CineApe 25

DarwinFPV · 2.5" cinewhoop FPV drone
User manual · analog version with ExpressLRS 2.4 GHz receiver



Read this entire manual carefully before first use, especially chapters 1 and 3. The drone is not a toy and is not intended for children. Rotating propellers can cause serious injury.

Importer: Rotorama, s.r.o. · Okrajová 1351, 674 01 Třebíč · info@rotorama.cz · www.rotorama.com

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1. Safety instructions

1.1 Before you start

The DarwinFPV CineApe 25 is a powerful FPV drone whose motors spin at tens of thousands of revolutions per minute. It is not a toy. Improper handling can cause personal injury, property damage or fire.

- The drone is not a toy and is not intended for children. Inexperienced pilots should only fly under the supervision of an experienced person.
- Read the entire manual before your first flight and practise the controls on a simulator.
- Do not fly under the influence of alcohol, medication or other substances, when tired or when you do not feel well.
- Do not modify the drone in any way that would reduce its safety, and use only original or recommended spare parts.

1.2 Rotating propellers and mechanical hazards

- The propeller guards (ducts) reduce the risk of injury but **do not eliminate it**. Never reach into the propeller area while a battery is connected.
- Carry out all settings in Betaflight, especially motor tests, **always with the propellers removed**.
- Before connecting the battery, make sure the drone is disarmed and the Arm switch on the radio is off.
- Keep the drone away from faces, hair, loose clothing and pets.
- After a crash, disconnect the battery first and only then handle the drone.

1.3 LiPo batteries

- Use only **3S or 4S** LiPo batteries. A battery with more cells than 4S will destroy the drone.
- Observe correct polarity. **Reversing the battery polarity will destroy the drone.**
- Charge batteries only with a charger designed for LiPo, on a non-flammable surface and under supervision. Never leave charging unattended.
- A fully charged LiPo cell is at 4.20 V (4S = 16.8 V). End the flight at 3.5 V per cell at the latest (4S = 14.0 V). For storage, leave the battery at 3.8 V per cell (4S = 15.2 V).
- Stop using a damaged, swollen or overheated battery immediately and dispose of it according to local regulations.
- Never leave the battery in the drone after flying and never transport it connected.

1.4 Operating environment

- Fly only in open areas free of people, animals and obstacles, at a sufficient distance from buildings, power lines and roads.
- Do not fly in rain, snow, fog, strong wind or poor visibility.
- The manufacturer has treated the stack with glue to reduce the risk of damage from metal particles, sand, grass or dew. **The drone is nevertheless not waterproof** – do not land it in water or wet grass.
- Strong sources of radio interference (transmitters, Wi-Fi, other drones) may degrade both the control link and the video signal.

1.5 Important manufacturer cautions

① The drone only supports the use of 3–4S LiPo batteries. Do not connect batteries above 4S to avoid burning the drone.

② Must remember not to reverse the battery, otherwise it will burn the drone.

③ After receiving the drone, first connect it to the computer in the Betaflight software to check whether the gyroscope and accelerometer are detected and whether the gyroscope attitude is normal.

④ Increase the throttle in the Betaflight software to ensure the normal rotation and correct rotation direction of the 4 motors, and then install the propellers to test flight. **Be sure to remove the propellers** when pulling the throttle in Betaflight to avoid accidents.

After confirming the above precautions, you can install the propellers and start flying.

2. Product description

2.1 Overview

CineApe25 is DarwinFPV's first cinematic whoop FPV drone. The frame is composed of upper and lower carbon plates and a high-strength injection guard, which is very strong, crash-resistant and easy to disassemble. The motor adopts the 1504-3600KV long-life motor; instead of the traditional AIO solution, a split F4 + 30A stack is used to reduce future maintenance costs.

- Comes with a high-strength one-piece injection-moulded propeller guard, which offers higher safety and a stronger, more durable frame.
- The ducted aerodynamic design together with the 1504-3600KV motors gives the CineApe 25 a flight time of up to 9 minutes (manufacturer's figure).
- The stack is treated with glue, which greatly reduces the risk of damage from metal particles, fine sand and gravel, weeds or dewdrops.
- The external USB-C port is convenient for parameter adjustment.
- Quick-release design: only 7 screws need to be removed to separate the top plate and the injection-moulded guard.
- The stack has a built-in barometer and SD card slot and reserves rich interface resources for future upgrades and DIY.

2.2 In the box

1×	CineApe 25 cinematic FPV drone (analog version with ExpressLRS 2.4 GHz receiver)
4×	HQProp T63MMX6 propeller (2L2R)
2×	battery strap 10 × 170 mm
1×	EVA crashproof foam
1×	EVA bottom plate shock-absorbing pad (under the battery)
1×	spare screw kit
1×	sticker
1×	manufacturer's manual

According to the manufacturer, the spare screw kit contains: 5× M2×4, 20× M2×5, 15× M2×6, 15× M2×7, 5× M2×14 and 5× M2×18 (round-head hexagon socket screws), 7× 2×M12 aluminium pillar and 10× M2 nylon nut.

❊ Battery, charger, radio transmitter and FPV goggles are not included.

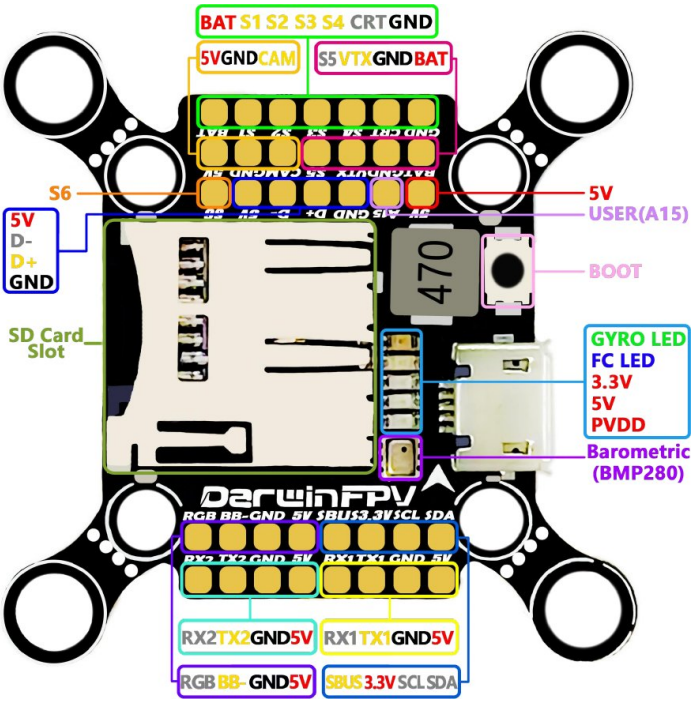
2.3 Specifications

Parameter	Value
Brand / model	DarwinFPV CineApe 25
Frame structure	True-X
Wheelbase	112 mm
Dimensions	160 × 160 × 43 mm
Flight controller (FC)	F411, MPU6500 gyro, AT7456E OSD, BMP280 barometer
Reserved FC connectors	1× SBUS (RX1 inverter), 2× UART (1, 2), 2× Soft serial, 1× I2C, 1× RGB, 1× buzzer, 1× USER (A15), 1× USB
ESC	30 A, 3–4S, BlueJay firmware
Camera	CADDX ANT (analog)
Video transmitter (VTX)	DarwinFPV, analog, 5.8 GHz, max. 600 mW
Receiver	ExpressLRS 2.4 GHz
Motors	1504-3600KV
Propellers	HQProp T63MMX6 (Duct T63MMX6 / Duct T63RMMX6)
Recommended battery	LiPo 4S 650–850 mAh
Supported input	LiPo 3–4S
Battery connector	XT60
Hovering time	approx. 9 min (4S 850 mAh battery)
Weight without battery	146 g
Weight with 4S 850 mAh battery	238 g
... and RunCam Thumb camera	250 g
... and 4K AIKUCAM NANO camera	311 g
FC firmware target	Betaflight, target DARWINF411

Data provided by the manufacturer. Flight time depends on the battery, flying style, camera weight and weather conditions.

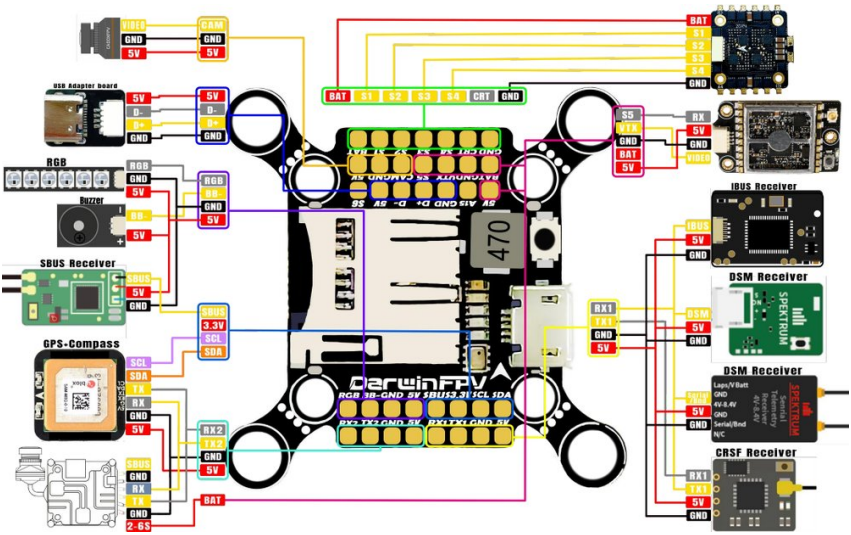
2.4 Flight controller (FC) and wiring

Layout of the solder pads, BOOT button, SD card slot and status LEDs on the flight controller:



DarwinFPV F411 flight controller – pads and components

Label	Meaning
BAT, S1–S4, CRT, GND	ESC connection: power, motor signals 1–4, current sensor, ground
5V GND CAM	camera power and video signal
S5 VTX GND BAT	video transmitter connection
RX1 TX1 / RX2 TX2	serial ports UART1 and UART2
SBUS	SBUS input (RX1 inverter)
SCL SDA	I2C bus (e.g. compass)
RGB, BB	LED strip, buzzer
USER (A15)	user output
BOOT	button for entering DFU mode
GYRO LED, FC LED	gyro and flight controller status LEDs



Manufacturer's wiring diagram – examples of connecting receivers, GPS, LED and buzzer

※ We supply the drone in the version with a built-in ExpressLRS receiver. No wiring changes (soldering) are required and they are not a product defect; damage caused by incorrect soldering is not covered by the manufacturer's warranty.

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 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 Drone classification and category of operation

- The drone **has no class identification label** C0–C4 under Regulation (EU) 2019/945.
- Drones without a class label may be operated in the open category in subcategory **A3**. For drones without a class label, subcategory A1 is reserved for privately built UAS with a maximum take-off mass (MTOM) below 250 g. Subcategory A2 is not available.
- According to the manufacturer, the drone weighs 238 g with a 4S 850 mAh battery and 250 g or more with an action camera. Always check the **actual take-off mass** in flight configuration by weighing.
- We do not give a binding assessment of the classification of a ready-made drone without a class label. If you are unsure, fly according to the rules of subcategory A3 or contact the Civil Aviation Authority (ÚCL).

3.3 Operator registration and pilot competency

- The drone is equipped with a camera, so its operator must **register** – regardless of the drone's weight. In the Czech Republic, registration is done with the ÚCL (dron.caa.gov.cz).
- The assigned operator registration number must be visibly displayed on the drone.
- The pilot must hold the appropriate competency for the open category (online training and test for subcategories A1/A3).

3.4 Operating limits of the open category

- Maximum flight height **120 m** above the ground.
- Flight within visual line of sight (VLOS) only – the pilot or an observer must see the drone at all times.
- No flying over assemblies of people.

- In subcategory A3: flight only in an area where no uninvolved persons are expected and at least **150 m** from residential, commercial, industrial and recreational areas.
- Respect geographical zones (airports, protected areas, military areas). The current zone map is available on the ÚCL website.

3.5 Flying with FPV goggles

When flying with FPV goggles, the pilot cannot see the drone directly. An **observer** must therefore stand next to the pilot, keep the drone in sight with the naked eye at all times, without optical aids, and warn the pilot of any danger in good time.

3.6 Radio frequencies and transmit power

The drone contains two radio devices:

Device	Band	Max. power according to the manufacturer
Video transmitter (VTX), analog	5.8 GHz	600 mW
ExpressLRS receiver (telemetry)	2.4 GHz	not stated

In the Czech Republic, operation without an individual licence is governed by the general authorisations of the Czech Telecommunication Office (ČTÚ):

Band	Limit	Regulation
2400–2483.5 MHz	25 mW e.i.r.p.	VO-R/10, Art. 3 (j)
5725–5875 MHz	25 mW e.i.r.p.	VO-R/10, Art. 3 (k)
5150–5250 MHz	indoors only; 5150–5170 MHz prohibited for UAS	VO-R/12, (b1)

※ The video transmitter can transmit at up to 600 mW. In the Czech Republic, without an individual ČTÚ licence, a maximum of 25 mW e.i.r.p. is permitted, and only on channels within 5725–5875 MHz. The user is responsible for the channel and power setting. Outside the Czech Republic, the limits of the respective country apply.

3.7 Personal data protection and insurance

- The drone’s camera may capture personal data. Do not film people without their consent and respect privacy and the GDPR rules.
- In the open category, liability insurance for a small drone is not mandatory in the Czech Republic. We nevertheless strongly recommend it.

4. Preparing for the first flight

4.1 What else you need

- A radio transmitter with an **ExpressLRS 2.4 GHz** transmitter module.
- FPV goggles or a monitor with an analog 5.8 GHz receiver.
- LiPo 4S 650–850 mAh batteries with an XT60 connector and a suitable charger.
- A computer with Betaflight Configurator and a USB-C data cable.
- A hex key for M2 screws and spare propellers.

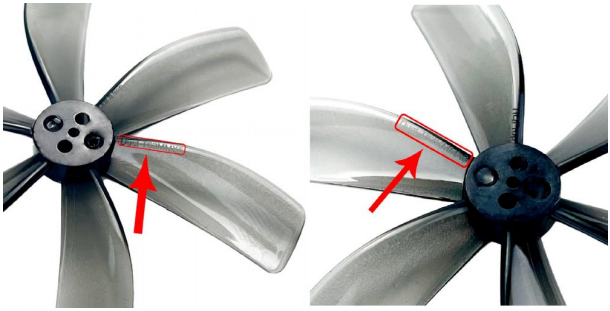
4.2 Choosing and connecting the battery

- The manufacturer recommends a **LiPo 4S 650–850 mAh** battery. The drone supports 3–4S batteries; never connect a battery above 4S.
- Always insert a **fully charged** battery before flying: 4.20 V per cell, 16.8 V in total for 4S.
- Place the battery on the EVA shock-absorbing pad on the bottom plate and secure it firmly with both straps. A loose battery may shift in flight and change the centre of gravity.
- Connect the XT60 connector – **observe correct polarity**. After connecting, leave the drone still on a level surface until the gyro has initialised.

4.3 Installing the propellers

DarwinFPV CineApe 25 adopts the **backward push design** (props out). When installing the propellers, be sure to pay attention to the installation method!

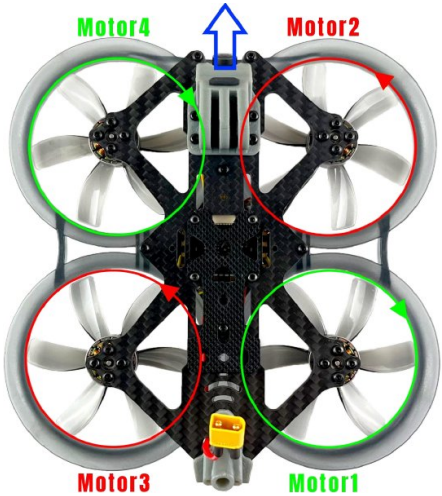
Step 1: Place the 4 propellers with the words facing up, as shown in the figure below:



Marking on the propeller blade (arrow)

Step 2:

- install the two propellers with the words Duct **T63MMX6** on the No. 2 and No. 3 motors respectively;
- install the two propellers with the words Duct **T63RMMX6** on the No. 1 and No. 4 motors respectively.



The correct propeller installation and motor rotation direction (blue arrow = flight direction)

❇ Propellers installed in the wrong direction will flip the drone immediately on take-off. Tighten the propeller screws gently to avoid damaging the thread.

5. Setup

5.1 Connecting to a computer and first check

① Remove the propellers.

② Connect the drone to the computer with a USB-C cable and click *Connect* in Betaflight Configurator.

③ On the *Setup* tab, check that the gyroscope and accelerometer are detected and that the 3D model follows the drone's tilt. If necessary, calibrate the accelerometer (*Calibrate Accelerometer*) on a level surface.

④ Connect the battery and spin up the motors one by one on the *Motors* tab. Check that all of them spin and in the direction shown in chapter 4.3.

⑤ On the *Receiver* tab, check that the stick movements correspond to the channels (after binding according to chapter 5.2).

5.2 Binding the ExpressLRS receiver

In the BNF version, the ExpressLRS 2.4 GHz receiver is connected to the flight controller at the factory. Before the first flight, you only need to bind it to your radio.

- The transmitter module and the receiver must have a **compatible ExpressLRS firmware version** (the same major version).
- The most reliable method is binding with a **binding phrase**: set the same phrase in the transmitter module and in the receiver (e.g. via the receiver's Wi-Fi web interface or ExpressLRS Configurator).
- Without a binding phrase, put the receiver into bind mode (with ExpressLRS usually by connecting and disconnecting power three times) and start *Bind* on the radio.
- After binding, check on the *Receiver* tab in Betaflight that all channels respond correctly and that loss of signal triggers failsafe.

For details, see the official ExpressLRS documentation (chapter 5.6).

5.3 Video transmitter (VTX) settings

- Before the first flight, set the channel and power of the video transmitter (usually in Betaflight or via the OSD menu) and select the same channel in your FPV goggles.
- In the Czech Republic, use only channels within 5725–5875 MHz and a power not exceeding 25 mW e.i.r.p. (chapter 3.6).
- Do not power the video transmitter without an antenna connected – it may be damaged.

5.4 Arm, Disarm and failsafe

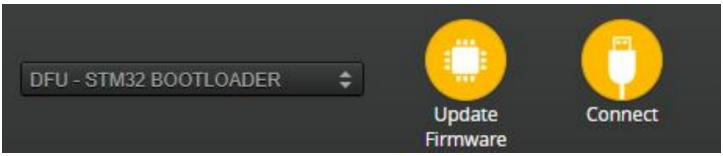
- Assign **Arm** (motors on) and **Disarm** (motors off) to a switch on your radio on the *Modes* tab in Betaflight. We recommend a two-position switch that cannot be flipped by accident.
- The drone will only arm when the throttle is at minimum and the drone is not tilted.
- On the *Failsafe* tab, set what the drone does when the signal is lost. For an FPV drone, we recommend stopping the motors immediately (*Drop*).
- Test the failsafe without propellers: the motors must stop when you switch off the radio.

5.5 DFU mode and firmware update

Before updating the firmware, save a backup of your settings (on the *CLI* tab with the *diff all* command). Configuration files and CLI for this drone are available in the support section of the manufacturer's website www.darwinfpv.com.

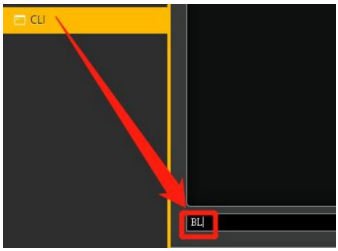
▶ How to enter DFU mode

① Press and hold the **Boot** button to connect to the computer to enter DFU mode; after the connection is successful, DFU will be displayed at the port of Betaflight.



Flight controller in DFU mode

② Connect to the computer by USB-C cable, open the Betaflight software, click the *Connect* button and open the *CLI* menu; entering **BL** in the menu bar can also enter DFU mode ("BL" can be uppercase or lowercase).



The BL command on the CLI tab

▶ Programming firmware

After entering DFU mode, select the **DARWINF411** target and the firmware version on the *Firmware Flasher* tab, load the firmware, then click *Flash Firmware* and wait for the programming to complete (*Programming: SUCCESSFUL* is displayed) before connecting to Betaflight again. After successful programming, the FC status indicator will light up again.

❊ Do not disconnect the drone while the firmware is being flashed. After the update, restore your settings from the backup and check the motor direction, receiver and failsafe again.

5.6 Further guides

Detailed guides for setting up ExpressLRS and EdgeTX are available on the official project websites:

ExpressLRS: www.expresslrs.org – binding, binding phrase, firmware update, power settings.

EdgeTX: www.edgetx.org – setting up a radio with EdgeTX firmware, models, switches.

6. Flying

6.1 Pre-flight check

- The battery is **fully charged** (4S = 16.8 V), undamaged and firmly secured with both straps.
- The propellers are undamaged, correctly installed (chapter 4.3) and tightened; the propeller guard is not cracked.
- All screws are tight, and the receiver and video transmitter antennas are in place.
- The radio is switched on, charged and the correct model is selected; the Arm switch is off.
- The image in the goggles is clear and the battery voltage is shown on the OSD.
- The observer is in place and there are no uninvolved persons in the flight area.

6.2 Take-off and basic control

① Place the drone on a level surface at least 3 m away from yourself and other people.

② Check that the throttle is at minimum and arm the drone.

③ Smoothly increase the throttle and climb to a safe height. First practise the controls in a gentle flight mode and at low height.

④ After landing, disarm immediately and only then disconnect the battery.

※ In a crash, disarm immediately. Otherwise blocked motors overheat and the motors and ESC may be damaged.

6.3 Monitoring voltage and ending the flight

- Monitor the battery voltage on the OSD. End the flight at **3.5 V per cell** at the latest (4S = 14.0 V) at rest.
- We recommend setting a low-voltage warning in Betaflight and, if desired, connecting a buzzer.
- Deep discharge shortens battery life and may damage the battery permanently.
- After the flight, let the motors and battery cool down before inserting another battery.

7. Maintenance and troubleshooting

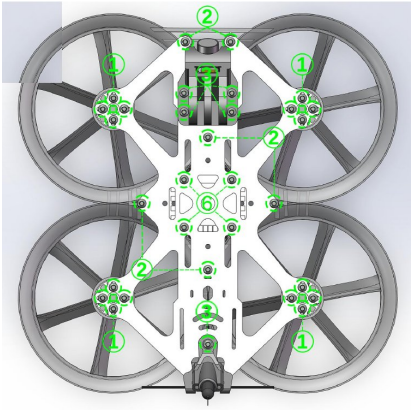
7.1 After every flight

- Disconnect the battery and check the propellers, propeller guard, motors and camera mount.
- Remove grass, hair and dirt from the motors; the motor must spin freely.
- Always replace cracked or bent propellers – even minor damage causes vibrations.

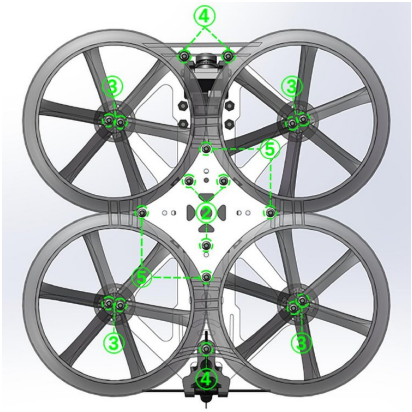
7.2 Screws and disassembly

Overview of the screws used in the drone (top and bottom view):

No.	Size	Use and quantity
①	M2 × 5	motor screws – 16 pcs
②	M2 × 6	VTX screws – 3 pcs; roof screws – 6 pcs
③	M2 × 7	propeller screws – 8 pcs; TPU parts screws – 5 pcs
④	M2 × 10	injection propeller guard screws – 3 pcs
⑤	M2 × 16	bottom plate screws – 4 pcs
⑥	M2 × 18	stack screws – 4 pcs



Screw positions – top view



Screw positions – bottom view

- The top plate can be separated from the propeller guard by removing 7 screws.
- Motor screws must not be longer than specified – a screw that is too long will damage the motor winding.

7.3 Storage

- Store the drone in a dry place at room temperature, out of direct sunlight and without a battery connected.
- Store batteries at **3.8 V per cell** (4S = 15.2 V) in a fireproof bag.

7.4 Troubleshooting

Problem	Possible cause and solution
The drone will not arm	Throttle not at minimum, drone tilted, no receiver signal or drone connected via USB. The cause is shown on the *Setup* tab in Betaflight (Arming Disable Flags).
The drone flips on take-off	Incorrectly installed propellers or wrong motor direction – see chapters 4.3 and 5.1.
The receiver will not bind	Different binding phrase or incompatible ExpressLRS versions in the transmitter and receiver – see chapter 5.2.
No video or noisy video	Different VTX and goggle channel, loose antenna, VTX in pit mode – check the VTX settings.
Strong vibrations, “jello” in the video	Damaged propeller, loose screw, dirt in a motor – replace the propeller and tighten the screws.
The FC does not communicate with the PC	Faulty or charge-only USB-C cable, missing drivers – use a data cable or enter DFU mode (chapter 5.5).

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 (DarwinFPV CineApe 25) is given on the product or 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

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.