GOKU GM10 Mini V3 GPS

Flywoo – GPS module with M10 chip, without compass
User manual



Read the safety instructions before installation. Power the module only with 5 V.

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1. Safety instructions

1.1 Before you start

- Read this entire manual before installation and keep it for future reference. If you pass the product on to another user, include this manual.
- The product is intended for installation in FPV drones and model aircraft. Installation and setup require basic knowledge of electronics, soldering and flight controller (FC) configuration.
- The product is not a toy. It contains small parts that could be swallowed – keep it out of the reach of children.

1.2 Electrical connection

- Power the module only with **5 V** DC. Never connect it directly to the drone battery.
- Check the wire order before connecting. Swapping 5 V and GND or connecting a higher voltage can permanently damage both the module and the flight controller (FC).
- Carry out all wiring and soldering only with the drone battery **disconnected** and the USB cable unplugged.
- The module is sensitive to electrostatic discharge. Do not touch the components on the board, work on an antistatic mat and hold the module by its edges.
- Make sure that neither the wires nor the solder pads can touch conductive parts of the frame (a carbon frame is conductive) – risk of short circuit.

1.3 Relying on GPS

- The GPS position may be inaccurate or temporarily unavailable (buildings, trees, interference, bad weather, too few satellites). Functions using GPS, such as return to home (GPS Rescue), **do not replace** the pilot's direct control of the model.
- The pilot is always responsible for the safe conduct of the flight and for complying with the regulations of the country in which they fly.

2. Product description

2.1 Intended use

Flywoo GOKU GM10 Mini V3 is a small satellite navigation (GNSS) receiver **without a compass**, based on the M10050 chip. It connects to the drone's flight controller (FC) via a serial port (UART) and provides it with position, speed and altitude. The flight controller can then show the position in the OSD, log it and use it for functions such as return to home.

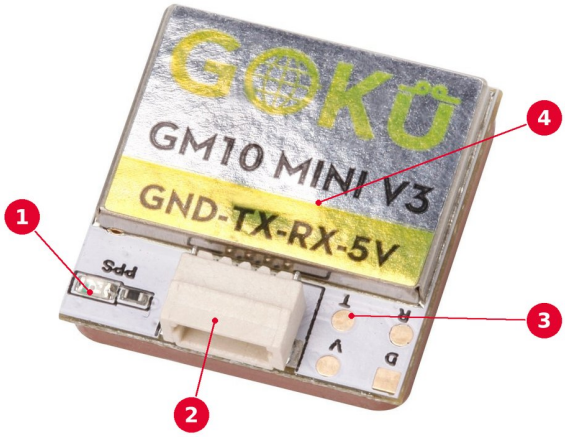
The manufacturer recommends the module for 2–5" freestyle and racing drones. The module only **receives** radio signals; it does not transmit anything.

2.2 Package contents

Qty	Item
1×	GOKU GM10 Mini V3 GPS module
1×	100 mm connection cable with SH1.0 4-pin connector
1×	Copper foil (shielding)

※ The package does **not** include a flight controller (FC), a compass or mounting material.

2.3 Parts overview



GOKU GM10 Mini V3 – top view

① **PPS LED** (yellow) – indicates the position fix status, see chapter 6.1.

② **SH1.0 4-pin connector** – for the supplied connection cable.

③ **Solder pads** marked T, R, V and D – an alternative to the cable with connector.

④ **Label with the connector pin order**: GND – TX – RX – 5V.

2.4 Technical data

Chip	M10050 (10th generation)
Compass	none
Dimensions	18 × 18 × 4.8 mm
Weight	4.7 g
Power supply	5 V DC
Connector	SH1.0, 4-pin (GND, TX, RX, 5V)
Satellite systems	GPS, GLONASS, Galileo, BeiDou, QZSS, SBAS
Default constellations	GPS + Galileo + BeiDou
Received bands	GPS L1, GLONASS L1, BeiDou B1, SBAS L1, Galileo E1
Channels	72
Sensitivity	tracking −162 dBm, reacquisition −160 dBm
Baud rate	4800–921600 bps, default 115200 bps
Signal level	TTL (default), RS-232
Update rate	1–10 Hz, default 10 Hz
Protocol	UBLOX, NMEA
Operating temperature	−40 °C to 85 °C
Storage temperature	−40 °C to 105 °C
Limits	altitude 50,000 m, velocity 500 m/s, acceleration < 4 g

3. Installation and wiring

3.1 Placement on the drone

- Mount the module on the top of the drone (typically on the stack or on the top plate of the frame) **with the GOKU label facing up**, so that it has the clearest possible view of the sky.
- Place it as far as possible from sources of interference – the video transmitter (VTX), its antenna, the camera and power wires.
- Do not cover the module with metal or carbon parts. A carbon frame and metal parts block satellite signals.
- Fix the module securely (double-sided tape, cable tie or holder) so that it cannot come loose in flight or get into the propellers. Route the cable away from the propellers.

3.2 Connecting to the flight controller (FC)

Connect the module to a **free serial port (UART)** of the flight controller. The TX and RX signals are connected **crosswise**:

GPS module		Flight controller (FC)
GND	→	GND
TX	→	RX (of the selected UART)
RX	→	TX (of the selected UART)
5V	→	5V

- On Flywoo flight controllers with a dedicated GPS connector, simply plug in the supplied cable (plug-and-play).
- On other flight controllers, solder the cable wires to the 5V, GND, TX and RX pads of the selected UART according to the table above. The pad layout and UART numbers can be found in the documentation of your flight controller.
- Before connecting the battery for the first time, use a multimeter to check that there is no short circuit between 5 V and GND.

※ Use a port powered with 5 V. Connecting to a higher voltage (e.g. a 9 V or 10 V VTX output) will destroy the module.

3.3 Copper foil

Place the supplied copper foil between the GPS module and the video transmitter (VTX). The foil reduces interference from the video transmitter with GPS reception. Make sure the foil does not touch the solder pads or any other conductive parts – risk of short circuit.

4. Setup in Betaflight

4.1 Port and baud rate

① Connect the flight controller (FC) to your computer and start Betaflight Configurator.

② On the *Ports* tab, for the UART the module is connected to, select **GPS** in the sensor column and the baud rate **115200**.

③ Save the settings (*Save and Reboot*).

4.2 GPS configuration

- Enable the **GPS** feature.
- Select **UBLOX** as the protocol and enable automatic configuration (*Auto Config*) and automatic baud rate (*Auto Baud*).
- Optionally enable the use of **Galileo**.
- Save the settings.

※ Older Betaflight firmware versions do not support the UBLOX protocol with the M10 chip; in that case use the **NMEA** protocol or update the firmware. The manufacturer states that there is no performance difference between the UBLOX and NMEA protocols.

4.3 Setup via CLI

The same settings can be entered on the *CLI* tab with these commands:

```
feature GPS
set gps_provider = UBLOX
set gps_auto_config = ON
set gps_auto_baud = ON
set gps_ublox_use_galileo = ON
save
```

4.4 Return to home (GPS Rescue)

The GPS Rescue function in Betaflight does not require a compass, so it can be used with this module. Before using it, study the Betaflight documentation thoroughly, configure the function and test it in a safe area in good conditions. The home position is stored at Arm (motor start) – therefore only arm the drone after a sufficient number of satellites has been acquired.

5. Setup in INAV

- On the *Ports* tab, for the UART the module is connected to, select **GPS** and the baud rate **115200**.
- In the GPS settings, enable the function and select **UBLOX** as the protocol. Save and restart the flight controller (FC).
- Older INAV versions may not support the module – use up-to-date firmware and INAV Configurator.

※ The module has no compass. For full INAV navigation functions (position hold, return to home, waypoint missions) the manufacturer recommends the module version with a compass.

6. Operation

6.1 PPS LED indication

PPS LED (yellow)	Meaning
off	no position fix
flashing	position fixed (fix)

6.2 First position fix

- On first power-up or after a longer period of inactivity (cold start), wait outdoors in an open area for **3–5 minutes** until the module obtains a position fix.
- Inside buildings, between tall buildings or under trees, the module may not obtain a fix.
- Monitor the number of satellites and the fix status in the configurator or in the OSD.

6.3 Before flight

- Check that the module is securely fixed and the cable is out of reach of the propellers.
- Before Arm, wait for a position fix (PPS LED flashing) and a sufficient number of satellites shown in the OSD.
- If you use return to home, verify that the flight controller has stored the home position.

7. Maintenance and troubleshooting

7.1 Maintenance and storage

- After a crash, check the module, connector and cable for mechanical damage.
- Keep the module dry and clean. Remove dirt with a dry soft brush; do not use solvents.
- Store in a dry place, within a temperature range of −40 °C to 105 °C, protected against mechanical damage and electrostatic discharge.

7.2 Troubleshooting

Problem	Possible cause and solution
The flight controller does not detect the module	TX and RX swapped (they are connected crosswise) – check the wiring. Make sure GPS is selected on the correct UART on the *Ports* tab.
No data or invalid data	Baud rate mismatch – set 115200 bps and enable *Auto Baud*. With older firmware versions, try the NMEA protocol.
No fix or slow fix	On a cold start, wait outdoors for 3–5 minutes. Remove obstacles above the module, move it away from the VTX and use the copper foil.
Few satellites in flight	Interference from the VTX or camera – change the module position, use the copper foil.
PPS LED stays off for a long time	The module has no fix – see above. Check the 5 V supply at the connector.

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 (GOKU GM10 MINI V3) is printed on the module cover.

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.