M0703 KV19000

T-Motor brushless motor for 65 mm tinywhoop
User manual



Before installation and first use, read the entire manual, in particular the safety instructions in Chapter 3. Keep this manual for future reference.

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1. Product description

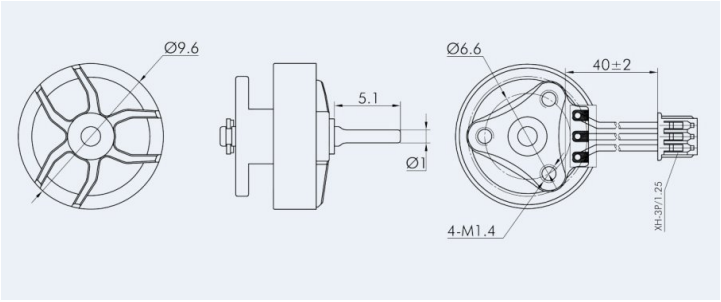
1.1 Intended use

T-Motor M0703 KV19000 is a brushless motor for small **65 mm tinywhoop** quadcopters powered by a **1S** battery. The manufacturer designed it for racing and fast flying with a tinywhoop and 31 mm propellers. The motor is sold as a single piece – a quadcopter needs four.

The motor bell uses a *unibell* design (bell and cap form one piece) which, according to the manufacturer, withstands crashes better. The leads are soldered to a small PCB on the motor base, so they are not torn directly out of the windings in a crash. The leads end in a connector, so the motor simply plugs into the flight controller – no soldering needed.



M0703 motors on a 65 mm tinywhoop (manufacturer's photo)



Manufacturer's dimensional drawing (dimensions in mm)

1.2 Technical data and package contents

Product designation	T-Motor M0703 KV19000 (printed on the motor bell as “M0703 KV19000”)
Size	0703
KV	19,000 rpm/V
Configuration	9N12P (9 coils, 12 magnets)
Power supply	1S
Weight	1.7 g (including leads)
Bell diameter	Ø 9.6 mm
Shaft	Ø 1.5 mm inside the motor, Ø 1 mm outside (for the propeller); protrudes 5.1 mm
Mounting	M1.4 thread, hole spacing Ø 6.6 mm
Leads and connector	length 40 ± 2 mm, 3-pin JST connector with 1.25 mm pitch (marked XH-3P/1.25 on the manufacturer's drawing)
Idle current	0.5 A (stated by the manufacturer at 10 V)
Max. power (10 s)	7.5 W
Peak current (10 s)	2.03 A
Application	65 mm tinywhoop, 1S, 31 mm propellers
Manufacturer's recommended combo	flight controller “06A AIO”

▶ **Package contents**

- 1× M0703 KV19000 motor with leads and connector
- 1× bag of mounting hardware: 4 screws, 2 white washers, 2 retaining clips and 2 brass washers (according to the manufacturer's photo of the package contents)



Contents of the hardware bag (manufacturer's photo)

※ The package does NOT include propellers, frame, flight controller with electronic speed controllers (ESC), battery or tools.

2. Installation and use

Before installation, read the safety instructions in Chapter 3. Fit the propellers only as the last step, after checking the direction of rotation.

2.1 What else you need

- A **frame** for a 65 mm tinywhoop with motor mounts for M1.4 screws on Ø 6.6 mm spacing.
- A **flight controller (FC)** with electronic speed controllers (ESC) for 1S, ideally an AIO board with 3-pin motor connectors matching the motor connector.
- **Propellers** with a diameter of 31 mm for a Ø 1 mm shaft (the manufacturer tested the motor with the T-Motor M12199 propeller).
- A **1S battery** suitable for a tinywhoop and a matching charger.
- A small Phillips or hex screwdriver matching the screw heads, and a computer with Betaflight Configurator.

2.2 Mounting the motor on the frame

① Place the motor on the motor mount so that the holes in the motor base line up with the holes in the frame and the lead points towards the centre of the frame.

② Fasten the motor from underneath the frame using the screws supplied. Tighten the screws gently – the M1.4 thread is very fine and strips easily.

③ Make sure the screw does not protrude into the motor. **A screw that is too long will touch the windings**, damage the insulation and cause a short circuit that can destroy both the motor and the speed controller.

④ Turn the bell by hand: it must rotate freely without rubbing. If it rubs, the screw is too long or the motor is not seated straight.

2.3 Connecting to the flight controller

Plug the motor connector into the corresponding motor connector on the flight controller. Route the lead so that it cannot touch the propeller and is neither stretched nor pinched between the frame and the board. The motor order (M1–M4) on the board must match the layout in the flight controller configuration.

Insert and remove the connector by holding the connector body, never by pulling the leads. If you cut off the connector and solder the leads directly to the board, the person who made this modification is responsible for it.

2.4 Configuration and rotation direction check

- The motor has 12 magnets (9N12P configuration), i.e. **12 magnetic poles**. For the RPM filter and RPM telemetry to work correctly, set the number of motor poles to 12 in Betaflight – on the *Motors* tab in the *Motor poles* field, or in the CLI with *set motor_poles = 12* followed by *save*.

- **With the propellers removed**, connect the battery and briefly spin up each motor in turn on the *Motors* tab. Check that the correct motor spins and in the correct direction according to the diagram in Betaflight.
- If a motor spins the wrong way, change its direction in the speed controller configuration (e.g. in the ESC configurator), or with the *Motor direction is reversed* setting in Betaflight (this also requires the corresponding propeller direction). All M0703 motors are identical; the direction is determined by configuration only.

2.5 Fitting the propeller

- The propeller is press-fitted onto the Ø 1 mm shaft. Fit it squarely and press evenly while supporting the shaft so that it does not bend and no force is applied to the bearings.
- Make sure the propellers face the correct direction – propellers for clockwise and counter-clockwise motors differ.
- Remove the propeller with a propeller removal tool or by carefully levering it off at the hub, not by pulling on the blades.

3. Safety and operating limits

3.1 Safety instructions

- A spinning propeller can cause injury, especially to eyes and fingers. Remove the propellers when working on the quadcopter with the battery connected.
- Connect the battery only just before flight and disconnect it immediately after landing. Before connecting, make sure the radio is switched on and the motors are disarmed (Disarm – motors switched off).
- Use the motor only with a 1S power supply. A higher voltage overloads the motor and can destroy it.
- The motor heats up during operation. Do not touch it after flight until it has cooled down.
- The magnets in the motor attract metal particles. Do not place the motor on a workbench with filings, screws or metal dust.
- Keep the motor and the quadcopter out of the reach of children and animals. Small parts (screws, washers, retaining clips) present a choking hazard.
- Charge Li-Po batteries only under supervision, on a non-flammable surface and with a suitable charger. Do not use a damaged or swollen battery.
- The motor is a component for building a drone. Drone operation is governed by Regulations (EU) 2019/947 and 2019/945, but national rules differ from country to country. When operating a drone, always follow the regulations of the country in which you fly.

3.2 Operating limits and manufacturer's test data

The manufacturer specifies a maximum power of **7.5 W** and a peak current of **2.03 A**, both for 10 s. Do not exceed these values – in particular, do not use propellers that are larger or heavier than the motor is designed for.

Manufacturer's test results with the T-Motor M12199 propeller (31 mm, three-blade) at 3.7 V:

Throttle	Voltage (V)	Current (A)	Speed (rpm)	Thrust (g)	Power (W)	Efficiency (g/W)
20 %	3.7	0.4	17,217	3.6	1.3	2.78
40 %	3.7	0.8	28,087	11.4	3.1	3.66
60 %	3.7	1.2	34,799.1	15.5	4.5	3.44
80 %	3.7	1.6	39,056.5	18.7	5.7	3.29
100 %	3.7	2.0	44,120.4	23.0	7.5	3.06

Values are the result of the manufacturer's test measurement; actual values depend on the propeller, battery and conditions.

4. Maintenance and troubleshooting

4.1 Maintenance

- After every crash, check that the shaft is not bent and that the bell turns freely without rubbing. A motor with a bent shaft vibrates – replace it.
- Remove dirt, sand and grass from the bell and between the magnets with compressed air or a soft brush. Do not insert metal objects into the motor.
- Regularly check that the mounting screws are tight and that the leads and connector are in good condition.
- Protect the motor from water and moisture. Store it in a dry place at room temperature.

4.2 Troubleshooting

Problem	Possible cause and solution
Motor does not spin	The connector is not fully inserted – push it in. Check that the bell is not rubbing on dirt or on a screw that is too long. Test the motor on the *Motors* tab.
Motor spins the wrong way	Change the direction in the ESC configuration or in Betaflight (Chapter 2.4).
Motor stutters, jerks or spins up unevenly	Damaged lead or connector, damaged winding, or dirt in the motor. Check the lead, clean the motor.
Vibration, noise, jello in the video	Bent shaft, damaged or incorrectly fitted propeller, loose screws. Replace the propeller, tighten the screws, replace a motor with a bent shaft.
Motor gets very hot after flight	Propeller too large or heavy, rubbing bell or incorrect filter settings. Use a 31 mm propeller, check that the motor turns freely and that the number of poles is set to 12.

5. Information for the EU and Czech Market

5.1 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

5.2 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.

6. 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 5.1.
- 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.