GEP-M1025-DQ

GEPRC – GPS module with compass and barometer
User Manual



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

www.rotorama.com

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1. Safety instructions

1.1 Intended use

The GEP-M1025-DQ is a global navigation satellite system (GNSS) receiver with a built-in magnetometer (compass) and barometer. It is intended for installation in FPV drones, multirotors, fixed-wing aircraft and other models, where it supplies the flight controller (FC) with position, speed, heading and altitude-change data.

- The module only receives signals from navigation satellites; it does not transmit any radio signals itself.
- This product is not a toy and is not intended for children. It should be installed by a user with basic knowledge of electronics and FPV drone setup.

1.2 Electrical safety and installation

- Always **disconnect the flight battery** and the USB cable before connecting, disconnecting or soldering any wires.
- Connect the module only to a flight controller power output within the range given in the technical data (Chapter 2.3). **Never connect it directly to the flight battery voltage.**
- Before switching on for the first time, check that the GND and 5 V wires are connected correctly and that adjacent pins or pads are not short-circuited.
- Electronics are sensitive to static electricity. Avoid touching the components on the board unnecessarily.
- **Always remove the propellers** when setting up the drone on the bench with the flight battery connected.

1.3 Operating a drone with a GPS module

- GPS-based functions (for example returning to the take-off point after signal loss) are an aid, not a guarantee. They may fail in the event of interference, an obstructed view of the sky or incorrect settings. Always test them first in a safe place.
- The operator of the drone is responsible for compliance with the operating rules. Regulations (EU) 2019/947 and 2019/945 apply in all EU Member States, but national implementing rules differ from country to country. **The law of the country in which the product is operated always prevails.**

2. Product description

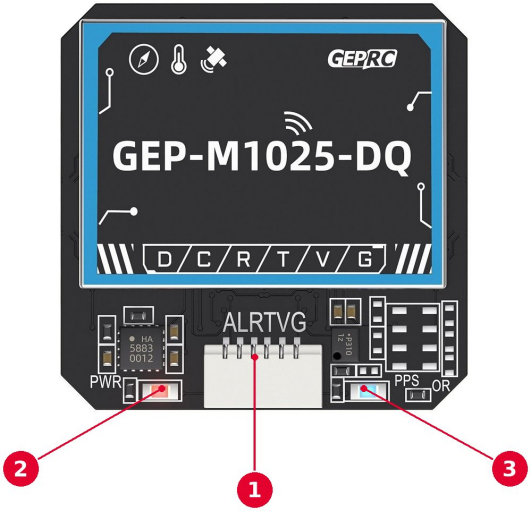
2.1 Introduction

The GEP-M1025 series GPS positioning module uses u-blox's M10 chip solution and supports GPS+BDS+Galileo+QZSS+SBAS joint positioning, up to 32 satellites. The 25 × 25 mm ceramic antenna provides better reception capabilities. The built-in Flash chip and Farad capacitor can save configuration parameters and allow a quick hot start.

The **GEP-M1025-DQ** variant contains a **QMC5883L** magnetometer and a **DPS310** barometer. The magnetometer provides accurate azimuth pointing, the barometer provides sensitive altitude change data. The module meets the needs of most FPV quadcopters, multirotors, fixed-wing aircraft and other model products.

※ The manufacturer states that, due to limited availability, the DPS310 barometer may be replaced with the DPS368 barometer. According to the manufacturer, there are no differences in performance or usage between the two barometers; they are shipped randomly.

2.2 Parts description



Top side of the module (connector side)

① Connector for the cable to the flight controller (GND, 5 V, TX, RX, SCL, SDA wires – see Chapter 3.2).

② PWR indicator.

③ PPS indicator.



Antenna side – marking ANTENNA / THIS SIDE UP

The side with the ceramic antenna is marked **ANTENNA – THIS SIDE UP** and must face the sky when mounted. The arrow in the centre of the marking indicates the orientation of the module (see Chapter 5.2).

2.3 Technical data

Parameter	Value
GPS chip	u-blox M10050
Input voltage	3.3–5 V
Receiving frequency	GPS L1, GLONASS L1, BDS B1, GALILEO E1, SBAS L1, QZSS L1
Operating mode	GPS + BDS + Galileo + QZSS + SBAS joint positioning
Channels	72
Navigation satellites	up to 32
Antenna	ceramic, 25 × 25 mm
Output protocol	UART (u-blox), I2C (barometer, magnetometer)
Baud rate	115200 bps
Output frequency	10 Hz
Speed accuracy	0.05 m/s
Horizontal positioning accuracy	2D 1.5 m (weather dependent)
Timing accuracy	30 ns
Receiver sensitivity	tracking −162 dBm, acquisition −160 dBm
Dynamic characteristics	max. height 50,000 m, max. speed 500 m/s
Maximum acceleration	4 g

Parameter	Value
Magnetometer	QMC5883L
Barometer	DPS310 (or DPS368)
Size	29 × 29 × 8.5 mm
Weight	13 g

2.4 Package contents

- 1× GPS module GEP-M1025-DQ
- 1× terminal wire with connector
- 1× GPS module instruction manual (manufacturer)
- 1× GEPRC sticker
- 1× heat shrink tubing

The package does **not** include a flight controller, a flight battery or mounting hardware for the frame.

3. Installation and wiring

3.1 Mounting the module

① The GPS antenna must face the sky. Do not block the antenna.

② The magnetometer needs to be away from magnetic interference to work properly. When installing the module, do not place it close to power wires or other places prone to magnetic interference.

③ Do not block the opening of the barometer, otherwise it will not be possible to read the atmospheric pressure data.

④ If a sponge is supplied with the module, it can be used to cover the top of the barometer to reduce the disturbance of airflow and improve the accuracy of the data.

※ Mount the module firmly so that it cannot rotate during flight – a change of orientation would corrupt the magnetometer data. We recommend placing it as far as possible from the video transmitter (VTX), receiver, camera and electronic speed controllers (ESC).

3.2 Connecting to the flight controller (FC)



Wiring diagram of the GEP-M1025-DQ module and the flight controller (FC)

Wire	Function and connection
GND	GPS ground – connect to the FC GND
5V	power supply – connect to the FC 5 V output
TX	GPS TX line – connect to the RX pin of the selected FC UART
RX	GPS RX line – connect to the TX pin of the same FC UART
SCL	magnetometer and barometer communication (I2C) – connect to the FC SCL
SDA	magnetometer and barometer communication (I2C) – connect to the FC SDA

The TX and RX lines are crossed: module TX to FC RX and module RX to FC TX.

4. GPS setting

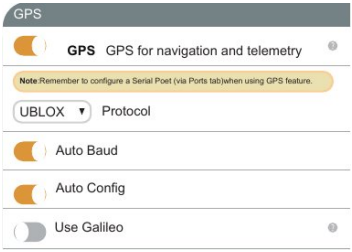
4.1 Betaflight

① On the *Ports* tab, enable **GPS** in the *Sensors* column for the port to which the module is connected (e.g. UART5) and set the baud rate to **115200**.



Betaflight – Ports tab

② On the *Configuration* tab, turn on the **GPS** function and set the protocol to **UBLOX**. The GPS feature requires a serial port to be configured on the *Ports* tab (step ①).



Betaflight – GPS settings on the Configuration tab

③ Save the settings and restart the flight controller. Once the flight controller recognises the GPS module, the **GPS** icon lights up in the top bar of the configurator.



GPS module recognised – GPS icon lit

※ The Betaflight firmware must be built with GPS support (when building the firmware in the cloud, select GPS in *Other Options*).

4.2 INAV

On the *Ports* tab, enable GPS for the port to which the module is connected and set the baud rate (the manufacturer specifies 115200). On the *Configuration* tab, enable GPS and select the **UBLOX** protocol. With the default settings, INAV configures the GPS module automatically.

5. Magnetometer and barometer settings

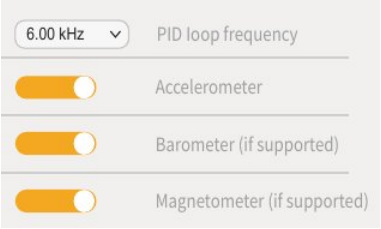
Before making the settings, the SDA and SCL wires of the module must be connected to the SDA and SCL pins of the flight controller (Chapter 3.2).

5.1 Betaflight

Betaflight firmware is built in the cloud. Usually, the flashed firmware does not include the magnetometer and barometer functions, and they need to be added manually.

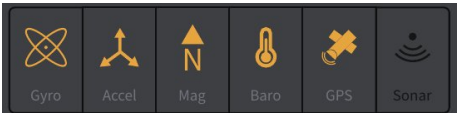
① When building the firmware, select **Magnetometers** in *Other Options* (magnetometer support). In the *Custom Defines* box, enter **BARO_DPS310** (barometer support). Then flash the firmware to the flight controller.

② After flashing the firmware, turn on the **Barometer** and **Magnetometer** switches on the *Configuration* tab. After saving and restarting, the flight controller will identify the devices automatically.



Betaflight – enabling the barometer and magnetometer

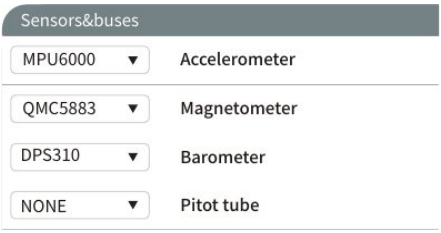
③ When the flight controller recognises the magnetometer and barometer, the **Mag** and **Baro** icons light up.



Magnetometer and barometer recognised – Mag and Baro icons lit

5.2 INAV

① On the *Configuration* tab, in the *Sensors & buses* section, set the magnetometer to **QMC5883** and the barometer to **DPS310**.



INAV – selecting the magnetometer and barometer

② If the installation direction of the GPS module is consistent with the arrow indication, set the QMC5883 magnetometer alignment to **CW 0° flip**.

③ After the setting is complete, restart the flight controller. When the flight controller recognises the magnetometer and barometer, the corresponding icons light up.



INAV – icons of recognised sensors lit

④ Calibrate the magnetometer according to the instructions of the configurator to ensure that it points correctly.

⑤ In a static state, check on the sensors tab whether the barometer data becomes stable.

6. First start and function check

6.1 First satellite acquisition

- Perform the first satellite acquisition (cold start) outdoors under an open sky, away from buildings, trees and other obstacles. Indoors, the module will usually not acquire any satellites.
- The first position fix may take several minutes. Do not move the drone during this time and leave it switched on.
- Monitor the number of satellites and the fix status on the *GPS* tab of the configurator or in the OSD.
- Thanks to the Farad capacitor, re-acquiring the position shortly after switching off is considerably faster (hot start).

6.2 Checking the magnetometer and barometer

- Calibrate the magnetometer only after the module has been permanently mounted on the drone, away from metal objects and sources of magnetic fields. Repeat the calibration whenever the module is relocated or the wiring is modified.
- After calibration, verify that the heading shown in the configurator matches the actual orientation of the drone in all cardinal directions. If the heading is permanently offset, check the magnetometer alignment setting.
- For the barometer, check that the altitude reading settles at rest and responds when the drone is lifted.

6.3 Before flying with GPS functions

- Before Arm (motor start), wait until the module has a valid 3D fix and a sufficient number of satellites. Only then will the flight controller store the home point.
- Check the settings and parameters of the return functions (e.g. GPS Rescue in Betaflight or RTH in INAV) according to the firmware documentation and test them first at a safe altitude in an open area.
- The GPS module must be powered at the same time as the flight controller, otherwise the flight controller may not recognise it correctly.

7. Maintenance and troubleshooting

7.1 Maintenance and storage

- Keep the module dry and clean. Protect it from water, moisture, dust and dirt, especially the barometer opening.
- Do not blow compressed air into the barometer opening and do not insert any objects into it.
- After a crash, check the cable, connector and mounting of the module. A rotated module corrupts the magnetometer data.
- Store in a dry place at room temperature, away from direct sunlight and strong magnets.

7.2 Troubleshooting

Problem	Possible cause and solution
The flight controller does not recognise the GPS (GPS icon not lit)	TX/RX lines swapped or not connected (they must be crossed); GPS not enabled on the correct port; wrong baud rate; firmware without GPS support. The module must be powered at the same time as the flight controller.
The module does not acquire satellites	Try outdoors under an open sky and wait several minutes. The antenna must face the sky and must not be covered. The VTX, camera or wiring close to the module may cause interference.
Magnetometer or barometer not recognised	Check the SDA and SCL wiring. In Betaflight, make sure the firmware includes magnetometer and barometer support (Chapter 5.1) and that the sensors are enabled. Some flight controllers power the I2C bus only when the flight battery is connected.
Barometer does not work, the flight controller has its own barometer	The barometers on the module and on the flight controller may have the same I2C address. The manufacturer describes the solution in the document *GPS Baro & Magnetometer troubleshooting* on geprc.com. Modifying the module board is not a product defect.
Compass heading is wrong	Check the magnetometer alignment (Chapter 5.2), repeat the calibration and move the module away from power wires and other sources of magnetic interference.
Altitude reading fluctuates at rest	Airflow is acting on the barometer. Do not block the barometer opening, but you can protect it with a sponge (Chapter 3.1).

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 (GEP-M1025-DQ) is printed on the top side of the module.

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.