FoldApe4

DarwinFPV · foldable 4" FPV drone
3S Analog ELRS BNF version



Read the entire manual and the safety instructions before first use. Keep it for future reference.

Importer: Rotorama, s.r.o. · www.rotorama.com

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1. Safety instructions

1.1 Before you start

The FoldApe4 is a foldable 4-inch FPV drone with spinning propellers, a Li-Po / Li-ion battery and radio transmitters. If handled improperly, it can cause personal injury, property damage or fire. Read this entire manual before your first flight and keep it for future reference.

- The drone is not a toy and is not intended for children.
- Do not fly under the influence of alcohol or medication, or when tired.
- Always operate the drone with regard to the safety of people, animals and property around you.
- Do not make any modifications to the drone that are not described in this manual or in the manufacturer's documentation.

1.2 Manufacturer's cautions

① The flight controller (FC) has an onboard SPI ExpressLRS 2.4 GHz receiver. It supports ExpressLRS 3.x TX modules.

② The 1504-3800KV motors support a **3S** battery at most. Never connect the battery with reversed polarity – otherwise it will burn the drone.

③ If the FC parameters are abnormal for any reason and the drone cannot be used normally, obtain the official parameter configuration from the Support page of the manufacturer's website www.darwinfpv.com.

④ After receiving the drone, first connect it to a computer running Betaflight Configurator and check that the gyroscope and accelerometer are detected and that the drone's attitude is displayed correctly.

⑤ On the *Motors* tab in Betaflight, increase the throttle to make sure that all four motors spin normally and in the correct direction. Only then install the propellers and make a test flight.

Be sure to remove the propellers whenever you operate the throttle in Betaflight – there is a risk of serious injury.

1.3 Spinning propellers and mechanical hazards

- Spinning propellers can cause cuts. Do not approach the drone while the battery is connected and the drone is armed (motors enabled).
- The propellers of this drone have no protective guard (duct).
- Connect the battery only just before the flight and disconnect it immediately after landing.
- Replace damaged or cracked propellers immediately.

1.4 Li-Po and Li-ion batteries

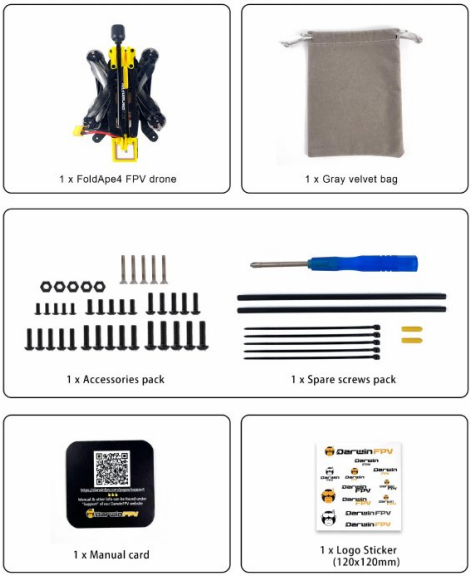
- Charge batteries only with a suitable balance charger, under supervision and on a non-flammable surface.
- Do not use swollen, damaged or overheated batteries.
- Do not short-circuit or puncture the battery and do not expose it to high temperatures or direct sunlight.
- After a crash, disconnect and inspect the battery. Do not use a damaged battery; hand it over for disposal (Chapter 8.3).
- Transport and store batteries in a fireproof bag.

1.5 Operating environment

- Fly only in good visibility and not in rain, snow or strong wind.
- Do not fly near people, animals, buildings, vehicles, power lines or airports.
- The drone is not waterproof. After landing in water or wet grass, disconnect the battery and let the drone dry thoroughly.
- Metal structures and strong sources of radio interference can affect reception of the control link, video and GPS.

2. Product description

2.1 Package contents



Package contents

- 1× FoldApe4 drone (Analog ELRS BNF version)
- 1× grey velvet pouch
- 1× accessory kit
- 1× spare screw kit
- 1× logo sticker (120 × 120 mm)
- 1× card with a link to the manufacturer's manual

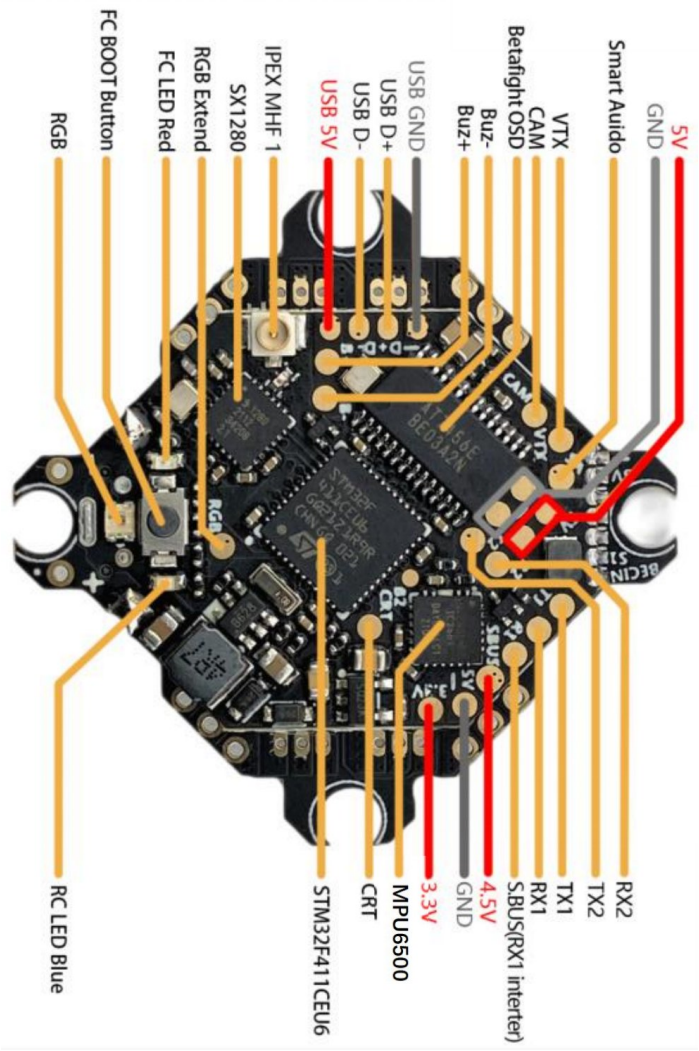
Not included: battery, charger, radio transmitter with an ExpressLRS TX module, FPV goggles or analog video receiver.

2.2 Specifications

Parameter	Value
Model	DarwinFPV FoldApe4 Analog ELRS BNF
Flight controller (FC)	DarwinFPV F411 15A ELRS AIO (STM32F411CEU6 processor, MPU6500 gyroscope)
Receiver	onboard SPI ExpressLRS 2.4 GHz (3.x)
FC firmware	Betaflight, target **DARWINF4SX1280HD**
GPS	DarwinFPV GM8
Motors	1504-3800KV
Propellers	Gemfan F4019-2 (clear grey)
Camera	Caddx Ant
Video transmitter (VTX)	DarwinFPV, analog 5.8 GHz, output power 25 / 200 / 400 / 600 mW
Frame	Wide X, folding arms
Wheelbase (diagonal)	168 mm
Arm thickness	4 mm
Dimensions without propellers	154 × 117 × 29 mm
Weight without battery	124.3 ± 5 g
Recommended battery	3S Li-Po 1150 mAh 60C (XT30), or 3S Li-ion 18650 3000 mAh
Flight time (manufacturer's data)	20 min with 3S 1150 mAh 60C; 30 min with 3S 18650 3000 mAh
Max. horizontal speed (manufacturer's data)	105 km/h

※ The flight time is the manufacturer's figure for calm flight. The actual flight time depends on flying style, wind, temperature and battery condition.

2.3 Flight controller wiring diagram

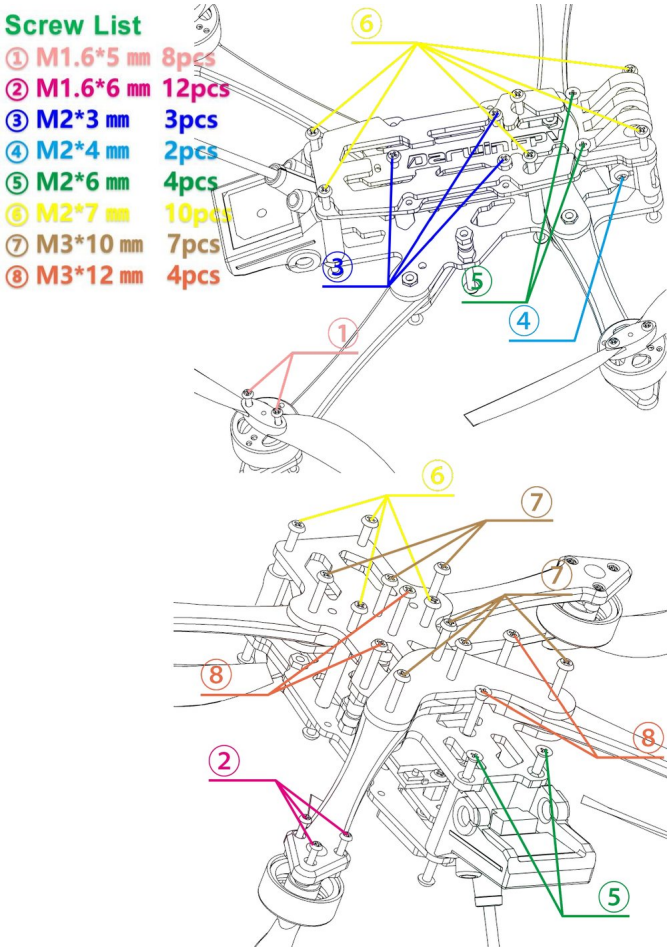


Wiring diagram of the DarwinFPV F411 AIO flight controller (labels as provided by the manufacturer)

The **FC BOOT Button** is used to enter DFU mode when updating the firmware (Chapter 5.6).

2.4 Screw list

The figure shows the location of the screws in the frame. Spare screws are included in the kit in the package.



Screw locations: ① M1.6×5 mm 8 pcs, ② M1.6×6 mm 12 pcs, ③ M2×3 mm 3 pcs, ④ M2×4 mm 2 pcs, ⑤ M2×6 mm 4 pcs, ⑥ M2×7 mm 10 pcs, ⑦ M3×10 mm 7 pcs, ⑧ M3×12 mm 4 pcs

3. Legal requirements for operation in the Czech Republic and the EU

3.1 The law of the country where you fly applies

Regulations (EU) 2019/947 and 2019/945 apply in all member states of the European Union, but the national implementing rules differ from country to country – registration portals, minimum pilot age, geographical zones, mandatory insurance, permitted frequency bands and maximum transmitter 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 Drone classification and operating categories

- The FoldApe4 drone **has no class identification label** C0–C4 under Regulation (EU) 2019/945.
- Regulation (EU) 2019/947 allows a drone without a class label to be operated in the open category only if it is a privately built UAS or a UAS placed on the market before 1 January 2024. For privately built UAS in subcategory A1, a maximum take-off mass below 250 g and a maximum speed below 19 m/s also apply; the manufacturer states a maximum speed of 105 km/h for this drone.
- The classification of a factory-assembled drone without a class label in the open category has not been clearly interpreted. Before your first flight, check the current interpretation with the Civil Aviation Authority of the Czech Republic (ÚCL, www.caa.gov.cz). A possible option is operation within a model aircraft club or association holding an authorisation under Article 16 of Regulation (EU) 2019/947, or operation in the specific category.
- Always verify the take-off mass (MTOM) by weighing the drone including the battery and all accessories. With an 18650 battery, the mass may exceed 250 g.

3.3 Operator registration and pilot competency

- The drone is equipped with a camera, so its operator must **register** regardless of the drone's mass (Article 14 of Regulation (EU) 2019/947). In the Czech Republic, registration is done on the ÚCL portal (portaldron.caa.gov.cz). The operator registration number must be displayed on the drone.
- The pilot must hold a competency appropriate to the operating category (e.g. the certificate for subcategories A1/A3 issued by ÚCL after online training and a test).

3.4 Operating limits and flying with FPV goggles

- The maximum flight height is 120 m above ground.
- The drone must be kept within visual line of sight (VLOS) throughout the flight.

- Flying over assemblies of people is prohibited. In subcategory A3, a distance of at least 150 m from residential, commercial, industrial and recreational areas must be kept.
- When flying with FPV goggles, an **unmanned aircraft observer** must stand next to the pilot and watch the drone directly with the naked eye, without optical aids.
- Respect geographical zones (airports, protected areas, prohibited areas). The current zone map is published by Air Navigation Services of the Czech Republic (ŘLP ČR).

3.5 Radio frequencies and transmitter power

The drone contains two radio transmitters. Device data according to the manufacturer and the limits applicable in the Czech Republic under the General Authorisation of the Czech Telecommunication Office (ČTÚ) No. VO-R/10/07.2021-8:

Device	Band	Power
ExpressLRS receiver (with telemetry)	2.4 GHz	max. power not stated by the manufacturer; limit in the Czech Republic 25 mW e.i.r.p. (2400–2483.5 MHz)
Video transmitter (VTX)	5.8 GHz	adjustable 25 / 200 / 400 / 600 mW; limit in the Czech Republic 25 mW e.i.r.p. (5725–5875 MHz)

In the Czech Republic, set the video transmitter power to 25 mW and use only channels in the 5725–5875 MHz band. Higher power and other frequencies may only be used with an individual licence. The user is responsible for the power and channel settings. Outside the Czech Republic, the limits of the respective country apply.

3.6 Privacy and insurance

- When recording and publishing footage, respect the privacy of others and the rules for personal data protection (GDPR).
- In the Czech Republic, liability insurance is mandatory, among others, in subcategory A2, in subcategory A3 above 4 kg and in the specific category. We recommend taking out insurance even where it is not mandatory.

4. Preparing for the first flight

4.1 What else you need

- a radio transmitter with an ExpressLRS 2.4 GHz 3.x TX module,
- analog FPV goggles or a monitor with a 5.8 GHz receiver,
- a 3S battery according to Chapter 4.3 and a suitable charger,
- a computer with Betaflight Configurator and a USB-C data cable.

4.2 Unfolding and locking the arms

The drone's arms fold for transport; the propellers do not need to be removed. After unfolding, the arms are locked with two screws (circled in the figure). Before each flight, always check that the arms are fully unfolded and the screws tightened – then the arms will not fold back even in a crash.



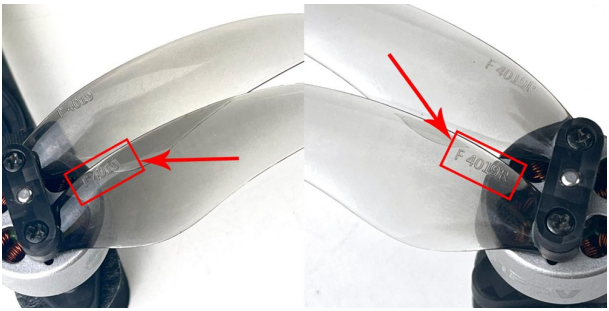
Left: arm locking screws (circled); right: drone in folded state

4.3 Choosing and connecting the battery

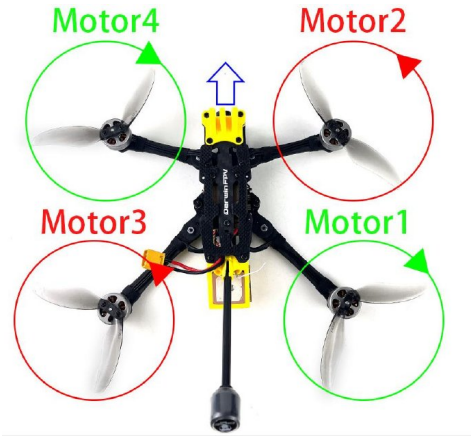
- The manufacturer recommends a **3S Li-Po 1150 mAh 60C** battery with an XT30 connector, or a **3S Li-ion 18650 3000 mAh** battery. Do not use a battery with more than 3S cells.
- Always insert a **fully charged** battery before flight: Li-Po 4.20 V/cell (12.6 V for 3S), LiHV 4.35 V/cell (13.05 V for 3S).
- Secure the battery firmly with a strap so that it cannot shift in flight and does not interfere with the propellers.
- Observe the correct connector polarity when connecting.

4.4 Propeller installation

Install the propellers with the words facing up. Install the two propellers marked **F4019** on motors No. 2 and No. 3, and the two propellers marked **F4019R** on motors No. 1 and No. 4.



The words on the propeller must face up



Correct propeller installation and motor rotation direction (arrow in the centre = forward flight direction)

5. Setup

5.1 Connecting to a computer

Connect the drone to a computer with a USB-C cable and launch Betaflight Configurator. Check that the gyroscope and accelerometer are detected and that the drone model on the *Setup* tab follows the tilt of the drone. Always keep the propellers removed while working with the drone connected to a computer.

5.2 Binding the ExpressLRS receiver

① Before binding, check that the firmware of the TX module and the receiver are consistent (ExpressLRS 3.x). If they are inconsistent, update the firmware of the TX module or the flight controller.

② Connect the drone to Betaflight Configurator and open the *Receiver* tab.

③ Click the *Bind Receiver* button in the lower right corner. The receiver status LED changes from slow flashing to double flashing – the receiver is in binding mode.

④ Start binding (Bind) on the TX module of your radio transmitter.

⑤ Once the LED turns solid, binding is successful. The receiver remembers the binding information and connects automatically next time; there is no need to re-bind.



RC LED Status	Receiver Mode
Blue Light Stays On	Paired
Blue Light Flashes Flashing	In Pairing Mode
Blue Light Slow Flashing	Not Paired

Bind Receiver button and receiver LED states according to the manufacturer

※ The manufacturer points out that binding mode on this drone cannot be entered by powering it on three times – use the *Bind Receiver* button.

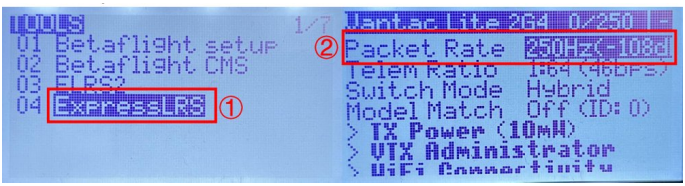
5.3 Receiver does not connect – packet rate

If, after binding, the receiver LED keeps flashing slowly and the receiver cannot connect to the transmitter normally, the packet rates of the TX module and the receiver are inconsistent. The SPI ExpressLRS receiver uses **250 Hz** by default. This can be solved in two ways:

▶ Method 1: modify the TX module packet rate

① On the radio transmitter, enter the ExpressLRS Lua script.

② Set *Packet Rate* to **250 Hz**.



ExpressLRS Lua script: ① ExpressLRS item, ② Packet Rate

▶ Method 2: modify the receiver packet rate in the Betaflight CLI

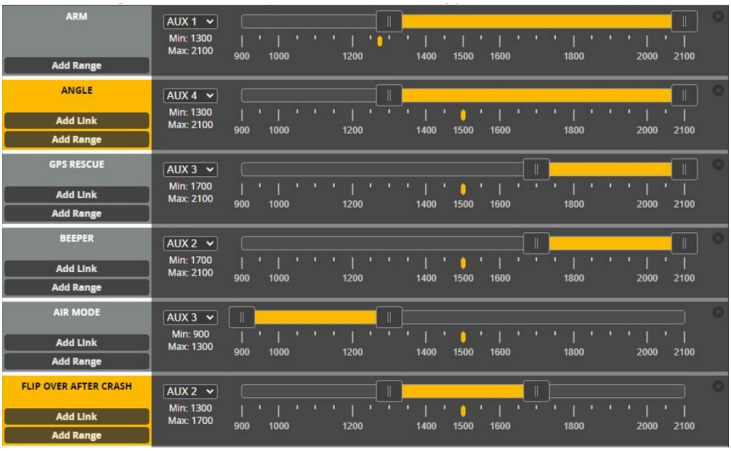
On the *CLI* tab, enter the command **set expresslrs_rate_index = [index]**, where the index corresponds to the packet rate:

Packet rate	Index
500 Hz	0
250 Hz	1
150 Hz	2
50 Hz	3

For example, to switch the packet rate to 150 Hz, enter **set expresslrs_rate_index = 2** followed by **save**.

5.4 Checking the transmitter switches

After successful binding, connect the drone to Betaflight and open the *Modes* tab. Toggle the function switches on the radio transmitter one by one: when the yellow cursor moves into the set range, the corresponding function is activated. The figure shows an example setup from the manufacturer's manual – always verify the actual channel assignment on your drone.

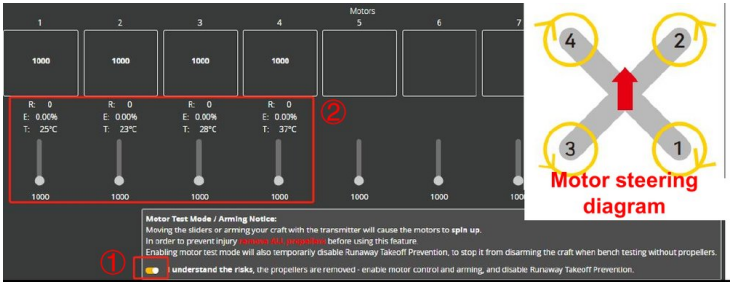


Modes tab – example assignment of the ARM, ANGLE, GPS RESCUE, BEEPER, AIR MODE and FLIP OVER AFTER CRASH functions

5.5 Checking motor direction

Open the *Motors* tab, turn on the *I understand the risks* switch ① and spin the motors one by one using the sliders ②. Check that the direction of rotation of each motor matches the motor direction diagram (figure in Chapter 4.4).

Be sure to remove all propellers before spinning the motors!



Motors tab: ① I understand the risks switch, ② motor sliders; on the right, the motor numbering diagram

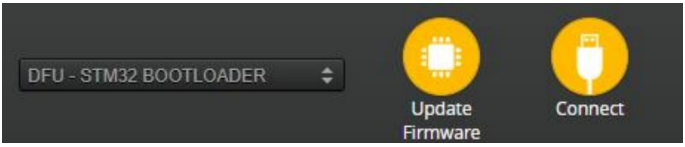
5.6 Flight controller firmware update

Before updating, back up your configuration (on the *CLI* tab with the **diff all** command) and remove the propellers.

▶ How to enter DFU mode

① Press and hold the **Boot** button and connect the drone to the computer with a USB-C cable. After the connection is successful, DFU is displayed in the port selection in Betaflight.

② Alternatively, connect the drone to Betaflight Configurator, open the *CLI* tab and enter the command **BL** (upper or lower case).



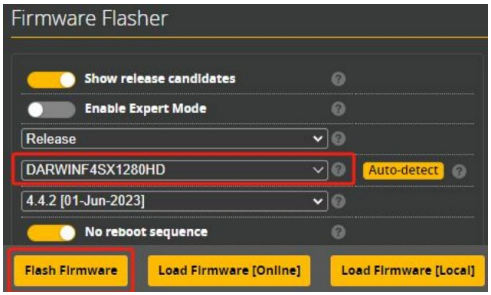
DFU port in Betaflight Configurator



BL command on the CLI tab

▶ Flashing the firmware

In DFU mode, open the *Firmware Flasher*, select the **DARWINF4SX1280HD** target and the firmware version, click *Load Firmware [Online]* and then *Flash Firmware*. Wait for flashing to complete. After successful flashing, the FC status LED lights up again and the drone can be connected to Betaflight Configurator. Then restore your configuration, or the official configuration from the manufacturer's support page.



Firmware Flasher – selecting the DARWINF4SX1280HD target and the Flash Firmware button

5.7 Further guides

For more information about the FC firmware, CLI, configuration files and the latest manuals, refer to the Support section of the manufacturer's website www.darwinfpv.com. For the ExpressLRS system and EdgeTX radio transmitters, see the official websites www.expresslrs.org and edgetx.org (QR codes below).

Left: edgetx.org, right: www.expresslrs.org

Links: edgetx.org · www.expresslrs.org

6. Flying

6.1 Pre-flight check

- The arms are fully unfolded and the locking screws are tightened.
- The propellers are undamaged, correctly placed (F4019 / F4019R) and firmly tightened.
- The battery is **fully charged** (Li-Po 4.20 V/cell, 12.6 V for 3S; LiHV 4.35 V/cell, 13.05 V for 3S) and firmly secured.
- The video transmitter antenna is connected – never power on the video transmitter without an antenna.
- The radio transmitter is switched on before the drone, the Arm switch is in the Disarm position and the throttle is at minimum.
- The video transmitter power and channel comply with the regulations (Chapter 3.5).
- There is sufficient GPS reception at the take-off site if you want to use GPS-based functions.

6.2 Arm, Disarm and failsafe

- **Arm** (motors enabled) and **Disarm** (motors disabled) are controlled by the switch assigned to the ARM function on the *Modes* tab.
- Disarm immediately after landing or a crash.
- Failsafe is the drone's response to loss of the radio signal. Set up and verify the behaviour on signal loss (motor stop or automatic return with GPS Rescue) on the *Failsafe* tab in Betaflight – always with the propellers removed.
- Do not rely on GPS Rescue (automatic return) as your only protection – it works only with sufficient GPS reception and correct configuration.

6.3 Monitoring voltage and ending the flight

- Monitor the battery voltage in the OSD during flight.
- End the flight at a voltage of **3.5 V/cell** at the latest (10.5 V for 3S Li-Po and LiHV).
- Do not discharge the battery below this value – this shortens its service life and may damage it.

7. Maintenance and troubleshooting

7.1 After each flight

- Disconnect the battery and let it cool down before charging.
- Check the propellers, arms, screws, antenna and cables. Tighten loose screws and replace damaged parts.
- Clean grass, dust and sand from the motors.

7.2 Storage

- Store batteries at **3.8 V/cell** (11.4 V for 3S) in a fireproof bag.
- Store the drone in a dry place, folded, in the supplied pouch.

7.3 Troubleshooting

Problem	Cause and solution
The receiver does not bind	Incompatible ExpressLRS firmware on the TX module and the receiver – update the firmware (Chapter 5.2).
The LED flashes slowly after binding	Different packet rates – set 250 Hz on the TX module or change the receiver packet rate (Chapter 5.3).
The drone does not arm	Throttle not at minimum, drone not stationary or ARM function not active. Betaflight shows the reason on the *Setup* tab.
The drone flips over on take-off	Incorrectly placed propellers or wrong motor direction – check Chapters 4.4 and 5.5.
FC parameters are corrupted	Load the official configuration from the manufacturer's support page, or re-flash the firmware (Chapter 5.6).
No video in the goggles	Different channels on the video transmitter and goggles, disconnected antenna or damaged camera cable.

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:** type designation FoldApe4 (variant Analog ELRS BNF); the flight controller firmware version is shown in Betaflight Configurator after connecting the drone to a computer.

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

9.1 Rights of the buyer under Czech law

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 manufacturer's warranty terms set out below (Chapter 9.2) **do not in any way limit** the buyer's rights arising from these regulations.

- 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.

9.2 Manufacturer's warranty terms

※ The following text is the manufacturer's original warranty statement.

If DarwinFPV determines that the problem is not covered by warranty, we will provide a discount for ordering new product replacement, and do not support free replacement.

Cases not supported by warranty:

- Drone crash or fire damage due to user operation error.
- Damage caused by incorrect soldering, improper installation and use.
- Damage caused by unauthorized modification of circuit and mismatch of battery and charger.
- Damage due to component aging or drone collision.