0702 PRO DB 23000KV

Brushless motor for FPV micro drones · set of 4
User manual



Read this entire manual carefully before installation and first use, and keep it for future reference.

VCI HOBBY · importer Rotorama, s.r.o. · www.rotorama.cz

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1. Safety instructions

1.1 Before you start

VCI 0702 PRO DB motors are spare parts for building and repairing small remote-controlled FPV drones (so-called whoop drones). Installation and wiring require basic experience with hobby electronics and soldering. This product is not a toy.

- Before installation, read this entire manual and also the manuals for the flight controller (FC), the electronic speed controller (ESC) and the drone in which you are installing the motors.
- The motor is designed to be powered **exclusively via an electronic speed controller (ESC)**. Never connect it directly to a battery or power supply – this may destroy both the motor and the power source.
- Keep the motors, screws and other small parts out of the reach of children – they could be swallowed.
- Use the motor only within the voltage and load range given in Chapter 2.2.

1.2 Rotating parts

- Rotating propellers and the motor bell can cause cuts and lacerations. **Remove the propellers** whenever you work on the drone, connect it to a computer or test the motors.
- Connect the battery only immediately before the flight and disconnect it right after landing. As long as the battery is connected, consider the motors live.
- Before every flight, check that the motor is firmly screwed in place and that the propeller is firmly seated and undamaged.

1.3 Heat, magnets and electrical hazards

- The motor heats up during operation. After the flight, let it cool down before touching it.
- The motor contains strong permanent magnets. Keep it away from magnetic data carriers, compasses and sensitive electronics. Persons with a pacemaker or other implant should keep their distance.
- Repair damaged wires or winding insulation immediately or replace the motor. A short circuit in the winding can damage the ESC and the battery.

1.4 Li-Po and LiHV batteries

The motor is designed to be powered from a single-cell (1S) battery, which is not included. Observe the following rules:

- Charge only with a suitable charger and never unattended: a Li-Po cell to max. 4.20 V, a LiHV cell to max. 4.35 V.
- End the flight when the voltage drops to 3.5 V/cell at the latest; for storage, keep the voltage at 3.8 V/cell.
- Do not use a swollen, damaged or overheated battery any more.

2. Product description



VCI 0702 PRO DB motor (illustrative photo by the manufacturer)

2.1 Package contents

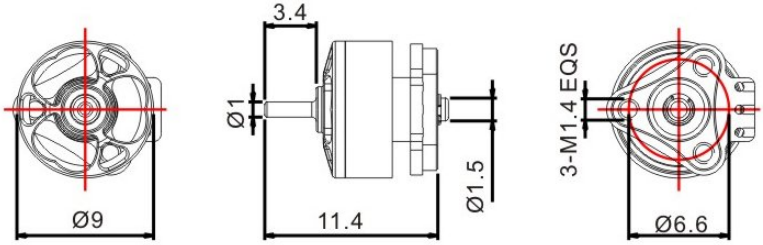
- 4× VCI 0702 PRO DB 23000KV brushless motor
- mounting screws

※ The manufacturer does not state the exact number and size of the supplied screws in the technical data; the motor mounting thread is M1.4 (see Chapter 2.3).

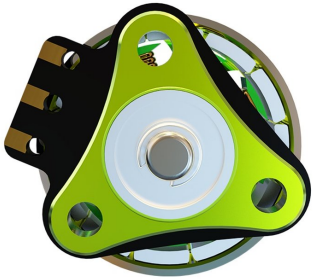
2.2 Technical data

Parameter	Value
Kv	23000KV
Configuration	9S12P (9 stator slots, 12 poles)
Stator size	Ø7 × 2 mm
Motor dimensions	Ø9 × 11.4 mm
Shaft diameter	Ø1 mm
Shaft length	3.4 mm
Magnets	52SH, arc
Internal resistance	230 mΩ
Rated voltage	1S (4 V)
Idle current (3.7 V)	0.57 A
Peak current	3.8 A
Max. instantaneous power	15.2 W
Wires	silicone, 30AWG, length 35 mm
Weight (incl. wires)	1.47 g
Mounting holes	3× M1.4 on a Ø6.6 mm pitch circle

2.3 Dimensional drawing



Motor dimensions in mm (manufacturer's drawing)



Bottom view – three mounting holes with M1.4 thread

2.4 Manufacturer

Manufacturer	VCI Innovation Technology Ltd. (VCI HOBBY)
Address	1205, Building 4, Kexing Science Park, Qianhai, Bao'an District, Shenzhen, China
E-mail	sales@vcihobby.com
Web	www.vcihobby.com

The importer and responsible person in the EU is Rotorama, s.r.o. – see Chapter 8.1.

3. Manufacturer's measured data

The following values were measured by the manufacturer on its own test bench with a **GF1219S-3** propeller at **4 V**. The motor temperature at the end of the test was **53 °C**.

Throttle (%)	Current (A)	Thrust (g)	Efficiency (g/W)	Power (W)
10	0.15	0.56	0.93	0.60
20	0.56	2.50	1.12	2.24
30	1.03	5.25	1.27	4.12
40	1.38	8.46	1.53	5.52
50	1.77	12.07	1.70	7.08
60	2.18	15.85	1.82	8.72
70	2.48	20.52	2.07	9.92
80	2.84	24.78	2.18	11.36
90	3.18	27.70	2.18	12.72
100	3.80	32.50	2.14	15.20

- The data are for reference only. Actual values depend on the propeller, ESC, battery, frame and ambient temperature used.
- The motor temperature is the shaft temperature measured after the throttle was raised steadily from 0 to 100 % in a static test (without the airflow present in flight).

4. What else you need

The motors are supplied on their own. To operate them, you need:

- a **frame** with motor mounts for 3× M1.4 mounting holes on a Ø6.6 mm pitch circle,
- a **flight controller (FC) with electronic speed controllers (ESC)** for 1S battery power and with sufficient current reserve for the motor's peak current of 3.8 A,
- **propellers** designed for a 1 mm shaft (the manufacturer tested with a GF1219S-3 propeller),
- a **1S battery** (Li-Po or LiHV) and a suitable charger,
- a soldering iron and tools – a screwdriver for M1.4 screws and, if needed, a propeller removal tool.

※ When choosing propellers and ESC, follow the recommendations of the frame or flight controller manufacturer. An oversized or heavy propeller can overload both the motor and the ESC.

5. Installation and wiring

5.1 Mounting the motor

① Disconnect any old motor from the ESC and unscrew it. The battery must be disconnected.

② Place the motor on the frame mount so that the holes line up and the wires point towards their ESC.

③ Fasten the motor with three M1.4 screws. Tighten the screws gently and alternately – the thread in a small motor strips easily.

④ Check that the motor bell rotates freely and does not rub anywhere.

※ Use screws of the correct length. A screw that is too long can penetrate the stator winding, damage the insulation and cause a short circuit.

5.2 Connecting to the ESC

- The motor has three phase wires. Connect them to the ESC output for the respective motor position according to the flight controller documentation.
- The order of the wires does not affect the motor's function, but it determines the **direction of rotation**. To reverse the direction, swap any two wires or change the setting in the ESC or flight controller configuration software.
- If you solder the wires, work quickly and with enough flux so that the insulation does not overheat. Do not shorten the wires unnecessarily and secure them against contact with the propeller.
- After wiring, check that the wires do not touch each other and that there is no short circuit.

5.3 Fitting the propeller

- Fit the propeller only after a successful check of the direction of rotation (Chapter 6.1).
- Push the propeller onto the shaft straight, without levering, while supporting the motor from below so that the bearings are not damaged.
- Observe the propeller rotation direction according to your drone's layout (usually “props in” or “props out”).
- To remove a propeller, use a propeller removal tool or pull it off evenly along the shaft.

6. Commissioning

6.1 Checking the direction of rotation

① Remove all propellers.

② Connect the flight controller to a computer and open the *Motors* tab in the configuration software (e.g. Betaflight Configurator).

③ After confirming the safety notice, spin up each motor in turn at low speed.

④ Verify that the correct motor spins and that it rotates in the correct direction. Correct any errors by remapping the outputs or changing the direction of rotation (Chapter 5.2).

6.2 Flight controller settings

- The motor has **12 poles** (9S12P configuration). Enter this value in the flight controller settings (in Betaflight, the *Motor poles* item) if you use RPM telemetry or RPM-based filtering (RPM filter).
- Always perform Arm (motor start) only with propellers fitted, at a safe place with no people nearby.
- Perform Disarm (motor stop) immediately after landing or in any abnormal situation.

6.3 First flight

- Before the flight, insert a **fully charged** 1S battery (Li-Po 4.20 V, LiHV 4.35 V).
- After the first short flights, check the motor temperature. If one motor is noticeably warmer than the others, find the cause (rubbing, damaged propeller, faulty bearing, filter settings).
- End the flight when the voltage drops to 3.5 V at the latest.

7. Maintenance and troubleshooting

7.1 Maintenance and storage

- After every flight, check that the bell rotates freely and that there is no dirt, hair or grass in the motor. Carefully remove any dirt, e.g. with compressed air.
- Regularly check that the mounting screws are tight and that the wires are in good condition.
- After a crash, check whether the shaft is bent. A motor with a bent shaft vibrates and should be replaced.
- Do not lubricate the bearings with ordinary oils – they attract dust.
- Store the motors in a dry place, away from moisture and metal filings that could stick to the magnets.

7.2 Troubleshooting

Problem	Possible cause and solution
Motor does not spin, only beeps or twitches	Broken phase wire or cold solder joint – check and resolder the joints. Check the ESC protocol setting.
Motor spins the wrong way	Swap two phase wires or change the direction of rotation in the configuration software.
Motor overheats	Oversized propeller, rubbing bell, damaged bearing or unsuitable filter settings. Eliminate the cause.
Strong vibrations, noise	Bent shaft, damaged or unbalanced propeller, worn bearings. Replace the faulty part.
Motor rubs or turns stiffly	Dirt between the bell and the stator, or a damaged bearing. Clean the motor or replace it if necessary.

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.cz

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 (0702 PRO DB) is marked directly on the motor housing.

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.