



Name of Product: Smart Battery

Product Model: ZF-14S20AH



Shandong Unid Intelligent Technology Co.,Ltd

<p>Normal communication, serial communication, WIFI communication and CAN communication; real-time battery information such as, current voltage, current, battery usage times can be obtained through the three methods; the flight control can also establish a connection with these for data exchange.</p>	<p>8. Data communication function</p>	<p>This product is designed with three communication methods: USB serial communication, WIFI communication and CAN communication; real-time battery information such as, current voltage, current, battery usage times can be obtained through the three methods; the flight control can also establish a connection with these for data exchange.</p>
<p>The battery log information includes cell voltage, current, battery temperature, number of cycles, number of abnormal states (number of over-discharging, number of charging overcurrent, number of over-charging, and number of overtemperature). Users can view these data in a mobile by connecting the battery through a computer software 1 or a mobile APP.</p>	<p>9. Battery logging function</p>	<p>This product is designed with a unique log recording function, which can record and store the data of the battery of its whole life. The battery log information includes cell voltage, current, battery temperature, number of cycles, number of abnormal states (number of over-discharging, number of charging overcurrent, number of over-charging, and number of overtemperature). Users can view these data in a mobile by connecting the battery through a computer software 1 or a mobile APP.</p>
<p>The battery is automatically balanced internally to keep the battery voltage difference within 20mV;</p> <p>10. Smart balancing function</p> <p>In idle, discharging, storage, and off states, if the minimum cell voltage > 3.85V, the balance function will turn on, otherwise it will turn off;</p> <p>3. In the charging state, if the minimum cell voltage is >3.0V, the balance function will turn on.</p>	<p>10. Smart balancing function</p>	<p>The battery is automatically balanced internally to keep the battery voltage difference within 20mV;</p> <p>In idle, discharging, storage, and off states, if the minimum cell voltage > 3.85V, the balance function will turn on, otherwise it will turn off;</p> <p>3. In the charging state, if the minimum cell voltage is >3.0V, the balance function will turn on.</p>

VI. Attentions

1. Please use the special charger for plant protection UAVs to charge, and keep away from high temperature environment;
2. Please recharge the battery in time after use to avoid over-discharge and damage to the battery due to long-term storage;
3. When the battery is stored for a long time, since the cell may self-discharge, in order to prevent over-discharge can cause damage to the battery, the battery should be checked and recharged regularly (recommended every 3 months) to keep the cell voltage at the best storage state of 3.8V-3.9V (an environment with a temperature of $20\pm 5^{\circ}\text{C}$ and a humidity of $65\pm 20\%RH$);
4. Do not use if a battery is deformed or has a peculiar smell during use.
5. It is strictly forbidden to throw the battery into water or fire under any conditions;
6. It is forbidden to squeeze, collide, puncture, disassemble, or short-circuit the battery to avoid unnecessary losses.

VII. Warranty

1. From the date of purchase, this product can enjoy free maintenance services when the following conditions (1) and (2) are met at the same time.
 - (1) Within 12 months; (2) Within 300 cycles of use;
2. Product failures caused by the following reasons are not covered by the free warranty:
 - (1) Product failures caused by man-made causes, such as broken, etc.;
 - (2) The battery is over- charged or discharged;
 - (3) The battery is stored in a high temperature environment;
 - (4) Force majeure: battery failures caused by natural disasters such as earthquakes and fires;
 - (5) Batteries that are disassembled and repaired by the user.

Revision History			
Date	Ver.	Revised contents	Remark
2020-07-17	V1.1	First edition	

Prepared by	Xie Jianchao	Date	July 17, 2020
Reviewd by		Date	
Approved by		Date	

IV. Main features of the product

1. Smart battery indicator

This product is designed with four high-bright LED indicators, which can automatically recognize and indicate the status of the battery while discharging or charging; when the battery is off, short press the button, the LED will indicate the battery level for about 2 seconds and then go out.

2. Battery life reminder

When the battery has been used for 200 times, all the LED battery indicators will turn red to indicate that the battery has reached the maximum life, and users shall use it according to the actual situation.

3. Charging smart alarm

During charging, the status of the battery should be detected all the time, and an alarm will be given for charge overvoltage, overcurrent, and overtemperature.

4. Smart storage function

When the battery is in high charge and not in use for a long time, the smart storage function will automatically start to discharge the voltage to the storage voltage to ensure the safety of battery storage.

5. Auto sleep function

When the battery is turned on and not in use, it will automatically sleep and shut down after 3 minutes for high battery level or after 1 minute for low battery level so as to save battery power.

6. Software upgrade function

This product has a software upgrade function, which can upgrade the battery software by connecting a computer via a USB port.

7. Data communication function

This product is designed with three communication methods: USB serial communication, WiFi communication and CAN communication; real-time battery information such as, current voltage, current, battery usage times can be obtained through the three methods; the flight control can also establish a connection with these for data exchange.

8. Battery logging function

This product is designed with a unique log recording function, which can record and store the data of the battery of its whole life. The battery log information includes cell voltage, current, battery temperature, number of cycles, number of abnormal states, etc.. Users can view these data in a mobile by connecting the battery through a mobile APP.

9. Smart balancing function

The battery is automatically balanced internally to keep the battery voltage difference within 20mV.

3

4

7

Content

1. Product overview.....	1
II. Diagrams of product sizes.....	1
III. Main parameters of the product.....	2
IV. Main features of the product.....	3
1. Smart battery indicator.....	3
2. Battery life reminder.....	3
3. Charging smart alarm.....	3
4. Smart storage function.....	3
5. Auto sleep function.....	3
6. Software upgrade function.....	3
7. Data communication function.....	3
8. Battery logging function.....	4
9. Smart balancing function.....	4
V. Functions and descriptions of the product.....	5
VI. Attentions.....	9
VII. Warranty.....	9

	<p>When the battery is in high charge and not in use for a long time, the smart storage function will automatically start to discharge the voltage to the storage voltage;</p> <p>Start conditions: All cell voltages > 3.90V, and the shutdown time > 4 days;</p> <p>End conditions: minimum cell voltage ≤ 3.85V or has start, charge or discharge operations;</p> <p>During the self-discharge process, 4 LEDs will flash slowly to indicate that it will automatically shut down when the end condition is reached.</p>	<p>5. Smart storage function</p>
	<p>When the battery is turned on and not in use, it will automatically sleep and shut down after 3 minutes for high battery level or after 1 minute for low battery level so as to save battery power;</p> <p>When the communication is not connected, if the lowest cell voltage ≥3.75V, it will turn off after 3 minutes; if the lowest cell voltage <3.75V, it will turn off after 1 minute;</p> <p>When the communication is connected, if the lowest cell voltage >3.55V, it will not automatically turn off; if the lowest battery voltage ≤3.55V, it will automatically turn off after 1 min.</p>	<p>6. Auto sleep function</p>
	<p>This product has a software upgrade function, which can upgrade the battery software by connecting a computer via a USB port.</p>	<p>7. Software upgrade function</p>

V. Functions and descriptions of the product

Function	Description	Remark																																																	
1. On/Off function	1. Turn on and off by pressing the buttons to control the battery power display and communication;																																																		
	(1) On: When the battery is off, short press the button and the LED will indicate the battery level, then press the button for another 2s before the LED light goes out, all the battery indicators will light up from left to right. The battery is turn on, and then the LED will indicate the current battery level. (2) Off: When the battery is on, short press the button, all 4 LEDs will flash, and then press and hold the button for more than 2s, the LED indicators will go out from right to left, and the battery will enter the shutdown state.																																																		
2. Smart battery indicator	This product is designed with 4 LED lights, divided into 8 levels (lighting/flashing) to indicate battery levels (capacity type); In the off mode, short press the button, the LED will indicate the current power, and then go out after 2s. In the off mode, charging and discharging can automatically wake up the power display function of the LED lights so that they will indicate the charging or discharging status circularly;																																																		
	<table border="1"> <thead> <tr> <th colspan="5">Battery indication</th> </tr> <tr> <th>LED1</th> <th>LED2</th> <th>LED3</th> <th>LED4</th> <th>Current battery level</th> </tr> </thead> <tbody> <tr> <td>○</td> <td>○</td> <td>○</td> <td>○</td> <td>0%~12%</td> </tr> <tr> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>13%~25%</td> </tr> <tr> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>26%~37%</td> </tr> <tr> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>38%~50%</td> </tr> <tr> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>51%~62%</td> </tr> <tr> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>63%~75%</td> </tr> <tr> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>76%~87%</td> </tr> <tr> <td>●</td> <td>○</td> <td>○</td> <td>○</td> <td>88%~100%</td> </tr> </tbody> </table> <p>Note: ● Lighting; ○ Off; ○ Flashing;</p>	Battery indication					LED1	LED2	LED3	LED4	Current battery level	○	○	○	○	0%~12%	●	○	○	○	13%~25%	●	○	○	○	26%~37%	●	○	○	○	38%~50%	●	○	○	○	51%~62%	●	○	○	○	63%~75%	●	○	○	○	76%~87%	●	○	○	○	88%~100%
Battery indication																																																			
LED1	LED2	LED3	LED4	Current battery level																																															
○	○	○	○	0%~12%																																															
●	○	○	○	13%~25%																																															
●	○	○	○	26%~37%																																															
●	○	○	○	38%~50%																																															
●	○	○	○	51%~62%																																															
●	○	○	○	63%~75%																																															
●	○	○	○	76%~87%																																															
●	○	○	○	88%~100%																																															

5

2

III. Main parameters of the product

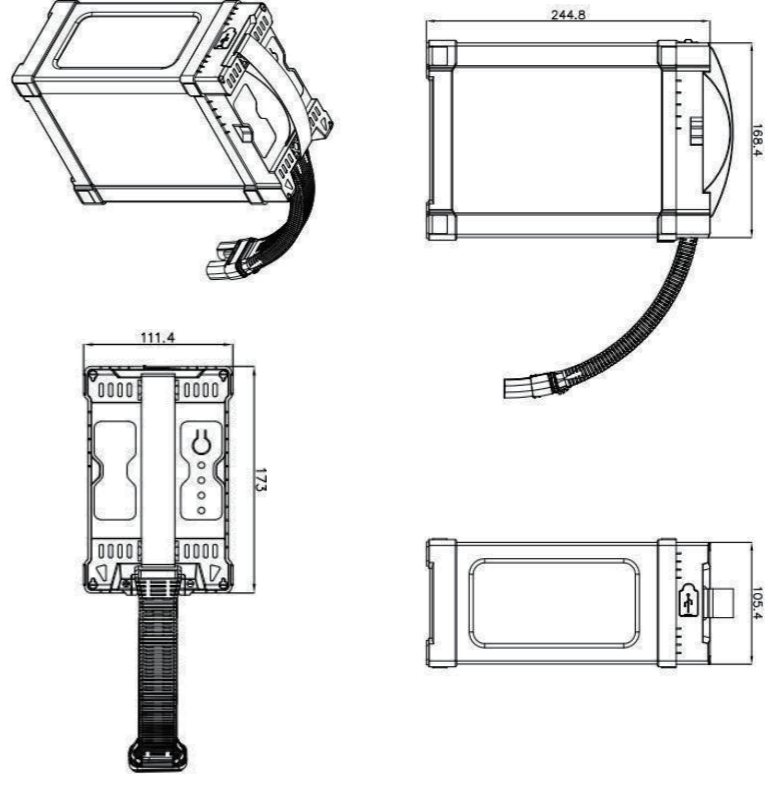
No.	Item	Parameter	Remark
1	Nominal voltage	51.8V (14S)	
2	Nominal capacity	20000mAh	
3	Charging voltage	60.9V (4.35V/Cell)	
4	Overvoltage alarm value	TYP.4.35V	
5	Overvoltage alarm recovery value	TYP.4.30V	
6	Charging overcurrent alarm value	TYP.60A	
7	Charging overcurrent alarm recovery value	TYP.10A	
8	Overtemperature alarm value	TYP.70°C	
9	Overtemperature alarm recovery value	TYP.65°C	
10	Over discharge voltage value	TYP.3.1V	
11	USB load capacity	5±0.25V /TYP.1.0A	
12	USB current/voltage threshold	TYP.200mA/3.5V	
13	Working temperature (discharge)	-10°C—+70°C	
14	Working temperature (charging)	0°C—+45°C	
15	Storage temperature	-10°C—+35°C	
16	Battery pack weight	TYP.6.5KG	
17	External dimensions	173.0*111.4*244.8mm	

III. Main parameters of the product

V. Functions and descriptions of the product

V. Functions and descriptions of the product

II. Diagrams of product sizes



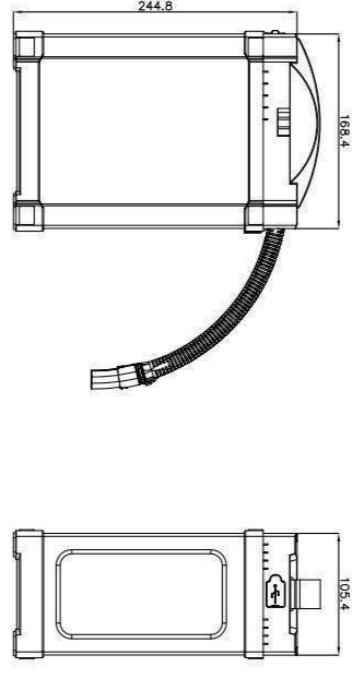
1

6

I. Product overview

This product is a 14S-20AH self-balancing smart battery pack with data record management function designed for plant protection UAVs, and the supporting Spower intelligent management system can provide users with comprehensive application and safety services.

II. Diagrams of product sizes



3. Battery life tips

When the battery has been used for 300 times, all the LED battery indicators to indicate the battery level will turn from green to red to prompt that the battery has reached the maximum life, and users shall use it according to the actual situation.

1. Use buzzer and LED for alarm prompt;

Battery alarm indication					
LED 1	LED 2	LED 3	LED 4	Indication method	Alarm type
○	○	○	○	Flashing	Charging overvoltage alarm
○	○	○	○	Flashing	Charging overtemperature alarm
○	○	○	○	Flashing	Charging overcurrent alarm

Note: ○ Off; ○ Flashing;

4. Smart alarm function

Alarm description:

Charging overvoltage alarm: When the voltage reaches 4.35V, the buzzer will alarm, and the corresponding LED will flash, which will be released until the voltage is lower than 4.30V;

Charging overtemperature alarm: When the temperature reaches 75°C, the buzzer will give an alarm, and the corresponding LED will flash, which will be released until the temperature is lower than 65°C or the charging ends;

Charging overcurrent alarm: When the current reaches 30A, the buzzer will alarm for 10 seconds, and the corresponding LED will flash; the LED alarm will be released until the charging current is less than 10A.