

M8

Manual V1.5

2019.12



ToolkitRC

www.ToolkitRC.com

ToolkitRC Technology (Shenzhen) Co., Ltd.

Introduction

Thank you for purchasing the M8 model toolchain.
Please read this manual carefully before use.

Key Points



Tips



Important



Information

Further information

To ensure that you have a more enjoyable experience,
Scan the QR code below and pay attention to obtaining
details of the use of this product, video teaching and the
latest information before using it. Information





Safety

- 1, M8 allows input voltage 7-30V, to ensure that the power supply voltage is consistent, pay attention to the positive and negative polarity of the power supply.
2. Do not use this product in heat, moisture, flammable or explosive atmospheres.
3. Please use this product under supervision to prevent accidents.
4. When not in use this product, please unplug the input power in time.
5. When using the charging function, please set the current matching with the battery. Do not set the battery to charge too much, so as not to damage the battery.

Contents

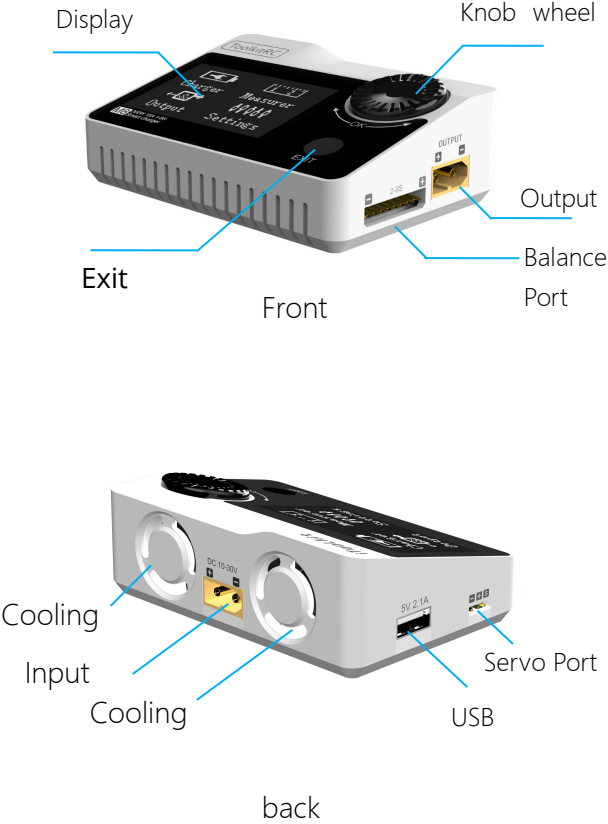
Introduction.....	2
Key Points.....	2
Safety.....	3
M8 Layout.....	6
Quick start.....	7
Charge and discharge.....	9
1, Battery type setting.....	9
2, Cutoff voltage setting (TVC)	11
3, NiMH Setting (PeakV)	12
4, Battery Setting.....	12
5, Current setting.....	13
6, Working mode.....	15
Battery Measurement.....	24
ESC measurement.....	26
Signal output.....	27
Power output.....	30
Drone charging.....	32
System settings.....	34
Other functions.....	37
Specification.....	39

product description

M8 is a charge and discharge instruments multifunctional model tool chain Product that integrates balance charging/discharging, power meters,electro-display, signal gauges, signal sources and other functions.

- Lipo, LiHV, Liion, LiFe 1-8S,NiMh 1-20s,PB 1-12s battery charging and discharging and balance management
- Charging current: Maximum 15A @300W
- Discharge Current: Recycle MAX 15A@300W
Extern MAX 15A@300W
normal mode MAX 3A @12W
- Lithium battery full voltage can be set (TVC)
- can measure battery voltage, battery internal resistance, lithium battery balance management
- Electrically adjustable power meter, simultaneous output voltage and throttle signal
- Measurement of signal values such as PWM/PPM/SBUS with accuracy of up to 1us
- can output PWM/PPM/SBUS standard signal, accuracy up to 1 microseconds
- constant current constant pressure source output, can customize 1-30v constant pressure, 1-15A constant current
- can be adapted to the mainstream UAV battery, automatically activated and charged.
- USB 2.1A@5.0V output, rechargeable mobile device.
- Device simulation for USB flash drive, copy upgrade file to achieve product firmware upgrade

M8 Layout



Quick start

- 1, The 7-30V power supply is connected to the input port on the back of the M8.
- 2, The display shows the bootup logo and stays for 2 seconds.
- 3, Accompanied with do-re-mi bootup sound
- 4, the bootup is completed, the display enters into the main interface as shown below



- 5, Rotate the knob wheel, move the cursor to select function, press the button on knob to enter the selected function and enter the corresponding interface
6. After entering the related function interface, rotate the knob wheel to move the cursor to select the setting item or value, press the knob, and modify the option or value. After the modification is completed, press the

knob wheel to confirm.

7. Press the EXIT key to end the modification or return to the previous screen.

=====



- 1, short press the knob once, to determine the key function

- 2, press and hold the knob for 2 seconds, as the delete key function

- 3, turn the knob or press any button, there are sound prompts

=====

Charge and discharge

After selecting the [Charge] function on the main interface, press [OK] to enter the charging function, the following interface is displayed.

```
LiPo 3S | Press OK to
New      | add a battery!
New      | long press OK
New      | to delete a
New      | battery!
```

1, Battery type setting

Rotate the knob wheel, move the cursor, select the battery that has been set, or create a new battery, press [OK] to enter the battery setting interface, as shown below.

```
LiPo 3S | Lipo      4.20V
         | 12.60V < 3 S
         | Charge    5.5A
         | DisCHG    3.0A
         | STR  DSC  CHG
```

Move the cursor to [Lipo] and press [OK] to modify the battery type. The charger supports charging and discharging five types of batteries: Lipo, LiHV, LiFe,

NiMh, PB. After selecting the the correct battery that matches the actual battery. Short press [OK] and [Exit] Effective.

=====

Important:



- 1, Incorrect battery type charging may damage the battery, charger, and may lead risk of burning, etc., please be double careful.
 - 2, battery that cannot be indicated the battery type, pls do not use this product to charge
- =====



Information:

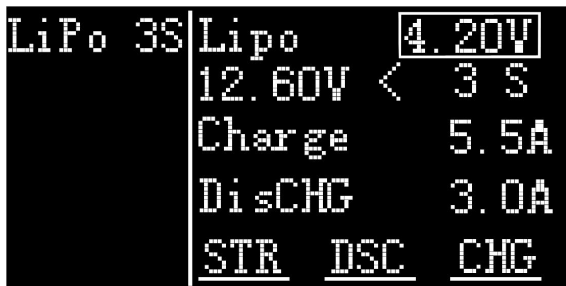
- 1, Lipo: often referred to as lithium polymer battery, nominal voltage 3.70V, fully charged 4.20V battery
- 2, LiHV: often referred to as high-voltage lithium battery, nominal voltage 3.85V, 4.35V battery after full
- 3, Liion: often referred to as lithium battery, nominal voltage 3.70V, 4.10V battery after full
- 4, LiFe: often referred to as iron-lithium battery, nominal voltage 3.30V, fully charged 3.60V battery
- 5, NiMh: Often called nickel-metal hydride

battery, nominal voltage 1.20V
6, PB: often referred to as lead-acid battery,
nominal voltage 2.00V

=====

2, Cutoff voltage setting (TVC)

Move the cursor to [4.20V] and press [OK] to modify the single-chip battery charge cut-off voltage. Turn [Knob wheel] to adjust the value and step 10mV.



```
LiPo 3S | Lipo      4.20V
          | 12.60V < 3 S
          | Charge    5.5A
          | DisCHG   3.0A
          | STR  DSC  CHG
```

=====

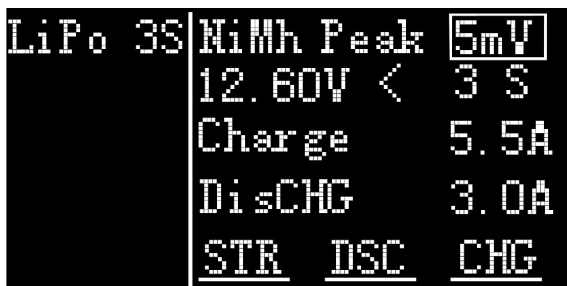


- 1, only LiPo, LiHV, LiFe battery can set the cutoff voltage
2. Do not modify the cutoff voltage when you are unfamiliar with battery characteristics.
- 3, the cutoff voltage can be set to the range of positive and negative 50mV of full voltage
- 4, vocabulary explanation: TVC: terminal voltage control

=====

3, NiMH Setting (PeakV)

When the battery type is NiMh, you can set the negative pressure value when the battery is full, and the range can be set from 5mV to 20mV, as shown below.



```
LiPo 3S | NiMh Peak 5mV
         | 12.60V < 3 S
         | Charge 5.5A
         | DisCHG 3.0A
         | STR  DSC  CHG
```



Tips:

1, only NiMh battery can set the battery negative pressure value

2, vocabulary explanation:

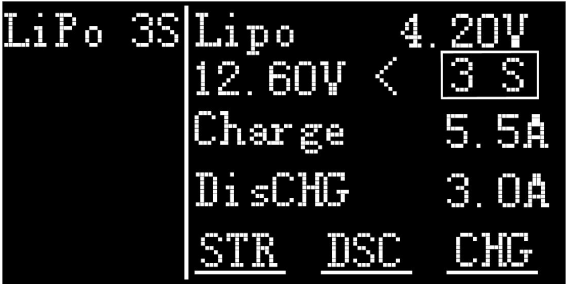
PeakV: Peak voltage drop per piece when NiMH battery is full

=====

4, Battery Setting

Move the cursor to the [Auto] or [xS] and press the [OK] button to change the number of battery strings. Turn the [knob wheel] to adjust the value. When set to [Auto], the charger will automatically

recognize the number of connected batteries according to the voltage of battery which connected with output port.



=====



Tip:

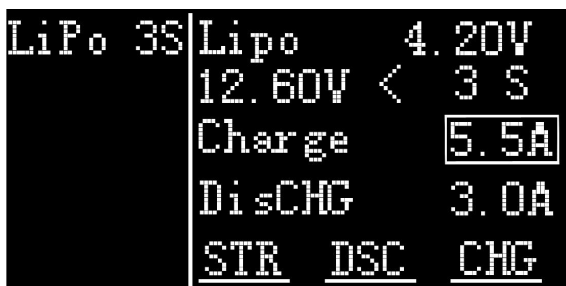
- 1, the battery which was over-discharged or over-charged, may cause the number of strings to be recognize falsely, you need to manually set the correct number of strings.
- 2, If the number of strings was set incorrectly, The battery cannot be full charged, or be overcharged and damaged, please set it carefully.
- 3. After the Lixx battery is connected to the balance port, the number of battery strings can be more accurately identified.

=====

5, Current setting

Move the cursor to the charging current [2.0A]

position and press [OK] to modify the charging current. Turn [knob wheel] to adjust the value and step 0.1A. Quickly rotate [knob wheel] to add or subtract quickly. The charger supports up to 15.0A.



The image shows a monochrome LCD screen with a black background and white text. The screen is divided into two main sections by a vertical line. The left section displays 'LiPo 3S'. The right section displays various battery parameters and settings. At the top right, it shows 'Lipo 4.20V' and '12.60V < 3 S'. Below this, 'Charge' is followed by '5.5A' which is enclosed in a rectangular box. Underneath, 'DisCHG' is followed by '3.0A'. At the bottom, there are three underlined labels: 'STR', 'DSC', and 'CHG'.

LiPo 3S	Lipo 4.20V
	12.60V < 3 S
	Charge 5.5A
	DisCHG 3.0A
	<u>STR</u> <u>DSC</u> <u>CHG</u>

Move the cursor to the discharge current [2.0A] position and press [OK] to modify the discharge current. Turn [knob wheel] to adjust the value and step 0.1A. Fast rotation [knob wheel] can be quickly reduced. The charger supports two discharge modes. 1, ordinary discharge mode, through internal heat dissipation discharge, maximum support 3.0A@20W discharge. 2, Recycle discharge mode, when the input is battery power, through this function to Recycle electrical energy to the input battery, the maximum support 15.0A@300W discharge

```

LiPo 3S | Lipo      4.20V
          | 12.60V < 3 S
          | Charge     5.5A
          | DisCHG     3.0A
          | STR  DSC  CHG

```

=====



Tip:

1. Please set the charging rate at 1-2C according to the battery capacity.

For example, if the battery capacity is 2000mAh, please set the charging current to 2.0-4.0A.

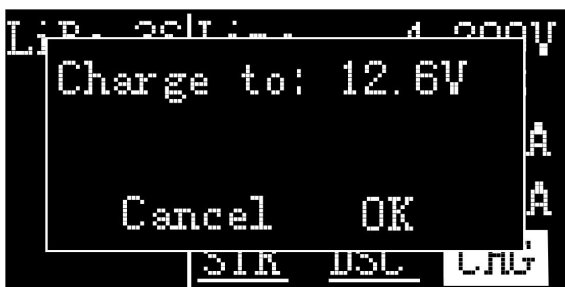
2, charging and discharging current is only valid in the corresponding working mode

3. For the discharge mode setting, refer to the <System Settings> chapter of this manual.

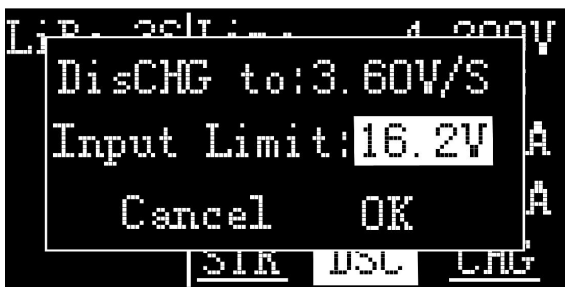
=====

6, Working mode

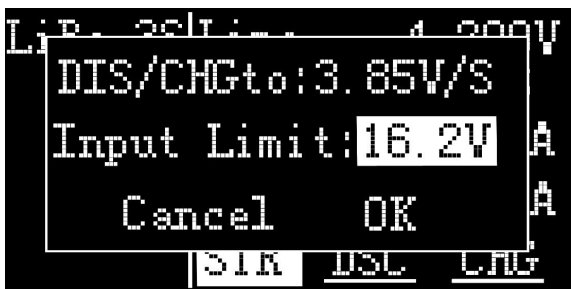
Move the cursor to [Store] [Discharge] [Charge] position, press [OK], the charger will work in the mode of the selected function. When selected as [Charge], it will indicate the target voltage that will charge the battery. As shown below



When selected as [Discharge], it will prompt the target voltage to put the battery. If the discharge mode is to recycle the discharge, it is also necessary to set the cutoff voltage of the power battery. As shown below



When selected as [Storage], it will prompt the target voltage to charge and discharge the battery. If the discharge mode is to recycle the discharge, it is also necessary to set the cutoff voltage of the battery. As shown below



The high limit voltage of recovered. The default is 0.5V higher than the input voltage. Please set according to the maximum limit voltage of the input power supply. To cancel the operation, move the cursor [Cancel] or press [Exit]. Move the cursor to [OK], short press [OK] to start charging, and display the charging and discharging work interface.

=====



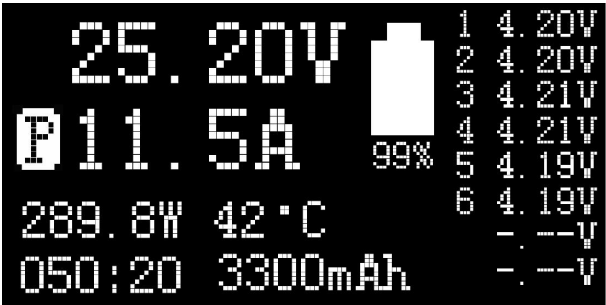
Tip:

1. The discharge cutoff voltage should be set according to the discharge characteristics of the battery.
2. After the Recycle limit voltage is set to the highest protection voltage of the power supply, the charger will automatically stop the Recycle discharge. Setting a high overvoltage may damage the input power

=====

Charge and discharge

When charging and discharging start, the charger enters the working interface as shown below.



Rotate [knob] on this screen to switch the bottom status display information or press and hold [OK] for 2 seconds to dynamically set the working current. As shown below



25.20V: The battery voltage of the output port.

11.5A: Charging or discharging current

: Current limit flag. P: power, C: maximum current

I: input over current or Power A: activate charging

F: The main port is full voltage or a single chip is full voltage

289.8W: Charge or discharge power of the charger

42°C: internal temperature of the charger

050:20: The time when the work has started. Unit: minute: second

3300mAh: the capacity that has been charged and discharged this time

Lipo 6S: currently set battery type and number of strings

12.0A: Current operating current set. Long press to modify.

20.11V: Input supply voltage

4.1Wh: Input power that has been discharged from the power supply.

1 4.20V: 1st battery voltage

2 4.20V: 2nd battery voltage

3 4.21V: 3rd battery voltage

4 4.22V: 4th battery voltage (the battery is being balanced)

5 4.19V: 5th battery voltage

6 4.22V: 6th battery voltage (the battery is being balanced)

-.--V : no battery connected

To end the charge and discharge work, short press [Exit], in the pop-up prompt box, select [OK] to exit.

When charging is complete, or charging is wrong.

A pop-up windows display and a tone sounds.



=====



1. Charging or discharging, should be under supervise throughout the process, in time to deal with abnormalities.

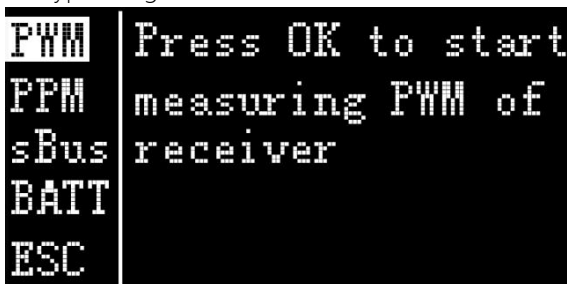
2. When charging and discharging the lithium battery, if only connect with the main port, battery will not be balanced. Please pay attention to the balance of the battery. Connect the battery with balance port, the balance management is automatically performed.

3, charging is completed, unplug the battery, after accessing the new battery, it will automatically continue to charge and discharge according to the setting mode. When set to a fixed number of strings, you need to access the same number of batteries. When setting to automatically detect the number of battery strings, please pay attention to whether the number of detected strings matches the actual ones.

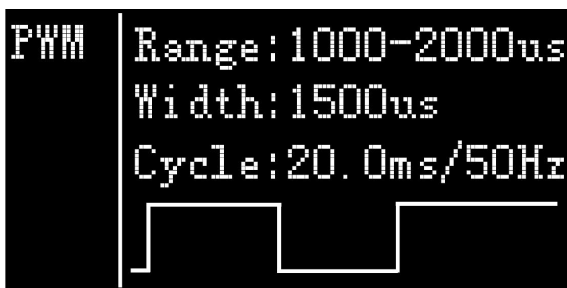
=====

Signal measurement

After selecting the [Measurement] function on the main interface, press [OK] to enter the function and display the following interface. Turn [knob] to select the type of signal to be tested.



Rotate the knob to move the cursor to the [PWM] item, press [OK] to enter the PWM test interface as shown below.



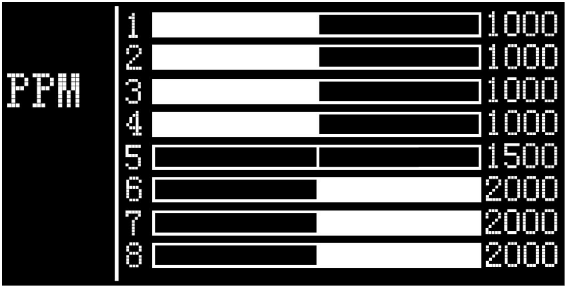
Tip:

1, PWM and PPM signals can automatically

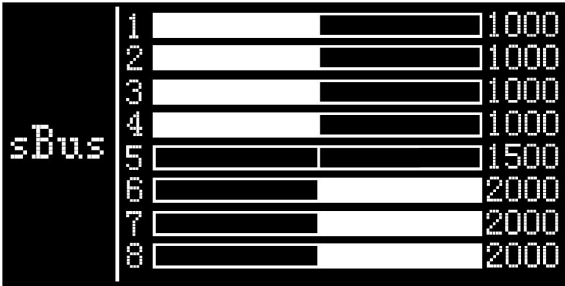
identify and switch to the corresponding interface.
2, sBus is an inverted signal, baud rate 100kbps 8-bit data bit ,2-bit stop bit, even parity

=====

Rotate the Knob switch on the measurement main interface to move the cursor to the [PPM] item, press [OK] to enter the PPM test interface as shown below.



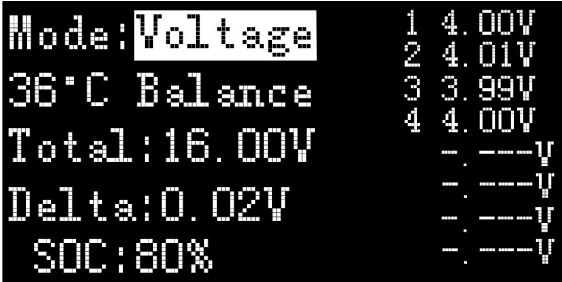
Rotate the Knob to move the cursor to the [xBus] item, press [OK] to enter the compatible signal test of SBus, Dbus, etc., rotate the Knob , and switch the 16 channel value and status bit. The display interface is as follows 2 (9-16 channel display is omitted)



sBus	DG1:	Off
	DG2:	Off
	Frame lost:	Off
	Failsafe:	Off
	Endbyte:	00

Battery Measurement

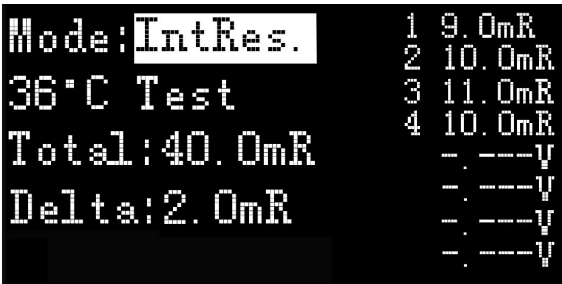
After selecting [Battery] function in the main interface of measurement, press [OK] to enter the function and display the following interface.



The screenshot shows a monochrome LCD display with the following text:

Mode: Voltage	1 4.00V
36°C Balance	2 4.01V
Total: 16.00V	3 3.99V
Delta: 0.02V	4 4.00V
SOC: 80%	- . ---V
	- . ---V
	- . ---V
	- . ---V

This interface displays the current battery voltage value and range. Rotate the knob, move the cursor, select [Balance], and press [OK] to start balancing management of the batteries. Move the cursor to the [Voltage] position, press [OK], switch to internal resistance mode and display the following figure.




The screenshot shows a monochrome LCD display with the following text:

Mode: IntRes.	1 9.0mR
36°C Test	2 10.0mR
Total: 40.0mR	3 11.0mR
Delta: 2.0mR	4 10.0mR
	- . ---V
	- . ---V
	- . ---V
	- . ---V

Move the cursor to [Test], press [OK] once to start

testing the internal resistance. The testing is finished after about 5 seconds. Shows the internal resistance of the battery

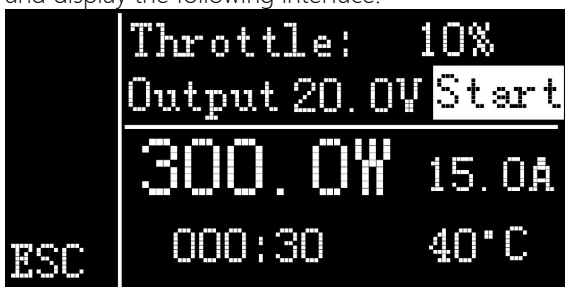
=====

 Tips:
1, this testing needs to charge the battery for 5A current for a short time, please ensure that the input power is sufficient and the battery is not overcharged.

=====

ESC measurement

After selecting [ESC] function in the main interface of measurement, press [OK] to enter the function and display the following interface.



Display instructions:

Throttle signal 10% : PWM signal value to be output from the signal

Output 20.0V: Input voltage value, straight output from the main port

Start: After pressing the OK button, the output signal and the main port voltage are started.

300W: The power being output

15.0A: Current being output

000:30: Working time

40°C: current internal temperature of the device

=====



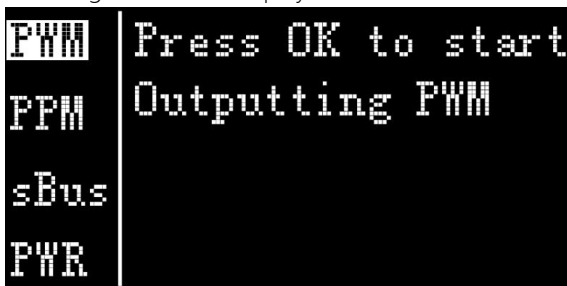
Tip: 1, please do not connect the battery under this mode, otherwise it may damage the device

2. Please adjust the throttle value slowly during the test to avoid the current being too large.

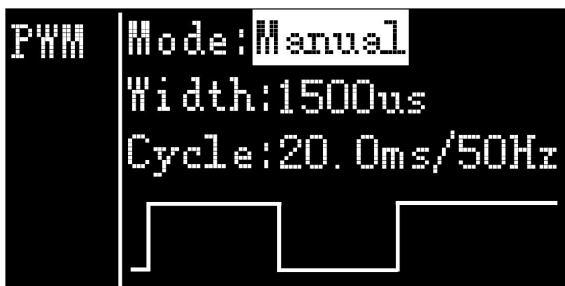
=====

Signal output

After selecting the [Output] function on the main interface, press [OK] to enter the function, and the following interface is displayed.



Rotate the knob to move the cursor to the [PWM] item, press [OK] to enter the PWM test interface as shown below.



Rotate the knob to move the cursor to the [Manual] item, press [OK] to set the output mode, which can be set to Manual, Auto 1, Auto 2, Auto 3.

When the mode is set to manual, you can move the cursor to the pulse width and period items to set the

signal value to be output.

When set to Auto 1, 2, 3, the pulse width value of the output PWM will automatically change at 3 different speeds.

Pulse width can be set from 800 to 2200us The cycle can be set from 2.5ms (400Hz) to 50.0ms (20Hz).

Rotate the knob on the output main interface to move the cursor to the [PPM] item, press [OK] to enter the PPM output interface as shown below.



Rotate the Knob to move the cursor to the value that needs to be modified. Press [OK] to modify the output pulse width value of this channel. Rotate the Knob under the output main interface to move the cursor to the [sBus] item, press [OK] to enter the compatible signal output of SBus, Dbus, etc., rotate the Knob, and switch the 16 channel value and status bit. The display interface is as shown below (9-16 channel and status display interface diagram omitted) Rotate the knob to move the cursor to the

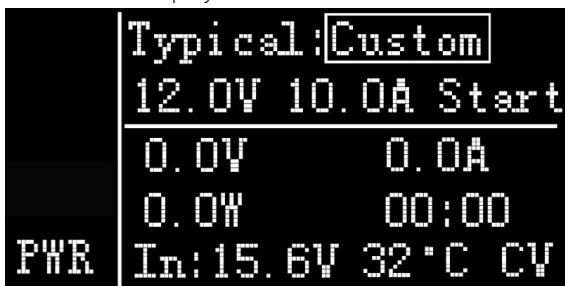
value of the channel to be modified. Press [OK] to modify the output pulse width value of this channel.

sBus	1	<div><div></div></div>	1000
	2	<div><div></div></div>	1000
	3	<div><div></div></div>	1000
	4	<div><div></div></div>	1000
	5	<div><div></div></div>	1500
	6	<div><div></div></div>	2000
	7	<div><div></div></div>	2000
	8	<div><div></div></div>	2000

sBus	DG1:	Off
	DG2:	Off
	Frame lost:	Off
	Failsafe:	Off
	Endbyte:	00

Power output

Rotate the Knob on the output main interface to move the cursor to the [Power] item, press [OK] to enter the power output function. This product will output the input power according to the setting voltage and current, constant voltage and constant current. The display interface is as shown below



Typical value: It is a common typical output mode, which can be set into the following 3 modes.

1. Input pass-through: Do not achieve constant current and constant voltage, and output the input voltage directly from the output main port.
- 2, custom: users can manually set the value of voltage and current limit according to demand
- 3, commonly used drone battery charging: select the corresponding battery, automatically configure the relevant output voltage and current.

Configure the relevant output voltage and current

12.0V: The voltage output from the output main port can be set to 5-30V.

10.0V: Maximum current limit output from the main port, the range of 1-15A can be set.

Start: Start output, stop output button

0.0V 0.0A 0.0W: Current output current and power of the main port.

33 ° C: current internal temperature of the device.

00:00: output time

CV CC: current working mode, CV: constant voltage
CC: constant current

=====



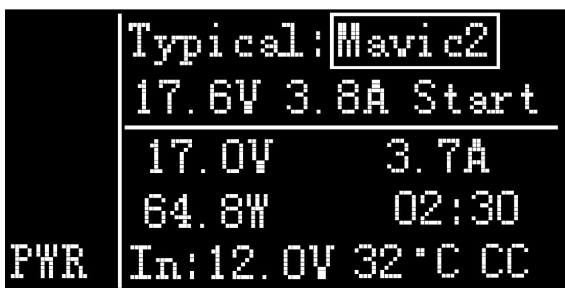
Important:

1. Do not charge the normal battery when the power output is turned on. Otherwise, the battery may be damaged or the device may be damaged.

=====

Drone charging

Rotate the knob wheel disk on the output main interface to move the cursor to the [PWR] item, press [OK] to enter, then move the cursor to the typical value, and change the output mode to the model of the drone that needs to be charged. Move the cursor to [START] and press the enter key. The charger will output the set voltage. The display interface is as shown below



Typical: For common drone models, it can be set to the following four types of drones. Mavic2, Mavic, Phantom, Inspire.

17.6V: The voltage value when the current battery is full cannot be changed.

3.8AV: Maximum current for charging, adjustable current.

Start: Start output, stop output button

17.0V 3.7.0A 64..8W: Voltage, current and power output from the main port.

02:30 Working hours

In: 12.0V: Input voltage.

32 °C: Current internal temperature of the device.

CV CC: Working mode, CV: constant voltage CC: constant current

=====



Tip:

1. There is no need to open the battery before charging. Automatic activation and charging

=====

Important:

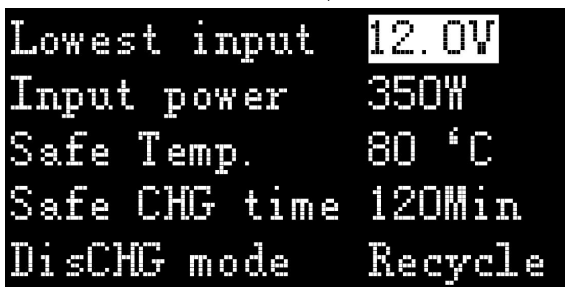


1. Do not charge the normal battery in this working mode, otherwise the battery may be damaged or the device may be damaged.

=====

System settings

After selecting the [Settings] function on the main interface, press the OK key to enter the function display the following interface, rotate the [knob] to switch to the second interface, as shown below



Lowest input	12.0V
Input power	350W
Safe Temp.	80 °C
Safe CHG time	120Min
DisCHG mode	Recycle

Function Description:

Minimum input voltage: Below this voltage, the device will stop the main port output.

Maximum input power: The maximum power obtained from the input port during charging.

Safe operating temperature: above this temperature value, the device will stop the main port output

Safe charging time: The maximum time for continuous charging and discharging, will stop working if it exceeds

Discharge mode: Can be set to normal discharge, discharged by internal heat dissipation. Or recycle the discharge and recycle the energy to the input power source (the input must be rechargeable

battery power)

sBus value	Original
Backlight	5
Contrast	4
Buzzer	6
Idle beep	OFF

xBus display value: The display mode of xBus when measuring or outputting, can be set to pulse width value (1000-2000), or original value (0-2047).

Backlight brightness: The brightness level of the backlight of the display can be set to 1-10

Contrast: Display contrast of the display, which can be set to (-10 to 10)

Buzzer: The tone of the buzzer can be set to off.

Energy saving tips: The sound and light are not disconnected from the power supply during this time.

Hub support	OFF
Language	English
Default	Confirm

Continuous operation: After charging and

discharging, whether to continue charging and discharging after replacing the battery

Default setting: Restore all settings to their default values.

ID: 8bytes hexadecimal unique product ID

Other functions

1, Firmware upgrade

After connecting the M8 to the computer via the USB cable in the box, the computer will recognize the USB flash drive named Toolkit and download the upgrade file app.upg on the official website to overwrite the files in the USB flash drive to upgrade the firmware.

2, USB 5.0V output

In addition to the above upgrade functions, the USB interface can also output 2.0A current to charge mobile devices.

3, energy saving reminder

When the M8 is idle for 5 minutes, the backlight will automatically decrease.

4, Automatically continue to charge and discharge after the next one .

unplug the battery for 2 seconds, then access the next battery, the device will automatically continue to charge and discharge.

5, Fan rating

When the internal temperature of the device reaches 40 ° C, the fan work at the half-speed air volume to reduce noise. When the internal temperature reaches 50 ° C, the fan turns on the full speed air volume to enhance heat dissipation.

6. Manually calibrate the voltage.

Under power off state, press and hold the knob switch without releasing it, and connect the input power to the power source. The system will enter the manual calibration voltage function. Use a voltmeter to measure the actual voltage of each battery, move the cursor to the corresponding voltage value, and modify the voltage value to match the voltmeter value for calibration. After the calibration is completed, move the cursor to save, short press once, the buzzer sounds once and the save is successful. Exit or Turn off device

7, Supplement

When the lithium battery is fully charged, When the setup menu is turned on and the charging is completed [trickle] function, the prompt "Finish". If the battery is not removed, constant voltage trickle charging will be performed automatically to bring the battery to the even more full state.

8. External Discharge

Turn the discharged battery into the output port and turn on the discharge load into the input port. Change the setting menu to [External]. When discharging, the charger will use an external resistor to discharge and balance the battery at the same time. For external loads, a 2-5 ohm resistor is best.

Specification

Charging	Input	7-30V@MAX16A
	Battery Type	LiPo LiHV Liion LiFe @1-8S NiMh @1-20S Pb @1-10S
	Bal Cur.	800mA @2-8S
	Accuracy	±0.02V
	Charging Power	0.1-15A@300W
	Discharging Power	0.1-15A@300W Recycle Mode 0.5-15A@300W Extern Mode 0.1-3A@20W Normal Mode
	USB	2.1A@5V upgrade@USB3.0
Measuring	PWM	880us-2200us @20-400Hz
	PPM	880us-2200us*8Ch @20-50hz
	SBUS	880us-2200us*16ch @20-100Hz
	Voltage	1.0V-5.0V @1-8S
	IR	1-99mR @1-8S
	ESC	0.1A-15A @MAX 300W
Output	PWM	500us-2500us @20-1000Hz
	PPM	880us-2200us*8ch @50hz
	SBUS	880us-2200us*16ch @74Hz
	Power	1-15A@1-30V Mode: CC+CV
Display	LCD	2.2 inch 132*64 resolution
Product	Size	98mm*68mm*35mm
	Weight	142g
Individual packing	Size	108.5mm*80.5mm*46mm
	Weight	235g