ToolkitRC M6D

Dual-channel balance charger
2× 250 W / 1× 500 W · DC 7–28 V



Please read this manual carefully before use. Never leave charging batteries unattended.

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1. Safety

Thank you for purchasing the ToolkitRC M6D charger. Please read this manual carefully before first use and keep it for future reference. Charging batteries, especially lithium batteries, involves a risk of fire – incorrect settings or a damaged battery may cause the cells to overheat, swell or ignite.

1.1 Power supply and connection

- M6D allows input voltage of **7–28 V**. Please ensure that the power supply or input battery voltage is in line with this range.
- Pay attention to the **positive and negative polarities** (+ / −) of the power supply when connecting.
- The power supply or input battery must be rated for the current drawn; the charger draws up to 30 A from the input.
- When not using this product, please unplug the input power in time.

1.2 Charging batteries

- Only use this product while **under direct supervision**. Do not leave charging or discharging batteries unattended.
- When using the charging function, always set the **battery type, number of cells and current** matching the actual battery. Don’t set excessive charging current, so as not to damage the battery.
- Do not use this product to charge batteries that do not indicate the battery type (cell chemistry).
- Do not charge damaged, swollen, punctured or overheated batteries.
- Charge lithium batteries with the balance lead connected so that the charger can monitor the voltage of each cell.
- Charge batteries on a non-flammable surface, ideally in a fireproof bag or box, away from flammable materials.
- If a battery starts to swell, heat up or emit smoke during charging, stop charging immediately, disconnect the power and move the battery to a safe place.

1.3 Operating environment

- Do not use this product in a hot area or near a heat source.
- Do not use this product in a damp, flammable or explosive gas environment.
- Do not cover the ventilation openings and the fan; the charger needs free air flow for cooling.
- Protect the charger from water, dust and mechanical damage, and keep it out of the reach of children.

2. Product description

2.1 Main features

M6D is a dual-channel balance charger with small size, high power density and charging accuracy as low as 5 mV.

- Charge, discharge and balance management of LiPo, LiHV, LiFe, Li-ion 1–6S, NiMH 1–16S and lead-acid (Pb) 1–10S batteries.
- Charging current: asynchronous mode maximum 15 A / 250 W per channel, synchronous mode maximum 25 A / 500 W.
- Discharge current: Recycle mode maximum 15 A / 250 W per channel, internal mode maximum 3 A / 12 W per channel.
- Lithium battery cut-off voltage can be set (TVC function).
- Constant voltage and constant current output – customizable 1–28 V constant voltage.
- Can be adapted to mainstream drone smart batteries – automatically activated and charged.
- Multi-language system, languages can be added by upgrade.
- USB 5.0 V / 2.1 A output for charging mobile devices.
- The device connects to a PC like a USB drive – simply copy the new firmware file to update.

2.2 Package contents

- 1× M6D charger
- 1× USB-C cable
- 1× manufacturer’s quick guide

※ The power supply, power and charging cables and the external temperature sensor are not included.

2.3 M6D layout



Front

① Display
② Scroll wheel – turn left / right to move the cursor, press to confirm (OK)
③ EXIT / CH key
④ Main (output) port XT60
⑤ Port for external temperature sensor
⑥ Balance port 2–6S



Back

⑦ Input port XT60 (DC 7–28 V)
⑧ USB output & firmware upgrade port
⑨ Cooling fan

2.4 Manufacturer

Manufacturer	ToolkitRC Technology (Shenzhen) Co., Ltd.
Address	3F, B1 Building, Shanghe Industrial Park, Nanchang Road, Hangcheng Street, Bao'an District, Shenzhen, China
E-mail	sales@toolkitrc.com
Web	www.toolkitrc.com

For news, information and firmware updates for your charger, visit the manufacturer’s website www.toolkitrc.com.

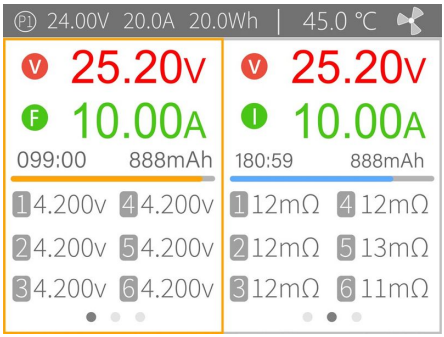
3. Quick start

3.1 Switching on

① Connect a 7–28 V power supply or input battery to the input port on the back of the M6D.

② The display shows the boot logo for 2 seconds, accompanied by the boot sound.

③ After booting, the display enters the main interface.



Main interface – left and right channel

3.2 Controls

① Short press **[EXIT]** – the cursor switches between the left and right channels.

② Press and hold **[EXIT]** – starts testing the internal resistance of the corresponding channel; after the test, the internal resistance is displayed.

③ Scroll the **scroll wheel** – switches the pages of the corresponding channel.

④ Short press **[OK]** – selects the charging task when the channel is idle; adjusts or ends the work when the channel is working.

⑤ Press and hold **[OK]** – enters the system setting interface (only when both channels are idle).

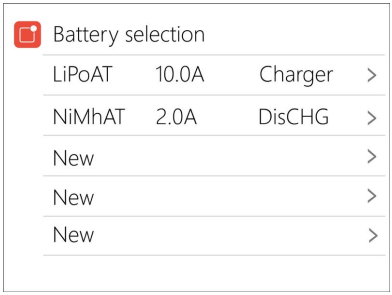
⑥ Press **[EXIT]** – ends the modification or returns to the previous interface.

▶ Scroll wheel functions

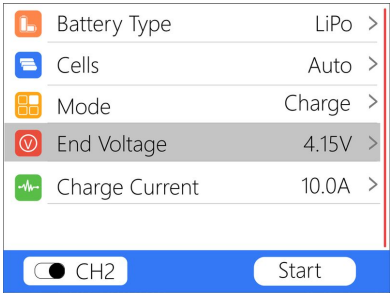
- Short press the scroll wheel once to confirm the key function.
- Press and hold the scroll wheel for 2 seconds to delete the key function.
- If any key is operated successfully, there will be a di-di prompt tone.

4. Charge and discharge settings

Short press [OK] on the main interface to enter the charging function. Scroll the wheel to select a stored battery or create a new battery (*New*) and press to confirm – the battery setting interface opens.



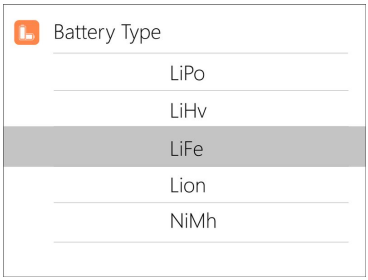
Battery selection



Battery setting interface

4.1 Battery type

Move the cursor to *Battery Type* and press [OK]. The charger supports charging and discharging of 6 types of batteries: **LiPo, LiHV, LiFe, Li-ion (Lion), NiMH and Pb**. The power supply mode (*Power*) and the smart battery (*SmartBat*) can also be selected. After selecting a battery type that matches the actual battery, short press [OK] to take effect and press [EXIT] to return to the previous interface.



Battery type selection

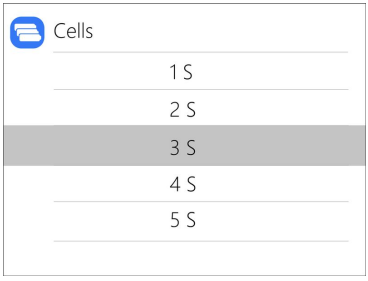
Warning: Choosing the wrong battery type may damage the battery and the charger, with the risk of burning, so please choose carefully. Do not use this product to charge batteries that do not indicate the battery type.

▶ Glossary of battery types (charger manufacturer's data)

Type	Nominal cell voltage	Fully charged cell
LiPo (lithium polymer)	3.70 V	4.20 V
LiHV (high-voltage lithium)	3.85 V	4.35 V
LiFe (lithium iron phosphate)	3.30 V	3.60 V
Li-ion (Lion)	3.60 V	4.10 V
NiMH (nickel-metal hydride)	1.20 V	–
Pb (lead-acid)	2.00 V	–

4.2 Number of cells

Move the cursor to *Cells* and press [OK]. Turn the scroll wheel to adjust the number of cells. When set to *Auto*, the charger will automatically recognize the number of cells according to the voltage of the battery connected to the main port. Short press [OK] to take effect and press [EXIT] to return.



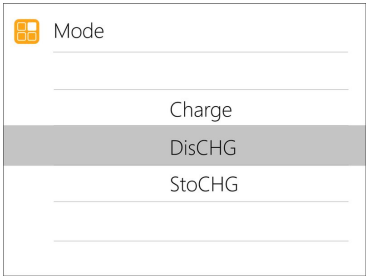
Number of cells setting

▶ **Tips**

- Over-charging or over-discharging of the connected battery may lead to incorrect recognition of the cell number; it is then necessary to set the correct cell number manually.
- If the cell number is set incorrectly, the battery may not be fully charged, or it may be damaged by overcharging. Please set it carefully.
- After a lithium battery is connected to the balance port, the number of cells can be identified more accurately.

4.3 Mode

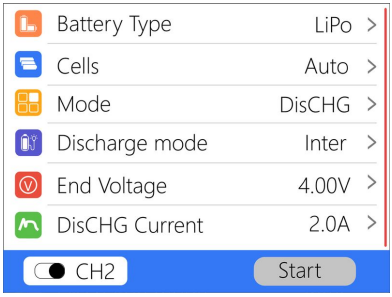
Move the cursor to *Mode* and press [OK]. LiPo, LiHV, LiFe and Li-ion batteries can be charged (*Charge*), discharged (*DisCHG*) and stored (*StoCHG*). NiMH batteries can be charged, discharged and cycled; Pb batteries can be charged and discharged. Short press [OK] to take effect and press [EXIT] to return.



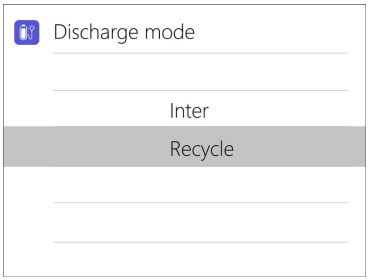
Mode selection

4.4 Discharge mode

When the working mode selects discharge, storage or cycle, the battery setting interface will add the *Discharge mode* item. Move the cursor to it and press [OK] to select the discharge mode.



Setting interface with Discharge mode

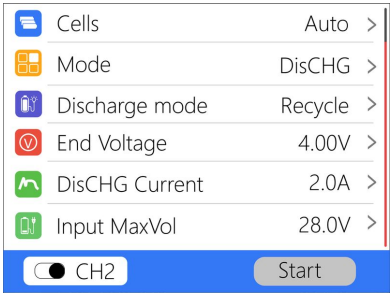


Discharge mode selection

- **Inter (Internal)** – discharge through internal heat consumption, maximum 3.0 A / 12 W.
- **Recycle** – when the input is a suitable battery, the electric energy from the discharging battery is recovered to the input battery, maximum 15.0 A / 250 W.

4.5 Input MaxVoltage (Input MaxVol)

When the discharge mode is set to *Recycle*, the battery setting interface will add the *Input MaxVol* setting. Move the cursor to it and press [OK] to adjust the voltage. If the input battery voltage reaches this voltage during discharge, the discharge will stop.

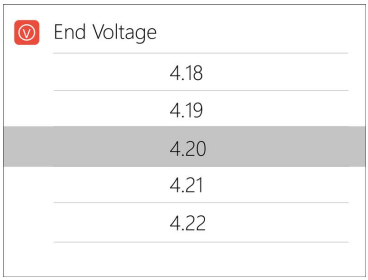


Input MaxVol setting

Tip: Please set the input cut-off voltage within the safe voltage range of the power supply battery. Setting a high over-voltage may damage the input battery by overcharging.

4.6 End voltage (TVC)

Move the cursor to *End Voltage* and press [OK]. When the working mode is charging, it is the charging cut-off voltage of a single cell, and the range is ±50 mV of the full voltage. When the working mode is discharge, it is the discharge cut-off voltage. Scroll the wheel to adjust the value in steps of 0.01 V.



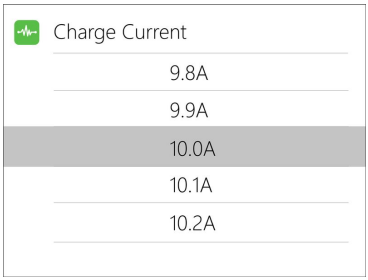
End voltage setting

▶ **Tips**

- Only LiPo, LiHV and LiFe batteries can set the end voltage.
- If not familiar with battery characteristics, please do not modify the end voltage.
- TVC: abbreviation for *terminal voltage control*.

4.7 Current setting

Move the cursor to *Charge Current* or *DisCHG Current* and press [OK]. Rotate the scroll wheel to adjust the value in steps of 0.1 A; scroll quickly to increase or decrease faster. The charger supports up to 15.0 A, in synchronous mode up to 25 A.



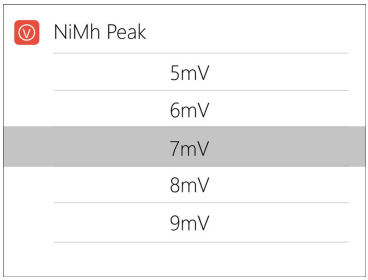
Current setting

▶ **Tips**

- Please set the charging rate of 1–2C according to the battery capacity. For example: for a battery with a capacity of 2000 mAh, set the charging current to 2.0–4.0 A.
- Charging and discharging current are only valid in the corresponding working mode.
- For the power supply setting for Recycle discharge, please refer to chapter 6 System settings.

4.8 NiMH setting (Peak)

When the battery type is NiMH, the sensitivity of the voltage drop detection at the end of charging (*NiMh Peak*) can be set in the range 5–15 mV.



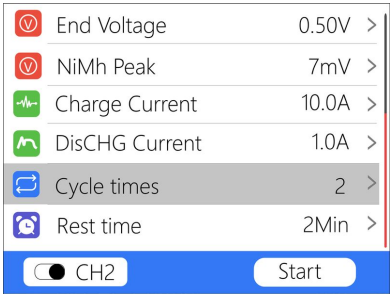
NiMh Peak setting

▶ **Tips**

- Only NiMH batteries can set this value.
- Peak: when a NiMH battery is fully charged, its voltage peaks and then drops slightly; the charger ends charging based on this drop.

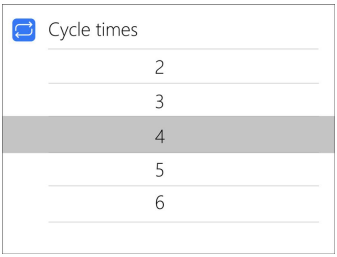
4.9 Cycle setting

When the battery type is NiMH and the work mode is set to cycle, the battery setting interface will add the *Cycle times* and *Rest time* settings.



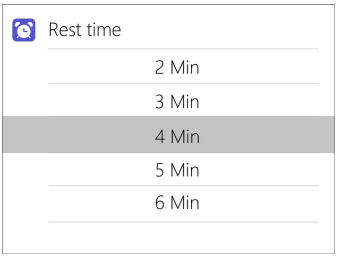
Cycle setting

Move the cursor to *Cycle times* and press [OK] to set the cycle times to 2–12. The charger will follow the pattern discharging → charging → discharging → charging…; one “discharge → charge” counts as 2 times.



Cycle times

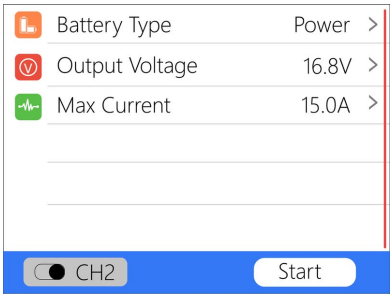
Move the cursor to *Rest time* and press [OK] to set the interval time between cycles. The range is 2–10 minutes.



Rest time between cycles

4.10 Power mode setting (Power)

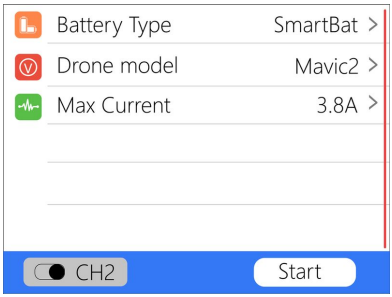
When the battery type is *Power*, the setting interface only has two options: *Output Voltage* in the range 1–28 V and *Max Current* (maximum output current) in the range 0.5–15 A.



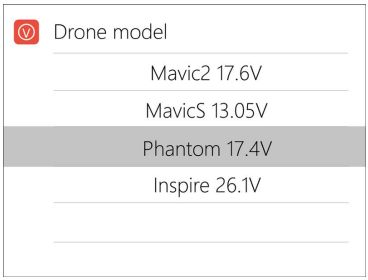
Power mode setting

4.11 Smart battery (SmartBat)

When the battery type is *SmartBat*, the settings are only the drone model (*Drone model*) and maximum current (*Max Current*). Move the cursor to *Drone model* and press [OK] to select the drone model.



Smart battery setting

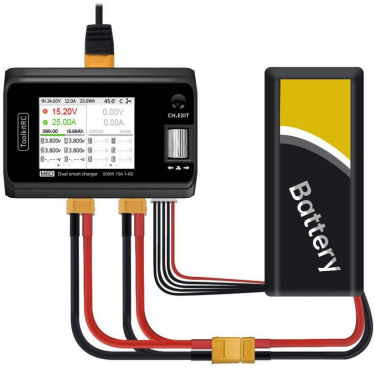


Drone model selection

Move the cursor to *Max Current* and press [OK] to set the charging current. The range is 0.5–15 A.

4.12 Synchronous mode

When the synchronous mode is turned on in the system settings, the M6D allows both channels to charge the same battery with a total current of up to 25 A. Connect the battery as shown in the figure.

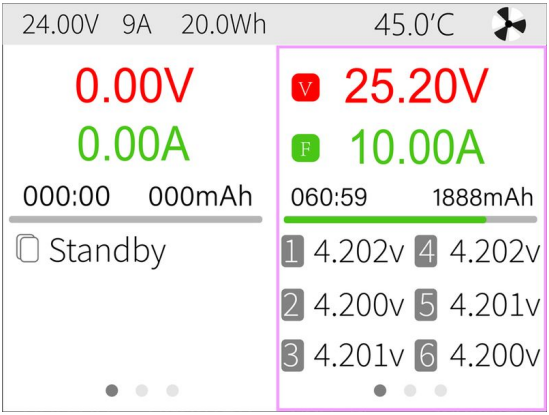


Connection in synchronous mode

5. Charge and discharge work

5.1 Working interface

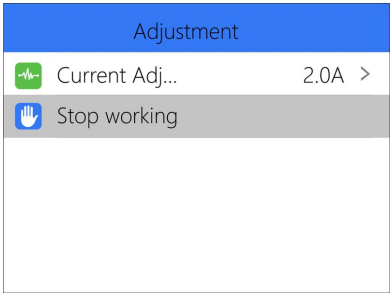
When charging or discharging starts, the charger enters the working interface. Rotate the scroll wheel to switch the bottom status information and the cell voltage and internal resistance display. Short press [OK] to dynamically set the working current or stop working.



Working interface

5.2 Adjusting current and stopping work

Short press [OK], move the cursor to *Stop working* and short press [OK] again – the work stops and the main interface is displayed. *Current Adj.* changes the working current. When charging is completed or an error occurs, a prompt box pops up and a tone sounds.



Adjustment menu during operation

5.3 Display content description

▶ Top status bar

24.00V	input power supply voltage
9A	input power current
20.0Wh	total energy consumed from the input
45.0 °C	charger internal temperature

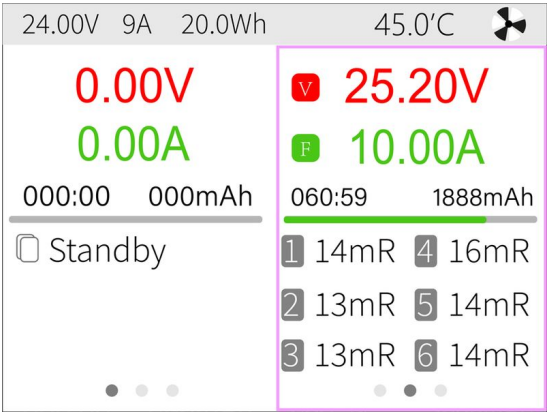
▶ Channel information

25.20V	channel main port voltage
10.00A	channel main port current
060:59	channel working time
1888mAh	cumulative capacity of the channel
1 4.202v	1st cell voltage (other cells likewise)
-.--V	no cell connected

A cell whose number is highlighted is in balance management.

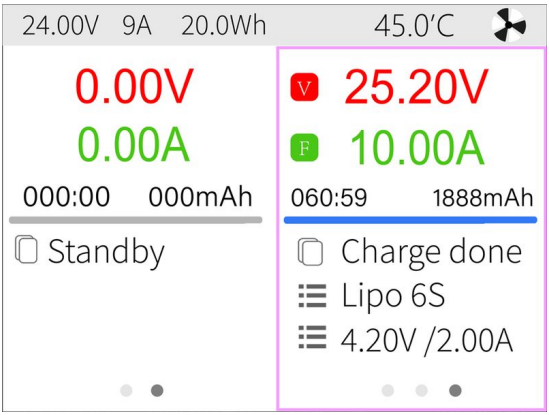
▶ Status flags

- **V** – constant voltage, **C** – constant current.
- Limit flags: **P** – power limit, **I** – input limit, **C** – maximum current, **A** – activate charging, **F** – main port voltage or single cell voltage is full.



Second page – cell internal resistance

Scroll the wheel to switch to the second column of the channel, which shows the internal resistance of each cell (e.g. *1 14mR* – internal resistance of the 1st cell 14 mΩ).



Third page – information

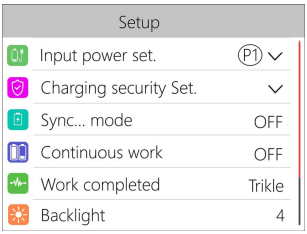
Scroll further to display the information bar: *Charge done* – current charging status, *Lipo 6S* – battery type and number of cells, *4.20V/2.00A* – end voltage and charging current.

▶ Tips

- When charging and discharging, please directly supervise throughout the process to deal with any abnormality in time. Do not leave charging or discharging batteries unattended.
- When a lithium battery is connected only to the main port, balance management is not performed. Connecting the balance lead is always recommended – balance management will then begin automatically.
- If *Continuous work* mode is on, after unplugging the charged battery and connecting the next one, the charger automatically continues with the same settings. When set to a fixed number of cells, connect batteries with the same cell count and capacity; when set to automatic detection, check that the detected number of cells is consistent with the actual battery.

6. System settings

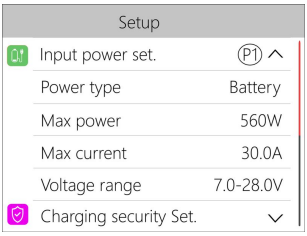
Long-press [OK] on the main interface to enter the system setting interface when both channels are idle.



System settings

6.1 Input power settings (Input power set.)

Relevant settings of the input power supply. Long-press to select power supply profile P1, P2 or P3; short press to expand its settings.

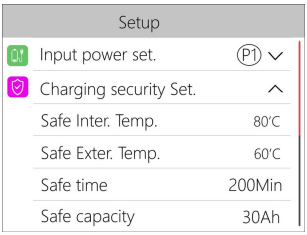


Power supply profile setting

- **Power type** – battery (*Battery*) or adapter (*PSU*). A battery can be used to recover energy when discharging batteries (Recycle mode), which provides greater current than internal discharging. **Recycle mode cannot be used with a Power Supply Unit (PSU) or any form of mains power adapter.**
- **Max power** – the maximum power absorbed from the input when charging.
- **Max current** – the maximum current drawn from the input during charging.
- **Voltage range** – the allowable input voltage range.

6.2 Safety limits (Charging security Set.)

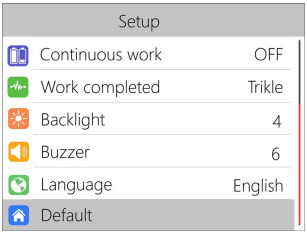
Short press to expand the safety limit settings.



Safety limits

- **Safe Inter. Temp.** – above this internal temperature, the device will stop the main port output.
- **Safe Exter. Temp.** – if the external sensor detects a higher temperature, the device will stop the main port output.
- **Safe time** – the maximum time of continuous charge or discharge, beyond which it will stop working.
- **Safe capacity** – the maximum capacity of continuous charge or discharge, beyond which it will stop working.

6.3 Other settings



Other system settings

- **Sync… mode** – turns the synchronization mode on; the two channels then work synchronously and support more power.
- **Continuous work** – when selected, the charger will automatically continue the same charging settings on the next connected battery. Ensure the next connected battery requires the same settings as the previous one.
- **Work completed** – after charging, whether to stop or continue with trickle charging (*Trikle*).
- **Backlight** – display backlight brightness, 1–10 levels.
- **Buzzer** – buzzer volume, can also be set to off.
- **Language** – system display language, e.g. English, Chinese and others.
- **Default** – restore all settings to factory defaults.

7. Other functions and specification

7.1 Firmware upgrade

Connect the M6D to the computer with the USB cable in the box. The computer will recognize a USB disk named *Toolkit*. Download the upgrade file *app.upg* from the official website www.toolkitrc.com, copy it to this USB disk and overwrite the previous file – the firmware will be upgraded.

7.2 USB 5 V output

In addition to the firmware upgrade, the USB port also serves as a 5 V / 2.1 A output for charging mobile devices.

7.3 Automatic continuation

When a battery is fully charged, unplug it, wait 2 seconds and connect the next battery – the device will continue to charge or discharge automatically. The function is turned on or off in the system settings (*Continuous work*).

7.4 Fan

When the internal temperature of the device exceeds 45 °C, the fan turns on at half speed to reduce noise. Above 53 °C, the fan runs at full speed to enhance heat dissipation.

7.5 Manual voltage calibration

In the shutdown state, press and hold the scroll wheel and connect the power supply – the system will enter the manual voltage calibration function. Measure the actual voltage of each cell with a voltmeter, move the cursor to the corresponding value and modify it to be consistent with the voltmeter value. After the calibration is completed, move the cursor to save and short press once – the buzzer beeps once and the save is successful. Then log out or shut down.

7.6 Fully charged

When the lithium battery is charged, the charger prompts that fast charging has ended. If the battery is not removed, constant voltage trickle charging will be performed automatically to make the battery more fully charged.

7.7 Specification

Parameter	Value
Input voltage	7–28 V DC, max. 30 A
Supported batteries	LiPo, LiHV, LiFe, Li-ion 1–6S NiMH 1–16S, Pb 1–10S
Balance current	800 mA (2–6S)
Accuracy	< 0.005 V
Charging current / power	0.1–15 A, 2× 250 W (asynchronous) 0.1–25 A, 500 W (synchronous)
Discharging current / power	0.1–15 A, 2× 250 W (Recycle) 0.1–3 A, 2× 12 W (internal)
USB output	5 V / 2.1 A, firmware upgrade
Cell voltage range	1.0–5.0 V (1–6S)
Cell internal resistance	1–100 mΩ (1–6S)
Display	IPS 2.4", 320 × 240 px
Dimensions	98 × 68 × 35 mm
Weight	220 g
Package dimensions	108.5 × 80.5 × 46 mm
Weight with packaging	300 g

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

The product is placed on the European Union market by the importer stated below, who is at the same time the responsible person within the meaning of Article 16 of Regulation (EU) 2023/988 of the European Parliament and of the Council on general product safety (GPSR).

Importer / responsible person in the EU	Rotorama, s.r.o.
Company ID (IČO)	051 57 692
VAT ID (DIČ)	CZ05157692
Registered office	Okrajová 1351, 674 01 Třebíč, Czech Republic
E-mail	info@rotorama.cz
Phone	+420 252 252 098
Website	www.rotorama.com

8.2 Product conformity

CE

- The product bears the **CE** marking and complies with the requirements of the applicable European Union harmonisation legislation.
- A copy of the **EU Declaration of Conformity** is available from the importer at the address stated above or at the e-mail address info@rotorama.cz.
- **Product identification:** the type designation (M6D) is given on the device and on its packaging.

8.3 Disposal of electrical equipment



- The crossed-out wheeled bin symbol on the product, its packaging or in the documentation means that at the end of its service life the product **must not be disposed of together with mixed municipal waste**.
- Hand it over at a take-back point for electrical equipment – at a collection yard, at a take-back point of a collective system, or at the retailer when purchasing a new equivalent product. Take-back is free of charge for the end user.
- The obligations under Act No. 542/2020 Coll., on end-of-life products, are fulfilled by the importer through a collective take-back system.
- Proper disposal helps prevent negative impacts on the environment and human health and contributes to the reuse of secondary raw materials.

Through its contractual partner **ASEKOL a.s.**, the company ensures the take-back of waste electrical equipment from households and the separate collection of waste electrical equipment, batteries and accumulators in accordance with the applicable legislation. The customer is entitled to hand over old electrical equipment or a battery or accumulator at any collection point of the above contractual partner. The addresses of these take-back points are listed at www.asekol.cz, www.ecobat.cz and also https://visoh2.mzp.cz/RegistrMistZO/RegistrMistZOPublic/MapaMistZpetOdberu.

9. Warranty and rights arising from defective performance

The rights and obligations of the contracting parties are governed by Czech law, in particular by Act No. 89/2012 Coll., the Civil Code, and Act No. 634/1992 Coll., on consumer protection.

- The seller is liable to the buyer for the product being free of defects on receipt. If the buyer is a consumer, a defect may be notified **within two years of receipt** of the product (Section 2165 of the Civil Code).
- If a defect appears within **one year** of receipt, the product is deemed to have been defective already at the time of receipt (Section 2161(5) of the Civil Code).
- When purchasing online, a consumer has the right to **withdraw from the contract within 14 days** of receiving the goods without giving a reason (Section 1829 of the Civil Code).
- Claims should be made with the retailer from whom you purchased the product. The importer's contact details are given in Chapter 8.1.
- The competent body for out-of-court settlement of consumer disputes is the **Czech Trade Inspection Authority**, Štěpánská 796/44, 110 00 Prague 1, www.coi.cz.