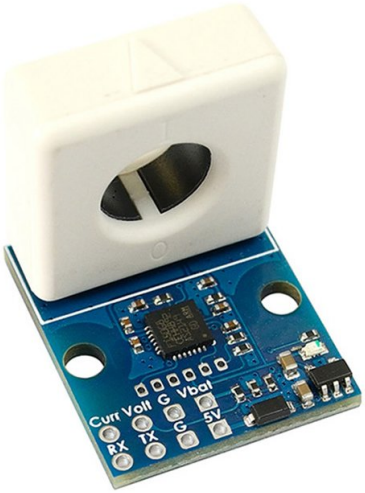
Matek HCS-150A

Hall current sensor 150 A
User manual



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

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1. Safety instructions

The sensor is installed in the power circuit of the model, which carries high currents from the battery. A mistake during installation can cause a short circuit, fire or damage to the flight controller (FC) and other components.

- Always carry out all installation, soldering and wiring work **with the battery disconnected**.
- Do not exceed the limits: sensor supply (**5V** pad) 4–13 V, measured voltage on the **Vbat** pad 0–69 V, continuous current through the wire 0–150 A DC.
- The sensor only measures current; it **does not fuse the circuit** and does not protect against overload or short circuit. The power wire, connectors and solder joints must be rated for the actual current of your model.
- The power wire passing through the sensor opening must have intact insulation. Never pass a bare conductor through the opening.
- Protect the sensor board from water, moisture, conductive dirt and metal objects. Do not touch the solder pads while a battery is connected.
- Use the sensor within the operating temperature range of −30 °C to 80 °C.
- The sensor is not a toy. Keep it out of the reach of children.
- When operating the model, comply with the regulations of the country in which you operate it – the law of that country always prevails.

2. Product description

2.1 Intended use

The Matek HCS-150A is a contactless current sensor based on the Hall effect. It is intended mainly for larger multirotors and fixed-wing models. The power wire from the battery is simply passed through the opening in the white sensor housing – unlike measurement with a current shunt (resistor), the wire is not interrupted, there is no voltage drop and no heat on a sense resistor, and one possible source of failure is eliminated.

The sensor sends the flight controller an analog signal proportional to the current flowing. In addition to current, it can also measure the battery voltage and pass it to the flight controller at a ratio of 1 : 21. The offset and sensitivity are calibrated in the factory.

2.2 Package contents

- 1× Matek HCS-150A current sensor

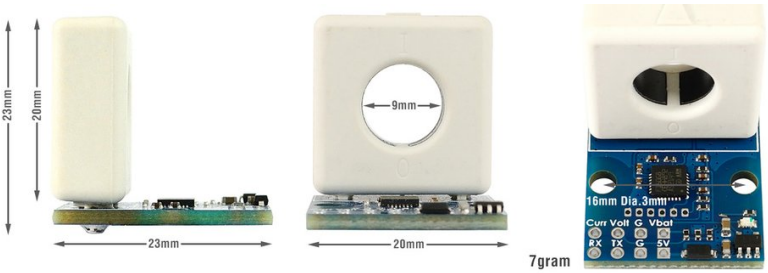
Not included: connecting wires, power wires, connectors, screws and flight controller.

2.3 Specifications

Measuring principle	Hall effect, contactless
Measurable current (continuous)	0–150 A DC
Sensitivity	20 mV/A (Curr output 0–3.3 V)
Measurable voltage (Vbat)	0–69 V
Voltage output (Volt)	1/21 Vbat, 0–3.3 V
Supply (5V pad)	4–13 V
Power consumption	17 mA
Offset error at zero current	±10 mV
Curr output voltage error	5 %
Operating temperature	−30 °C to 80 °C
Dimensions	23 × 20 × 23 mm
Wire opening diameter	9 mm
Mounting holes	3 mm diameter, 16 mm spacing
Weight	7 g

2.4 Dimensions and pads

Pad	Function
Vbat	battery voltage sense input, 0–69 V
Volt	measured voltage output = 1/21 Vbat, 0–3.3 V
Curr	current signal output, 0–3.3 V
5V	sensor board supply, input 4–13 V, 17 mA
G	ground (GND)
TX / RX	intended for firmware update and configuration; not yet supported by the manufacturer – leave unconnected



Sensor dimensions (manufacturer's data)

3. Installation and wiring

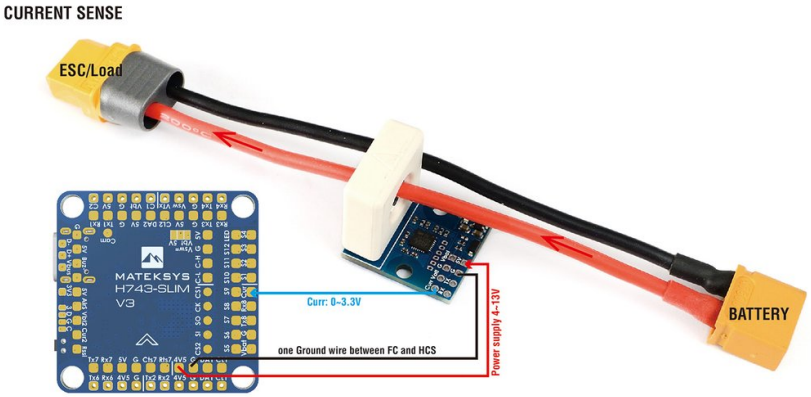
3.1 Location and mounting

- **Mount the sensor as far away from iron and magnetic materials as possible** (manufacturer's recommendation). The magnetic field of nearby parts affects measurement accuracy.
- Fix the board with two screws through the 3 mm mounting holes with 16 mm spacing, or by another reliable method, so that it does not move in flight or rub against wires.
- Route the connecting wires to the flight controller by the shortest possible path and secure them against being pulled out.

3.2 Routing the power wire

- Pass **only the positive (red) power wire** between the battery and the electronic speed controllers (ESC) through the sensor opening (9 mm diameter). Route the negative wire outside the sensor – as shown in the manufacturer's pictures.
- Current must flow through the wire **in the direction from the battery to the load (ESC)** as shown in the pictures in chapters 3.3 and 3.4 (red arrows).
- A wire with a connector attached usually does not fit through the opening. Pass it through before soldering on the connector, or choose another point on the power lead.

3.3 Wiring for current sensing



Current sensing – example wiring with the Matek H743-SLIM V3 flight controller (manufacturer's picture)

① Connect the sensor's **Curr** pad to the current sensor input of the flight controller (Curr pad in the picture). The signal range is 0–3.3 V.

② Connect the sensor's **5V** pad to a power output of the flight controller (4–13 V; 4V5 pad in the picture).

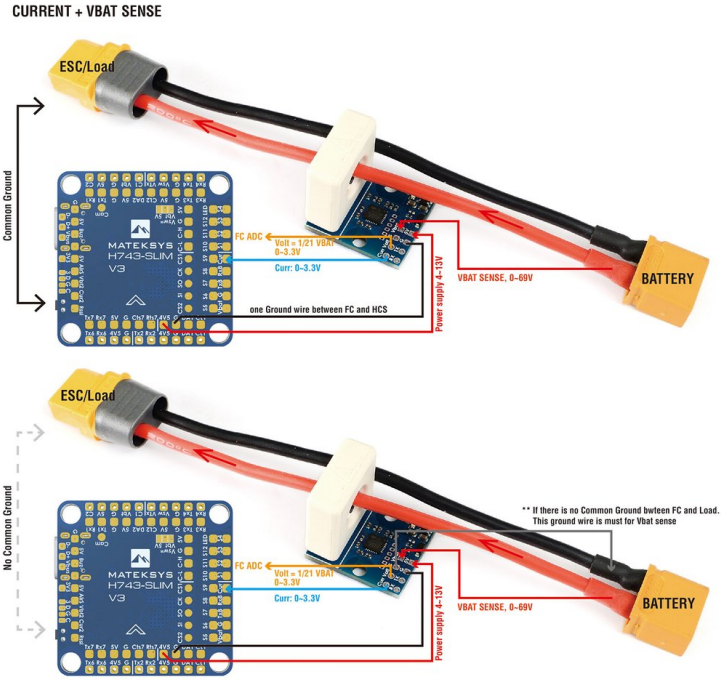
③ Connect the sensor's **G** pad to the flight controller ground (G) with one ground wire.

3.4 Wiring for current and voltage sensing

To also measure the battery voltage with the sensor, additionally connect:

④ the sensor's **Vbat** pad to the positive battery terminal (VBAT SENSE, 0–69 V).

⑤ the sensor's **Volt** pad to an analog ADC input of the flight controller (labelled FC ADC in the manufacturer's picture). The Volt output equals 1/21 of the battery voltage, i.e. 0–3.3 V.



Current and voltage sensing – top: with a common ground between the flight controller and the load (Common Ground), bottom: without a common ground (No Common Ground). Manufacturer's picture.

※ If the flight controller and the load (ESC) do not share a common ground, an additional ground wire from the sensor's G pad to the negative battery terminal is required for voltage sensing (bottom picture).

※ Check the documentation of your flight controller to find out which ADC input is suitable for the Volt output. The battery voltage input of the flight controller (Vbat) usually has its own voltage divider; the sensor's Volt output is already divided at a ratio of 1 : 21.

4. Flight controller setup

The manufacturer gives the following scale values for the individual firmwares:

Firmware	Current	Voltage
Betaflight	scale = 200	scale = 210
INAV	scale = 200	scale = 2100
ArduPilot	BATT_AMP_PERVLT = 50	BATT_VOLT_MULT = 21.0

The manufacturer does not specify an offset value; the sensor's offset and sensitivity are calibrated in the factory. Menu paths and parameter names may differ between firmware versions – follow the documentation of the firmware you use.

4.1 Betaflight

- In Betaflight Configurator, open the *Power & Battery* tab.
- Set *Current Meter Source* to *Onboard ADC* and enter **200** in the *Scale* field.
- If you measure voltage with the sensor, set *Voltage Meter Source* to *Onboard ADC* and enter **210** in the *Scale* field.
- Save the settings with the *Save* button.

4.2 INAV

- In INAV Configurator, enable current measurement with sensor type *ADC* and set the current scale to **200**.
- If you measure voltage with the sensor, set the voltage scale to **2100**.
- Save the settings and restart the flight controller.

4.3 ArduPilot

- Set up the analog voltage and current monitor (parameter *BATT_MONITOR*) and assign the *BATT_VOLT_PIN* and *BATT_CURR_PIN* inputs according to the documentation of your flight controller.
- Set **BATT_AMP_PERVLT = 50**.
- If you measure voltage with the sensor, set **BATT_VOLT_MULT = 21.0**.
- Write the parameters and restart the flight controller.

4.4 Checking and fine-tuning the readings

- With no load (motors stopped), the measured current should correspond only to the idle consumption of the electronics.
- Compare the voltage reading with the battery voltage measured with a multimeter.
- Check the current after a flight: compare the consumed capacity (mAh) reported by the flight controller with the capacity the charger put back into the battery. If the values differ, adjust the scale in small steps and repeat the measurement.

※ According to the manufacturer, the current output has an error of up to 5 %. Treat the consumed capacity reading as indicative and do not fly until the battery is completely discharged.

5. Maintenance and troubleshooting

- After a crash, check that the sensor board is not cracked, that the solder joints hold and that the insulation of the power wire is not damaged where it passes through the sensor.
- Keep the board clean and dry. Remove dirt with a dry brush.
- Do not tamper with or modify the sensor.

Problem	Possible cause and solution
No current reading (always 0 A)	Check the sensor supply (5V and G), the connection of Curr to the correct flight controller input and the current meter source setting in the firmware.
Current is negative or does not match the load	Check the direction of the positive wire through the sensor (from battery to ESC, chapter 3.2) and the scale value (chapter 4).
Current is inaccurate or fluctuates	The sensor is close to iron or magnetic material – relocate it (chapter 3.1). If necessary, fine-tune the scale (chapter 4.4).
No voltage reading or wrong voltage	Check the Vbat and Volt wiring, the ADC input used, the voltage scale and, without a common ground, the additional ground wire (chapter 3.4).

6. Information for the EU and Czech Market

6.1 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

6.2 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:** manufacturer Matek Systems, type designation **HCS-150A** (Hall Current Sensor 150A); the printed circuit board bears the marking MATEKSYS Hall Current Sensor.

6.3 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.

7. 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 6.1.
- 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.