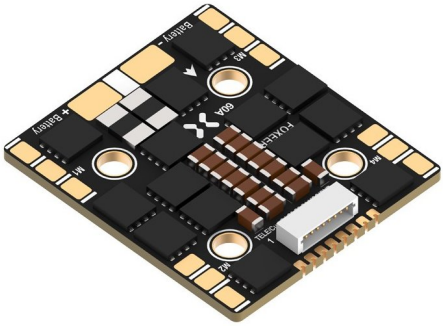
Reaper F4 Slim Mini 60A

Foxeer · 4in1 electronic speed controller (ESC) · BLHeli_32

3–8S · 60 A · 20 × 20 mm



Read the safety instructions in chapter 1 before installation.

www.rotorama.com

Contents

1. Safety instructions

1.1 Before you start

1.2 Electrical safety and Li-Po batteries

1.3 Motors and propellers

2. Product description

2.1 Intended use

2.2 Package contents

2.3 Specifications

2.4 Wiring

2.5 Dimensions and mounting

3. Legal conditions of operation

3.1 The law of the country of operation applies

3.2 Operating a drone with this ESC

4. Installation

4.1 What else you need

4.2 Mounting in the frame

4.3 Connecting the motors

4.4 Connecting the power

4.5 Connecting to the flight controller

5. Setup

5.1 Connecting the battery for the first time

5.2 Betaflight settings

5.3 Motor direction

5.4 ESC firmware

6. Operation

6.1 Pre-flight check
6.2 Battery voltage
6.3 Load and temperature
7. Maintenance and troubleshooting
7.1 Maintenance and storage
7.2 Troubleshooting
8. Information for the EU and Czech Market
8.1 Importer and responsible person in the EU
8.2 Product conformity
8.3 Disposal of electrical equipment
9. Warranty and rights arising from defective performance

1. Safety instructions

1.1 Before you start

The Foxeer Reaper F4 Slim Mini 60A electronic speed controller (ESC) is an electronic component intended for installation in a multicopter (FPV drone). Installation requires experience with soldering and building FPV drones. Read this entire manual before connecting the ESC and keep it for future reference.

- This product is not a toy and is not intended for children. Keep it out of the reach of children.
- Use the ESC only within the specifications given in section 2.3 – in particular the input voltage and current.
- Solder in a well-ventilated area, use a soldering stand and never solder with a battery connected.
- Do not make any modifications to the ESC that are not described by the manufacturer.

1.2 Electrical safety and Li-Po batteries

- The ESC works directly with the voltage and current of the Li-Po battery. A short circuit at the input or at the motor outputs can destroy components and cause fire or burns.
- **Always observe the power polarity**: battery positive to the **B+** pad, negative to the **B−** pad. Reverse polarity will permanently damage the ESC.
- When connecting a battery for the first time after installation, use a **smoke stopper** or a bench power supply with current limiting.
- Charge Li-Po batteries only with a suitable charger, never unattended and on a non-flammable surface. Do not use a damaged, swollen or overheated battery.
- Always disconnect the battery when you have finished. Never leave a connected battery unattended.

1.3 Motors and propellers

- **Remove the propellers** whenever you test motors on the bench or configure the drone on a computer.
- Spinning propellers can cause serious injury. Before connecting the battery, make sure the drone is in the Disarm state (motors off) and nobody is near it.
- After a crash, always disconnect the battery first before handling the drone.

2. Product description

2.1 Intended use

The Foxeer Reaper F4 Slim Mini 60A is a four-channel electronic speed controller (4in1 ESC) for FPV drones with a 20 × 20 mm mounting pattern. It drives four brushless motors according to commands from the flight controller (FC). It runs BLHeli_32 firmware on an F4 processor.

According to the manufacturer, the ESC is Plug & Play with the Foxeer F722 Mini flight controller. The ESC has no voltage regulator (BEC) of its own – the drone electronics are powered by the flight controller.

2.2 Package contents

Qty	Item
1×	Foxeer Reaper F4 Slim Mini 60A ESC (4in1)
1×	Accessory kit

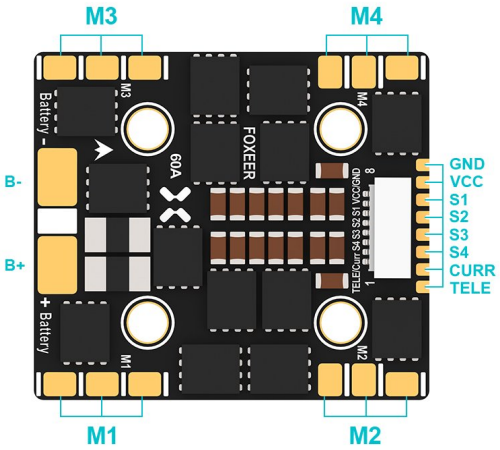
※ Battery, motors, flight controller, capacitor and propellers are not included. The product is supplied in unbranded packaging.

2.3 Specifications

Parameter	Value
Processor	F4
Firmware	BLHeli_32
Continuous / burst current	60 A × 4 / 100 A × 4
Input voltage	9–40 V DC (3–8S Li-Po)
BEC	no
Telemetry	yes
Current sensor scale	70
Input signal	DShot150 / 300 / 600 / 1200, MultiShot, OneShot
PWM frequency	up to 128 kHz
Operating temperature	−20 °C to +55 °C
Operating humidity	20–95 %
Storage temperature	−20 °C to +70 °C
Mounting holes	20 × 20 mm, Φ 4 mm / M3
Dimensions	36 × 41 mm
Weight	13 g

Data provided by the manufacturer Foxeer. The manufacturer does not specify the duration of the burst current.

2.4 Wiring

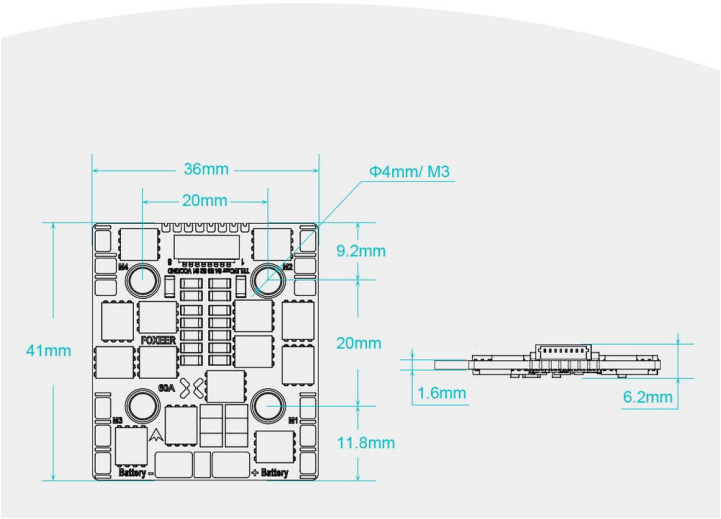


Solder pads and connector of the ESC (source: Foxeer)

Label	Function
B+ / B−	battery power (+ Battery / − Battery)
M1 – M4	outputs for motors 1–4, three pads each
GND	ground
VCC	power wire of the connector to the flight controller
S1 – S4	motor 1–4 control signals from the flight controller
CURR	current sensor output
TELE	ESC telemetry output

The 8-pin connector is marked 1 (TELE) to 8 (GND) on the board. Wire order from pin 1: TELE, CURR, S4, S3, S2, S1, VCC, GND.

2.5 Dimensions and mounting



Dimensional drawing (source: Foxeer). Values in mm.

3. Legal conditions of operation

3.1 The law of the country of operation applies

The ESC is a component; operating regulations apply to the finished drone in which you install it. Regulations (EU) 2019/947 and 2019/945 apply in all member states of the European Union, but national implementing rules differ from country to country – registration portals, minimum pilot age, geographical zones, mandatory insurance, permitted frequency bands and maximum transmit power. The information in this chapter describes the situation in the Czech Republic. If you operate the drone in another country, you must follow the regulations of the country in which you fly.

3.2 Operating a drone with this ESC

- A drone assembled from individual components has no C0–C4 class. In the open category it can be operated as a privately built UAS – in subcategory A1 with a maximum take-off mass below 250 g, otherwise in subcategory A3.
- If the drone has a camera, its operator must register (in the Czech Republic with the Civil Aviation Authority) and display the registration number on the drone.
- Observe the limits of the open category: height up to 120 m, visual line of sight, no flying over assemblies of people. When flying with FPV goggles, an observer next to the pilot is required.
- The user is responsible for setting the transmit power of the drone's radio equipment (video transmitter, receiver).

4. Installation

4.1 What else you need

- a frame with a 20 × 20 mm mounting pattern and a flight controller (FC) with a matching 4in1 ESC connector,
- four brushless motors suitable for the voltage of the chosen battery,
- a power lead with a battery connector and a low-ESR capacitor rated for the voltage of the battery used,
- a 3S to 8S Li-Po battery,
- a soldering iron, solder and flux, a multimeter and a smoke stopper,
- a computer with Betaflight Configurator and BLHeli_32 ESC configuration software.

4.2 Mounting in the frame

① Place the ESC in the frame so that the 8-pin connector faces the matching connector of the flight controller.

② The Φ 4 mm mounting holes are designed for M3 screws with rubber grommets (soft mounts) that dampen vibration.

③ No conductive part may get between the ESC and the carbon frame or between the ESC and the flight controller. Do not overtighten the screws; the board must not bend.

4.3 Connecting the motors

Solder the motor wires to the pad groups M1 to M4 as shown in section 2.4. Motor numbering must match the motor layout set in the flight controller (the *Motors* tab in Betaflight). The order of the three motor wires on the pads determines the direction of rotation; it can be changed later in the ESC settings without resoldering (section 5.3).

- Cut the wires to the required length, strip only as much as necessary and tin them before soldering.
- After soldering, check that adjacent pads do not touch and that no solder balls remain on the board.

4.4 Connecting the power

- Solder the power lead with the battery connector to the large pads **B+** (positive) and **B−** (negative). Choose the wire gauge according to the expected current.
- Solder a low-ESR capacitor as close as possible to the B+ and B− pads. It suppresses voltage spikes caused by rapid changes in motor speed. Observe the capacitor polarity and its rated voltage – it must be higher than the voltage of a fully charged battery.

- Use a multimeter to check that there is no short circuit between B+ and B−.

4.5 Connecting to the flight controller

Connect the ESC to the flight controller with an 8-wire cable with connectors. **Before connecting, compare the pin order** on the ESC (section 2.4) with the pin order on the flight controller. If they differ, re-pin the cable – connecting VCC or GND to a signal wire can destroy the flight controller.

※ Check in the flight controller documentation which voltage the VCC wire carries and whether the flight controller input can withstand the voltage of the battery used.

5. Setup

5.1 Connecting the battery for the first time

① Remove the propellers.

② Insert a smoke stopper between the battery and the drone.

③ Connect the battery. The motors beep briefly – the ESC has initialised. If the smoke stopper indicator stays lit or anything heats up, disconnect the battery immediately and check the wiring.

5.2 Betaflight settings

- On the *Configuration* tab, select the **DShot** ESC protocol (DShot150, 300 or 600 depending on the flight controller loop frequency; the ESC also supports DShot1200, MultiShot and OneShot).
- On the *Power & Battery* tab, set the *Amperage Meter* source to *Onboard ADC* and set the *Scale* to **70** as specified by the manufacturer. If the reported consumption does not match, fine-tune the value by comparing it with the capacity recharged into the battery.
- To use ESC telemetry, connect the TELE signal to a free RX input of a flight controller serial port and enable *ESC Sensor* for that port on the *Ports* tab (on some flight controllers this port is already dedicated – see their documentation).
- On the *Motors* tab, check the motor order: use the sliders to spin motors 1 to 4 one at a time (without propellers!) and check that the motor in the correct position spins.

5.3 Motor direction

The direction of each motor must match the diagram on the *Motors* tab in Betaflight. Change an incorrect direction in the BLHeli_32 ESC configuration software (parameter *Motor Direction*) – the ESCs are accessed through the flight controller (passthrough) via USB, with the battery connected. Alternatively, you can enable *Motor direction is reversed* in Betaflight (reverses all motors); the propellers must then be fitted accordingly.

5.4 ESC firmware

- The ESC comes with BLHeli_32 firmware installed. The current firmware file intended specifically for this ESC is listed on the *Firmware* tab of the manufacturer's product page at www.foxeer.com.
- Never flash firmware intended for another ESC. Incorrect firmware can permanently damage the ESC. Do not disconnect the battery or the USB cable while flashing firmware.

6. Operation

6.1 Pre-flight check

- Fit a **fully charged** battery (4.20 V/cell for Li-Po, 4.35 V/cell for LiHV).
- Check that the propellers are firmly tightened and that no wire can touch the propellers or motors.
- Check the motor and power solder joints and the ESC mounting.
- After connecting the battery, wait for the motors' initialisation beeps. The drone must remain disarmed until you are ready to take off.

6.2 Battery voltage

The ESC works with 3S to 8S batteries. End the flight no later than when the voltage drops to **3.5 V/cell**. Values for the individual configurations:

Battery	Full Li-Po	Full LiHV	End flight	Storage
3S	12.6 V	13.05 V	10.5 V	11.4 V
4S	16.8 V	17.4 V	14.0 V	15.2 V
5S	21.0 V	21.75 V	17.5 V	19.0 V
6S	25.2 V	26.1 V	21.0 V	22.8 V
7S	29.4 V	30.45 V	24.5 V	26.6 V
8S	33.6 V	34.8 V	28.0 V	30.4 V

Per cell: fully charged 4.20 V (Li-Po) / 4.35 V (LiHV), end flight 3.5 V, storage 3.8 V.

6.3 Load and temperature

- The stated continuous current of 60 A per channel is the manufacturer's value. Actual load capacity depends on cooling – the ESC needs airflow.
- Choose the combination of motors, propellers and battery voltage so that the motor current does not exceed the ESC's continuous current.
- Check the ESC temperature after flying. If the ESC is very hot after a normal flight, reduce the load (smaller propellers, lower voltage) or improve cooling.
- Operate the ESC only within the operating temperature range of −20 °C to +55 °C.

7. Maintenance and troubleshooting

7.1 Maintenance and storage

- After every flight, check the solder joints, wire insulation and the board for mechanical damage.
- Protect the ESC from water, moisture, dust and metal filings. Remove dirt with a dry brush.
- Store in a dry place at −20 °C to +70 °C, with no battery connected.

7.2 Troubleshooting

Problem	Possible cause and solution
Motors do not beep after connecting the battery	No power – check the connector and the B+ / B− solder joints. Check the connection to the flight controller.
A motor does not spin or stutters	Cold joint or short on the motor pads, faulty motor wire. Check the soldering and the motor winding resistance.
Motor spins the wrong way	Change the direction in the BLHeli_32 settings (section 5.3).
The wrong motor spins	Incorrect motor order – adjust the output mapping in the flight controller or resolder the motors.
Current reading is wrong	Check the scale of 70 and the *Onboard ADC* source on the *Power & Battery* tab.
ESC telemetry does not work	Check that TELE is connected to an RX input and that *ESC Sensor* is enabled on the *Ports* tab.
ESC overheats	Excessive load or insufficient cooling – see section 6.3.

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 (Foxeer Reaper F4 Slim Mini 60A BL32) is given in this manual and on the proof of purchase; the ESC board bears the manufacturer's print FOXEER and the marking 60A.

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.