



GTS V3 1002 19000KV

RCINPOWER – brushless motor for 1S Whoops and
Toothpicks
User manual



Read this entire manual, especially the safety instructions, before installation and first start-up. Keep the manual for future reference.

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Contents

1. Safety instructions

- 1.1 Before you start
- 1.2 Rotating parts and propellers
- 1.3 Electrical and thermal hazards
- 1.4 Operating environment

2. Product description

- 2.1 What the motor is for
- 2.2 Parts overview
- 2.3 Technical data
- 2.4 Dimensions
- 2.5 Manufacturer's performance data
- 2.6 Package contents and manufacturer

3. Use in a drone and legal framework

- 3.1 The law of the country where you fly applies
- 3.2 Drones built from components
- 3.3 Basic operating rules

4. Installation

- 4.1 What else you need
- 4.2 Mounting the motor on the frame
- 4.3 Connecting the cable
- 4.4 Fitting the propeller

5. Start-up

- 5.1 Motor test without propellers
- 5.2 Direction of rotation
- 5.3 Arm, Disarm and first start

6. Operation

6.1 Power supply

6.2 Load and motor temperature

7. Maintenance and troubleshooting

7.1 After every flight

7.2 Repairing a torn-off cable

7.3 Storage

7.4 Troubleshooting

8. Information for the EU and Czech Market

8.1 Importer and responsible person in the EU

8.2 Product conformity

8.3 Disposal of electrical equipment

9. Warranty and rights arising from defective performance

1. Safety instructions

1.1 Before you start

The RCINPOWER GTS V3 1002 19000KV motor is a component intended for installation in a small remotely controlled model (FPV drone). Installation, wiring and configuration require basic soldering skills and experience with the flight controller software. If in doubt, ask an experienced modeller for help.

- This product is not a toy. It is not intended for children or for persons who are not familiar with operating models.
- Never connect the motor directly to a battery. It may only be operated via an electronic speed controller (ESC) for brushless motors.
- Disconnect the battery before any work on the model.

1.2 Rotating parts and propellers

- The rotating motor bell and the propellers can cause injury. Keep your hands out of the propeller area while a battery is connected.
- Fit the propellers only **after** testing the motors and checking the direction of rotation (Chapter 5).
- Replace a damaged, cracked or bent propeller immediately. A loose propeller or a fragment of it can fly off at high speed.
- Keep loose objects, hair, grass and metal chips away from the motor – the strong magnets in the bell attract small steel particles.

1.3 Electrical and thermal hazards

- The motor gets very hot under full load. According to the manufacturer's measurements, it reaches approx. 80 °C with the heaviest propeller tested (Chapter 2.5). Do not touch the motor after a flight until it has cooled down.
- A short circuit between the wires or damaged winding insulation can destroy both the motor and the speed controller and cause a battery fire.
- When soldering, keep the contact between the tip and the pad short; prolonged overheating can damage the printed circuit board and the winding insulation.
- Handle Li-Po and LiHV batteries according to their manufacturer's instructions: do not charge them unattended and do not use damaged or swollen cells.

1.4 Operating environment

- Protect the motor from water, moisture, sand and dust. Dirt in the bearings and between the magnets shortens the motor's service life.
- After flying in damp conditions, let the model dry thoroughly before using it again.
- Only operate a model with this motor where you do not endanger people, animals or property.

2. Product description

2.1 What the motor is for

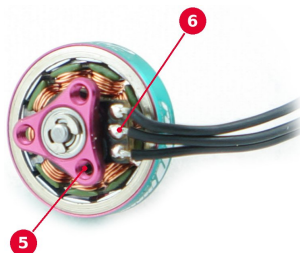
The RCINPOWER GTS V3 1002 19000KV is a small outrunner brushless motor intended primarily for Whoops and Toothpicks powered by a single-cell (1S) battery. The manufacturer recommends it for small frames of 65–75 mm.

The motor has a Unibell design and two bearings. The wires are soldered to the pads of a small printed circuit board at the bottom of the motor and are fitted with a connector from the factory. If the cable is torn off in a crash, the motor winding is therefore usually not damaged – simply solder a new cable to the pads. The 1.5 mm shaft is suitable for propellers with a T-mount.

2.2 Parts overview



Side view



Bottom view

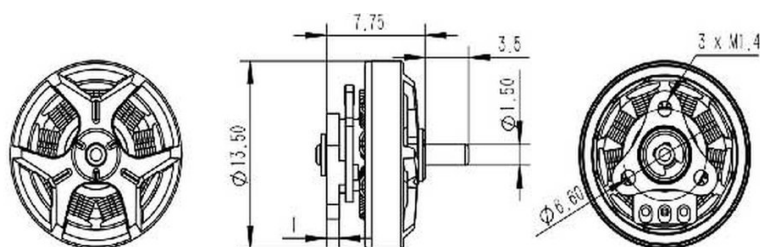
- ① Shaft, 1.5 mm diameter (for T-mount propellers)
- ② Unibell bell (rotor) marked 1002 and 19000 KV
- ③ Motor base
- ④ Three-wire cable with connector
- ⑤ Mounting holes 3 × M1.4 on a 6.6 mm circle
- ⑥ Solder pads for connecting the wires

2.3 Technical data

Parameter	Value
Designation	GTS V3 1002 19000KV
Stator size	1002 (10 mm diameter, 2 mm length)
KV	19,000 KV
Configuration	9N12P
Power supply	1S Li-Po
Shaft diameter	1.5 mm
Motor dimensions (diameter × length)	Ø 13.5 × 7.75 mm
Weight	2.5 g (including 5 cm cable)
Idle current (at 5 V)	1.3 A
Maximum current	11.8 A
Maximum continuous power	44 W
Internal resistance	89 mΩ
Current at maximum efficiency	2–4 A (efficiency > 84 %)
Mounting holes	3 × M1.4 on a Ø 6.6 mm circle
Cable	3 wires, 5 cm long, fitted with a 1.25 mm connector

※ Values as stated by the motor manufacturer.

2.4 Dimensions



Dimensional drawing according to the manufacturer (dimensions in mm)

2.5 Manufacturer's performance data

The manufacturer measured the motor with several propellers at a voltage of 3.7 V. The table is intended as a guide for choosing a propeller; actual values depend on the battery, speed controller, settings and propeller condition. Propeller designations are taken from the manufacturer's data.

Propeller	Volt. (V)	Thr.	Curr. (A)	Thrust (g)	Power (W)	Eff. (g/W)	Temp.*
GF1610R*2	3.7	50 %	1.8	28	6.7	4.204	58 °C
		100 %	6.6	62	24.4	2.539	
GF1635R*3	3.7	50 %	2.1	27	7.8	3.475	63 °C
		100 %	8	64	29.6	2.162	
GF1635R*4	3.7	50 %	2.5	30	9.3	3.243	65 °C
		100 %	8.8	68	32.6	2.088	
GF2015R*2	3.7	50 %	2.9	37	10.7	3.448	68 °C
		100 %	9.2	79	34.0	2.321	
GF2023R*3	3.7	50 %	3.7	36	13.7	2.630	80 °C (hot)
		100 %	11.8	65	43.7	1.489	

* Motor temperature at full throttle for 3 s.

With the GF2023R*3 propeller the motor runs at the limit of its maximum current and heats up considerably. Use full throttle with this propeller only briefly.

2.6 Package contents and manufacturer

- 1× RCINPOWER GTS V3 1002 19000KV motor with cable and connector
- 1× set of screws

Not included: propellers, speed controller (ESC), flight controller (FC), frame and battery. The motor is sold individually; a quadcopter needs four motors.

Manufacturer	RC-IN-POWER Co., Ltd (RCINPOWER)
Address	Floor 5, District A, Number 73 Xishan Road, Xishan Village, Sanxiang Town, Zhongshan City, Guangdong Province, China
E-mail	RCINPOWER@163.com
Website	www.rcinpower.com

3. Use in a drone and legal framework

3.1 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, compulsory insurance, permitted frequency bands and maximum transmitting power. The information in this chapter describes the situation in the Czech Republic. If you operate a drone with this motor in another country, you must follow the regulations of the country in which you fly.

3.2 Drones built from components

The motor itself is not an unmanned aircraft and no aviation regulations apply to it. Whoever builds a drone with it is responsible for its safe and lawful operation.

- A drone built from individual components has no C0-C4 class. In the open category it can be operated as a privately built unmanned aircraft system – in subcategory A1 if its maximum take-off mass is less than 250 g and its speed does not exceed 19 m/s, otherwise in subcategory A3 – or within a model aircraft club or association.
- If the drone carries a camera, its operator must register regardless of the drone's weight, and the registration number must be displayed on the drone.
- Determine the take-off mass of the finished drone by actually weighing it, including the battery and all accessories.

3.3 Basic operating rules

- Fly no higher than 120 m above the ground and within visual line of sight (VLOS).
- Do not fly over assemblies of people. In subcategory A3 keep a distance of 150 m from residential, commercial, industrial and recreational areas.
- When flying with FPV goggles, an observer must stand next to the pilot and watch the drone directly, without optical aids.
- Liability insurance is not compulsory for small drones in the Czech Republic, but we strongly recommend it.

4. Installation

4.1 What else you need

- a frame for size 1002 motors with a mounting hole pattern of 3 × M1.4 on a Ø 6.6 mm circle,
- a flight controller (FC) with speed controllers (ESC) for 1S, typically an AIO board with motor connectors,
- propellers for a 1.5 mm shaft,
- a 1S Li-Po or LiHV battery with a charger,
- a small screwdriver, solder and a fine soldering iron (for possible cable repairs).

4.2 Mounting the motor on the frame

- ① Place the motor on the frame arm so that the mounting holes ⑤ line up with the holes in the frame and the cable points towards the flight controller.
- ② Fasten the motor with the screws supplied. Tighten the screws gently – the threads in the small motor base strip easily.
- ③ If you use other screws, make sure that they do not protrude into the motor when tightened. A screw that is too long will touch the stator winding and damage its insulation.
- ④ Check that the bell turns freely and does not rub against the frame or the cable.

4.3 Connecting the cable

- ① Route the cable along the arm so that it cannot get into the propeller and is not under tension.
- ② Plug the connector into the corresponding motor socket on the flight controller. Observe the correct motor order according to your flight controller's wiring (in Betaflight, the *Motors* tab).
- ③ Do not plug or unplug the connector by pulling on the wires – hold it by the connector body.

4.4 Fitting the propeller

Fit the propellers only after testing the motors and checking the direction of rotation (Chapter 5). Push a T-mount propeller onto the shaft all the way and, depending on the propeller design, secure it with a screw. Make sure the propeller is oriented correctly for the motor's direction of rotation (CW and CCW propellers).

5. Start-up

5.1 Motor test without propellers

First test each motor **without a propeller fitted**. Connect the drone to a computer, open the *Motors* tab in Betaflight Configurator, confirm that the propellers are removed and spin up the individual motors one by one at low speed.

- Check that the motor that spins up matches the number in the program.
- The motor must run smoothly and quietly, without stuttering or rubbing.
- Test only briefly and at low speed – a motor without a propeller is not cooled by airflow.

5.2 Direction of rotation

The direction of rotation of each motor must match the diagram in the *Motors* tab. Because the motor wires end in a connector, the direction is not changed by swapping wires but in the speed controller settings – for example in ESC Configurator or in Betaflight (the *Motor direction is reversed* option changes the direction of all motors and requires reversed propellers).

5.3 Arm, Disarm and first start

- Assign **Arm** (motors on) and **Disarm** (motors off) to a switch on your radio and try them out without propellers before the first flight.
- With the propellers fitted, perform the first Arm in an open area and at a safe distance from people. If the drone flips over immediately when you raise the throttle, Disarm at once and check the motor order, direction of rotation and propeller orientation.
- Set up failsafe so that the motors are switched off when the signal is lost.

6. Operation

6.1 Power supply

The motor is designed to be powered by a single-cell (1S) battery. The manufacturer specifies it for 1S only – do not use a battery with more cells. Always fit a **fully charged** battery before flying and observe the following voltages:

State	1S Li-Po	1S LiHV
Fully charged	4.20 V	4.35 V
End the flight	3.5 V	3.5 V
Storage	3.8 V	3.8 V

Monitor the voltage in the OSD or via telemetry. Deep discharge permanently damages the battery.

6.2 Load and motor temperature

- Do not exceed the motor's maximum current of 11.8 A. Choose the propeller according to the table in Chapter 2.5; a larger or heavier propeller than those tested by the manufacturer will overload the motor.
- After the first flights, check the motors by touch (carefully). If they are too hot to touch after a short flight, the propeller is too heavy or the flight controller settings are unsuitable (oscillations, PID values too high).
- After a demanding flight, let the motors cool down before inserting another battery.

7. Maintenance and troubleshooting

7.1 After every flight

- Remove grass, hair and dirt from the motor, especially around the shaft.
- Check that the shaft is straight and that the propeller does not wobble.
- Check that the motor screws are tight and inspect the cable and connector.
- Turn the bell by hand – it must rotate easily, without rubbing or grinding.

7.2 Repairing a torn-off cable

The wires are soldered to the pads ⑥ at the bottom of the motor, not directly to the winding. If the cable is torn off, all you need to do is:

- ① Disconnect the battery and unplug the motor from the flight controller.
- ② Remove the remains of the old wire from the pad with desoldering wick or a desoldering pump.
- ③ Solder on a new wire with brief contact of the tip so that neither the board nor the winding overheats.
- ④ Check that no solder bridge has formed between adjacent pads and test the motor without a propeller (Chapter 5.1).

7.3 Storage

Store the motor in a dry, clean place, away from small metal objects that the magnets could attract. Store batteries at 3.8 V per cell.

7.4 Troubleshooting

Problem	Possible cause and solution
Motor does not spin or only twitches	Connector not fully seated, torn-off wire or cold solder joint on the pads ⑥. Check the wiring and joints.
Motor spins in the wrong direction	Change the direction of rotation in the speed controller settings (Chapter 5.2).
Drone flips over immediately after Arm	Wrong motor order, direction of rotation or propeller orientation. Disarm and check everything (Chapters 4.3 and 5).
Vibration or noisy running	Bent shaft, damaged propeller, dirt in the motor, worn bearings or loose screws.
Motor overheats	Propeller too heavy, oscillations due to unsuitable flight controller settings, or damaged winding.
Bell rubs or turns stiffly	Dirt between the magnets and the stator, damaged bearing or mounting screw too long.

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@rotorاما.cz
Phone	+420 252 252 098
Website	www.rotorاما.com

8.2 Product conformity



- 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@rotorاما.cz.
- **Product identification:** the type designation (GTS V3 1002 19000KV) is marked on the motor housing (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.