

TB50 & TB55 User Guideline (Updated – 19 December 2018)

Background

DJI released a firmware update on 16 November 2018 following reports of a small number of TB50 and TB55 batteries showing incorrect power levels which led to the loss of power mid-flight. The firmware update addresses a rare issue involving the battery state of charge (SOC) calculation algorithm by incorporating the following conservative measures listed below which serve to enhance the battery management system and optimize power supply during flight.

On 19 December 2018, DJI released new firmware updates which serve to address a small number of reports of Matrice 200 Series drone users experiencing early Return-to-Home (RTH) or Automatic Landing (AL). These cases were the result of false alarms triggered by the conservative measures DJI implemented in November. This new firmware update (v01.02.0301) further improves the algorithm accuracy of the battery management system to enhance user experience without compromising flight safety and product reliability which remain DJI's top priorities.

For TB55 batteries used with M200 series drones, the firmware update will impose these new battery safeguards:

Additional battery heating before take-off (S1)

The additional heating will prevent batteries from turning off unexpectedly at low temperatures. The temperature of both batteries must now be 16°C (61°F) or higher before the aircraft can take off. This is because a battery with low temperature has a higher internal resistance, which causes lower voltage than in warmer conditions. A battery with low voltage will provide a lower level of power to the drone, and hence impose higher risk of a power loss.¹

Improved battery percentage and fault detection (S2)

The battery percentage check before take-off has been improved, and users will be warned when the battery is faulty or the remaining battery charge suddenly jumps to a false higher percentage. The voltage of the battery will be used to verify the SOC value by the further improved DJI algorithm in the new firmware. This SOC value will be compared to the one calculated by the battery SOC calculation algorithm to determine if there is a "false high" SOC reading. If there is a "false high" SOC reading, then the aircraft will not be able to take off.

Enhanced Return-to-Home (RTH) or Automatic Landing (S3)

When the DJI algorithm detects a difference in SOC levels (this calculation runs within the battery and is therefore not visible to users through the screen) between the algorithm and the actual level that is too large, RTH (Return-to-Home) will be activated at a detected battery level of 30% and Automatic Landing (AL) activated at 10% (based on the DJI algorithm). Previously observed false alarms, that triggered early RTH or AL in a small number of cases, have been reduced drastically.

For TB50 batteries used with M200 series drones, the FW update will impose this new battery safeguard:

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The additional heating will prevent batteries from turning off unexpectedly at low temperatures. The temperature of both batteries must be 16°C (61°F) or higher before the aircraft can take off. This is because a battery with low temperature has a higher internal resistance, which causes lower voltage than in warmer conditions. A battery with low voltage will provide a lower level of power to the drone, and hence impose higher risk of a power loss.²

¹ Flight times vary depending on age of batteries, temperature of the environment, altitude or payload.

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Guideline

Latest firmware. While the update is not mandatory, M200 series drone users are strongly advised to update their drone and batteries to the latest firmware. We ask that pilots allow extra time before their next flight to perform this update to minimize disruption to their operations.

Inconsistent Firmware Notification. For the time being, pilots who are using drones of both the DJI M200 series and the DJI Inspire 2 with TB50 batteries may continue to receive an "inconsistent firmware" notification when using batteries updated with different firmware versions. This may lock the drone. DJI advises that pilots use batteries upgraded with the same firmware until a new firmware update is issued in January.

Battery is taking a longer time to heat up. This is caused by S1. DJI suggests pilots pre-heat their batteries or keep them at room temperature (about 16°C/61°F) before flying outdoors to minimize the risk of flight disruption.

In the rare case that a pilot experiences early trigger of RTH or AL:

- When a drone starts Smart RTH, pilots can interrupt and stop RTH by pressing the "X" on the screen
- When a drone begins AL, pilots can still steer the drone using the joystick to help find the safest landing location. Pushing up the throttle can also slow or counteract the descending aircraft.

It is important to note that these responses are not caused by any hardware fault. In the rare case that early RTH or AL is triggered, it is due to the risk mitigation strategy programmed into our flight controller.

While DJI, just like any other manufacturer, can never guarantee absolute safety in every case, we take safety very seriously and therefore are addressing this situation with an abundance of caution, while we work on a longer-term resolution to be released in January.

As an added guidance, as with all Lithium batteries, there are several factors that impact the usability of your TB50 and TB55 batteries, including external variables such as weather and altitude where your flight takes place, as well as factors in your control such as storage and handling methods.

Listed below are some tips DJI has prepared for drone operators – especially those conducting operations in cold weather environments.

Pre-flight

- Make sure that the batteries are fully charged before use.
 - Preheat the battery at room temperature so that it reaches 16°C (61°F) (battery temperature can be monitored in the DJI Pilot /DJI GO /DJI GO 4 Apps).
 - If the environment is too cold, hover the aircraft for about 1 minute so the batteries can heat up to around 16°C (61°F).
 - Keep battery packs warm:
 - Hand warmers.
 - Warm rice is recommended since it stays warm for long periods of time and is reusable: microwave about 5-10lb of dry rice in a large resealable bag. Heat for 5-10 minutes or until hot. Then place in a high-quality cooler with the batteries.
 - Keep the batteries close to your body to use your body heat to keep them warm.
 - Preheat the batteries while travelling so that they can be used immediately when arriving on site.
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During flight

- Remember that flight times will be reduced when operating in cold environments. Make sure there is sufficient battery capacity to allow for a Return-to-Home. This also applies to the remote controller as it could power down during the flight if battery levels are not monitored.
- Do not fly any partially discharged packs or packs that have entered self-discharge mode state.
- When removing the aircraft from a warm environment to the cold, please let it acclimatize without batteries for at least 10 – 15 minutes.
- When moving the RC from warm to cold you could receive a calibration error. If this happens, please turn off the aircraft and perform an RC calibration via the RC tab in the app.
- Make sure to bring dry towels and wipe off any moisture that might build up during flight or in the field.
- Please make sure all contacts on cameras and batteries are dry before installing or putting them in storage.
- Smart gloves are not a requirement but a recommendation. Smart gloves allow the use of a smart devices without the need of removing the glove.

Storage

- Do not store charged packs at temperatures lower than 0°C.
- Never store batteries outdoors in cold temperatures. Doing so can seriously damage the packs or shorten their life dramatically. Batteries should be stored in a temperature between 10 - 45°C (50 - 113°F).
- Always keep packs between 50 - 65% during storage. If stored for more than a few months, it is recommended to check these storage levels regularly. It is recommended that packs in storage be charged once every 90 days and then return them to a storage percentage of 50 - 65%.

Please read our [Intelligent Flight Battery Safety Guidelines](#) for more detailed information to help minimize potential disruption to your operations.