GTS V3 2105 Plus

Brushless motor 2950 KV
User manual



Read the entire manual before installation and first use, especially the safety instructions in Chapter 1. Keep this manual.

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1. Safety instructions

1.1 Before you start

The motor is a component intended for installation in a multicopter (drone) or another RC model. Installation and setup require basic knowledge of electronics, soldering and configuration of the flight controller (FC) and electronic speed controllers (ESC). If you are not sure, have the motor installed by an experienced person.

- The product **is not a toy** and must be kept out of the reach of children.
- Use it only for the purpose described in this manual and do not make any structural modifications to the motor.

1.2 Rotating parts

- Always perform bench tests and configurator setup **without propellers**.
- With the battery connected, keep hands, hair and loose clothing away from the rotor and propeller.
- Fit the propeller only just before flight and always with the battery disconnected.
- The rotor (bell) rotates – nothing may rub against it. Route the wires so that they cannot touch it.
- Do not use a damaged propeller or a motor with a bent shaft – an unbalanced propeller can break apart in flight.

1.3 Electrical safety and batteries

- Operate the motor only with a **3S to 4S Li-Po** battery (manufacturer's specification). A higher voltage will overload the motor.
- Connect the motor only via an electronic speed controller (ESC) for brushless motors, **never directly to the battery**.
- The manufacturer specifies a maximum current of 38.8 A (at 3S). Choose an electronic speed controller (ESC) that can reliably handle this current.
- Solder and modify the wiring only with the battery disconnected. Charge Li-Po batteries only under supervision and do not use a damaged or swollen battery.

1.4 Temperature and operating environment

- The motor heats up during operation. After flight, do not touch it until it has cooled down.
- High temperature damages the winding insulation and the magnets. Do not overload the motor with an oversized propeller (Chapter 2.6).
- Protect the motor from water, sand and metal debris, which is attracted by the strong rotor magnets. Do not fly in rain, snow or wet grass.

2. Product description

2.1 Intended use

The RCinpower **GTS V3 2105 Plus 2950KV** is a brushless outrunner motor for FPV multicopters. The manufacturer intends it for 5" ultralight long-range builds and for 3–4" toothpick and cinewhoop builds with propeller ducts. It is powered from a 3S–4S Li-Po battery via an electronic speed controller (ESC).

The rotor is made of 7075-T6 aluminium alloy, the shaft of TC4 titanium alloy. The propeller is secured with a nut on the output end of the shaft with an M5 thread.

2.2 Package contents

Qty	Item
1×	RCinpower GTS V3 2105 Plus 2950KV motor
1×	Screw set

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

※ A propeller nut is not listed in the package contents. If you do not find one in the package, use an M5 self-locking nut.

2.3 Parts description



Side view

① TC4 titanium alloy shaft with M5 thread for the propeller

② Rotor (bell) made of 7075-T6 aluminium alloy, with magnets

③ Stator mounting base with four M2 threaded holes

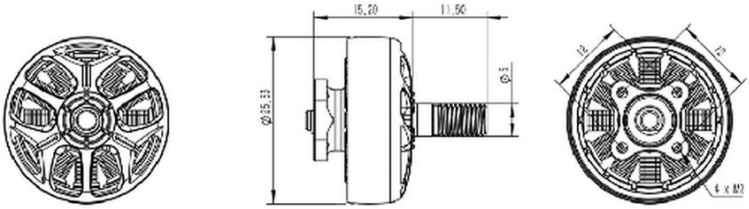
④ Three phase wires for connection to the electronic speed controller (ESC)



Bottom view

① M2 threaded hole for frame mounting (4×, 12 × 12 mm pattern)
② Lower end of the shaft and bearing
③ Stator windings – the screw must not reach them (Chapter 4.2)
④ Phase wires

2.4 Dimensions



Manufacturer's dimensional drawing (dimensions in mm)

- **Ø 25.53** – rotor diameter
- **15.20** – motor height without shaft
- **11.50** – shaft protrusion above the rotor
- **Ø 5** – M5 shaft thread
- **12 × 12** – mounting hole pattern **4× M2**

2.5 Specifications

Parameter	Value
Designation	GTS V3 2105 Plus 2950KV
KV	2950 KV (rpm per 1 V)
Configuration	12N14P (12 stator coils, 14 magnet poles)
Stator	diameter 21 mm, height 5.5 mm
Motor dimensions	Ø 25.53 × 15.2 mm
Shaft	3 mm (inner), M5 threaded output; TC4 titanium alloy
Mounting	4× M2, 12 × 12 mm pattern
Weight	21 g (with 3 cm wires)
Battery	Li-Po 3S–4S
Idle current	1.5 A at 10 V
Max. continuous power	620 W (3S)
Max. current	38.8 A (3S)
Internal resistance	60 mΩ
Max. efficiency current	2–4 A (efficiency > 85%)
Magnets	N52H, arc
Bearings	693ZZ, 3 × 8 × 4 mm, ISC (Japan)
Windings	single-strand oxygen-free copper wire, 260 °C insulation class
Rotor material	7075-T6 aluminium alloy
Wires	22AWG, length 15 cm

※ Current, power and efficiency values are the manufacturer's data measured under laboratory conditions. Data on the magnets, bearings, windings, rotor material and wires are taken from the Rotorama product page.

2.6 Manufacturer's performance data

The manufacturer states the following measurements for this motor with various propellers:

Propeller	Voltage	Throttle	Current (A)	Thrust (g)	Power (W)	Efficiency (g/W)	Temp.*
GF4024R	12 V	50%	2.6	155	31.2	4.968	53 °C
		100%	12.5	499	150.0	3.327	
	16 V	50%	4	256	64.0	4.000	58 °C
		100%	19.5	805	312.0	2.580	
HQT5×3R	12 V	50%	4.5	287	54.0	5.315	62 °C
		100%	20.8	785	249.6	3.145	
	16 V	50%	6.6	439	105.6	4.157	77 °C
		100%	30.9	1176	494.4	2.379	
GF5125R	12 V	50%	4	257	48.0	5.354	63 °C
		100%	20.9	806	250.8	3.214	
	16 V	50%	7.2	453	115.2	3.932	78 °C
		100%	31.6	1236	505.6	2.445	
GF6026	12 V	50%	5.7	370	68.4	5.409	69 °C
		100%	26.7	994	320.4	3.102	

* Motor temperature after 3 s at full throttle. These are the manufacturer's laboratory measurements; actual values depend on the propeller, battery, ESC and flight conditions.

※ The manufacturer's measurements at 24 V (outside the 3S–4S range) are not listed here. For the GF6026 at 16 V the manufacturer states 85 °C marked "HOT" (overheating) and gives incomplete further data – we do not recommend this combination.

2.7 Manufacturer

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

3. Operation and legal regulations

3.1 The law of the country where you fly applies

The motor itself is not an aircraft – the regulations apply to the drone or model in which you install it. Regulations (EU) 2019/947 and 2019/945 apply in all member states of the European Union, but national implementing rules differ from state to state – registration portals, minimum pilot age, geographical zones, compulsory insurance, permitted frequency bands and maximum transmitting power. The information in this manual describes the situation in the Czech Republic. If you operate a drone in another country, you must comply with the regulations of the country in which you fly.

3.2 Drone operation in the Czech Republic

- The operator of a drone equipped with a camera must register regardless of the drone's weight; in the Czech Republic the register is kept by the Civil Aviation Authority (ÚCL). The registration number is displayed on the drone.
- Observe the operational limits of the open category – in particular the maximum height of 120 m, flight within visual line of sight (VLOS) and the ban on flying over assemblies of people.
- When flying with FPV goggles, an unmanned aircraft observer must be present next to the pilot.
- We recommend taking out liability insurance for damage caused by drone operation.

4. Installation

4.1 What else you need

- a frame with a 12 × 12 mm motor mount for M2 screws,
- an electronic speed controller (ESC) for brushless motors, rated for 3S–4S and for the motor current,
- propellers for an M5 shaft and M5 self-locking nuts,
- a 3S or 4S Li-Po battery,
- a soldering iron, solder, heat-shrink tubing and cable ties,
- optionally medium-strength threadlocker.

4.2 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 frame (12 × 12 mm pattern).

② Use M2 screws of a suitable length for the arm thickness. The screw **must not pass through the base into the stator windings** – it would damage the insulation and cause a short circuit that destroys both the motor and the electronic speed controller (ESC).

③ After tightening, turn the rotor by hand. If it rubs, the screw is too long.

④ Tighten the screws gently and crosswise – the threads in the aluminium base are easily stripped.

⑤ Route the wires along the arm so that they cannot touch the propeller or the rotor.

※ A mounting screw that is too long is the most common cause of a new motor being destroyed.

4.3 Connecting to the electronic speed controller (ESC)

- The motor has three phase wires. The direction of rotation depends on their order – swapping any two wires reverses the direction.
- Cut the wires to the required length, strip and tin the ends and solder them to the pads of the electronic speed controller (ESC). The joint must be shiny and solid; a cold joint causes motor dropouts in flight.
- Do not worry about the direction of rotation yet – you will set it according to Chapter 5.2.

4.4 Fitting the propeller

- Fit the propeller only after a successful motor test without propellers and always with the battery disconnected.
- Check that the propeller type (CW / CCW) matches the motor's direction of rotation according to the frame and flight controller (FC) layout.
- Secure the propeller with an M5 self-locking nut. Tighten it firmly but without excessive force, which could damage the shaft thread or the propeller hub.

5. Setup

5.1 Flight controller (FC) and ESC settings

- In the Betaflight configurator (motor settings), set the number of motor poles to **14** – the 12N14P configuration has 14 magnet poles. This value is required for correct RPM calculation (bidirectional DShot, RPM filter).
- Leave the other electronic speed controller (ESC) parameters at their default settings unless you know exactly what you are changing.

5.2 Checking the direction of rotation without propellers

① Make sure that **no propellers are fitted** to the motors.

② For the first power-up, use short-circuit protection (smoke stopper) if you have one.

③ In the Betaflight configurator, on the *Motors* tab, confirm the safety warning and spin up the individual motors one by one at low throttle.

④ Check that the correct motor spins and that it rotates in the correct direction according to the diagram in the configurator.

⑤ Reverse a wrong direction in the ESC configurator or by swapping two phase wires.

⑥ The motor must run smoothly, without rubbing, clicking or vibration.

6. Operation

6.1 Choice of battery and propeller

- Use a **3S or 4S** Li-Po battery (manufacturer's specification), never a higher cell count.
- Always fit a **fully charged** battery before flight.
- The propellers with which the manufacturer tested the motor are listed in Chapter 2.6. With a larger propeller and a higher voltage, both the current and the motor temperature increase.

Li-Po battery state	per cell	3S	4S
fully charged	4.20 V	12.6 V	16.8 V
end flight	3.5 V	10.5 V	14.0 V
storage	3.8 V	11.4 V	15.2 V

6.2 Temperature and load

- After the first flights, carefully check the motor temperature. If a motor is so hot that you cannot keep your finger on it, it is overloaded – use a smaller propeller or reduce the load.
- Motors can also get hot due to oscillations caused by unsuitable flight controller (FC) settings.
- If you smell burnt insulation or see smoke, disconnect the battery immediately and do not use the motor any further.

7. Maintenance and troubleshooting

7.1 After each flight

- Clean grass, sand and dust off the motor. Carefully remove metal debris attracted by the magnets.
- Turn the rotor by hand – it must rotate freely and without rubbing.
- Check that the shaft is not bent (the propeller does not wobble when rotating).
- Check that the mounting screws and the propeller nut are tight.
- Check the wires and solder joints for damage or chafing.

7.2 Bearings and crash damage

- The 693ZZ bearings (3 × 8 × 4 mm) wear out. Noisy running, rubbing or rotor play indicate that they need replacing.
- Replacing the bearings requires removing the rotor; have it done by an experienced person.
- After a crash, check that the rotor does not rub against the stator, that the magnets are not damaged and that the shaft is not bent. Do not use a damaged motor.

7.3 Storage

- Store in a dry place at room temperature, away from metal dust and small metal objects.
- Because of the strong magnets, do not store the motor near magnetic cards or sensitive instruments.

7.4 Troubleshooting

Problem	Possible cause and solution
Motor does not spin, only beeps or twitches	Broken or cold solder joint on one of the phase wires – check and resolder. Damaged windings – replace the motor.
Motor spins in the wrong direction	Change the direction in the ESC configurator or swap two phase wires.
Motor rubs or is noisy	Debris between rotor and stator, worn bearing, bent shaft or a mounting screw that is too long.
Motor overheats	Oversized or damaged propeller, oscillations due to unsuitable FC settings, damaged windings.
Vibrations in the video or recording	Damaged or unbalanced propeller, bent shaft, loose screws.
Short circuit or burnt ESC after connection	Mounting screw touching the windings, damaged wire insulation. Do not use the motor any further.

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 (GTS V3 2105 Plus 2950KV) is given in this manual; the motor bears the GTS V3 series logo.

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.