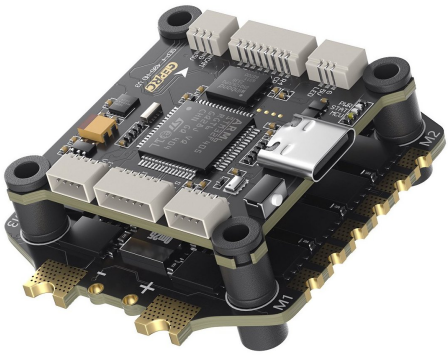
TAKER F405 BLS 60A V2

Flight controller and ESC stack
GEP-F405-HD V3 + TAKER H60_BLS 60A 4IN1 ESC



Read this entire manual carefully before installation and before connecting a battery for the first time. Always solder and wire with the battery disconnected.

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1. Safety Instructions

1.1 Before you start

The GEPRC TAKER F405 BLS 60A V2 stack is an electronic assembly consisting of a flight controller (FC) and a 4-in-1 electronic speed controller (ESC), intended to be built into an FPV drone. Installation requires soldering and basic knowledge of electronics and of the Betaflight software. Before installation, read this entire manual and the manuals of all other parts you are going to connect (motors, receiver, video transmitter, camera, GPS).

- This product is not a toy. It is not intended for children or for persons without experience with electronics and drone operation.
- Always carry out soldering and wiring **with the battery disconnected** and the USB cable unplugged.
- Observe the input voltage of **3–6S LiPo**. A higher voltage will permanently damage the stack.
- Before connecting a battery for the first time, check with a multimeter that there is no short circuit between the positive and negative power leads and that the polarity is correct. We recommend the first power-up through a current limiter (smoke stopper).
- Protect the boards against moisture and conductive carbon dust; a carbon frame must not touch the boards or solder pads.

1.2 LiPo batteries

The stack is powered by a LiPo battery with 3 to 6 cells in series, which is not included. Observe these values:

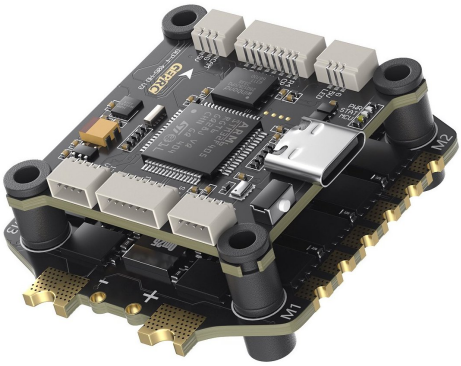
State	3S	4S	5S	6S
Fully charged (4.20 V/cell)	12.6 V	16.8 V	21.0 V	25.2 V
End flight (3.5 V/cell)	10.5 V	14.0 V	17.5 V	21.0 V
Storage (3.8 V/cell)	11.4 V	15.2 V	19.0 V	22.8 V

- Charge batteries only with a charger designed for LiPo, under supervision and on a non-flammable surface.
- Do not use or charge a damaged, swollen or overheated battery.
- Always disconnect the battery after a flight or test. A battery left connected to a drone unattended is dangerous.

1.3 Motor tests and spinning propellers

- When setting up and testing the motors (*Motors* tab in Betaflight), **always remove the propellers**.
- When handling a drone with propellers fitted, expect that the motors may start at any time – for example after connecting the battery or due to an incorrectly configured Arm switch (Arm = motors enabled).
- The ESC and motors heat up during operation – do not touch hot parts after a flight.

2. Product Description



GEPRC TAKER F405 BLS 60A V2 stack – flight controller mounted above the ESC

2.1 Package contents

1×	GEP-F405-HD V3 flight controller
1×	TAKER H60_BLS 60A 4IN1 ESC
1×	Capacitor
1×	DJI Air Unit adapter cable
1×	Flight controller adapter cable (FC – ESC)
1×	XT60 power cable
4×	M3 × 30 screw
4×	M3 × 25 screw
8×	Nylon nut
8×	Silicone grommet
2×	SH1.0 4-pin silicone cable
1×	Camera connection cable

※ The package does **not** include a battery, motors, propellers, receiver, video transmitter, camera, GPS module, buzzer or LED.

2.2 GEP-F405-HD V3 flight controller

Parameter	Value
MCU	STM32F405
IMU (gyro)	ICM42688-P (SPI)
Blackbox memory	16M, onboard
Barometer	BMP280
OSD	Betaflight OSD, AT7456E chip
BEC	5 V / 3 A and 12 V / 2.5 A (dual independent outputs)
Input voltage	3–6S LiPo
UART	6
Motor outputs	M1–M6
USB connector	USB-C
Power filter	integrated LC filter
DJI video transmitter	direct plug-in connection
Firmware target	GEPRCF405
Size	37.2 × 37.2 mm
Mounting holes	30.5 × 30.5 mm; ⌀ 4 mm hole, ⌀ 3 mm with silicone grommet (M3)
Weight	7.3 g

2.3 TAKER H60_BLS 60A 4IN1 ESC

Parameter	Value
Input voltage	3–6S LiPo
Continuous current	60 A
Burst current	65 A (5 s)
Current sensor	yes
Protocol	DShot 150 / 300 / 600
Firmware	BLHeli_S, target B_X_30
Size	42 × 45.7 mm
Mounting holes	30.5 × 30.5 mm; ⌀ 4 mm hole, ⌀ 3 mm with silicone grommet (M3)
Weight	14.9 g

※ Data taken from the documentation and product page of the manufacturer GEPRC. The firmware version varies by production batch.

3. Installation and Power

3.1 Mechanical installation

Both the flight controller and the ESC have a 30.5 × 30.5 mm mounting pattern. Insert the silicone grommets from the package into the ⌀ 4 mm mounting holes – this reduces the hole to ⌀ 3 mm for M3 screws. The grommets dampen vibrations so that the gyro works stably.

① Depending on the frame height, choose the M3 × 25 or M3 × 30 screws from the package.

② Place the ESC at the bottom and the flight controller (FC) above it. Orient the flight controller so that the connectors and the USB-C port remain accessible; you will set the actual board orientation later in Betaflight (*Configuration → Board and Sensor Alignment*).

③ Secure the boards with the nylon nuts. Do not overtighten the nuts – compressed grommets lose their damping effect.

④ Check that no component or solder pad touches the frame or the other board.

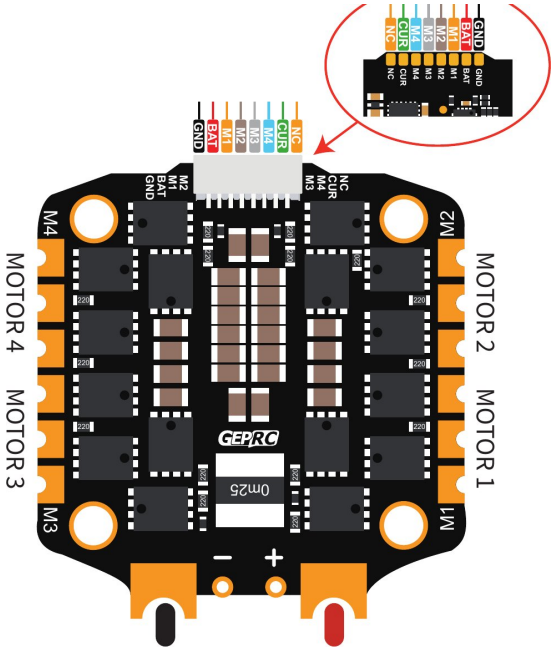
3.2 Power and capacitor

Solder the XT60 power cable and the capacitor from the package to the ESC power pads marked **+** and **−**. The capacitor suppresses voltage spikes generated by motor switching and protects the electronics. **Strictly observe the polarity** of both the capacitor and the power cable – reverse polarity will destroy the capacitor and the ESC.

- Place the capacitor as close to the power pads as possible and keep its leads as short as possible.
- Route the power wires along the shortest path and away from signal wires and the receiver.
- After soldering, check with a multimeter that there is no short circuit between + and −.

3.3 ESC and motors

Solder the motors to the pads on the sides of the ESC marked M1–M4 (MOTOR 1 to MOTOR 4). Connect the ESC to the flight controller with the cable from the package (8-pin connector).



TAKER H60_BLS 60A 4IN1 ESC – motor pads M1–M4, power (+/–) and 8-pin connector

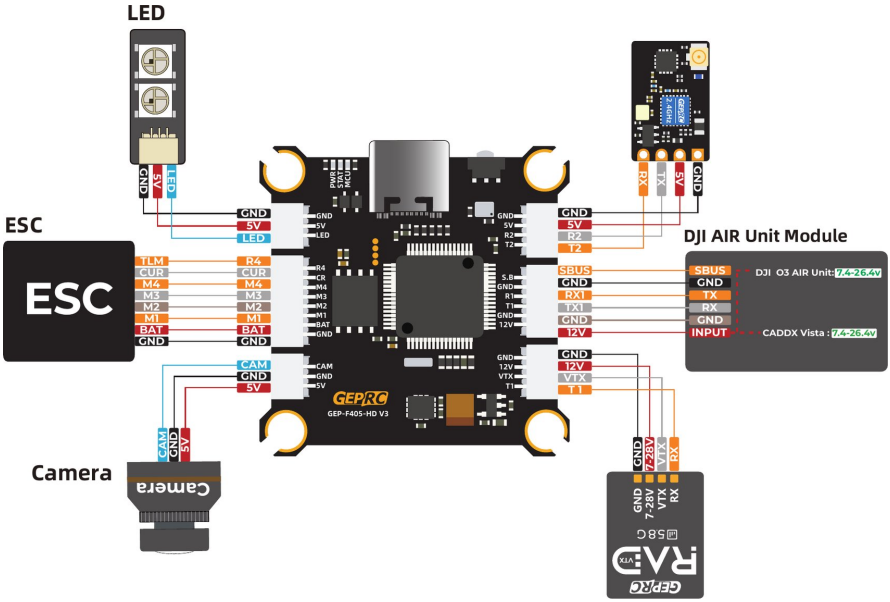
▶ FC – ESC connector pinout

ESC	FC	Function
GND	GND	ground
BAT	BAT	battery voltage (measurement)
M1	M1	motor 1 signal
M2	M2	motor 2 signal
M3	M3	motor 3 signal
M4	M4	motor 4 signal
CUR	CUR	current sensor
NC	R4 (TLM)	not connected on the ESC side

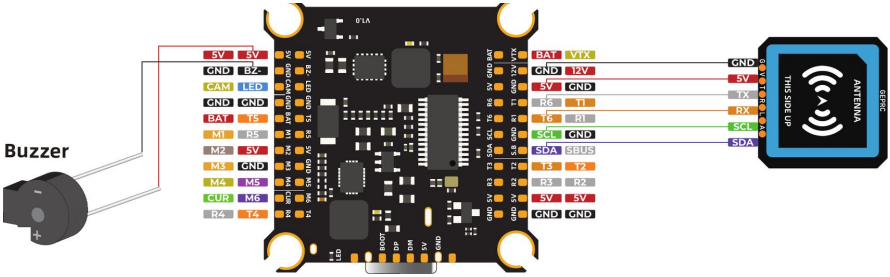
After the first connection, check the direction of rotation and the order of the motors in Betaflight (Motors tab) – always without propellers.

4. Connecting Peripherals

The diagrams are taken from the manufacturer's documentation. On top are the connectors (ESC, LED, camera, receiver, DJI, analog VTX), on the bottom the solder pads (buzzer, GPS, further UARTs, M5–M6).



Top side of the flight controller – connectors and peripherals (manufacturer's diagram)



Bottom side of the flight controller – solder pads, buzzer and GPS module (manufacturer's diagram)

4.1 Receiver

Connect a serial receiver (e.g. CRSF) to the **GND** / **5V** / **R2** / **T2** connector (UART2):

Receiver	Flight controller	Note
GND	GND	ground
5V	5V	power
TX	R2	data to FC
RX	T2	data from FC

4.2 DJI / Caddx Vista digital video transmitter

Connect the DJI O3 Air Unit or Caddx Vista with the DJI Air Unit cable from the package to the **SBUS** / **GND** / **RX1** / **TX1** / **GND** / **12V** connector. Unit input voltage according to the manufacturer's diagram: DJI O3 Air Unit 7.4–26.4 V, Caddx Vista 7.4–26.4 V.

Flight controller	DJI unit	Note
SBUS	SBUS	DJI receiver signal
GND	GND	ground
RX1	TX	data (MSP)
TX1	RX	data (MSP)
GND	GND	ground
12V	INPUT	unit power

4.3 Analog video transmitter

Connect an analog video transmitter to the **GND** / **12V** / **VTX** / **T1** connector. The manufacturer's diagram shows the GEPRC RAD VTX with a 7–28 V input.

Flight controller	Video transmitter	Note
GND	GND	ground
12V	power	12 V BEC output
VTX	VTX	video signal
T1	RX	control (IRC Tramp)

Use the 12 V supply only for a video transmitter that, according to its manufacturer, tolerates 12 V.

4.4 Camera, LED, buzzer and GPS

- **Camera** – **CAM** / **GND** / **5V** connector; use the camera connection cable from the package.
- **LED** – **GND** / **5V** / **LED** connector.
- **Buzzer** – pads on the bottom side: positive lead (+) to **5V**, negative lead (−) to **BZ-**.
- **GPS module** – pads on the bottom side: GND – GND, 5V – 5V, module TX – **R6**, module RX – **T6**, SCL – SCL, SDA – SDA (UART6; SCL/SDA is the I²C bus, e.g. for a compass).
- The **M5** and **M6** outputs on the bottom side are intended for additional motors or servos (e.g. on a hexacopter).

5. Betaflight Setup

5.1 Connecting to a computer and firmware

Connect the flight controller to the computer with a USB-C cable and open Betaflight Configurator. A battery does not need to be connected for the USB connection. When updating the firmware, select the target **GEPRCF405**. Back up your settings before updating (*diff all* command in the CLI tab).

- Flash firmware only with the battery disconnected and without propellers.
- If the computer does not recognise the flight controller, try a different USB-C data cable and install the drivers offered by Betaflight Configurator.

5.2 Port and receiver setup

The settings are based on the manufacturer's diagrams. Ports are configured in the *Ports* tab, the receiver type in the *Receiver* tab:

Connection	Ports	Receiver / Peripherals
Receiver (e.g. CRSF)	UART2: *Serial RX* on	*Receiver Mode*: Serial-based receiver; *Serial Receiver Provider*: according to the receiver (e.g. CRSF)
DJI (FPV System)	UART1: *Configuration/MSP* on; UART2: *Serial RX* on	*Receiver Mode*: Serial (via UART); *Serial Receiver Provider*: SBUS
Analog VTX	UART1: *Peripherals*	VTX (IRC Tramp), AUTO
GPS module	UART6: *Sensor Input*	GPS, AUTO

※ When using a serial receiver, always configure the corresponding UART in the *Ports* tab and select the receiver type in the *Receiver* tab. Each UART can have only one function enabled.

5.3 ESC

The ESC supports DShot 150, 300 and 600; the protocol is selected in the *Configuration* tab (*ESC/Motor protocol*). The BLHeli_S ESC firmware (target B_X_30) can be configured with a BLHeli_S configurator, for example to change the motor direction.

- Enable the current sensor in the *Power & Battery* tab (*Current Meter Source*: Onboard ADC). Verify the reading by measurement and adjust the scale (*Scale*) if necessary.
- The flight controller measures the battery voltage via the BAT wire; in the *Power & Battery* tab set the warnings according to the table in chapter 1.2.

5.4 Checks before the first flight

① Place the drone on a level surface and run *Calibrate Accelerometer* in the *Setup* tab.

② Check that the model in the *Setup* tab responds to tilting in the correct direction; otherwise adjust *Board and Sensor Alignment*.

③ Without propellers, check the order and direction of rotation of the motors in the *Motors* tab.

④ In the *Receiver* tab, check that all channels respond correctly.

⑤ In the *Modes* tab, set up the Arm switch (motors enabled) and check Disarm (motors disabled).

⑥ In the *Failsafe* tab, set the behaviour on signal loss and test it by switching off the radio transmitter – without propellers.

⑦ Before flying, insert a **fully charged** battery (see chapter 1.2).

6. Operating the Assembled Drone

6.1 The law of the country where you fly applies

The stack is a component; the person who assembles and operates the drone is responsible for the assembled drone and its operation. 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, mandatory insurance, permitted frequency bands and maximum transmit power. The information in this chapter describes the situation in the Czech Republic. If you operate a drone in another country, you must follow the regulations of the country in which you fly.

6.2 Basic rules in the Czech Republic

- Drone operation in the Czech Republic is supervised by the Civil Aviation Authority (ÚCL, www.caa.gov.cz).
- A drone with a camera requires operator registration regardless of its weight; the registration number must be displayed on the drone.
- The pilot must hold the competency appropriate to the category of operation.
- Flying with FPV goggles in the open category is only possible with an observer who keeps the drone in direct visual line of sight.
- The video transmitter and the radio transmitter must operate in the bands and at the power levels permitted in the country of operation; the user is responsible for the power setting.

7. Maintenance and Troubleshooting

7.1 Maintenance

- After a crash, check the boards, solder joints, connectors and the capacitor. Replace a cracked or swollen capacitor.
- Keep the boards clean and dry; remove dirt with a dry brush or compressed air.
- Check the tightness of the screws and the condition of the silicone grommets; replace worn grommets.
- Disconnect the battery for storage.

7.2 Troubleshooting

Problem	Possible cause and solution
The computer does not recognise the flight controller	Faulty or charge-only USB-C cable – use a data cable; install the drivers.
The receiver does not respond	Check the wiring TX → R2, RX → T2, the *Serial RX* setting on UART2 and the receiver type in the *Receiver* tab.
OSD in DJI does not work	Check the RX1/TX1 wiring and that *Configuration/MSP* is enabled on UART1.
Analog VTX cannot be controlled	Check the T1 wire and the *Peripherals* setting on UART1 (IRC Tramp).
The drone will not Arm	Check the Arm switch in the *Modes* tab, the accelerometer calibration, the throttle position and the messages in the *Setup* tab.
A motor spins the wrong way	Change the direction in the BLHeli_S configurator or swap two motor wires.
Incorrect current reading	Adjust the current sensor scale in the *Power & Battery* tab.

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:** type designation (GEPRC TAKER F405 BLS 60A V2 Stack; GEP-F405-HD V3 flight controller, TAKER H60_BLS 60A 4IN1 ESC); the flight controller designation is printed on the circuit board. The flight controller firmware version is shown by Betaflight Configurator.

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.