DarwinFPV 1504 3600KV

Brushless motor for FPV drones
User manual



Read the safety instructions before installation. Fit the propellers only after checking the motors' direction of rotation.

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1. Safety instructions

1.1 Before you start

Thank you for choosing the DarwinFPV 1504 3600KV brushless motor. The motor is a component intended to be built into an FPV drone. Read this entire 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; installation and operation should only be carried out by persons experienced in building and flying FPV drones.
- Always carry out installation, soldering and configuration **without propellers fitted** and with the battery disconnected, unless the step explicitly requires power.
- Do not modify the motor in any way (do not drill the bell, rewind the windings or alter the shaft). Such modifications may cause a failure in flight and are not a product defect.

1.2 Rotating propellers and mechanical hazards

The motor reaches high speeds. A rotating propeller can cause serious cuts and damage objects nearby.

- Fit the propellers only after checking the direction of rotation and verifying the failsafe function on your radio transmitter.
- When the motors are running, stay out of the plane of rotation of the propellers and keep a safe distance from people and animals.
- Do not touch the rotating motor bell and do not stop it with your hand or any object.
- Replace a damaged propeller or a motor with a bent shaft immediately – vibration and imbalance can cause parts to come loose in flight.

1.3 Power supply and batteries

The motor is never connected directly to the battery – it is always powered via an electronic speed controller (ESC). The manufacturer specifies a rated voltage of 16 V, i.e. a **4S Li-Po** battery.

- A fully charged 4S Li-Po battery has a voltage of 16.8 V (4.20 V/cell). End the flight at 14.0 V (3.5 V/cell) at the latest. For storage, set the battery to 15.2 V (3.8 V/cell).
- Charge Li-Po batteries only under supervision, on a non-flammable surface and with a charger designed for this cell type.
- Do not use a swollen, punctured or otherwise damaged battery.

1.4 Temperature and operating environment

The motor heats up during operation. Do not touch it after a flight until it has cooled down. Do not overload it with a propeller that is too large or has too much pitch – overheating damages the winding insulation and the magnets.

- Protect the motor from water, moisture, sand, dust and metal filings. The rotor magnets attract small ferrous particles that can jam the motor.
- Do not fly in rain, snow or fog.

2. Product description

2.1 Intended use

The DarwinFPV 1504 3600KV is a brushless outrunner motor with a 15 × 4 mm stator. According to the manufacturer, it is intended for 3–3.5" freestyle FPV drones, 2.5" whoops and 4" long range drones.



DarwinFPV 1504 3600KV

2.2 Package contents

Qty	Item
1×	DarwinFPV 1504 3600KV motor
5×	M2 × 7 mm hexagon socket head screw
1×	sticker

Propellers, ESC, frame and battery are **not included**.

2.3 Specifications

Parameter	Value
Designation	DarwinFPV 1504 3600KV
KV	3600 KV
Stator size	Φ15 × 4 mm
Configuration	12N14P
Rated voltage	16 V (4S Li-Po)
Idle current	0.66 A
Maximum current	12.1 A
Maximum power	193.6 W
Interphase resistance	700 mΩ
Prop shaft	Φ1.5 × 3.5 mm
Bearings	Φ2 × Φ5 × 2.5 mm
Rotor	split
Magnets	N45H
Winding	single-strand copper wire
Lead wires	28AWG × 150 mm
Mounting holes	9 × 9 mm, M2 thread
Dimensions	Φ18.25 × 18.5 mm
Weight (incl. wires)	9.1 ± 0.2 g
Package dimensions	55 × 55 × 58 mm

2.4 Dimensions and mounting holes



Motor dimensions and lead wire length (manufacturer's data)



Mounting holes 9 × 9 mm, M2 thread

2.5 Manufacturer's load test

The manufacturer states the following measured values with a Gemfan 3520 propeller at 16 V. The values are a guide for choosing the propeller and ESC; actual values depend on the propeller, battery, ESC and temperature.

Throttle (%)	Speed (rpm)	Current (A)	Thrust (g)	Power (W)	Efficiency (g/W)	Conditions
10	6000	0.1	8	1.6	5.00	
20	10500	0.4	30	6.4	4.69	
30	14400	0.9	61	14.4	4.24	
40	17500	1.5	95	24	3.96	
50	20000	2.4	137	38.4	3.57	Gemfan 3520, 16 V
60	23700	3.8	188	60.8	3.09	
70	26000	5.3	234	84.8	2.76	
80	28500	7.1	298	113.6	2.62	
90	29700	8.9	323	142.4	2.27	
100	32000	12.1	418	193.6	2.16	

3. Installation

3.1 What else you need

- a frame with 9 × 9 mm motor mounts for M2 screws,
- an ESC rated for 4S and with headroom above the maximum motor current of 12.1 A,
- propellers of a suitable size with a hole for a Φ1.5 mm shaft,
- a soldering iron, solder and flux for electronics, a hex key matching the supplied screws, and optionally medium-strength threadlocker.

3.2 Mounting the motor on the frame

① Place the motor on the frame arm so that the 9 × 9 mm mounting holes line up with the holes in the frame. Route the wires towards the centre of the frame.

② Fasten the motor with the supplied M2 × 7 mm screws. Tighten the screws gradually in a cross pattern and gently – the thread in the aluminium motor base strips easily.

③ Make sure the screw **does not reach into the stator windings**. If the frame arm is thin, use shorter screws. A screw touching the windings damages their insulation and causes a short circuit.

④ Turn the motor bell by hand. It must rotate freely, without rubbing and without foreign objects in the gap between rotor and stator.

※ A screw driven in too deep and touching the windings is the most common cause of a short circuit and damage to both motor and ESC. Such damage is not a product defect.

3.3 Connecting to the ESC

The motor has three 28AWG phase wires, 150 mm long. The order of the wires on the ESC pads is arbitrary – it only affects the direction of rotation, which can be changed later (chapter 4.2).

① Cut the wires to length so that they are neither tight nor hanging into the propeller. Strip and tin the ends.

② Solder each wire to one phase pad of the ESC for that motor. Solder quickly and with enough flux so that the insulation does not overheat.

③ Check that there is no solder bridge between adjacent pads and that no wire has damaged insulation.

④ Secure the wires to the arm (e.g. with heat-shrink tubing or a cable tie) so that they cannot get into the propeller or chafe against the frame edges.

4. Start-up

4.1 Checking the direction of rotation

Always perform this check **without propellers**. Connect the drone to a computer and open the *Motors* tab in Betaflight Configurator. After confirming the safety notice, briefly spin each motor individually and compare the direction of rotation with the diagram for the selected propeller direction (*Props In* / *Props Out*) in the flight controller (FC) configuration.

4.2 Changing the direction of rotation

If a motor spins the wrong way, you have two options:

- **In software** – reverse the direction in the ESC configurator (e.g. esc-configurator.com, BLHeliSuite) or in the *Motors* tab of Betaflight Configurator, if the ESC supports it.
- **In hardware** – by swapping any two of the three motor wires on the ESC.

4.3 Fitting the propellers

- The motor shaft is 1.5 mm in diameter and 3.5 mm long. Use propellers designed for a Φ1.5 mm shaft and fasten them as specified by the propeller manufacturer.
- Fit each propeller on the motor with the correct direction of rotation according to the frame diagram.
- The manufacturer tested the motor with a Gemfan 3520 propeller (chapter 2.5). Larger or higher-pitch propellers increase current draw and motor temperature – check the temperature of the motors and ESC after the first flights.

4.4 First start-up

- Before the first flight, verify Arm (motors on), Disarm (motors off) and failsafe on your radio transmitter.
- Before flying, connect a fully charged 4S Li-Po battery (16.8 V).
- Make the first take-off in an open area, at low altitude and with just enough throttle for the drone to lift off. Watch for unusual noises and vibration.
- After a short flight, land and carefully check the temperature of the motors. A motor that is significantly hotter than the others indicates a problem (chapter 7).

5. Legal requirements for operation

5.1 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 a drone in another country, you must follow the regulations of the country in which you fly.

5.2 The motor as part of a drone

The motor itself is not an unmanned aircraft. The obligations of the operator and pilot (operator registration, pilot competency, operational categories and limits) depend on the finished drone in which the motor is installed. In the Czech Republic, information on operating unmanned aircraft is published by the Civil Aviation Authority at www.caa.gov.cz.

6. Maintenance and storage

6.1 After every flight

- Disconnect the battery and check that all motors turn freely and equally easily.
- Remove grass, dust and sand from the motor. Carefully remove small ferrous particles from the magnets, ideally with adhesive tape.
- Check that the mounting screws are tight and inspect the wires and their solder joints.
- Check the shaft: a bent shaft causes vibration – replace the motor or rotor.

6.2 Bearings

Worn bearings show up as noisy running, rubbing or play in the bell. The bearings measure Φ2 × Φ5 × 2.5 mm. Do not lubricate the motor with ordinary oil and do not clean it with solvents that could damage the winding enamel.

6.3 Storage

Store the motor in a dry place, out of the reach of children, away from metal filings and other motors or magnets. Store a drone with installed motors with the battery disconnected.

7. Troubleshooting

Problem	Possible cause and solution
Motor spins in the wrong direction	Reverse the direction in the ESC configurator or swap two motor wires (chapter 4.2).
Motor does not start, only twitches or beeps	Cold or broken solder joint, bridge between pads, damaged wire. Check the soldering and wire insulation. Make sure the bell turns freely.
Motor rubs or turns stiffly	Foreign object or ferrous particles in the gap between rotor and stator, mounting screw reaching into the windings, worn bearings.
Motor gets very hot after a flight	Propeller too large or too much pitch, screw touching the windings, damaged bearing, unsuitable ESC settings. Check the other motors too – if only one is hotter, the problem lies in that motor or its ESC.
Vibration, blurred image, "jello"	Damaged or unbalanced propeller, bent shaft, loose mounting screws. Replace the propeller and check the shaft.
Motor cuts out in flight	Loose solder joint, broken wire, overheated ESC. Land immediately, disconnect the battery and check the wiring.

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 1504 3600KV) is given on the product 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

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.