ROTORAMA

Nanofly20 2S

2" carbon toothpick frame for 2S
User manual



Read this manual carefully before assembly and the first flight, and keep it for future reference.

www.rotorama.com

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1. Product description

1.1 Purpose

The **Sub250 Nanofly20 2S** is a carbon frame for building a small, lightweight toothpick-style FPV drone with 2-inch propellers, powered by a 2S battery. The manufacturer Sub250 derived it from the single-cell Nanofly20 frame and adapted it for outdoor flying: the main plate is thickened to 2 mm and the carbon plate at the motors protrudes beyond their edge, so the motors are better protected in a crash.

This version of the frame is intended for **analog video transmission** – the 3D-printed canopy holds a nano-size camera (14 mm) and a 3D-printed battery holder sits under the frame. The frame is supplied as a kit without electronics; you purchase and install the flight controller, motors, camera, video transmitter, receiver, propellers and battery yourself.



Sub250 Nanofly20 2S – analog version, without electronics

1.2 Specifications and package contents

Product designation	Sub250 Nanofly20 (2s), frame NF2S
Version	analog, 3D parts aqua green
Motor-to-motor diagonal	88 mm
Carbon thickness	2 mm
Propeller size	up to 2"
Recommended motors	size 1002 / 1102 and similar
Motor mounting holes	3 × M1.4 on a Ø 6.6 mm circle
AIO board mounting holes	25.5 × 25.5 mm
Camera	nano (14 × 14 mm)
Battery	2S (not included)

▶ **Package contents (according to the manufacturer)**

- 1× carbon bottom plate (frame) Sub250 Nanofly 20 2S
- 1× 3D-printed canopy for an analog camera
- 1× 3D-printed battery holder
- hardware kit: 4× M2×14 screw, 2× M2×3 screw, 1× M2×6 screw, 14× M1.4×3.5 screw, 1× self-clinching nut (bronze)
- 1× SUB250 card

※ NOT included: flight controller (AIO board), motors, camera, video transmitter, antenna, receiver, propellers, battery, charger, battery strap or tools.

2. Assembly and use

2.1 What else you need

- an AIO board (flight controller with integrated ESC, possibly also with receiver and VTX) with 25.5 × 25.5 mm mounting hole spacing,
- 4 motors of size 1002 / 1102 or similar with 3 × M1.4 mounting, suitable for 2S power,
- a nano-size analog camera (14 mm), a video transmitter (if not on the AIO board) with antenna,
- a receiver compatible with your radio (if not on the AIO board),
- propellers up to 2" for the shaft diameter of your motors,
- a 2S Li-Po / LiHV battery that fits the battery holder, and a suitable charger,
- tools: hex / Phillips screwdrivers for M1.4 and M2 screws, a fine soldering iron, flux, solder, heat-shrink tubing, cable ties.

2.2 Assembly procedure

① Before building, lay out the parts and check that the package is complete and the carbon plate is undamaged. You can lightly chamfer sharp carbon edges with wet sandpaper (do not inhale carbon dust).

② **Motors:** screw the motors to the ends of the arms using the M1.4×3.5 screws from the kit. Before tightening, make sure the screw does not touch the motor windings – a screw that is too long will damage the windings and cause a short circuit. Tighten gently; the threads in small motors are delicate.

③ **AIO board:** mount the board on the 25.5 × 25.5 mm holes in the centre of the frame using the supplied hardware. The arrow on the board must point forward (towards the camera). Neither the board nor its components may touch the carbon – carbon is electrically conductive.

④ **Motor wiring:** shorten the motor wires to the required length and solder them to the ESC according to the AIO board manufacturer's diagram. Route the wires

so that they cannot come into contact with the propellers.

⑤ **Camera and VTX:** insert the nano camera into the canopy, set the tilt and connect it according to the AIO board diagram. Secure the VTX antenna so that it does not reach into the propellers.

⑥ **Canopy:** fit the 3D-printed canopy and screw it on with screws from the kit. Cables inside must not be pinched.

⑦ **Battery holder:** mount the 3D-printed battery holder on the underside of the frame. Secure the battery in it against falling out (e.g. with a strap).

⑧ Do **not** fit the propellers yet. First complete the setup described in Chapter 2.3.

※ The manufacturer does not specify where each screw from the kit goes. Always match the screw length to the specific parts you install in the frame.

2.3 Setup and first flight

- Connect the flight controller to a computer and configure it in the configuration software (typically Betaflight) according to the AIO board manufacturer's instructions: board orientation, motor direction, receiver, OSD, Arm (motors on), Disarm (motors off) and failsafe.
- Check the motor direction and motor order **without propellers**.
- When connecting the battery for the first time, use short-circuit protection (smoke stopper) and check that nothing is getting hot.
- Fit the propellers in the correct direction of rotation only after a successful check.
- Before every flight, insert a **fully charged** battery: Li-Po 4.20 V/cell (8.40 V for 2S), LiHV 4.35 V/cell (8.70 V for 2S).
- End the flight no later than when the voltage drops to 3.5 V/cell (7.0 V for 2S). Store a battery that you will not use for a longer time at 3.8 V/cell (7.6 V for 2S).

3. Safety, maintenance and operation

3.1 Safety instructions

- The frame is intended for building an FPV drone by an experienced user. The product is not a toy and must be kept away from children.
- Spinning propellers can cause serious injury. Always remove the propellers when working on the drone with a battery connected.
- Sanding and drilling carbon produces dust that irritates the skin and respiratory tract. Work wet and use a respirator and gloves.
- Carbon is electrically conductive – electronics and bare wires must not touch it.
- Charge Li-Po and LiHV batteries under supervision, on a non-flammable surface and with a charger designed for the cell type. Do not use a damaged, swollen or punctured battery.

- 3D-printed parts may soften and deform at high temperatures (e.g. in a car in the sun).

3.2 Maintenance and inspection

- After every flight, and especially after a crash, check the carbon plate for cracks or delamination (separation of layers). Replace a cracked frame – it may fail in flight.
- Check that the screws of the motors, AIO board and canopy are tight.
- Inspect the 3D-printed parts – replace a cracked canopy or battery holder so that the camera and battery cannot come loose in flight.
- Spare parts (bottom plate, battery holder, screw kit) are offered separately by the manufacturer.

3.3 Legal requirements for operation

Regulations (EU) 2019/947 and 2019/945 apply in all EU member states, 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.

- A drone built on this frame is a privately built unmanned aircraft system without a class label. If its actual take-off mass including the battery does not exceed 250 g, it can be operated in subcategory A1, otherwise in A3. Therefore weigh the finished drone.
- A drone with a camera requires **operator registration** regardless of its mass; the registration number must be visibly displayed on the drone (in the Czech Republic with the Civil Aviation Authority).
- Observe the limits of the open category: maximum height 120 m, flight within visual line of sight (VLOS), no flying over assemblies of people. When flying with FPV goggles, an observer must stand next to the pilot.
- The video transmitter and radio system may only operate in permitted frequency bands and at permitted power. The user is responsible for the settings.

4. Information for the EU and Czech market

4.1 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

4.2 Disposal

The frame contains no electronics or batteries and **is not electrical equipment**. At the end of its service life, dispose of it according to the waste sorting rules applicable where you live – typically at a municipal collection yard. Do not burn the carbon plates or leave them in nature; dispose of the 3D-printed plastic parts as plastic or mixed waste according to local rules.

The electronics, motors and batteries you install in the frame are separate products and must be disposed of according to the instructions in their manuals – electrical equipment and batteries **must not** be placed in mixed municipal waste.

5. Warranty and rights in case of defects

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 4.1.
- 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.