AOS Supernova 2207

1980KV brushless motor for 5-inch FPV drones
User manual



Read the safety instructions before installation and first start-up. Always test the motors without propellers.

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1. Safety instructions

1.1 Before you start

This manual describes the AOS Supernova 2207-1980KV brushless motor. The motor is a component intended for installation in a multicopter (FPV drone); on its own it is not a functional product. Read this manual carefully before installation and first start-up and keep it for future reference.

- This product is not a toy. It is not intended for children or for persons who are not familiar with building and operating FPV drones.
- Carry out installation and wiring only with the flight battery disconnected.
- Operate a drone fitted with this motor in accordance with the regulations on unmanned aircraft. The regulations of the country in which the product is operated always prevail.

1.2 Rotating parts and mechanical hazards

- A motor with a propeller reaches very high speeds. A spinning propeller can cause serious cuts and damage property.
- When testing motors, configuring and tuning on the bench, **always remove the propellers**.
- Before connecting the battery, make sure the drone is in the Disarm state (motors off) and that nobody is within reach of the propellers.
- Do not touch the spinning motor bell. Do not insert fingers or objects into the motor.
- The magnets in the motor bell are strong. Keep the motor away from pacemakers, magnetic cards and sensitive instruments and protect it from small metal objects (filings, screws) that it could attract.

1.3 Electrical and thermal hazards

- Power the motor only through a suitable electronic speed controller (ESC). Never connect it directly to a battery or power supply.
- Observe the permitted number of cells given in chapter 2.3. A higher voltage may destroy both the motor and the ESC.
- The motor heats up during operation. Do not touch it after a flight until it has cooled down.
- When soldering, work safely: use a non-flammable mat, a ventilated area and eye protection.
- In the event of a short circuit, smoke or a burning smell, disconnect the battery immediately and stop using the motor.

2. Product description

2.1 Intended use

The AOS Supernova 2207-1980KV is a brushless motor for 5-inch FPV drones, intended for both freestyle and racing. It was designed by AOS RC (Chris Rosser) with the aim of achieving the highest possible power, torque and efficiency at a motor weight of 31 g; the motor is manufactured by RCinPower.

The motor bell and base are made of 7075 aluminium alloy; the bell is secured on the hollow shaft with an M3 screw. The motor uses bearings from Japan, N52H arc magnets and a single-strand winding with insulation heat-resistant up to 260 °C.

2.2 Package contents

- 1× AOS Supernova 2207-1980KV motor with propeller nut
- 1× set of screws and small mounting hardware



Motor and bag of mounting hardware (illustrative photo)

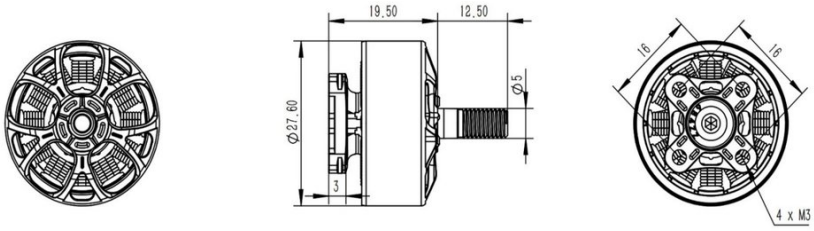
Not included: propellers, electronic speed controller (ESC), flight controller (FC), frame and battery.

2.3 Technical data

Type designation	AOS Supernova 2207-1980KV
KV	1980 rpm per 1 V
Configuration	12N14P (12 stator slots, 14 magnetic poles)
Dimensions (diameter × length)	Ø 27.6 × 19.5 mm
Shaft	Ø 4 mm, hollow
Propeller shaft section	Ø 5 mm, length 12.5 mm above the bell
Mounting	4× M3, 16 × 16 mm pattern
Weight	31 g (with wires cut to 2 cm)
Power supply	5–6S LiPo (via ESC)
Idle current	1.1 A at 10 V
Internal resistance	45 mΩ
Max. current (5S)	61 A
Max. continuous power (5S)	1456 W
Max. efficiency range	5–11 A, efficiency > 86 %
Magnets	N52H, arc
Bell and base material	7075 aluminium alloy
Design	AOS RC LTD, United Kingdom
Manufacturer	RCinPower, Floor 5, District A, Number 73 Xishan Road, Xishan Village, Sanxiang Town, Zhongshan City, Guangdong Province, China; info@rcinpower.com

Data according to the RCinPower datasheet and the AOS RC product page.

2.4 Dimensional drawing



Dimensions in mm: diameter 27.6, height 19.5, propeller shaft section Ø 5 × 12.5, mounting 4× M3 on a 16 mm pattern

2.5 Manufacturer's performance data

The manufacturer gives the following measurement results with selected 5-inch propellers. They are intended for indicative comparison; actual values depend on the propeller, ESC, battery condition and temperature.

Propeller	U (V)	Throt - tle	I (A)	Thrust (g)	Power (W)	Eff. (g/W)	Temp. [1]
GF5136R	21	50 %	10.0	839	210.0	3.995	76 °C
		100 %	49.6	2184	1041.6	2.097	
	24	50 %	11.9	1006	285.6	3.522	84 °C
		100 %	59.4	2521	1425.6	1.768	
GF51466R	21	50 %	10.1	861	212.1	4.059	76 °C
		100 %	51.0	2278	1071.0	2.127	
	24	50 %	12.1	1040	290.4	3.581	84 °C
		100 %	60.7	2547	1456.8	1.748	
HQ R36	21	50 %	9.4	811	197.4	4.108	69 °C
		100 %	44.7	2025	938.7	2.157	
	24	50 %	11.7	997	280.8	3.551	79 °C
		100 %	54.4	2236	1305.6	1.713	
HQ R38	21	50 %	9.8	806	205.8	3.916	75 °C
		100 %	47.2	1941	991.2	1.958	
	24	50 %	12.2	981	292.8	3.350	83 °C
		100 %	57.7	2279	1384.8	1.646	
DAL T5148.5	21	50 %	8.9	759	186.9	4.061	72 °C
		100 %	43.9	1967	921.9	2.134	
	24	50 %	10.4	920	249.6	3.686	80 °C
		100 %	54.3	2311	1303.2	1.773	

[1] Motor temperature at full load for 5 s. 21 V and 24 V are the voltages during the measurement.

3. Installation

3.1 What else you need

- a frame for 5-inch propellers with motor holes on a 16 × 16 mm pattern (M3),
- an electronic speed controller (ESC) rated for the motor current and for 5S or 6S voltage (see chapter 2.3),
- 5-inch propellers with a Ø 5 mm shaft hole,
- a soldering station, solder and flux, heat-shrink tubing,
- hex keys and a wrench for the propeller nut, medium-strength thread locker.

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 arm and the wires point towards the centre of the frame.

② Fasten the motor with four M3 screws from the set. Tighten the screws gradually in a cross pattern with reasonable force.

③ **Screw length is critical.** The screw may only engage the thread in the base – it must not touch the stator windings. A screw that is too long will damage the winding insulation and cause a short circuit. Choose the screw length according to the thickness of the frame arm.

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

⑤ You can secure the screws with medium-strength thread locker.

※ If the bell turns stiffly or rubs after tightening the screws, loosen them immediately and use shorter ones.

3.3 Connecting to the ESC

The motor has three phase wires. They are connected to the M1–M4 pads of the respective motor on the ESC; the order of the wires only determines the direction of rotation, which can later be changed in software (chapter 4.1).

- Shorten the wires to the required length so that they are not under tension and do not touch the propeller or sharp edges of the frame.
- Strip and tin the wire ends, and tin the ESC solder pads as well. Solder the joints quickly so that neither the insulation nor the ESC overheats.
- After soldering, check that no solder bridge has formed between adjacent pads.
- Route the wires along the arm and secure them (heat-shrink, tie) so that they cannot get into the propeller.

4. Configuration and first start-up

4.1 Direction of rotation

The direction of rotation of each motor must match the flight controller (FC) settings – in Betaflight this is the *Motor direction is reversed* option (props “out” / “in”). Check it on the *Motors* tab, **always without propellers**.

- If a motor spins the wrong way, change the direction in the ESC configuration software (e.g. BLHeli / Bluejay / AM32 – the *Motor Direction* option),
- or swap any two of the three motor phase wires.

4.2 Flight controller settings

- The motor has **14** magnetic poles. Enter this value in Betaflight on the *Motors* tab (*Motor poles*) so that RPM telemetry and the RPM filter work correctly.
- For the RPM filter, enable bidirectional DShot (*Bidirectional DShot*); the ESC must support it.
- Adjust filter and PID tuning to your own build.

4.3 Checking the motors without propellers

① Remove the propellers and place the drone on a stable surface.

② Connect the battery and confirm the warning on the *Motors* tab of Betaflight Configurator.

③ Use the slider to spin up each motor individually at low speed. Check the motor order and direction of rotation.

④ The motor must run smoothly, without stuttering, vibration or unusual noises.

4.4 Fitting the propeller

- Fit the propeller only after the motor check has been completed successfully and with the battery disconnected.
- Make sure the propeller direction (CW / CCW) matches the direction of rotation of the motor.
- Secure the propeller with the propeller nut; tighten it firmly but do not overtighten. Replace a damaged nut with a new one.
- Before every flight, check that the nut is tight and the propeller is undamaged.

5. Operation

5.1 Power supply

The motor is intended for builds powered by a **5S or 6S LiPo** battery. Always insert a fully charged battery before flight and observe these voltage values:

State	per cell	5S LiPo	6S LiPo
fully charged	4.20 V	21.0 V	25.2 V
end the flight	3.5 V	17.5 V	21.0 V
storage	3.8 V	19.0 V	22.8 V

5.2 Load and temperature

- Do not exceed the maximum current and power given in chapter 2.3. Large propellers with a high pitch considerably increase current draw and motor temperature.
- After the first flights, check the motor temperature. If the motors are very hot after a normal flight, the build is overloaded or poorly tuned – use a smaller propeller or adjust the settings.
- Let the motors cool down between demanding flights.
- Protect the motor from water, moisture, sand and dust.

6. Maintenance and storage

6.1 After every flight

- Check that the motor screws and the propeller nut are tight.
- Turn the bell by hand: it must rotate smoothly, without rubbing and without play.
- Remove grass, dust and small metal particles attracted by the magnets from the motor. Do not use water or solvents.
- Check the motor wires and their joints with the ESC.

6.2 After a crash

- Check whether the shaft is bent and the bell damaged. A bent shaft causes vibration; do not continue to use a motor with a bent shaft.
- Check that the winding is not mechanically damaged and the wires are not cut.
- If the motor turns stiffly or noisily after an impact, the bearings may be damaged.

6.3 Storage

Store the motor in a dry place at room temperature, away from direct sunlight and away from magnetically sensitive objects.

7. Troubleshooting

Problem	Possible cause and solution
Motor spins in the wrong direction	Change the direction in the ESC settings or swap two phase wires (chapter 4.1).
Motor stutters, whines or does not start	Cold solder joint or broken wire – check the soldering. Check the ESC and DShot protocol settings.
Bell rubs or turns stiffly	Mounting screw too long, dirt in the motor or damaged bearing. Loosen the screws, clean the motor.
Strong vibration	Damaged or unbalanced propeller, bent shaft, loose motor. Replace the propeller, check the shaft and screws.
Motor is very hot after flight	Overload (large propeller, high voltage), poor filter or PID tuning, vibration. Adjust the build and settings.
RPM telemetry shows nonsense	Wrong number of poles – set *Motor poles* to 14 (chapter 4.2).

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 (SUPERNOVA 2207-1980KV) 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.