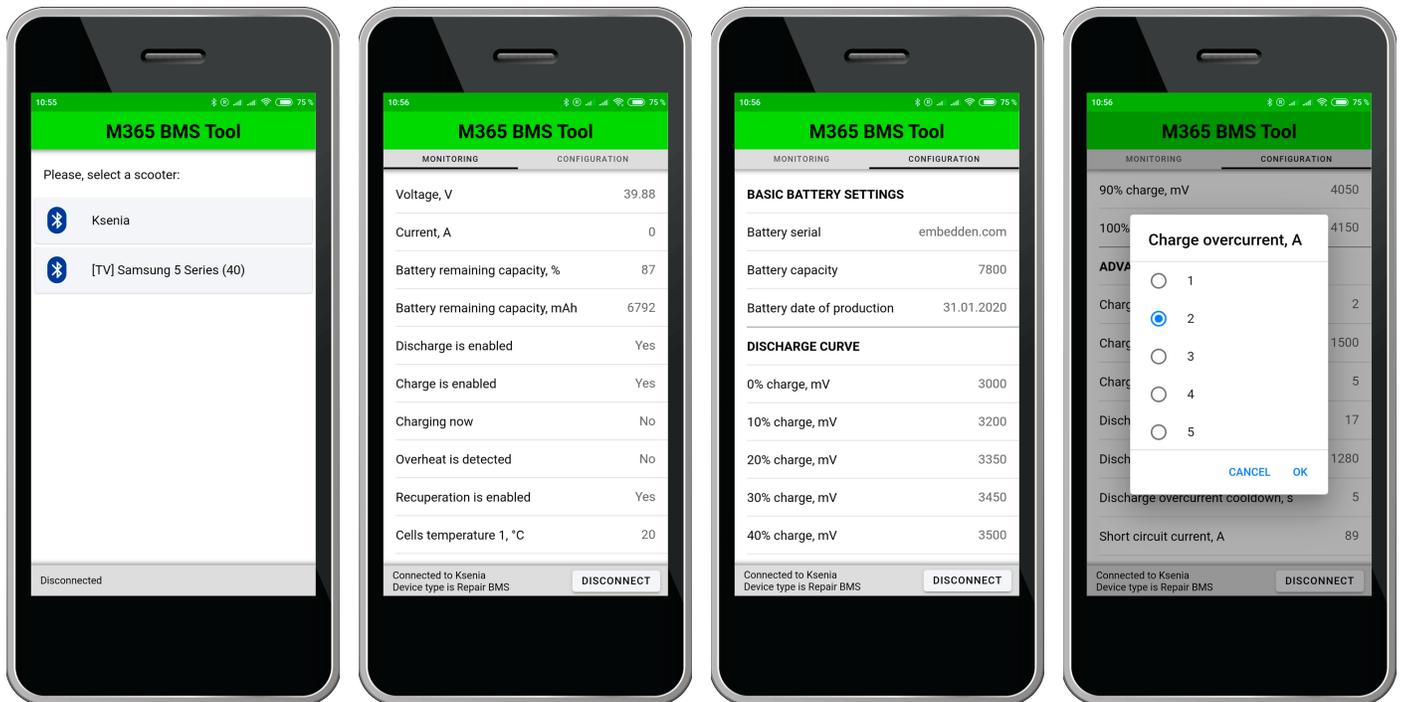
You can configure many battery parameters if the battery is equipped with Repair BMS.

Default values are suitable for M365/1S/Essential/3 batteries.

PRO/PRO2 batteries require changing the “Battery capacity” parameter from 7800 to 12800.

Custom batteries require at least a proper “Battery capacity” parameter setting, but you can reach maximum scooter performance by discovering all available settings.

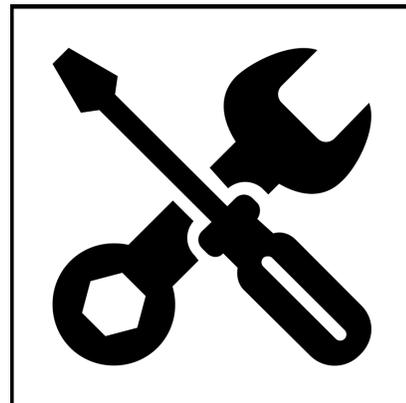
Please, use the “M365 BMS Tool” application to configure your battery:



[Download for Android](#)



[Download for iPhone](#)



Description of parameters

Parameter	Description
Battery serial	This parameter affects only the battery serial number displayed in applications. For example, put your name or your workshop name there.
Battery capacity	A very important parameter, it must be set correctly, otherwise the scooter will show the wrong charge level during a ride.
Battery date of production	This parameter affects only the battery production date displayed in applications.
Discharge curve	Sets the correlation between the voltage of the most discharged parallel and the charge level, by 11 points. For example, by default, 0% is 2700mV, 10% is 3100mV, ..., 90% is 4000mV, 100% is 4100mV. These values are used for initial battery charge level calculation after the BMS launch. 100% point is also used for coulomb counter calibration, 4100 is the optimal value.
Charge overcurrent Charge overcurrent delay Charge overcurrent cooldown	If the charge current exceeds the "Charge overcurrent" value for longer than the "Charge overcurrent delay" time, then the BMS disables charging for "Charge overcurrent cooldown" time.
Discharge overcurrent Discharge overcurrent delay Discharge overcurrent cooldown	If the discharge current exceeds the "Discharge overcurrent" value for longer than the "Discharge overcurrent delay" time, then the BMS disables discharging for "Discharge overcurrent cooldown" time.
Short circuit current Short circuit delay Short circuit cooldown	If the discharge current exceeds the "Short circuit current" value for longer than the "Short circuit delay" time, then the BMS disables discharging for "Short circuit cooldown" time.
Cell overvoltage Cell overvoltage delay Cell overvoltage hysteresis	If at least one parallel voltage is higher than the "Cell overvoltage" value for longer than the "Cell overvoltage delay" time, then the BMS disables charging until all parallel voltages drop below the ("Cell overvoltage" - "Cell overvoltage hysteresis") value.
Cell undervoltage Cell undervoltage delay Cell undervoltage hysteresis	If at least one parallel voltage is lower than the "Cell undervoltage" value for longer than the "Cell undervoltage delay" time, then the BMS disables discharging until all parallel voltages rise above the ("Cell undervoltage" + "Cell undervoltage hysteresis") value.
BMS shutdown undervoltage	If at least one parallel voltage is below this value for more than 30 seconds, then the BMS turns itself off and remains off until it is launched again by connecting a charger. This feature prevents cells from being deeply discharged.

(continued on the next page)

Description of parameters(continuation)

<i>Parameter</i>	<i>Description</i>
Balancing mode	There are 3 balancing options: Always - to balance the cells always. Charging&overvoltage - to balance the cells during charging or when the battery is almost fully charged. Never - never balance the cells.
Lowest voltage to balance	A cell group will not be balanced if its voltage is below the "Lowest voltage to balance" value.
Cells disbalance threshold	If the voltage of a cell group exceeds the lowest voltage cell group more than the "Cell Imbalance Threshold", then the balancing of the group starts.
Cells dsg. max. temperature	If the cells temperature exceeds this value, then the BMS disables discharging until the cells temperature drops below the ("Cells dsg. max. temperature" - "Cells temperature hysteresis") value.
Cells dsg. min. temperature	If the cells temperature drops below this value, then the BMS disables discharging until the cells temperature exceeds ("Cells dsg. min. temperature" + "Cells temperature hysteresis") value.
Cells chg. max. temperature	If the cells temperature exceeds this value, then the BMS disables charging until the cells temperature drops below the ("Cells chg. max. temperature" - "Cells temperature hysteresis") value.
Cells chg. min. temperature	If the cells temperature drops below this value, then the BMS disables charging until the cells temperature exceeds ("Cells chg. min. temperature" + "Cells temperature hysteresis") value.
Cells temperature hysteresis	See the explanation above.
BMS max. temperature	If the BMS temperature exceeds this value, then the BMS disables discharging and charging until the BMS temperature drops below the ("BMS max. temperature" - "BMS temperature hysteresis") value.
BMS temperature hysteresis	See the explanation above.
Reset to defaults	Set the 12876 value to restore factory default BMS settings

Default parameter values

<i>Parameter</i>	<i>Default value</i>
Battery serial	"DEFAULT VALUES"
Battery capacity, mAh	7800
Battery date of production	19.07.2021
Discharge curve, mV	2700, 3100, 3500, 3600, 3700, 3750, 3800, 3850, 3900, 4000, 4100
Charge overcurrent, A	3.5
Charge overcurrent delay, ms	1000
Charge overcurrent cooldown, s	30
Discharge overcurrent, A	33
Discharge overcurrent delay, ms	1280
Discharge overcurrent cooldown, s	30
Short circuit current, A	133
Short circuit delay, us	70
Short circuit cooldown, s	30
Cell overvoltage, mV	4200
Cell overvoltage delay, s	2
Cell overvoltage hysteresis, mV	100
Cell undervoltage, mV	2700
Cell undervoltage delay, s	4
Cell undervoltage hysteresis, mV	150
Balancing mode	Charge&Overvoltage
BMS shutdown undervoltage, mV	2500
Lowest voltage to balance, mV	3600
Cells disbalance threshold, mV	30
Cells dsg. max. temperature, °C	60
Cells dsg. min. temperature, °C	-5
Cells chg. max. temperature, °C	40
Cells chg. min. temperature, °C	5
Cells temperature hysteresis, °C	5
BMS max. temperature, °C	90
BMS temperature hysteresis, °C	10

Troubleshooting

Trouble:

The battery does not work, the BMS indication LED does not blink.

Solution:

1. Connect a charger: normally it starts the BMS.
2. Check the wiring.
3. Make sure that every cell group is fine: the group voltage must be between 2.5V and 4.2V.

Trouble:

The BMS starts up, but shuts down 30 seconds later.

Solution:

Make sure that every cell group voltage is higher than the “BMS shutdown undervoltage” value. If at least one cell group voltage is below the value, leave a charger connected until the voltages are fine.

Trouble:

The BMS indication LED blinks, but the scooter does not turn on.

Solution:

1. Check the battery output voltage. If it is in the range between 25V and 42V, the BMS and the battery pack are fine, so the problem is not related to the battery, and you have to diagnose other scooter modules.
2. If the battery output voltage is below 25V, pay your attention at the BMS indication LED:
 - a) Double short flash every second - there is a balancing wires connection issue. Some wires are not connected or connected the wrong way.
 - b) Long(0.5-1s) flashes - the temperature protection has tripped. The cells temperature is too high or too low, or the BMS temperature is too high, or the temperature sensors are broken.
 - c) Short flash every 4 seconds - at least one of the cell groups is completely discharged, the battery discharging is prohibited by the BMS, charging is required.
 - d) Short flash every 1 second - the battery is in a standby state and is ready to be charged or discharged. This is a typical battery condition when the scooter is off and not charging. If the indication LED blinks this way, but the battery output is below 25V - the BMS board or the output wires/plug are damaged.
 - e) Short flash every 0.5 second - the battery is in an active state: charging, discharging, or data exchanging. If the indication LED blinks this way, but the battery output is below 25V - the BMS board or the output wires/plug are damaged.
 - f) Continuous flash - the overcurrent protection has tripped. You have to wait about 30-60 seconds for the protection cooldown.

Trouble:

I am getting a continuous LED flash after connecting the battery to the controller.

Solution:

Sometimes the ESC capacitors initial charging current trigs the overcurrent protection. If it happens, just leave the battery connected for a few trip-cooldown cycles, until the capacitors are fully charged and do not trigger the protection anymore. Or use some anti spark solutions to charge the ESC capacitors before plugging the battery in.

Warranty and technical support

We do not accept returns and do not provide warranty because there are many cases when unqualified customers fry the BMS by wrong wiring, and then require a warranty exchange. But if you are a skilled guy, feel free to order and install the BMS - its quality is proven by years and hundreds of installations, but unfortunately we are not able to provide warranty, paying for every failure of not qualified enough customers.

If you did not find the answer to your question after reading this manual, please join our support Telegram group:

[E-scooters Upgrade Workshop by Denis Yurev](#)

