M9

ToolkitRC – multi-function balance charger
600 W · 20 A · LiPo / LiHV / LiFe / Li-ion / LTO 1–8S · NiMH 1–20S · Pb 1–10S



Read the entire manual carefully before first use, especially the safety instructions in Chapter 1. Keep this manual for future reference.

User manual · based on the original manual by ToolkitRC

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1. Introduction and safety

1.1 Introduction

Thank you for purchasing the **ToolkitRC M9** balance charger. Please read this manual carefully before use and keep it for future reference.

To stay up to date with news, information and firmware updates for your charger, visit the manufacturer's website www.toolkitrc.com.

1.2 Manufacturer's safety instructions

- The M9 allows an input voltage of **DC 7.0–35.0 V**. Ensure the charger is only connected to a suitable power source and with the **correct polarity**.
- Do not use this product in hot, humid, flammable or explosive environments.
- Do not use this charger without supervision. **Never leave charging batteries unattended.**
- When not using this product, unplug the input power.
- When using the charging function, set a current that matches the battery. Do not set an excessive charging current, to avoid damage to the battery. Check the guidelines of your battery's manufacturer for correct charging instructions.
- Do not use this product to charge non-compatible battery chemistries.
- If the cell count is set incorrectly, it may lead to overcharging, which presents a fire risk.

Ensure the correct battery type has been selected prior to charging. An incorrect choice may damage the battery and/or become a fire hazard.

1.3 General rules for handling batteries

- The product is intended for persons aged 14 and over.
- Charge on a non-flammable surface, away from flammable materials. We recommend charging lithium batteries in a fireproof safety bag.
- Do not charge damaged, swollen, punctured or overheated batteries. Disconnect a battery immediately if it becomes excessively hot or swells during charging.
- Always charge lithium batteries with the balance connector connected.
- Do not cover the ventilation openings or the fan of the charger and ensure free air flow.
- Make sure the output connectors and the battery leads cannot be short-circuited.
- Protect the device from moisture, dust, drops and impacts.

2. Product description

2.1 Features

The M9 is a multifunctional tool that integrates a balance charger and discharger, a signal measuring device and a signal source.

- Charges, discharges and balances (where applicable) LiPo, LiHV, LiFe, Li-ion and LTO 1–8S, NiMH 1–20S and Pb 1–10S batteries.
- Charge current: max. 20 A at max. 600 W.
- Discharge current: Recycle / External mode max. 20 A at 600 W, internal mode max. 3 A at 20 W.
- Lithium battery cut-off voltage can be adjusted at will (TVC function).
- Measures battery voltage and internal resistance, balances lithium packs automatically.
- Measures and outputs PWM/PPM/SBUS standard signals with an accuracy of 1 µs.
- Constant voltage and constant current source output: customizable 1–35 V constant voltage, 0.5–20 A constant current.
- Can be adapted for charging consumer-grade drone batteries.
- Multi-language user interface and multi-language voice broadcast with customizable voice packs.
- TYPE-C + TYPE-A dual fast charging USB output, up to 65 W.
- Pivoting display from 0–85° for optimal viewing angles.
- Easily upgradable via USB.

2.2 Controls and connectors



Front



Back

No.	Element	No.	Element
1	Display (pivoting)	7	USB TYPE-C output
2	[Exit] button	8	USB TYPE-A output
3	Scroll wheel	9	Speaker
4	Output port for the battery (OUTPUT)	10	TF (microSD) memory card slot
5	Balance port (2–8S)	11	Power input port (INPUT DC 7–35 V)
6	Signal port (−, +, S)	12	Cooling fan

2.3 Specifications

Area	Parameter	Value
Charge	Input	7–35 V, max. 25 A
	Battery types	LiPo, LiHV, LiFe, Li-ion, LTO 1–8S NiMH 1–20S, Pb 1–10S
	Balance	1000 mA at 4.2 V
	Accuracy	< 0.005 V
	Power	0.1–20 A, max. 600 W
Discharge	Recycle / External	0.1–20 A, max. 600 W
	Internal	0.1–3 A, max. 20 W
USB A + C	Output	5–20 V, 65 W PD, QC, PPS, AFC, SCP
Measure	Cell voltage	1.0–5.0 V, 1–6S
	Internal resistance	0.1 mΩ–99 Ω, 1–8S
	PWM	880–2200 µs, 20–400 Hz
	PPM	880–2200 µs, 8 channels, 20–50 Hz
	SBUS	880–2200 µs, 16 channels, 20–100 Hz
Signal output	PWM	500–2500 µs, 20–1000 Hz
	PPM	880–2200 µs, 8 channels, 50 Hz
	SBUS	880–2200 µs, 16 channels, 74 Hz
Power supply	Output	1–20 A, 1–35 V, CC + CV mode
Display	Type	LCD IPS 2.4", 320 × 240 resolution
Product	Size	108 × 71 × 36 mm
	Weight	235 g
Packing	Size	135 × 81 × 44 mm
	Weight	330 g

3. Quick start

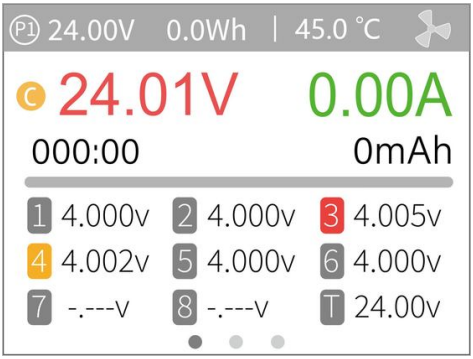
3.1 Switching on

① Connect the 7–35 V power supply to the input port on the back of the M9.

② The display shows the boot logo for 2 seconds.

③ A welcome sound (voice pack dependent) is played simultaneously.

④ After booting up, the main interface is displayed.



Main interface – for the meaning of the values see Chapter 5.1

3.2 Operation

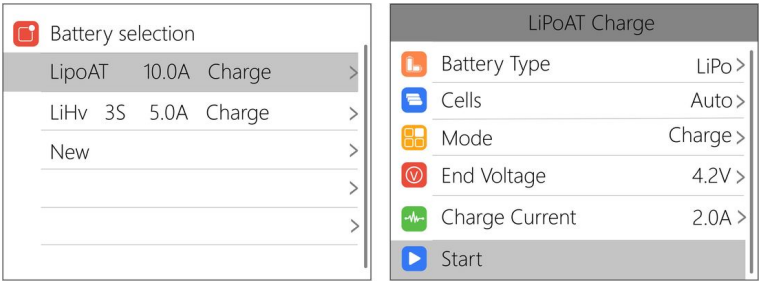
- **Press and hold [Exit]** – enter the auxiliary functions (Chapter 6).
- **Turn the scroll wheel** – switch between pages.
- **Short press [OK]** with the charger idle – set the charging parameters (Chapter 4). Press [OK] during charging to adjust the current or stop the process.
- **Press and hold [OK]** with the charger idle – system settings (Chapter 7.1).
- **Short press [Exit]** – return to the previous interface.

4. Charge and discharge settings

4.1 Battery selection

In the main interface, short press [OK] to enter the charging function. If the *Battery selection* option is enabled in the system settings (Chapter 7.1), the list of saved batteries is displayed first.

Turn the scroll wheel and select one of the presets, or create a new battery (*New*). Up to 32 battery files can be created. Press [OK] to enter the settings of the selected battery.



Battery selection (left) and charge settings (right)

4.2 Battery type

Move the cursor to *Battery Type* and press [OK] to modify the battery type. The charger supports charging and discharging of Lipo, LiHV, LiFe, Lion, LTO, NiMh and PB batteries; there is also a smart drone battery mode to choose from (*UAVbat*, Chapter 4.12). After selecting the battery type that matches the battery on charge, short press [OK] and [Exit] to save and return to the previous interface.

An incorrectly selected battery type may damage the battery and/or become a fire hazard. Do not charge non-compatible battery chemistries.

Type	Battery	Nominal voltage	Fully charged
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
Lion	lithium-ion	3.60 V	4.10 V
LTO	lithium titanate	2.40 V	2.70 V
NiMh	nickel-metal hydride	1.20 V	—
PB	lead-acid	2.00 V	—

Voltages are given per cell.

4.3 Cells

Move the cursor to *Cells* and press [OK] to modify the number of cells. Rotate the scroll wheel to adjust the value. When set to *Auto*, the charger automatically identifies the number of cells by checking the total voltage against the balance port data. Short press [OK] and [Exit] to confirm and return to the previous interface.



Battery type (left) and cell count (right)

- If the connected battery is over-discharged or over-charged, the cell count may be identified incorrectly – in that case set the number of cells manually.
- If the cell count is set incorrectly, it may lead to overcharging, which presents a fire risk.
- The cell count can be determined more accurately if the balance port is connected.

4.4 Work mode

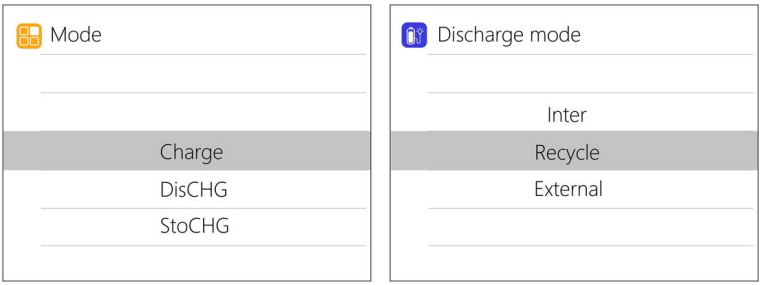
Move the cursor to *Mode* and press [OK] to modify the work mode: *Charge* (charging), *DisCHG* (discharging), *StoCHG* (storage) or *Cycle* (cycling). Short press [OK] and [Exit] to confirm.

- Lipo, LiHV, LiFe, Lion and LTO batteries can be charged, discharged and stored.
- NiMh batteries can be charged, discharged or cycled.
- PB batteries can be charged and discharged.

4.5 Discharge mode

Under the discharge, storage and cycle modes, the *Discharge mode* option appears. Move the cursor to it and press [OK] to select one of the three discharge modes:

- **Inter** (internal) – discharge using internal heat dissipation; max. 3.0 A at 20 W.
- **Recycle** – when a battery is used as the input, the energy is recovered to the input battery; max. 20.0 A at 600 W.
- **External** – the input port is connected to a discharge load and the output port to the battery; max. 20.0 A at 600 W.



Work mode (left) and discharge mode (right)

4.6 Max input voltage

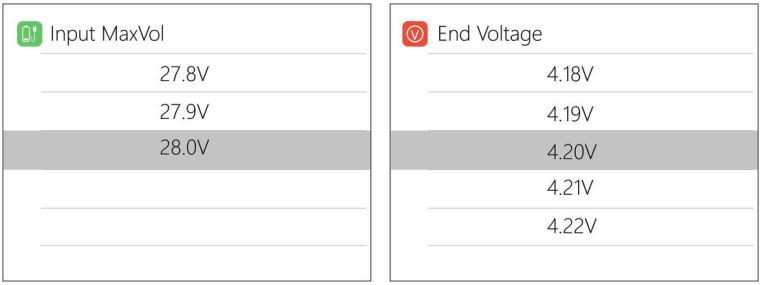
When the *Recycle* discharge mode is selected, the *Input MaxVol* option appears. Move the cursor to it and press [OK] to adjust it. If the input voltage reaches this value during discharge, the discharge stops.

Set the max input voltage to the highest protection voltage of the power supply. When this voltage is reached, the charger automatically stops recycle discharging.

Setting the max input voltage too high may damage the input power source.

4.7 End voltage (TVC)

Move the cursor to *End Voltage* and press [OK] to modify the end voltage for the individual cells. When charging, it is the charge cut-off voltage, which can be set within ±50 mV of the full voltage. When discharging, it is the discharge cut-off voltage. Turn the scroll wheel to adjust the value in steps of 0.01 V.



Max input voltage (left) and end voltage (right)

- Only LiPo, LiHV and LiFe batteries allow the cut-off voltage to be set.
- Do not modify the cut-off voltage if you are not familiar with the battery characteristics.
- TVC (Terminal Voltage Control) – control of the end voltage.

4.8 Charge and discharge current

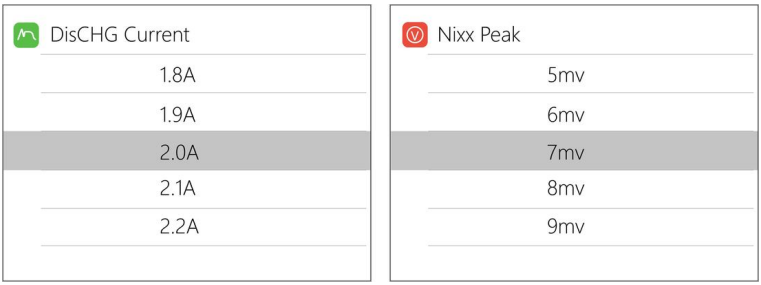
Move the cursor to *Charge Current* or *DisCHG Current* and press [OK] to modify the current. Rotate the scroll wheel to adjust the value in steps of 0.1 A; scroll quickly to change it faster. The maximum current depends on the mode – see the specifications in Chapter 2.3.

- Set a charging rate of 1–2C according to the battery capacity. For example, for a 2000 mAh battery set the charge current to 2.0–4.0 A.
- The charge / discharge current is only valid in the corresponding work mode.
- Whether recycle discharging is available depends on the selected power type (*Power type*, Chapter 7.1).

4.9 NiMH full-charge detection (PeakV)

When the battery type is NiMH, the peak voltage value used to detect a fully charged battery can be set (*Nixx Peak*). The setting range is 5–15 mV.

- This function is only available for NiMH cells.
- PeakV – the maximum voltage drop per cell when the NiMH battery is fully charged.

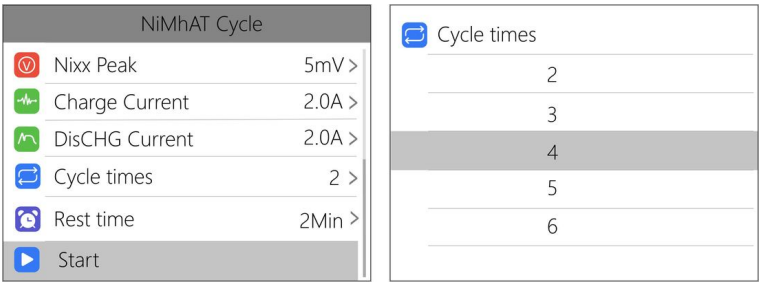


Discharge current (left) and NiMH PeakV (right)

4.10 NiMH cycling

When the battery type is NiMh and the cycle mode is selected, the *Cycle times* and *Rest time* options appear.

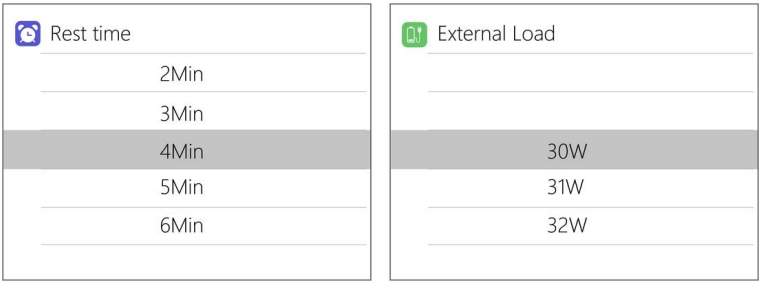
- *Cycle times* – number of cycles in the range 2–12. The charger follows the pattern discharge → charge → discharge → charge...; "discharge → charge" is 2 times.
- *Rest time* – rest time between the cycle steps, 2–10 minutes.



Cycle settings (left) and cycle times (right)

4.11 External load

When the *External* discharge mode is selected, the *External Load* option appears. Set the wattage according to the external load used.

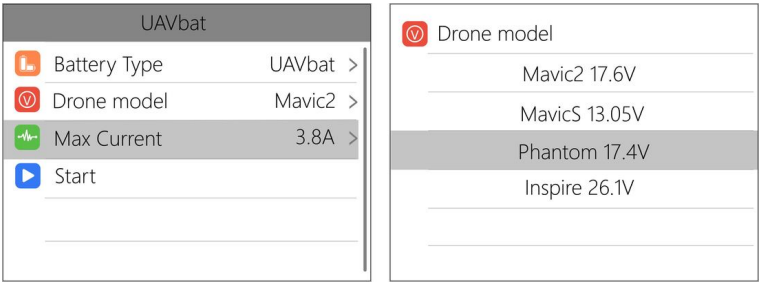


Rest time (left) and external load wattage (right)

4.12 Smart drone batteries (UAVbat)

When *UAVbat* is selected as the battery type, there are only two settings:

- *Drone model* – drone model: Mavic2 (17.6 V), MavicS (13.05 V), Phantom (17.4 V) or Inspire (26.1 V).
- *Max Current* – charge current in the range 0.5–20 A.



UAVbat settings (left) and drone model selection (right)

5. Charge and discharge work

5.1 Work screen

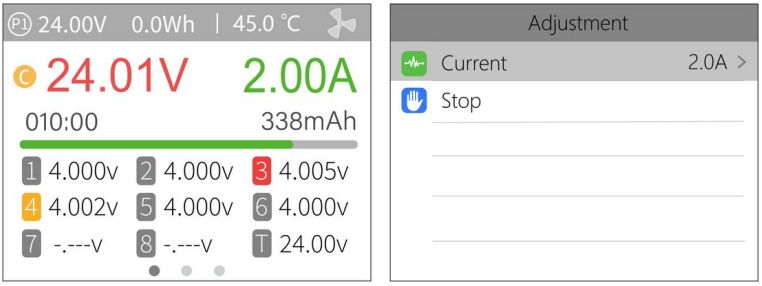
When charging or discharging starts, the charger enters the work screen. Rotate the scroll wheel to toggle between three pages. Values on the first page (and on the main interface):

Value	Meaning
P1	power source selected in the system settings
24.00V (header)	input voltage
0.0Wh	accumulated power consumption
45.0 °C	internal temperature of the charger
C / V	constant current / constant voltage mode
24.01V	main port voltage
2.00A	main port current
010:00	working time
338mAh	charged capacity
1 4.000v	voltage of the first cell (other cells likewise)
T 24.00v	total voltage measured at the balance lead
-.---v	no cell connected

5.2 Adjusting the current and stopping

Short press [OK] during charging to open the *Adjustment* menu, where you can dynamically set the current (*Current*) or end the process. To stop charging or discharging, move the cursor to *Stop* and short press [OK] – the process stops and the main interface is displayed.

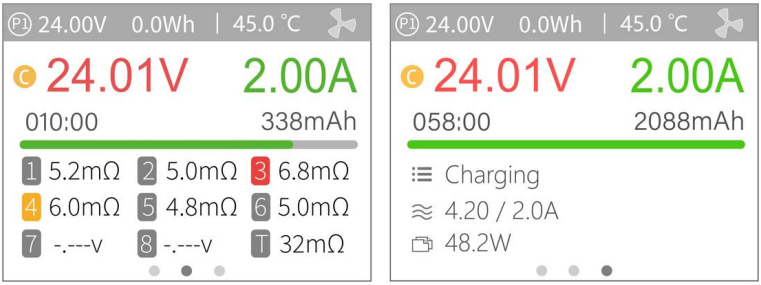
When charging is complete or a charge error occurs, a popup appears along with an audible tone.



Work screen (left) and Adjustment menu (right)

5.3 Internal resistance and general information

The second page shows the internal resistance of the individual cells (e.g. *1 5.2mΩ* – internal resistance of the first cell) and the total internal resistance (*T*). The third page shows general information: the current status (*Charging*), end voltage / charge current (*4.20 / 2.0A*) and the current charging power (*48.2W*).

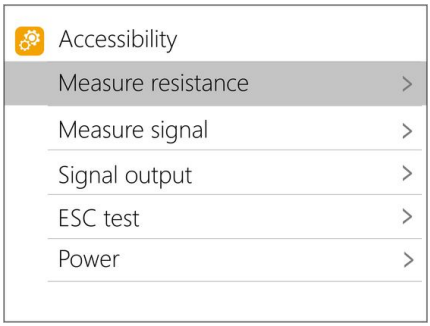


Cell internal resistance (left) and general information (right)

- When charging and discharging, never leave the cells unattended.
- Lithium batteries are only balanced if the balance plug is connected. The charger automatically balances each cell if a balance plug is detected.
- Charging automatically starts for the next battery if the initial battery is disconnected after being fully charged. If a fixed cell count is set, ensure that the next battery has the same cell count as the initial battery. If set to automatic, make sure that the cell count matches what is detected.

6. Auxiliary functions

Press and hold [Exit] in the main interface to enter the auxiliary function menu (*Accessibility*).



Auxiliary function menu

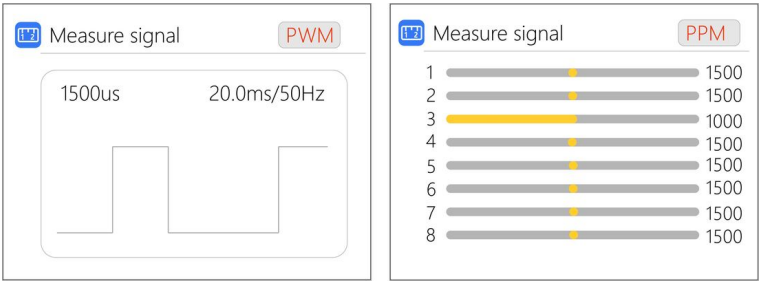
6.1 Measure resistance

Select *Measure resistance* and short press [OK] to test the internal resistance of the connected battery; the result is displayed on the main interface.

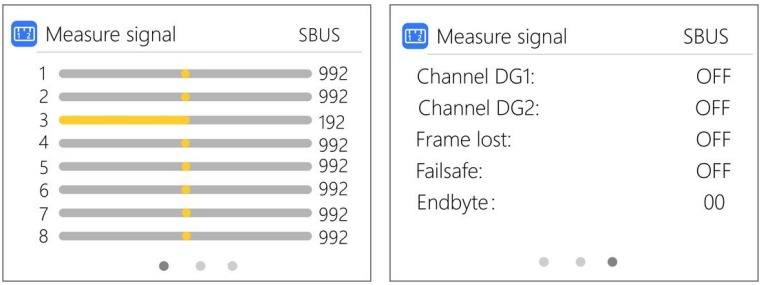
6.2 Measure signal

Move the cursor to *Measure signal* and short press [OK] to enter the signal test interface. Rotate the scroll wheel to select the signal type:

- **PWM** – pulse width and period / frequency.
- **PPM** – values of channels 1–8.
- **SBUS** – rotate the scroll wheel to display channels 1–8, channels 9–16 and the overall status (*Channel DG1*, *Channel DG2*, *Frame lost*, *Failsafe*, *Endbyte*).



Measuring a PWM (left) and PPM (right) signal



Measuring an SBUS signal – channels 1–8 (left) and overall status (right)

6.3 Signal output

Move the cursor to *Signal output* and short press [OK] to enter the signal output interface. Rotate the scroll wheel to select the signal type.

▶ PWM

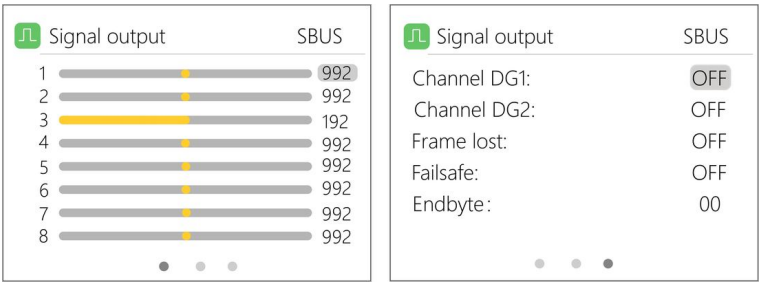
Move the cursor to *Manual* and press [OK] to set the output mode: *Manual*, *Auto 1*, *Auto 2* or *Auto 3*. In manual mode you can change the pulse width and cycle values using the cursor. In Auto 1–3 the pulse width of the output PWM changes automatically at 3 different speeds. The width can be set from 800 to 2200 µs, the cycle from 2.5 ms (400 Hz) to 50.0 ms (20 Hz).

▶ PPM and SBUS

Rotate the scroll wheel to move the cursor to the value of the channel to be modified and press [OK] to modify the output pulse width of this channel. For SBUS there are three pages: channels 1–8, channels 9–16 and the status flags.



PWM (left) and PPM (right) signal output



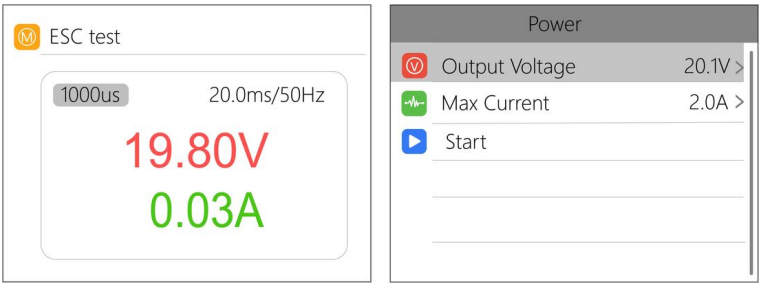
SBUS signal output – channels 1–8 (left) and status flags (right)

6.4 ESC test

Select *ESC test* and short press [OK] to enter the ESC test mode. Rotate the scroll wheel to move the cursor to the pulse width or cycle and press [OK] to change the corresponding value.

6.5 Adjustable power supply (Power)

Select *Power* and short press [OK]. The output voltage (*Output Voltage*) and current (*Max Current*) of the power supply can be set at will. Move the cursor to *Start* and short press [OK] to start the power output and return to the main interface.



ESC test (left) and adjustable power supply (right)

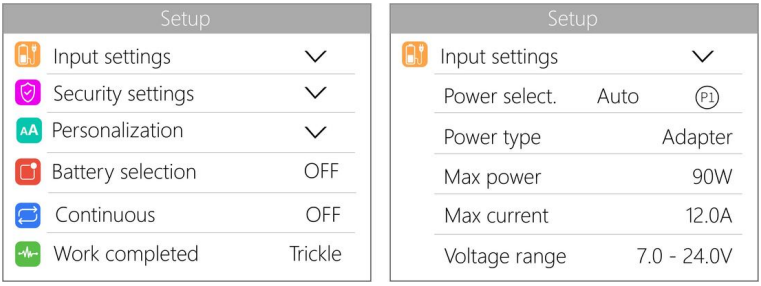
6.6 USB information

Select *USB infomation* and short press [OK] to view the USB output data: voltage, current, time, capacity and the protocol used.

7. System settings and other functions

7.1 System settings

Press and hold [OK] in the main interface to enter the system settings (*Setup*). Short press to expand a settings group.



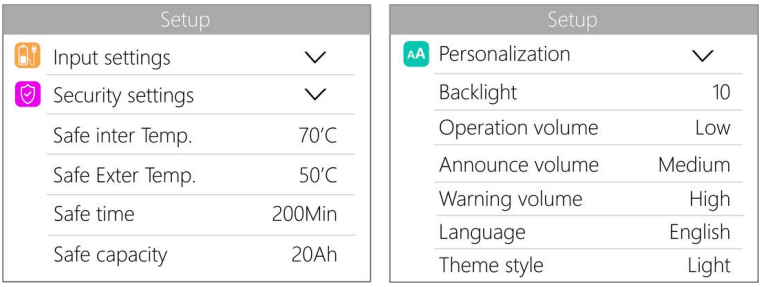
System settings (left) and the Input settings group (right)

▶ Input settings

Item	Meaning
Power select.	power presets: Power 1, Power 2, Power 3
Power type	power source type: battery pack or adapter (*Adapter*). For battery packs recycle discharging is enabled, for adapters it is disabled.
Max power	maximum wattage allowed via the input port during charging
Max current	maximum current allowed via the input port during charging
Voltage range	input voltage range

▶ Security settings

Item	Meaning
Safe inter Temp.	charging stops when the temperature of the device exceeds this value
Safe Exter Temp.	charging stops when the ambient temperature exceeds this value
Safe time	maximum time limit for continuous charging / discharging
Safe capacity	maximum accumulated capacity for one charging / discharging session



Security settings (left) and personalization (right)

▶ Personalization

Item	Meaning
Backlight	display backlight brightness, 1–10
Operation volume	scroll wheel sound volume: off, low, medium, high
Announce volume	menu readout volume: off, low, medium, high
Warning volume	warning tone volume: off, low, medium, high
Language	system display language: English, Chinese etc.
Theme style	light or dark theme

▶ Other items

Item	Meaning
Battery selection	show / hide the list of frequently used batteries (Chapter 4.1)
Work completed	stop after charge completion, or continue with trickle charge (*Trickle*)
Balance start Vol.	balance the cells prior to full-current charging
Continuous work	enable / disable continuous charging / discharging after battery replacement
Default	restore factory settings
ID	unique device ID and firmware version

7.2 Custom boot image and voice broadcast

The M9 supports a customizable boot image and voice packs. Connect the device to a computer using the USB cable supplied (USB-A plug to the computer). Two USB drives appear on the computer: the *Toolkit* drive is used for upgrading firmware, the other one for storing customized files. Its root directory contains two folders: *LOGO* for boot images and *SOUNDS* for voice files.

▶ Boot image

When the M9 is switched on, it automatically reads the file named *logo.bmp* in the LOGO folder. If the file is read successfully, the image is displayed as the startup page.

- Only the BMP file format with a resolution of 240 × 320 pixels is supported.
- If the file with this name cannot be read, the default startup page is displayed.

▶ Voice broadcast

During use, the M9 reads the voice files in the SOUNDS folder. The voice files of each language are stored in separate folders:

Folder	Language	Folder	Language
CHI	Chinese	DEU	German
ENG	English	ESP	Spanish
FRA	French	ITA	Italian
JAP	Japanese	KOR	Korean
POR	Portuguese	TRA	Traditional Chinese

File	Content
0000.wav–0090.wav	numbers 0–90
0100–0109.wav	numbers 100–1000
0167–0176.wav	decimals .1–.9
Bootup.wav	boot-up sound
Warning.wav	warning sound
other files	menu broadcast

- Only mono WAV files are supported.

7.3 Other functions

▶ Firmware upgrade

After connecting the M9 to a computer with the USB cable supplied, the computer recognizes a USB drive named *Toolkit*. Download the upgrade file *app.upg* from the official ToolkitRC website and overwrite the files on the drive to upgrade the firmware.

▶ USB fast charge output

TYPE-C and TYPE-A fast charge outputs, maximum output 65 W. Supported protocols: PD 3.0, PD 2.0, PPS, QC4, QC3.0, QC2.0, AFC, FCP, SCP, PE2.0, PE1.1, SFCP and VOOC.

▶ Automatic continuous charging / discharging

When a battery is fully charged, connect the next battery – the device automatically continues to charge and discharge. You can enable or disable this function in the system settings (*Continuous work*).

▶ Fan

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

▶ Manual voltage calibration

① With the M9 powered off, press and hold the scroll wheel.

② Without releasing the wheel, connect the power supply – the system enters the manual voltage calibration mode.

③ Use a voltmeter to measure the actual voltage of each cell, move the cursor to the corresponding value and modify it to match the voltmeter reading.

④ After calibration, move the cursor to save and short press once – a single beep confirms the save.

⑤ Exit the calibration or switch the device off.

▶ Full charge mode

When a lithium battery is fully charged, the message *Fast charge complete* is shown. If the battery is not removed, the charger continues with trickle charging until the battery is disconnected.

8. Information for the EU and Czech Market

The information in this chapter describes the situation in the Czech Republic. If you operate the product in another country, you must follow the regulations of the country in which you operate it.

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.cz

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 (M9) is given on the device; the unique device identification number (ID) and the firmware version are shown in the last line of the system settings (Chapter 7.1).

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.