XING NANO 0803 22000KV

iFlight

Brushless motor for 1S Tiny Whoops and toothpicks



Read this entire manual carefully before installation and first start-up. A spinning propeller can cause injury.

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1. Safety instructions

1.1 Before you start

- The motor is a component for building and repairing small FPV drones. Installation and start-up require basic knowledge of electronics and of configuring the flight controller (FC) and the electronic speed controller (ESC).
- This product is not a toy. Keep it away from children and from persons who are not familiar with the operation of FPV equipment. Small parts (screws) can be swallowed.
- Use the motor only with a suitable speed controller, propeller and power supply (see chapters 2.3 and 2.5).
- Drone operation is governed by the regulations of the country in which you fly. Regulation (EU) 2019/947 applies in the EU, but national implementing rules differ from state to state. **The law of the country in which the product is operated always prevails.**

1.2 Rotating parts and propellers

- The motor reaches very high speeds. A spinning propeller can cause injury, especially to the eyes, and damage property.
- Carry out all motor tests after installation, configuration on the computer and checks of the direction of rotation **without propellers**.
- Fit the propeller only shortly before the flight and only with the battery disconnected.
- Keep fingers, tools and cables away from the spinning bell and never stop it by hand.
- Replace a damaged, cracked or bent propeller immediately. Do not use the motor with a bent shaft.

1.3 Power supply, temperature and batteries

- Never connect the motor directly to a battery – always only via a speed controller (ESC).
- The speed controller must be rated for the currents the motor draws with the given propeller (for performance data see chapter 2.5).
- The motor gets warm during operation. After the flight do not touch the bell or the stator until they have cooled down.
- Charge Li-Po and LiHV batteries only with a suitable charger and under supervision. A fully charged Li-Po cell has 4.20 V, a LiHV cell 4.35 V. End the flight at 3.5 V per cell at the latest; set 3.8 V per cell for storage.
- Do not continue to use a damaged, swollen or overheated battery.

2. Product description

2.1 What the motor is for

The iFlight XING NANO 0803 22000KV is a small brushless motor for single-cell (1S) drones – 65 mm and 75 mm Tiny Whoops and small toothpicks with propellers of 31–40 mm (1.2–1.6") diameter.

The motor has a segmented bell, N52H magnets, NSK bearings and a single-strand copper winding. It is fitted with a 30 mm lead terminated with an SH1.25 connector for easy connection to the flight controller. A direction-of-rotation mark is laser-engraved on the motor; it only serves as an aid when fitting the propellers – the motor can spin in both directions (see chapter 3.4).



iFlight XING NANO 0803 (illustrative photo)

2.2 Package contents

Qty	Item
1	XING NANO 0803 22000KV motor with lead and connector
4	M1.4 × 3 mm screw for mounting the motor

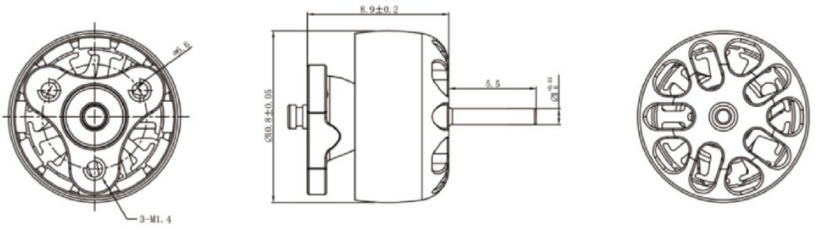
※ Not included: propellers, flight controller (FC), speed controller (ESC), frame and battery.

2.3 Specifications

Parameter	Value
Model	XING NANO 0803 22000KV
KV	22000 KV
Power supply	1S (manufacturer's test at 4.0 V)
Weight (incl. lead)	2.1 g
Dimensions	φ 10.8 × 14.4 mm (incl. shaft)
Interphase resistance	58 mΩ
Peak current	5.81 A
Max. power	23.2 W
Mounting holes	3 × M1.4 on a φ 6.6 mm pitch circle
Rotor design	segmented bell
Shaft diameter	1.0 mm
Shaft protruding length	5.5 mm
Lead	30 mm, 30 AWG, SH1.25 connector
Magnets	N52H, curved
Configuration	9N12P
Bearings	NSK
Winding	single-strand copper wire

Data provided by the manufacturer iFlight for the 22000KV version.

2.4 Dimensions and mounting holes



Dimensional drawing (mm): left – base with three M1.4 holes on a φ 6.6 mm pitch circle, centre – side view, right – top view of the bell. Manufacturer's drawing.

The height of the motor body (without shaft) is 8.9 ± 0.2 mm, the bell diameter is 10.8 mm. The 1 mm shaft protrudes 5.5 mm above the bell.

2.5 Manufacturer's performance data

The manufacturer tested the motor with two propellers at a supply voltage of 4.0 V. The values help you choose the speed controller, battery and propeller; in actual flight they vary with the propeller, battery voltage and temperature.

Propeller	Throttle (%)	Current (A)	Thrust (g)	Power (W)	Efficiency (g/W)
GF 40 mm	50	2.71	23.0	10.8	2.122
	60	3.26	27.1	13.0	2.078
	70	3.81	31.2	15.2	2.047
	80	4.2	35.8	16.8	2.131
	90	4.77	39.1	19.1	2.049
	100	5.81	46.6	23.2	2.005
GF 1220	50	2.44	12.4	9.8	1.265
	60	2.96	16.4	11.8	1.382
	70	3.38	20.1	13.5	1.487
	80	3.78	23.6	15.1	1.562
	90	4.15	26.8	16.6	1.614
	100	4.91	31.7	19.6	1.614

Motor temperature measured by the manufacturer after the test: 55 °C with the GF 40 mm propeller, 42 °C with the GF 1220 propeller.

❉ At full throttle the motor draws up to 5.81 A according to the manufacturer's measurement. Choose the speed controller and battery with a sufficient margin.

3. Installation

3.1 What else you need

- a drone frame with mounting holes for 0803 size motors (3 × M1.4 on a φ 6.6 mm pitch circle) and propellers with a 1 mm shaft hole,
- a flight controller (FC) with speed controllers (ESC) and SH1.25 motor connectors; if you remove the connector, also a soldering iron, solder and heat-shrink tubing,
- a screwdriver for M1.4 screws,
- a computer with the configuration software for the flight controller and the speed controllers.

3.2 Mounting the motor on the frame

① Place the motor on the frame arm so that the holes in the base line up with the holes in the frame. Route the lead towards the centre of the drone.

② Fasten the motor with the supplied M1.4 × 3 mm screws. Depending on the arm thickness, screws of a different length may be required.

③ Tighten the screws gradually and with care. Small M1.4 screws are easily overtightened and the thread in the base can be damaged.

④ After tightening, turn the bell by hand. It must rotate freely, without rubbing and without unusual noise.



Motor base – the mounting holes lie directly above the stator winding.

※ A screw that is too long will reach the stator winding and cause a short circuit that can destroy the motor and the speed controller. After tightening, the screw must not reach into the motor.

3.3 Connecting to the flight controller and speed controller

- The motor has three phase wires terminated with an SH1.25 connector. Plug the connector into the matching socket for that motor on the flight controller or speed controller. Do not force the connector and do not pull on the lead.
- If your board has no motor sockets, cut off the connector and solder the wires to the pads for that motor. The wire order only affects the direction of rotation.
- When soldering, check that no joint bridges adjacent pads and that the wire insulation is intact. A cold joint can fail in flight.
- Route and secure the lead so that it cannot get into the propeller and does not rub against the frame.

3.4 Direction of rotation

The motor has no fixed direction of rotation; it is set by the speed controller. According to the manufacturer, the laser-engraved direction mark on the motor is only an aid for fitting the propeller correctly – motors with either marking are electrically identical and can spin in both directions.

The required direction for each motor position is shown in the flight controller configuration software (e.g. Betaflight). If it is reversed, change it in the speed controller or flight controller configuration software (recommended); with soldered wires you can alternatively swap any two of the three phase wires.

4. Start-up

4.1 Test without propeller

During all tests in this chapter the propellers must be removed.

① Connect the battery (we recommend using a short-circuit protection device, a so-called smoke stopper) and connect the drone to the computer.

② In the flight controller configuration software, spin up each motor in turn at low speed and check that the correct motor spins in the correct direction.

③ The motor must start smoothly, without stuttering and without unusual noise.

④ After a short run, disconnect the battery and check by hand that neither the motor nor the speed controller is excessively warm.

4.2 Fitting the propeller

① Disconnect the battery.

② Fit a propeller with a 1 mm shaft hole on the shaft so that its direction matches the direction of rotation of the motor (the leading edge of the blade moves in the direction of rotation). The mark on the motor helps you.

③ Hold the propeller at its hub and press it straight onto the shaft; support the bell from below so that you do not overload the bearings.

④ Check that the propeller sits straight and firmly and does not wobble when turned by hand.

5. Operation

5.1 Pre-flight check

- Motor screws are tight, propellers sit firmly on the shafts.
- The bell rotates freely, without play or rubbing; the shaft is not bent.
- Propellers are undamaged and correctly oriented.
- Motor leads are not chafed, connectors are plugged in and the leads do not obstruct the propeller.
- Insert a fully charged battery into the drone (1S Li-Po 4.20 V, 1S LiHV 4.35 V).

5.2 Motor load and temperature

- A larger propeller, higher pitch or higher voltage increases the motor current and temperature. Use the manufacturer's data in chapter 2.5 as a guide.
- Check the motor temperature after the first flights. If after landing the motor is too hot to keep your hand on it, it is overloaded – choose a smaller propeller, adjust the control settings or shorten aggressive manoeuvres.
- Overheating damages the winding insulation and weakens the magnets; the consequences of overloading are not a product defect.
- End the flight at 3.5 V per cell at the latest (1S: 3.5 V).
- After a crash or a fall, check the motor according to chapter 6.1 before the next flight.

6. Maintenance

6.1 After every flight

- Remove dust, hair, grass and sand from the motor. No dirt, especially metal filings, may remain between the magnets and the stator.
- Turn the bell by hand – rubbing or grinding indicates dirt or a damaged bearing.
- Check that the motor screws are tight, the propeller is seated properly and the lead and connector are in good condition.
- After a crash, check whether the shaft is bent: spin the motor without a propeller and watch for vibrations.

6.2 Bearings, shaft and bell

- A worn bearing shows itself by noise, play and increased vibration.
- Do not apply oils or greases to the motor and do not use compressed air containing dirt or moisture.
- When disassembling, do not damage the stator winding and beware of the strong magnets that attract metal objects.

6.3 Storage

- Store in a dry, dust-free place out of the reach of children.
- Protect the motor from moisture, which causes corrosion of the bearings and magnets.
- Store batteries separately, charged to a storage voltage of 3.8 V per cell.

7. Troubleshooting

Problem	Possible cause and solution
The motor does not start, only twitches or beeps	Loose connector, cold solder joint, broken phase wire – check the connector and the joints. Check the protocol and output settings in the flight controller.
The motor spins in the wrong direction	Change the direction in the configuration software of the speed controller or flight controller (chapter 3.4).
The bell rubs or turns stiffly	Dirt between the magnets and the stator, mounting screw too long, damaged bearing. Remove the dirt, use shorter screws.
Strong vibration or noise	Damaged or unbalanced propeller, bent shaft, loose propeller or motor screws, worn bearings.
The motor overheats	Propeller too large, control settings too aggressive, cold solder joint, damaged bearing. See chapter 5.2.
Burning smell, smoke	Short circuit in the winding or on the speed controller. Disconnect the battery immediately and do not use the motor any further.

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 (XING NANO 0803, 22000KV) is marked on the motor bell.

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.