

How to check the battery

MiR100, MiR200, MiR500 and MiR1000



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Valid for: MiR100, MiR200, MiR500 and MiR1000.

How to check the battery on MiR100, MiR200, MiR500 and MiR1000

These instructions describe how to test the battery of MiR100, MiR200, MiR500 and MiR1000 robots and which steps to take if the test results show that the battery should be replaced.

Which robots should be tested?

Depending on when they were manufactured, robots have either 15-digit or 9-digit product serial numbers.



To see where the labels with serial numbers are located, follow [this link](#).

Robots with 15-digit serial numbers (S/N):

- All MiR100 from S/N 180100002000600
- All MiR200 from S/N 18020011100200
- All MiR500 and MiR1000

For MiR100 and MiR200 robots with 15-digit serial numbers lower than the ones mentioned above—see Robots that must have their batteries replaced on page 6.

Robots with 9-digit serial numbers (S/N):

- All MiR100 with 1 battery up to S/N 201703081
- All MiR100 with 2 batteries up to S/N 201803021
- All MiR100 BOR with up to S/N 202103127
- All MiR100 CN with up to S/N 202203056
- All MiR200 with 1 battery up to S/N 201903019
- All MiR200 with 2 batteries up to S/N 202003024
- MiR500 up to S/N 202503019
- MiR1000 up to S/N 202603001

Checking the battery

For each robot, follow the steps in this section to check the battery and find out if it needs to be replaced.

You can use the diagram below to get an overview of the workflow.

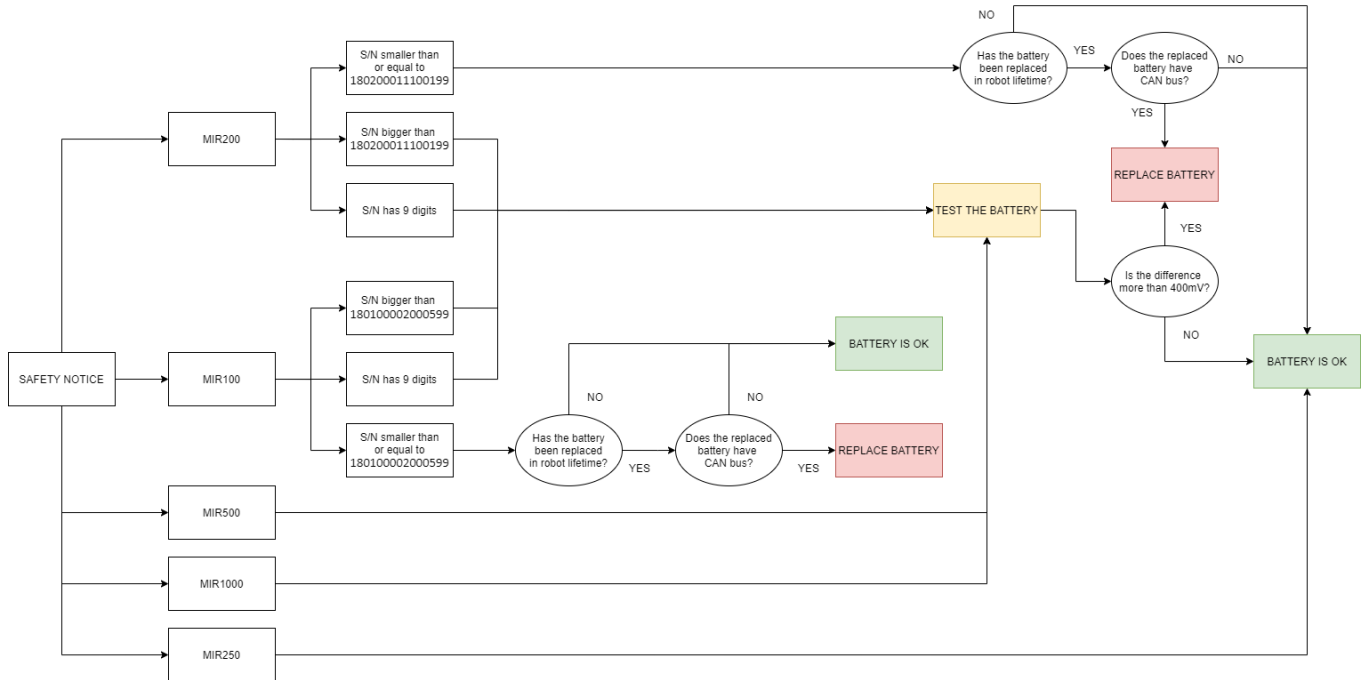


Figure 1.1. The diagram shows which steps to go through to check the different robots.

Step 1: Discharge your robot. Stop the robot, turn off any top interface, and leave the robot idle until it shuts down. The robot is now off as a result of the automatic shut-down procedure.



This process can take several hours depending on the battery state of charge.



Make sure to complete the test within 24 hours, and do not leave the robot fully discharged.

Step 2: Turn the robot on again by pushing the On/Off button.



NOTICE

If you can't turn the robot on again, do not attempt to charge it. Contact MiR Technical Support.

Step 3: Log on to the robot interface and go to **Monitoring > Hardware health > Power system > Battery Management System (BMS).** Read the voltage values of the cells listed and note down the lowest and highest values. Be aware that the robot is very low on power, and that you will have a limited amount of time to perform this action before it shuts down again.

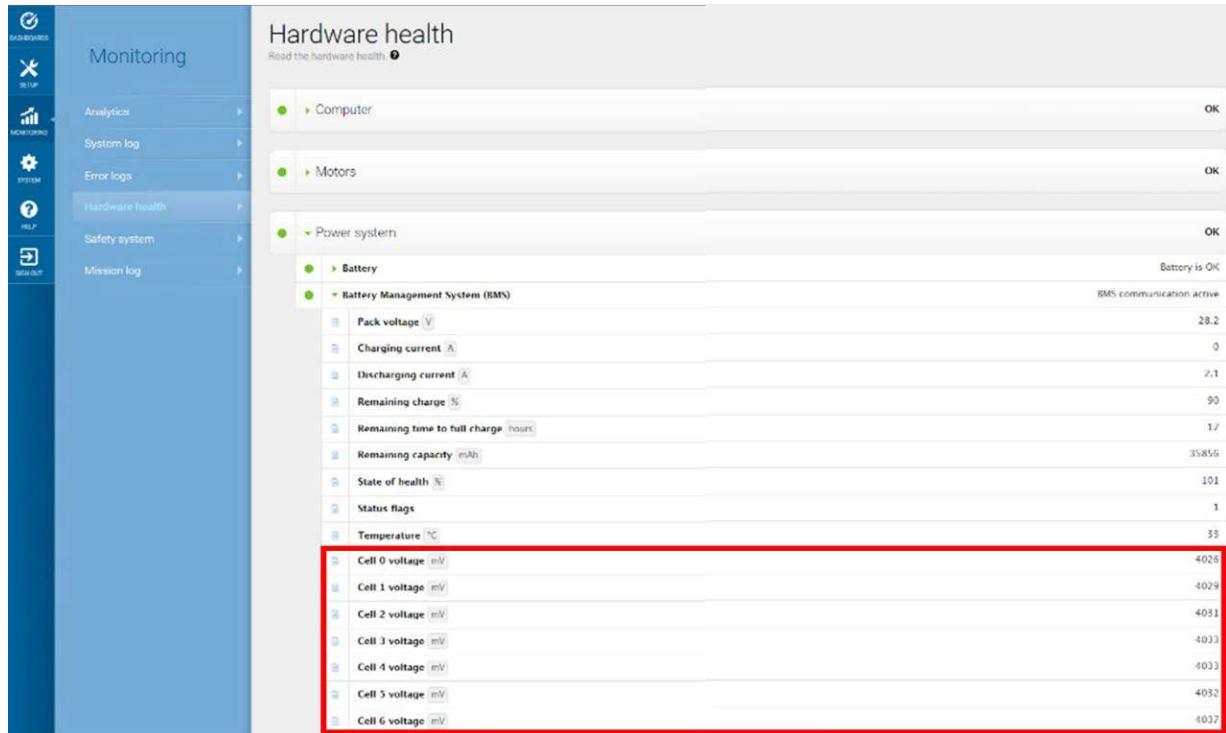


Figure 1.2. Read the voltage value of the lowest and highest cells listed. Different types of batteries have a different number of cells.



Step 4 is for MiR100 and MiR200 with two batteries only. For all other robots, continue to Step 5.

Step 4: Shut down the robot after reading the cell values on the first battery. Then connect the communication cable to the other battery so that this is now connected to the BMS CAN bus. Now turn on the robot again and repeat step 3.



Due to lack of space, it can be difficult to connect the CAN bus cable to the second battery. If you experience that, you may swap the batteries instead.

To do so:

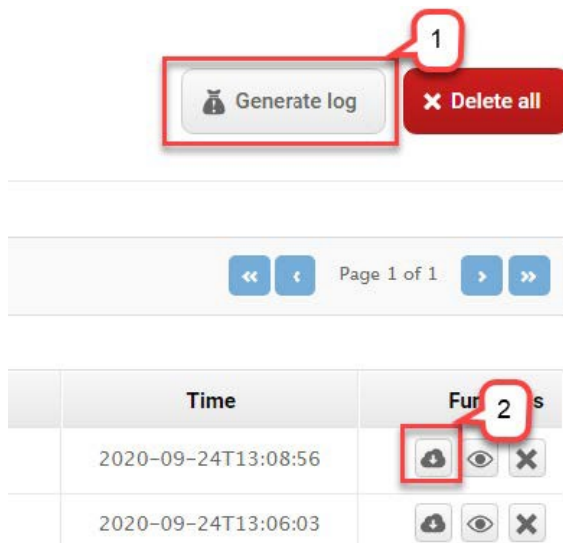
1. Turn off the robot.
2. Remove the battery connectors and BMS connector.
3. Take off the back cover of the robot and remove the metal plate holding the batteries in place.

4. Take out both batteries and put in the battery that did not have the BMS cable connected in the first place and connect the BMS cable. Now perform step 3 again.

Step 5: Calculate the difference between the maximum and minimum values of the cells.

- a. If the calculated difference is equal to or higher than 400 mV, go to **Monitoring > Error logs** to generate an error log.

Select **Generate log** (1) and then download the file (2).



Next, take a picture of the ID label on the battery in question that shows the serial number clearly—see Figure 1.4 on page 7. Attach the picture together with the error log when you contact your local MiR representative for a replacement battery.



NOTICE

Do not attempt to charge the battery if the difference between the two values is higher than or equal to 400 mV.

- b. If the calculated difference is smaller than 400 mV, the battery is OK, and you can charge the robot again and continue using it as usual.

Example:

In the screenshot below, the lowest cell voltage is 3630 mV in Cell 2, and the highest cell voltage is 3806 mV in Cell 5.

The difference between the two values is: $3806 \text{ mV} - 3630 \text{ mV} = 176 \text{ mV}$. In this example, the battery is fine.

Cell 0 voltage mV	3782
Cell 1 voltage mV	3804
Cell 2 voltage mV	3630
Cell 3 voltage mV	3796
Cell 4 voltage mV	3791
Cell 5 voltage mV	3806
Cell 6 voltage mV	3796

Figure 1.3. In the shown example, the difference between the lowest and highest values is <400 mV, which indicates that the battery is OK.

Robots that must have their batteries replaced

Older MiR100 and MiR200, not listed at the beginning of this document, may need to have their batteries preventatively replaced.

Whether this is necessary depends on the type of replacement battery. If the battery has been replaced with a battery with CAN bus communication connection, it must be replaced, if not there is no need for replacement.

Robots included are:

- MiR100 with S/N up to 180100002000599
- MiR200 with S/N up to 180200011100199

You can distinguish a battery with CAN bus connection from a battery without by the extra connector next to the blue battery connector. You can also check the battery serial number. Numbers that include the letters “CB” are for batteries with CAN bus communication connection.



Figure 1.4. You can tell if the battery has CAN bus communication connection by the extra (black) connector and the letters “CB” in the serial number.

To get a replacement battery, please contact your local MiR representative.

Document history

Version	Date	Description
1.0	2020-09-28	First edition.
1.1	2020-09-30	Diagram of workflow added.
1.2	2020-10-14	Picture of serial no. must be part of the support case added.

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