HDZero Lux

FPV camera with HD composite video output
for the HDZero digital system (AIO5, AIO15, ECO VTX)



Before installation and first use, read this entire manual carefully, especially the safety instructions, and keep it for future reference.

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1. Safety instructions

1.1 Before you start

The HDZero Lux camera is an electronic module designed to be built into an FPV drone. Installation requires basic knowledge of electronics and soldering. If you are not sure, have the installation done by an experienced modeller.

- This product is not a toy. Keep it away from children and from persons who are unable to assess the risks associated with its installation and operation.
- Small parts (camera, spare lens) can be swallowed – keep them out of reach of children and animals.
- Do not modify or disassemble the camera, except for the lens replacement described in Chapter 6.2.

1.2 Power supply and soldering

- The camera is powered with **3.3–5 V** from the camera output of the video transmitter. **Never connect it directly to the battery** (VBAT) – a higher voltage will permanently destroy the camera.
- Always solder with the battery and the USB cable disconnected. After soldering, check that there is no short circuit between adjacent pads.
- The soldering iron is hot – there is a risk of burns and of damaging nearby components or wire insulation. Work in a well-ventilated area.
- Protect the electronics from static electricity when handling them; do not touch the pads and components with your fingers.
- Protect the camera from moisture, water and condensation. Do not power up wet electronics.

1.3 Camera on a drone

- **Always remove the propellers** when setting up on the bench. The camera and video transmitter menus are operated with the radio sticks and an accidental Arm (motors enabled) will spin up the motors.
- The camera image is the pilot's only source of information when flying with FPV goggles. Before every flight, check that the image is sharp, stable and free of dropouts.
- Make sure the camera and its cable are firmly secured – a loose camera or a broken wire means loss of video in flight.

2. Product description

2.1 What the camera is for

The RunCam HDZero Lux is a compact, lightweight and durable FPV camera designed for tiny whoops and micro drones. It has a 1/2" CMOS sensor that delivers a sharp image and good low-light performance. The camera supports Wide Dynamic Range (WDR) and captures the image at a higher 1080p resolution, which it oversamples to the 720p output.

Unlike cameras with a flat MIPI cable, the Lux camera sends the image to the video transmitter as **HD composite video over a single signal wire**. This saves space and weight and makes the connection more durable. The camera is optimised for a 4:3 aspect ratio, but it can also be set to 16:9 – in that case the vertical field of view is reduced.

2.2 Package contents

- 1× RunCam HDZero Lux camera

Not included: video transmitter (VTX), camera mount, spare lens and FPV goggles. These parts must be purchased separately.

2.3 Parts description

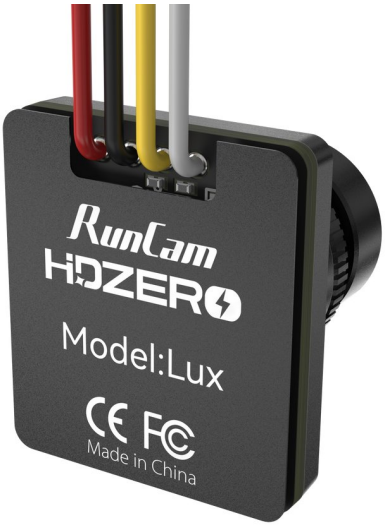


HDZero Lux camera – front view

① Lens with M8 thread – replaceable (see Chapter 6.2)

② Camera body with the sensor

③ Camera cable – wires for power, ground, video signal and camera menu control



Back side with the model designation and the CE marking

2.4 Specifications

Parameter	Value
Manufacturer	RunCam (HDZero brand)
Model	HDZero Lux (marked “Model: Lux” on the product)
Manufacturer code	HDZ3271
Sensor	CMOS 1/2"
Sensitivity	10650 mV/Lux-sec
Shutter	rolling shutter
Resolution	1280 × 720 at 60 fps (4:3 and 16:9)
Field of view 4:3	D 155° / H 126° / V 94°
Field of view 16:9	D 170° / H 145° / V 82°
Output	HD composite video (single signal wire)
Lens	M8 thread
Supply voltage	3.3–5 V
Power consumption	0.5 W
Weight	2.3 g
Dimensions (L × W × H)	14 × 16 × 14 mm

D = diagonal, H = horizontal, V = vertical field of view. Data provided by the manufacturer.

2.5 Compatibility

The manufacturer lists the Lux camera as compatible with the following HDZero video transmitters that have an HD composite video input:

- **HDZero AIO5** – flight controller (FC) with an integrated video transmitter for 1S tiny whoops,
- **HDZero AIO15** – flight controller (FC) with an integrated video transmitter for 2S/3S whoops,
- **HDZero ECO VTX** – stand-alone video transmitter.

※ The Lux camera has no MIPI interface. It therefore cannot be used with HDZero video transmitters that only have a MIPI connector.

3. Legal conditions of operation

3.1 The law of the country of operation applies

Regulations (EU) 2019/947 and 2019/945 apply in all member states of the European Union, but the national implementing rules differ from country to country – registration portals, minimum pilot age, geographical zones, compulsory 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.

3.2 Drone with a camera and operator registration

A camera is a sensor capable of capturing personal data. Under Article 14(5) of Regulation (EU) 2019/947, the operator of a drone equipped with a camera must therefore **register regardless of the weight of the drone** – even for a tiny whoop under 250 g. In the Czech Republic, registration is handled by the Civil Aviation Authority (ÚCL). The registration number is displayed on the drone.

The rules for the flight itself (operational category, height, flying with FPV goggles with an observer) can be found in the drone manual and on the website of the civil aviation authority.

3.3 Privacy protection

- Respect the privacy of others. Do not film people or private property without their consent.
- When processing recordings in which people can be identified, follow the personal data protection regulations (GDPR).

4. Installation and wiring

4.1 What else you need

- a compatible HDZero video transmitter (AIO5, AIO15 or ECO VTX – see Chapter 2.5),
- a frame or mount matching the dimensions of the camera (Chapter 2.4),
- an HDZero digital receiver – HDZero FPV goggles or another HDZero system receiver,
- a fine soldering iron, solder and flux (if the camera cable is soldered to pads),
- a radio bound to the flight controller (FC) – the camera menu is operated with the sticks.

4.2 Mounting the camera in the frame

- Insert the camera into the mount in the frame and secure it. After wiring, check in the goggles that the image is not rotated.
- Route the cable so that it does not touch the propellers, is not under tension and does not rub against sharp edges of the frame.
- Choose the camera tilt according to your flying style and secure it against turning by itself.
- Do not touch the lens glass with your fingers during installation.

4.3 Connecting to the video transmitter

The camera has four wires: power, ground, video signal and the camera menu control wire. They are connected to the camera input of the video transmitter. Pad labels and wire colours according to the HDZero documentation:

AIO5 / AIO15	ECO VTX	Colour	Function
5V	5V	red	camera power
G	GND	black	ground
C	CAM	yellow	video signal
P	OSD	white	camera menu control

The ECO VTX camera connector also has SCL and SDA pins – they remain unconnected.

❇ Before soldering or connecting, always compare the pad labels on your video transmitter with the table. Swapping power and signal can damage both the camera and the transmitter.

4.4 First power-up

① Remove the propellers.

② Switch on the FPV goggles and set them to the video transmitter channel.

③ Connect the drone battery. After a moment, the camera image should appear in the goggles.

④ If the image is missing or distorted, proceed according to Chapter 5 and Chapter 7.

5. Settings

5.1 Video transmitter firmware

Support for the Lux camera was added to the HDZero video transmitter firmware later. Older video transmitter firmware does not support the Lux camera. Before first use, therefore, flash the **latest firmware** to the video transmitter. The firmware and the update procedure (usually via HDZero FPV goggles) can be found on the manufacturer's websites:

- www.hd-zero.com/document – firmware and manuals,
- docs.hd-zero.com – HDZero online documentation.

5.2 Entering the camera menu

The camera menu is generated by the camera itself; the video transmitter only passes on the stick commands to it. For stick control to work, the video transmitter must be connected to the flight controller (FC) via UART with the MSP DisplayPort protocol (on the AIO5 and AIO15 this connection is made directly on the board).

The description applies to stick **Mode 2** (throttle and yaw on the left stick):

① The drone must be **disarmed** (Disarm – motors off). The menu cannot be opened while armed.

② Set the throttle **to the middle** and leave the right stick centred.

③ Move the left stick **to the right** (yaw) and hold it for about 3 seconds. The selection menu of the video transmitter opens (Chapter 5.3).

④ In the menu, move with the right stick up and down; change and confirm options with the right stick to the right or left.

⑤ Leave the camera menu by moving the left stick **to the left** and holding it. The screen shows the hint *MOVE THROTTLE LEFT TO EXIT CAMERA MENU*.

5.3 VTX selection menu

The menu control voltages of the Lux camera and the ECO camera differ and are not compatible with each other. The AIO5, AIO15 and ECO VTX video transmitters therefore first display a selection menu when entering the camera menu:

Item	Meaning
ECO CAMERA MENU	opens the HDZero ECO camera menu – do not use with the Lux camera
LUX CAMERA MENU	opens the Lux camera's own menu
VTX RATIO FOR LUX CAMERA	aspect ratio reported by the video transmitter to the goggles: <4:3> or <16:9>
EXIT	closes the menu

※ With the Lux camera, always select LUX CAMERA MENU. The ECO CAMERA MENU option uses a different control voltage and the Lux camera will not respond correctly to commands.

5.4 Changing the aspect ratio 4:3 / 16:9

The AIO5, AIO15 and ECO VTX video transmitters cannot automatically detect which aspect ratio is set on the Lux camera. The aspect ratio must therefore be **set manually in both places – in the video transmitter and in the camera**, always to the same value:

① Open the selection menu (Chapter 5.2).

② With the right stick, move to the *VTX RATIO FOR LUX CAMERA* line and, by moving the right stick to the right or left, set the required ratio *<4:3>* or *<16:9>*. The setting is saved in the video transmitter.

③ Move to *LUX CAMERA MENU* and enter the camera menu. Set the **same** image aspect ratio there.

④ Leave the camera menu (left stick to the left and hold) and check the image in the goggles.

The procedure is demonstrated in the manufacturer's video: youtu.be/aenS9-K2mU4.

The camera is optimised for the 4:3 ratio, at which it has the largest vertical field of view (94°). At 16:9 the image is wider, but the vertical field of view is reduced (82°).

※ If the aspect ratio in the video transmitter and in the camera differ, the image in the goggles will be stretched or squeezed.

6. Operation and maintenance

6.1 Before every flight

- Check that the lens is clean and undamaged.
- Check that the camera is firmly secured in the mount and that the cable is intact.
- After power-up, check that the image in the goggles is sharp, stable and has the correct aspect ratio.

6.2 Lens care and replacement

- Clean the lens with a soft microfibre cloth or with an optics cleaner. Do not use solvents or abrasive materials.
- A scratched or cracked lens can be replaced. The original **HDZero Replacement Lens for Nano V3/Lux** (code HDZ3313), which the manufacturer specifies for the Nano V3 and Lux cameras, is available as a spare part.
- When replacing, carefully unscrew the lens, make sure no dust gets into the camera body, and screw in the new lens. After replacement, check the image sharpness in the goggles.

6.3 Storage

- Store the camera in a dry, dust-free place away from direct sunlight.
- For longer storage, put the camera into a case so that the lens does not get scratched.

7. Troubleshooting

Problem	Possible cause and solution
No camera image in the goggles	Check the connection of all four wires according to Chapter 4.3 and the quality of the solder joints. Make sure the video transmitter supports the Lux camera and flash the latest firmware to it (Chapter 5.1).
The image is stretched or squeezed	The aspect ratio in the video transmitter (*VTX RATIO FOR LUX CAMERA*) and in the camera differ. Set the same value in both places (Chapter 5.4).
The menu does not open with the sticks	The drone is armed – disarm it. The throttle is not in the middle. With a stand-alone ECO VTX, check the UART connection to the flight controller (FC) and the MSP DisplayPort setting.
The camera menu does not respond correctly	*ECO CAMERA MENU* was selected in the selection menu. For the Lux camera, select *LUX CAMERA MENU* (Chapter 5.3).
The image is blurred or hazy	The lens is dirty or scratched. Clean it or replace it (Chapter 6.2).
The image drops out in flight	Check how the cable is secured and the solder joints – vibration can break a damaged joint. Also check the video transmitter antenna.

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 (Model: Lux) is given on the back of the camera.

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.