R5 2207 Race 2050Kv

iFlight · brushless motor for racing FPV drones
User manual



Read this entire manual carefully before installation and first start, especially the safety instructions. The product is intended for persons aged 14 and over.

Rotorama, s.r.o. · www.rotorama.com · info@rotorama.cz

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1. Safety instructions

1.1 Before you start

- The motor is a part intended for installation in an FPV drone. It does not work on its own – it only operates together with an electronic speed controller (ESC), a flight controller (FC) and a battery.
- Installation requires experience with building drones and soldering. If you are not sure, have it done by an experienced person.
- The product is intended for persons aged 14 and over. Keep the screws and the nut out of the reach of small children.
- Read this entire manual before installation and keep it for future reference.

1.2 Rotating parts and propellers

- The motor bell and the propeller rotate at very high speed during operation. Never touch a running motor or propeller and do not get close to them.
- When working on the drone, configuring it or testing the motors on the bench, **always remove the propellers**.
- Arm (switching the motors on) only when there are no people, animals or obstacles near the drone.
- Do not continue to use a damaged propeller, a bent shaft or an otherwise damaged motor – replace them.

1.3 Power supply and batteries

- Never connect the motor directly to a battery. It is powered exclusively via an electronic speed controller (ESC).
- The manufacturer specifies an input voltage of **25.2 V**, which corresponds to a fully charged **6S LiPo** battery (6 × 4.20 V).
- A fully charged 6S LiHV battery has 26.1 V (6 × 4.35 V), which is more than the motor manufacturer specifies. Do not use 6S LiHV batteries with this motor.
- End the flight at the latest when the voltage drops to 3.5 V/cell (21.0 V for 6S). For storage, charge the battery to 3.8 V/cell (22.8 V for 6S).
- Disconnect the battery before soldering and before any work on the drone.

1.4 Temperature and overload

- The motor heats up during operation. After the flight, let it cool down first – risk of burns.
- A propeller that is too large or too heavy, damaged bearings or a blocked rotor lead to overload. Overheating damages the winding insulation and the magnets.
- The magnets in the motor attract metal particles. Do not place the motor in sand, metal filings or on a dusty workbench.

2. Product description

2.1 Package contents

- 1× iFlight R5 2207 2050Kv motor
- 4× M3 × 8 mm screw
- 1× M5 flanged nut

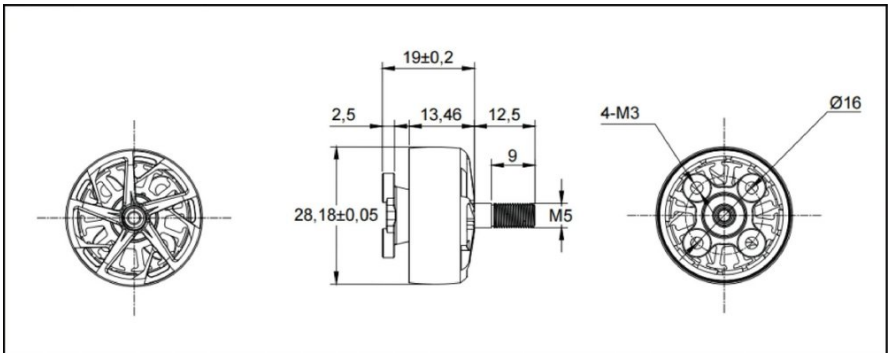
2.2 Parts description



Left: side view, right: view of the base.

① Ø 5 mm shaft with M5 thread for mounting the propeller
② Bell with magnets (rotor) – rotates together with the shaft and the propeller
③ Base with four M3 threaded holes for mounting to the frame
④ Stator with winding
⑤ Three phase wires, length 150 mm

2.3 Dimensions



Dimensions in mm according to the manufacturer's drawing. Left: view from the propeller side, centre: side view, right: base.

The shaft protrudes 12.5 mm from the bell, 9 mm of which is the M5 thread. The base has four M3 threaded holes on a Ø 16 mm pitch circle.

2.4 Technical data

Manufacturer	iFlight Intelligent Technology Ltd., F6, Building B2, Galaxy IMC, Beixin Road, No. 6, Zhongkai Avenue, Huizhou 516006, Guangdong, China; support@iflight.com
Type	R5 2207 Race 2050Kv
Size	2207
Kv	2050
Configuration	12N14P
Input voltage	25.2 V (6S LiPo)
Peak current	49.53 A
Maximum power	1166.4 W
Phase-to-phase resistance	56.3 mΩ
Weight	34.6 g (including wires)
Dimensions	Ø 28.2 × 31.5 mm
Mounting	4× M3 thread on a Ø 16 mm pitch circle
Shaft	Ø 5 mm, M5 thread, protruding length 12.5 mm
Magnets	N52H, curved arc, centre-slotted
Bearings	9 × 4 × 4 mm
Winding	single-strand copper wire
Wires	3×, length 150 mm, 20 AWG

2.5 Manufacturer's test data

The manufacturer tested the motor powered by a 6S battery with three different propellers. The values are indicative – actual thrust, current and temperature depend on the propeller, battery, speed controller and flight conditions.

Propeller	Throttle (%)	Voltage (V)	Current (A)	Thrust (g)	Power (W)	Efficiency (g/W)
Nazgul R5 V2	50	23.86	10.86	968	259.1	3.74
	60	23.8	19.1	1498	454.6	3.3
	70	23.75	25.52	1501	606.1	2.48
	80	23.68	36.34	1764	860.5	2.05
	90	23.61	42.39	1914	1000.8	1.91
	100	23.55	49.53	2068	1166.4	1.77
HQ R37	50	23.89	9.78	895	233.6	3.83
	60	23.84	15.32	1129	365.2	3.09
	70	23.8	23.59	1343	561.4	2.39
	80	23.72	35.86	1664	850.6	1.96
	90	23.64	43.85	1870	1036.6	1.8
	100	23.58	47.82	1923	1127.6	1.71
GF51466	50	23.84	9.96	977	237.4	4.11
	60	23.78	17.02	1338	404.7	3.31
	70	23.7	24.86	1481	589.2	2.51
	80	23.6	34.58	1783	816.1	2.18
	90	23.56	41.28	1928	972.6	1.98
	100	23.51	49.48	2108	1163.3	1.81

3. Motor installation

3.1 What else you need

- a drone frame with motor mounting holes at 16 mm spacing,
- an electronic speed controller (ESC) for 6S batteries, rated for the motor current with the chosen propeller,
- a flight controller (FC) and a 6S LiPo battery,
- propellers for a 5 mm shaft secured with an M5 nut,
- a soldering iron, solder, heat-shrink tubing, a hex key for M3 screws and a wrench for the M5 nut.

3.2 Mounting the motor to the frame

① Check the screw length. A screw may only reach into the base so far that, once tightened, it **does not touch the stator winding**. Use the supplied M3 × 8 mm screws only if their length suits the arm thickness of your frame.

② Place the motor on the arm so that the holes in the base line up with the holes in the arm, and screw in all four M3 screws.

③ Tighten the screws with care – the thread in the base is fine and will be damaged by overtightening.

④ Turn the bell by hand. It must rotate freely, without rubbing and without touching the screws or wires.

A screw that is too long will pierce the winding insulation and cause a short circuit. With a carbon frame, the short circuit can also pass to the frame – the speed controller may be destroyed.

3.3 Connecting to the speed controller (ESC)

- The motor has three phase wires. Solder them to the three pads of the speed controller intended for this motor. The wire order only determines the direction of rotation.
- Shorten the wires and route them along the arm, away from the propeller and sharp frame edges.
- Solder cleanly and quickly, without cold joints. Do not overheat the pads or the wires.
- After soldering, check that adjacent joints do not touch.

3.4 Direction of rotation

Each motor must rotate as required by the drone configuration (e.g. *Props In* or *Props Out*). To change the direction:

- swap any two phase wires, or
- set it in the ESC configuration software (e.g. BLHeli, Bluejay, AM32).

4. Propeller installation

4.1 Choosing a propeller

- The motor is intended for racing FPV drones on 6S batteries.
- The manufacturer tested the motor with Nazgul R5 V2, HQ R37 and GF51466 propellers (see Chapter 2.5).
- A larger or heavier propeller increases the current draw. The current of the speed controller and the motor may then exceed what they can withstand.
- After the first flights with a new propeller, check the motor temperature (Chapter 6.2).

4.2 Fitting and tightening the propeller

① Fit the propeller only after completing all settings and tests without propellers (Chapter 5).

② Place the propeller on the shaft so that its leading edge faces the direction of motor rotation. The propeller must sit flat over its entire surface.

③ Screw on the M5 nut with the flange towards the propeller and tighten it with a wrench. While tightening, hold the propeller or the motor bell, never the wires.

④ Tighten the nut firmly but do not overtighten it – the propeller hub or the shaft thread could be damaged.

A propeller mounted upside down or fitted on a motor with the opposite direction of rotation produces no thrust – the drone will flip over on take-off.

5. Commissioning

5.1 Check before connecting the battery for the first time

- The bell turns freely and evenly by hand, nothing squeaks or rubs.
- There are no metal particles or dirt between the magnets.
- The screws do not reach into the winding, the solder joints are clean and do not touch each other.
- The phase wires have no conductive connection to the frame – with a carbon frame, check this with a multimeter.

5.2 First start without propellers

- The propellers must be removed.
- When connecting the battery for the first time, we recommend using a current limiter (smoke stopper). It protects the speed controller in the event of a short circuit.
- In the flight controller configuration software (e.g. Betaflight, *Motors* tab), spin up each motor one at a time at low speed.
- Check that each motor runs smoothly, without stuttering or unusual noise, and that it rotates in the correct direction (Chapter 3.4).

5.3 Flight controller and speed controller settings

- The motor has a 12N14P configuration, i.e. **14 magnetic poles**. Enter this value in the flight controller as the number of motor poles (in Betaflight *Motor poles*). It is needed for correct RPM measurement, e.g. for the RPM filter.
- Make the other speed controller settings (protocol, timing) according to the manuals of the speed controller and the flight controller.

6. Operation

6.1 Before each flight

- Insert a **fully charged** 6S LiPo battery (25.2 V) into the drone.
- The motor screws are tight and the propeller nut is secure.
- The propeller is intact, without cracks or bent tips.
- The bell turns freely, the shaft is not bent, the wires are not damaged.

6.2 After the flight

- Disconnect the battery first and only then touch the motors.
- Carefully check the motor temperature. If a motor is too hot to touch, it is overloaded. Use a smaller or lighter propeller and check the flight controller settings and the condition of the bearings.
- After a crash, check the shaft, bell, bearings, screws and wires.

6.3 Drone operation and legal regulations

Operate a drone with this motor in accordance with the regulations on the operation of unmanned aircraft. Regulation (EU) 2019/947 applies in all member states of the European Union, but national implementing rules differ from country to country – operator registration, minimum pilot age, geographical zones, compulsory insurance, permitted frequency bands and transmit power. **The law of the country in which you operate the drone always applies.**

7. Maintenance and troubleshooting

7.1 Cleaning

- Remove dust and dirt with compressed air or a soft brush.
- Carefully remove metal particles caught on the magnets, e.g. with adhesive tape.
- Do not wash the motor with water or solvents.

7.2 Bearings and shaft

- Bearings are wear parts. Rough running, noise or play in the bell indicate wear or damage.
- Do not straighten a bent shaft. Do not continue to use a motor with a bent shaft or damaged bearings – it causes vibration and overheating.

7.3 Storage

Store the motor in a dry and clean place, protected from dust and metal particles.

7.4 Troubleshooting

Problem	Possible cause and solution
Motor does not spin, only beeps or twitches	Broken phase or cold solder joint – check the soldering. Incorrect speed controller settings – check the configuration.
Motor spins in the wrong direction	Swap two phase wires or change the direction in the speed controller settings (Chapter 3.4).
Motor rubs or squeaks	Dirt or a metal particle between the magnets, a screw reaching into the winding, damaged bearings.
Motor gets excessively hot	Propeller too large or too heavy, damaged bearings, unsuitable flight controller settings, damaged winding.
Vibration, jello in the video	Damaged propeller, bent shaft, loose motor screws or propeller nut.
Motor stops or stutters in flight	Cold solder joint, damaged wire insulation, unsuitable speed controller settings.

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

- The product is a component intended for installation in a model drone. It operates at safety extra-low voltage (max. 25.2 V DC) and therefore does not fall under Directive 2014/35/EU (low voltage).
- If the **CE** marking is shown on the product or its packaging, the manufacturer thereby declares conformity with the relevant European Union legislation. Responsibility for the electromagnetic compatibility of the assembled drone lies with the person who assembles it and puts it into service.
- **Product identification:** type designation R5 2207 Race 2050Kv; the size 2207 and the value 2050KV are 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.