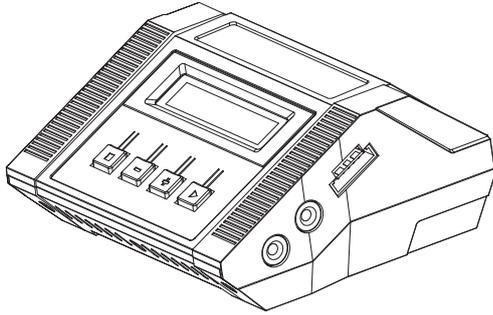


SplashDrone 3+

Smart Balance Charger User Manual

for firmware v4.0 with STORAGE mode



If your charger does not have firmware v4.0, please update the charger. Instructions and firmware is available at swellpro.com/download.html

September 2019

SwellPro
www.swellpro.com

Please check www.swellpro.com for the latest version of this manual.

IMPORTANT:

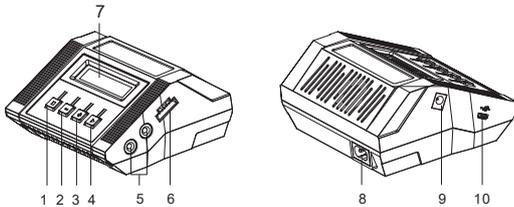
1. Charging batteries can be dangerous. Incorrect charging can result in fire, explosion or the permanent damage of batteries. Always store and charge Lithium batteries at cool temperatures <25c.
2. Ensure you read and understand this manual before using the charger.
3. Different battery types need to be charged differently. You must ensure that the the settings of the charger match the requirements of your battery.
4. This manual is for the SwellPro Balance Charger with version 404 firmware. The firmware version appears on the screen of the charger at power up. Updated charger firmware is available at swellpro.com.

1. Important Precautions

1. NEVER LEAVE A BATTERY UNATTENDED DURING CHARGING OR DISCHARGING. Do not use this product in direct sunlight, rain or moist environments.
2. Always operate the charger in a suitable environment 5 °C ~ 45 °C. Keep the charger away from heat sources, water, flammable gas and corrosive agents.
3. Ensure the charger has sufficient ventilation (recommended >50cm).
4. Do not cover the charger or battery during operation. Do not place the battery on top of the charger.
5. Do not charge non-rechargeable batteries or incompatible batteries.
6. During operation, the charger and battery should be placed on a strong anti-flammable and non-conductive surface. Do not charge batteries on a car seat, carpet or other similar surfaces.
7. Only charge compatible batteries. Charging incompatible batteries is a fire risk.
8. Do not charge or discharge a battery that has been physically damaged.
9. Do not disconnect the input line during charging. After charging has completed, disconnect the battery and then the input line.
10. Keep the charger clean and dry.
11. Do not modify or disassemble the charger or batteries.
12. Avoid using the charger during thunderstorms.
13. Do not allow children under the age of 14 to use the charger.
14. Do not short-circuit or disassemble a battery.
15. In the event of fire, disconnect the charger and use a dry powder fire extinguisher to fight the fire.

2

2. Charger Features



- | | |
|------------------|---|
| 1. Charge Mode | 6. Balance Interface |
| 2. Decrease | 7. LCD Screen |
| 3. Increase | 8. AC Input |
| 4. Start/Confirm | 9. DC Input (for connection to a car charging port) |
| 5. Main Output | 10. USB Interface (for software updating) |

2.1 Buttons



STOP button:
- Stop the current program
- Change MODE

START button:
- Hold down to START program
- Select an item value to change

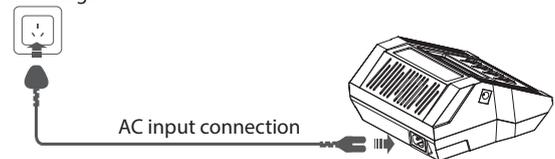
- button:
- Decrease selected item value
- Change MODE
- BACK through menu items

+ button:
- Increase selected item value
- FORWARD through menu item

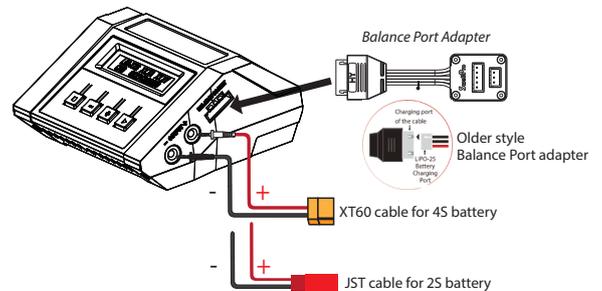
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3. Connection instructions

1. The charger can be connected to an AC outlet (100~240V AC) or to a suitable high-current DC source 11~18V such as a car charging port. Normal cigarette lighter adapters do not usually have sufficient current to be safely used for this charger.



2. Connect the Balance Port Adapter and Charging cable to the charger.



Use the JST cable for the SplashDrone remote controller battery or S3 Goggle battery
Use the larger XT60 cable for the SplashDrone 3/3+ drone battery.

Only ONE battery can be charged at a time.

CHECK THAT THE CHARGING CABLE COLORS MATCH THE COLOR OF THE PORTS

4S BATTERY: the large battery used in the drone

2S BATTERY: the smaller battery used in the remote controller and for the S3 Goggles

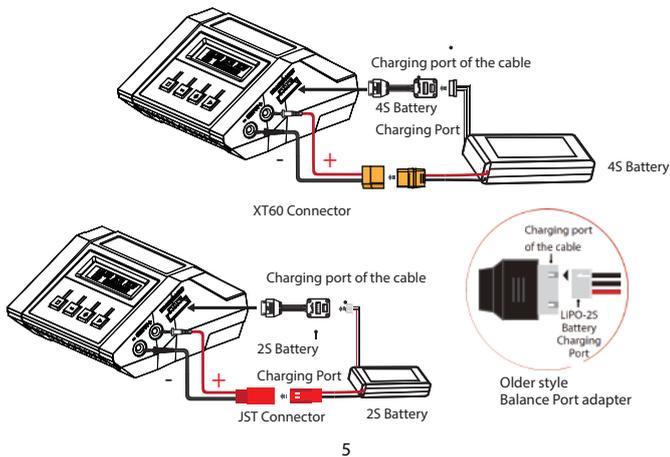
4

1. Before charging, check and make sure the terminals and wires of the battery pack are not damaged.
2. When connecting the battery, always check that the positive (red) and negative (black) wires are connected correctly and the connector plugs are connected to the same color ports on the charger.
3. In order to avoid short circuits, connect the charging cable to the charger before connecting the battery. When disconnecting, disconnect the battery before unplugging the cable from the charger.

4. Charging and Maintaining Batteries

1. It is best to charge the batteries shortly before use.
2. DO NOT store batteries fully charged for more than a few days
3. Check the state of charge of stored batteries every 3 months using the appropriate STORAGE program.

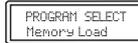
Connect either a 2S or 4S Lithium battery to the charger using the charge and balance connectors.



5

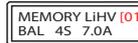
For simplicity, the SplashDrone 3/3+ Balance Charger is preloaded with six charge and maintenance programs for SwellPro batteries. Simply plug your battery in and select the correct memory program for the battery type.

Program	Function	Battery Type
[01]	CHARGING	LiHV 4S - SplashDrone 3+ Drone battery
[02]	CHARGING	LiPo 2S - Remote Controller & S3 Goggle battery
[03]	CHARGING	LiPo 4S - Older SplashDrone 3 battery
[04]	STORAGE/REPAIR	LiHV 4S - SplashDrone 3+ Drone battery
[05]	STORAGE/REPAIR	LiPo 2S - Remote Controller & S3 Goggle battery
[06]	STORAGE/REPAIR	LiPo 4S - Older SplashDrone 3 battery



1. Press the STOP button until the Memory Load menu appears.

2. Press START to confirm.



3. Program [01] will be displayed.



4. Press the DECREASE or INCREASE buttons to scroll through the available programs.



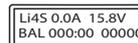
5. When the desired charge program is displayed, press the START button to select the program.



The program parameters will be displayed. In this example, program [01] is displayed.



Press and hold the START button to start the charge program.

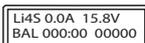
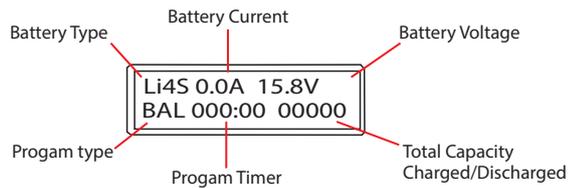


The charger will check the connections and then start the program.

6

4.1 Charger Status

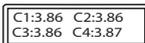
During a charging program, the charger displays the current status of the battery.



Once a charging program has started, additional information about the battery and charging process are available.



Press the + button once to show the individual cell voltages of the battery.



The display shows the voltage of each cell. In this example, a 4S battery shows the voltage of the 4 cells.



Press the - button to cycle through each of the following information screens.



Final voltage when the program ends.



Capacity cut-off - charger will stop if this limit is exceeded



Safety timer ON and duration of time in minutes.



Cut off temperature. An external temperature probe must be installed for this feature.



External (battery) and Internal (charger) temperature.



Input voltage to the charger (DC)

7

5. Lithium Battery Storage

- ▲ Lithium batteries must not be stored for more than a few days fully charged. Storing lithium batteries fully charged reduces their life and their capacity.

The SwellPro Balance Charger includes a convenient STORAGE charge mode. This mode assesses the state of charge of the battery and automatically performs a balanced charge or discharge cycle to achieve the optimum storage state for Lithium batteries.

Batteries stored for an extended period of time without use should be STORAGE charged every 3 months.

Programs [04], [05] and [06] are STORAGE charge cycles for the three standard SplashDrone battery types as per the table on page 6.

6. Battery testing

The Charger can detect the voltage of a single battery, the charger input and output voltage, and the internal and external temperature of the charger. The detected information is used to determine whether the battery is damaged.

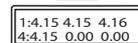
6.1 Battery voltage measurement



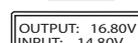
1. Press STOP until the Battery Meter menu appears.



2. Press "START" to confirm, the current voltage of each cell inside the battery is displayed.



3. Press the DECREASE button to view the charger input and output voltages, as well as the temperature.



If any cell voltage is lower than 3.0V, the battery pack has been over-discharged. This battery may no longer be usable and will have diminished capacity.

8

6.2 Battery Resistance Measurement

PROGRAM SELECT
Battery IR

1. Press STOP until the Battery IR menu appears.



MAIN OUT: *MΩ

2. Connect the battery, to be tested and press "START". The charger will display the internal resistance of the battery.

Internal resistance detection accuracy: $\pm 5\text{m}\Omega$.

Batteries are consumable components. Through use and age, their performance decreases and they need to be replaced.

The performance and age of Lithium batteries can be gauged by measuring the internal resistance. The lower the internal resistance, the better the discharge performance of the battery.

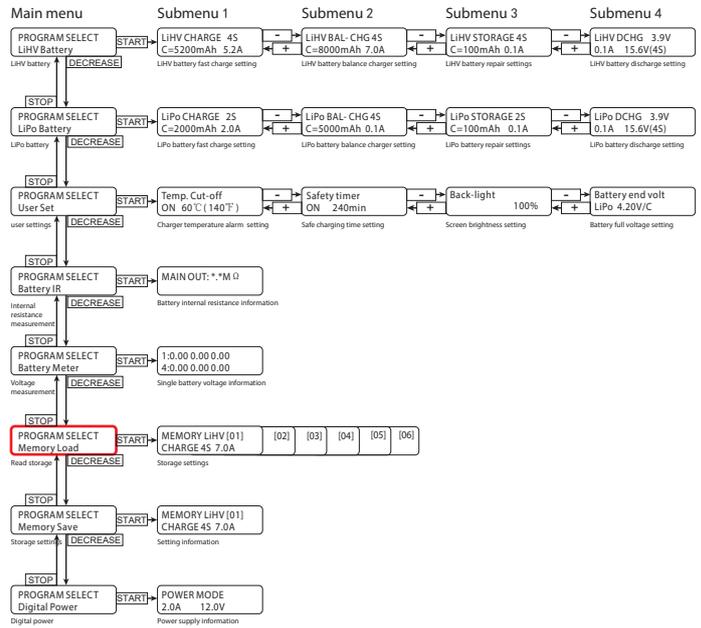
- SD3+ LiHV drone battery internal resistance reference value: $\leq 15\text{m}\Omega$
- SD3+ LiPO remote control battery internal resistance reference value: $\leq 15\text{m}\Omega$
- SD3 LiPO drone battery internal resistance reference value: $\leq 11\text{m}\Omega$

As the battery ages and the number of discharge cycles increases, the internal resistance of the battery will gradually increase and the discharge performance of the battery will decrease.

If battery capacity drops dramatically, the internal resistance will also have increased and it is recommended to replace the battery.

7. Other Charger Functions

The charger can charge other batteries and has other functions which may be of interest to some users.



7.1 User settings

PROGRAM SELECT
User Set

1. Select the User Set menu.

START

Temp. Cut-off
ON 60°C (140°F)

2. Temperature protection, when the temperature measured on an optional external sensor reaches 60 °C, the charger will alarm and stop charging.

"-" / "+"

Safety timer
ON 240min

3. Press "-" or "+" to select "Safety timer". Press "START" to confirm, "ON" starts to flash, press "-" or "+" to switch on or off, and press "START" to confirm. The time starts to flash, set by pressing "-" or "+", press the "START" button to confirm the setting. (The built-in safety charge timer starts when the charger starts charging. This setting prevents the battery from overcharging if the charger cannot detect that the battery is fully charged.)

"-" / "+"

Back-light
100%

4. Press "-" or "+" to select "Back-light". Press the "START" button to confirm, when 100% starts to flash, use the "-" or "+" button to adjust the screen brightness, and then press the "START" button to confirm the setting.

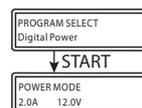
"-" / "+"

Battery end volt
LiPo 4.20V/C

5. Press "-" or "+" to select "Battery end volt". Press the "START" button to confirm. When LiPo starts to flash, select "LiPo" or "LiHV" with "-" or "+", press the "START" button to confirm the selection, and 4.20V/C starts to flash. (The default setting is LiPo 4.20V/C and LiHV is 4.35V/C. When the battery voltage reaches the set value, it will automatically stop charging). **WARNING: Incorrectly setting this voltage may cause battery damage or fire.**

7.2 Digital Power

In Digital Power mode, the charger can be used directly as a regulated power supply.



Press the "START" button to confirm, the current starts to flash, and the output current is set by "-" or "+", range from 0.1 to 7A. After setting, press the "START" button to confirm, the voltage starts to flash, press the "-" or "+" button to set the output voltage. Range from 5~24V. Press the "START" button to confirm the setting. Finally, press the "START" button for 2 seconds to start outputting the voltage and current.

8. Error Messages & Troubleshooting

8.1 Error messages

When the charger is used incorrectly or there is a fault, the charger will prompt an error message for the user to view. As shown below:

REVERSE POLARITY	The output port is connected to the wrong terminals.
CONNECTION BREAK	The battery is not connected to the charger correctly.
SHORT ERROR	The charger output has been short-circuited.
INPUT VOL ERR	The input voltage is too low
BATTERY CHECK LOW VOLTAGE	The total battery voltage is lower than the user settings, please check the battery type setting.
BATTERY CHECK HIGH VOLTAGE	The battery voltage is too high, check the battery type setting.
BATTERY VOLTAGE CELL LOW VOL	The voltage of cells of the battery is too low, check the battery's cells one by one.
BATTERY VOLTAGE CELL HIGH VOL	The voltage of cells of the battery is too high, check the battery's cells one by one.
BATTERY VOL ERR CELL CONNECT	The battery cells have been incorrectly connected. Check all connections on the balance port.
TEMP OVER ERR	The charger has overheated. Let it cool down.
BATTERY CHECK BALANCE DELTA V	The voltage difference between the cells is too large, the battery may be damaged.

13

8.2 Troubleshooting Battery Issues

If the voltage of any cell in the battery is lower than 2.5v or the voltage difference between cells is greater than 0.22v, the charger will not charge the battery.

If a charger gives the error message "Balance Delta V", then there is too much voltage difference between individual cells within the battery. This battery condition can sometimes be corrected by the following steps.

1. Select LiPo Battery mode from the main menu. Press START to select this option.
2. Select LiPo CHARGE mode. Press START to select this option.
3. Using +/- change the cell count to match the battery you are repairing.

For drone batteries, select 4S

For Remote Controller/Goggle batteries, select 2S

4. Press START and select 2000mAh.

5. Press START and select 2.0A

6. Press and hold START to start the fast charge program.

LiHV CHARGE 4S
C=2000mAh 2.0A

7. If the charge takes longer than 2 hours, you may need to repeat the charge process until the battery charger reports the battery is FULL.

ENSURE THE BATTERY IS NOT LEFT UNATTENDED DURING CHARGING OR REPAIR AND THAT IT DOES NOT GET HOT DURING CHARGING

8. After completing the fast charge, select the appropriate STORAGE/REPAIR program for your battery from the saved programs on page 6.



Although the repair may be successful, the battery may have irreversible damage due to over-discharge or age and its performance will be greatly reduced.

If you can't repair the battery through the above steps, the battery must be replaced.

DO NOT attempt to repair batteries that are visibly swollen or are soft and puffed up.

14

9. Appendix

9.1 Specifications

Input	AC input 100-240V DC output 11V-18V
Output Power	100W
Battery types	LiPo, LiHV
Output voltage	7.4-17.4V
Charging Current	0.1-10A
Battery Numbers	LiPo-2S, LiPo-4S, LiHV-4S
Balance Current	400mA/cell
Discharge current	0.1- 2.0A
Input Protection	Overcurrent
Output Protection	Overvoltage, undervoltage, short circuit, overheating, short circuit, reverse connection
Working Temperature	5-45°C
Size	130*115*61 mm
Weight	380g

9.2 Warranty & After Sale Service

1. The product is covered by a 12-month warranty.
2. Warranty repairs are free of charge for one year from the date of purchase. If the customer is unable to provide valid proof of purchase, the date will be based on the internal date code of the charger.
3. For repairs after the first 12 months of use, the cost will be charged as appropriate, and the customer shall bear the round-trip shipping costs.

15

Warranty does not cover damage due to neglect or incorrect usage of the charger including:

1. Product damage caused by failure to use a suitable input voltage as required.
2. Damage caused by not following the instructions.
3. Any man-made, accidental impact or other force majeure that causes damage to the product.
4. Modification, disassembly or modification of the internal circuit of this product without the approval of the company.
5. Water immersion or intrusion, moisture or other foreign matter entering the product and causing damage.
6. Aging, bumps and scratches on the surface of the product.



The user is responsible for any consequences caused by the operation of the charger. SwellPro is not liable for the costs beyond the cost of the product and reserves the right to modify the terms of this warranty which is subject to change without notice.

9.3 Version Information

Version Comments

- 1.0 Pre-release Manual for Smart Balance Charger
- 2.0 New Manual for Smart Balance Charger
- 2.1 Added Charging connection Controller Battery
- 2.3 Updated the Manual
- 2.4 Updated Connection Instructions for the Manual
- 2.5 Updated software upgrade for the manual
- 3.0 Rewrite for new firmware including 6 memory settings
- 4.1 Release

16