STANDARD OPERATING PROCEDURES

Charging Drone Batteries and Remote Controller

I. General

This standard operating procedure (SOP) provides instructions on how to charge the intelligent flight batteries and remote controller of the DJI Inspire 2® drone. The drone has a dual battery design which requires a set of two batteries during each flight. Each pair of batteries can provide a maximum of 25-minute flight time for the drone with the Zenmuse X5S® camera. It is necessary to charge the batteries after each flight to ensure they have enough power before next usage. The batteries and remote controller can be charged by using a Inspire 2/Ronin 2 180 W battery charger and a battery charging hub. There's also a DJI battery station available for the same purpose of battery charging, but it will not be discussed in this document.

II. Charging Equipment

A. DJI Inspire 2/Ronin 2 180 W Battery Charger®

The DJI Inspire 2 180W battery charger, as shown in Figure 1, is used to charge the Inspire 2 remote controller and intelligent flight batteries. It is manufactured by DJI® and the official sales price is $119 before tax. The input voltage requirements for the charger are 100 - 240 V ~ 50/60 Hz 2.9 A, and the output voltage is 26.1 V with a maximum current of 6.9 A.

Figure 1. DJI Inspire 2/Ronin 2 180 W Battery Charger®

The charger will require a separate AC cable and the compatible model is the 180 W Power Adaptor AC Cable, as shown in Figure 2. The cable can be purchased from the DJI official store, and the price is $11 before tax. The charger can directly be used for charging the remote controller, but to charge the flight batteries, an additional charging hub is required.

Figure 2. 180 W Power Adaptor AC Cable

B. DJI Inspire 2 Intelligent Flight Battery Charging Hub®

The DJI Inspire 2 Intelligent Flight Battery Charging Hub® is designed for use with the Inspire 2 Battery Charger. It is available in the official store with a cost of $129 before tax. As demonstrated in Figure 3, four flight batteries can be placed in the charging hub at once, but only a maximum of two batteries will be charged at a time. The charging hub is designed to charge batteries in a

descending order based on battery power levels, and if batteries are paired, the pair with more stored power will be charged first. The Micro USB port is used for firmware updates.

Figure 3. DJI Inspire 2 Intelligent Flight Battery Charging Hub

III. Charging Procedures

A. Charging the Intelligent Flight Battery

The compatible battery for DJI Inspire 2 is the TB50 Intelligent Flight Battery®. The battery type is LiPo 6S with net weight being 515 g. The front and back images of one battery can be seen in Figure 4. Each battery has a capacity of 4280 mAh and voltage of 22.8 V. The batteries can only be charged with an appropriate DJI approved charger, and they will stop charging if high amperage (more than 10A) is detected. The maximum charging power is 180 W, and the charging temperature should be within the range of 41° to 113° F (5° to 45° C). When fully charged, each pair of batteries can provide a maximum of 25-minute flight time under ideal flight conditions. The operating temperature should be within the range of 14° to 104° F (-10° to 40° C).

Figure 4. DJI TB50 Intelligent Flight Battery

Step 1: Remove the batteries from the drone

To remove batteries from the drone, first press the battery removal button located at the top of the drone (marked in red in Figure 5) and the batteries will be released. Then, slide the batteries off the drone, as demonstrated in Figure 5.

Figure 5. Removing the batteries from the drone

Step 2: Connect to a power source

Connect the DJI Inspire 2 180W battery charger to a power outlet (100-240 V, 50/60 Hz) using the AC cable, then uncover the rubber cover on the power port ([1] in Figure 7) located at the top of the charging hub, and connect the charging hub to the battery charger, as demonstrated in Figure 6.

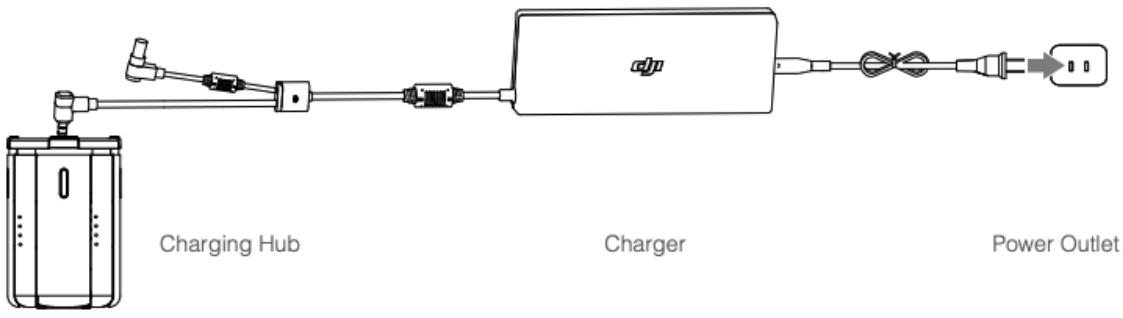

Figure 6. Connecting to a power outlet

Step 3: Connect batteries with the charging hub

Press the cover release button ([5] in Figure 7) and open the corresponding charging port cover ([3] in Figure 7). Align the grooves on the Intelligent Flight Battery with the battery slot tracks, and insert the batteries into the charging port to begin charging. This process is illustrated in Figure 8. It is recommended that each battery pair is charged and discharged simultaneously so that their service life can be prolonged, and a better flight experience can be provided.

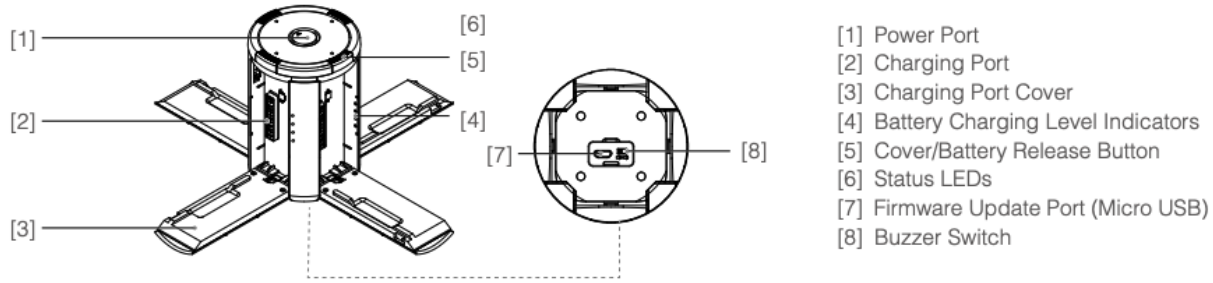

Figure 7. Charging Hub Diagram

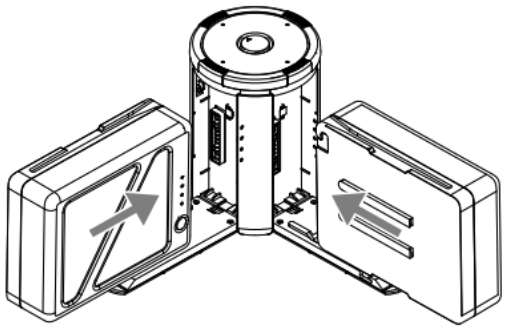

Figure 8. Connecting the Batteries with the Charging Hub

The charging progress can be monitored through Status LEDs located at the top of the charging hub ([6] in Figure 7) and battery level indicators located at one side of each battery (LED 1-4 in Figure 9). For the charging hub status LEDs, if the charging operation is correct, then users will expect to see a green blinking light for the batteries that are being charged, and a solid yellow light for the batteries that are ready to be charged. Table 1 describes the detailed meaning of each possible LED pattern.

Table 1. Descriptions of the Charging Hub Status LEDs

Status LED (Charging Hub)	Description
Blinks Green	Charging
Solid Green	Fully charged
Blinks Red	Battery Charger error
Solid Red	Intelligent Flight Battery error
Blinks Yellow	Battery temperature too high/low. Temperature must be within operating range (5°-40°C)
Solid Yellow	Ready to charge

In addition to the charging hub status LEDs, the LEDs located on one side of each battery can also display the current battery level when being charged. The battery levels corresponding to each LED pattern are listed in Table 2.

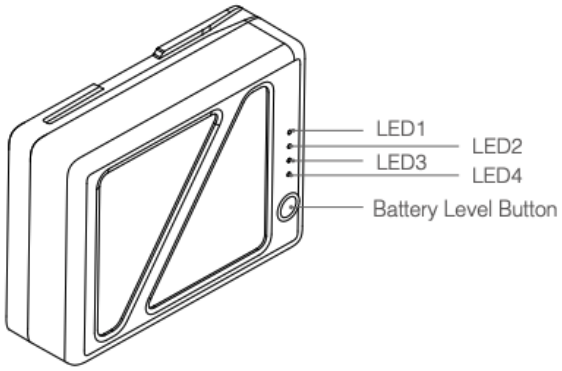

Figure 9. Intelligent Flight Battery Diagram

Table 2. Descriptions of the Battery Level Indicators while Charging

Battery Level Indicators while Charging (Battery)				
LED1	LED2	LED3	LED4	Battery Level
☼	☼	○	○	0%~50%
☼	☼	☼	○	50%~75%
☼	☼	☼	☼	75%~100%
○	○	○	○	Fully Charged

Flight batteries are designed to have smart charge-discharge functionality to prevent battery damage. When a charging error is detected, battery level indicators can also inform users of the

exact issue through different blinking patterns. Table 3 shows battery protection mechanisms and corresponding LED patterns.

Table 3. Descriptions of the Battery Level Indicators for Battery Protection

Battery Level Indicators for Battery Protection					
LED1	LED2	LED3	LED4	Blinking Pattern	Battery Protection Item
○	☼	○	○	LED2 blinks twice per second	Over current detected
○	☼	○	○	LED2 blinks three times per second	Short circuit detected
○	○	☼	○	LED3 blinks twice per second	Over charge detected
○	○	☼	○	LED3 blinks three times per second	Over-voltage charger detected
○	○	○	☼	LED4 blinks twice per second	Charging temperature is too low (<0°C)
○	○	○	☼	LED4 blinks three times per second	Charging temperature is too high (>40°C)

Step 4: Finish charging and remove batteries from the charging hub

It takes approximately 1.5 hours to fully charge an Inspire 2 Intelligent Flight Battery. If both batteries and remote controller are being charged at the same time, then the battery charging time may be longer. When batteries are fully charged, the charging hub status LED as well as all the battery level indicators will display a solid green light, as shown in Figure 10, then charging will automatically stop.

Figure 10. Charging Hub Status LEDs Display a Solid Green Light

Additionally, the buzzer located at the bottom of the charging hub will begin beeping when charging is complete. It will beep quickly when a battery pair is fully charged, and if all four batteries are fully charged, the buzzer will switch into an alternating two short and one long beeps. This beeping pattern will last for about 1 hour to remind users to remove the batteries.

Once charging is finished, simply press the battery release button ([5] in Figure 7) again, remove the batteries, and close the corresponding charging port cover. Then disconnect the charger with the charging hub and replace the rubber cover on the power port ([1] in Figure 7).

B. Inspire 2 Remote Controller Charging

The Inspire 2 remote controller is powered by a 2S rechargeable battery with a capacity of 6000 mAh. The battery level is indicated by the battery level LEDs on the front panel of the remote controller, as shown in Figure 12. The Inspire 2 remote controller can be charged by connecting it to an Inspire 2 Intelligent Flight Battery charger.

Figure 11. Inspire 2 Remote Controller

Step 1: Check the battery level of the remote controller

When the remote controller is powered off, press the power button located on the front panel of the remote controller once and the battery level LEDs will display the current battery level.

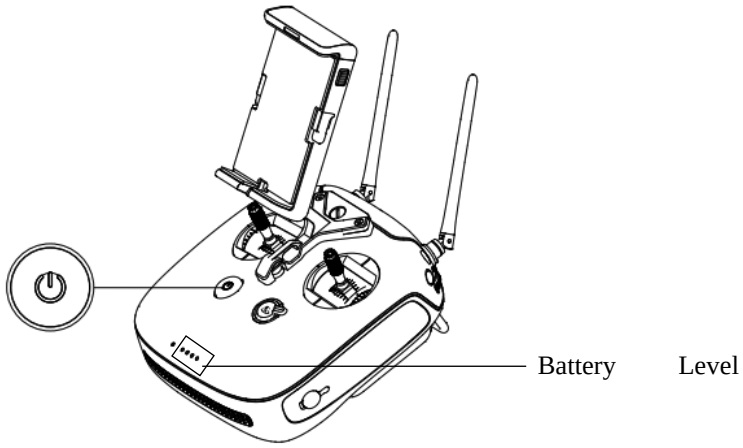

Figure 12. Status LEDs on the Front Panel of Inspire 2 Remote Controller

Step 2: Connect the remote controller with the charger

Similar to battery charging, first connect the DJI Inspire 2 180W battery charger to a power outlet (100-240 V, 50/60 Hz) using the AC cable, then uncover the rubber cover on the charging port located on one side of the remote controller. Connect the remote controller with the battery charger using cable B, as demonstrated in Figure 13. Users should see the battery level indicators blinking to display the charging progress.

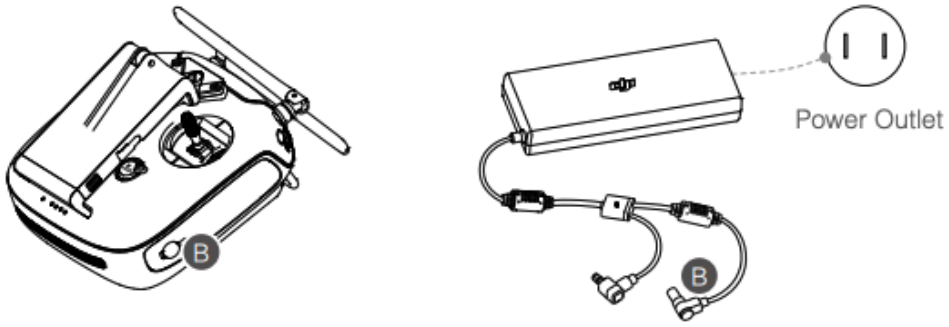

Figure 13. Connecting the Remote Controller with the Battery Charger

Step 3: Finish charging and disconnect the remote controller

The remote controller will take approximately 3 hours to be fully charged. If the charger is charging both batteries and remote controller together, the charging time may be longer. When charging is completed, all the battery level LEDs will display a solid white light. Disconnect the

remote controller from the charger and replace the rubber charging port cover on the remote controller. To power off the remote controller, simply press and hold the Power Button until all the LEDs are turned off.

Procedure Checklist of Charging Drone Batteries and Remote Controller

Procedure Checklist of Charging Drone Batteries and Remote Controller		
General Information	Project Number:	Comments
	Date:	
	Time:	
	Operator:	
Required Equipment		Check
Charging Equipment	DJI Inspire 2/Ronin 2 180 W Battery Charger®	
	180 W Power Adaptor AC Cable	
	DJI Inspire 2 Intelligent Flight Battery Charging Hub®	
Charging Procedures for TB50 Intelligent Flight Battery®		Check
Charging Environment	Ensure the charging temperature is within the range of 41° to 113° F (5° to 45° C)	
	Ensure the charging power do not exceed 180 W	
Battery Removal	Remove batteries from the drone by pressing the battery removal button	
Connect the charging hub to a power source	Connect the DJI Inspire 2 180W battery charger to a power outlet (100-240 V, 50/60 Hz) using the AC cable	
	Uncover the rubber cover on the charging hub power port, and connect the charging hub to the battery charger	
Connect batteries with the charging hub	Press the cover release button and open the corresponding charging port cover	
	Align the grooves on the Intelligent Flight Battery with the battery slot tracks	
	Insert batteries into the charging port to begin charging	
Monitor the charging process	Monitor the charging process through the charging hub's status LEDs and battery level indicators (detailed meaning of different patterns can be found in the SOP document)	
Finish charging	Ensure the charging hub status LED and all the battery level indicators display a solid green light	
	Press the battery release button to remove the batteries and close the corresponding charging port cover	
	Disconnect the charger with the charging hub and replace the rubber cover on the power port	

Charging Procedures for Inspire 2 Remote Controller		Check
Check the battery level	Press the power button located on the front panel of the remote controller once and the battery level LEDs will display the current battery level	
Connect the remote controller with the charger	Connect the DJI Inspire 2 180W battery charger to a power outlet (100-240 V, 50/60 Hz) using the AC cable	
	Uncover the rubber cover on the charging port located on one side of the remote controller	
	Connect the remote controller with the battery charger using a different cable	
Finish charging	Ensure all the battery level LEDs will display a solid white light	
	Disconnect the remote controller from the charger and replace the rubber charging port cover on the remote controller	
	Press and hold the Power Button until all the LEDs are turned off to power off the remote controller	
Operator Signature		