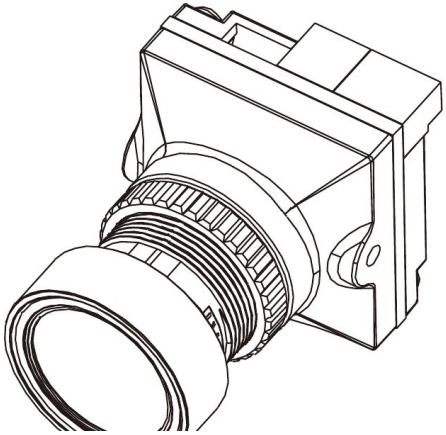
Ratel Pro

Caddx analog FPV camera
User manual



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

Importer: Rotorama, s.r.o. · www.rotorama.com

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1. Safety instructions

1.1 General rules

- The camera is designed to be installed in FPV drones and models. Installation and wiring should be carried out by a person with basic knowledge of electronics and soldering.
- This product is not a toy. Keep it and its small parts (screws) out of the reach of children.
- Do not use the camera if it is mechanically damaged, if its cables or connectors are damaged, or if water has entered it.
- Operate the camera only within the working temperature range of **−20 °C to +60 °C** and humidity of **20–80 %**. Protect it from rain, condensation and dust.
- Do not disassemble or modify the camera. Damage caused by improper intervention is not a product defect.

1.2 Power supply and wiring

- Power the camera exclusively with DC voltage in the range of **4.5–27 V**. A higher voltage will destroy the camera.
- Always **disconnect the drone battery** before connecting or disconnecting any cables. Never solder or reconnect anything while powered.
- Observe the correct polarity: **red** wire = power (+), **black** wire = GND (−). Reversing them may damage the camera and other electronics.
- Route the wires so that they cannot get into the propellers, are not under tension and do not chafe against the edges of the frame. Prevent short circuits between wires.
- Power up for the first time after installation without propellers fitted, ideally through a protective fuse (smoke stopper).

1.3 Operation and legal regulations

- The camera heats up during operation. The metal case helps dissipate heat – do not cover it and do not touch it after prolonged operation on the bench.
- When flying an FPV drone, comply with the regulations for unmanned aircraft and respect the privacy of others – the camera may capture personal data.
- **The law of the country in which the product is operated is decisive.** EU regulations apply in all member states, but national implementing rules differ. If you operate the product outside the Czech Republic, follow the regulations of that country.

2. Product description

2.1 What the camera is for

The Caddx Ratel Pro is a micro-size (19 × 19 mm) analog FPV camera for freestyle, long-range and racing drones. Featuring blacklight technology and a large BSI 1/1.8" sensor, it provides enough light for flying both in daylight and in poor lighting conditions. Ratel Pro displays real color images during the day and switches to black-and-white visuals at night.

The camera supports WDR, switchable 16:9 / 4:3 screen ratio, switchable PAL / NTSC TV system and a 125° FOV. The lightweight metal case improves durability and heat dissipation. Image settings are adjusted in the OSD menu using the supplied joystick (menu board).

2.2 Package contents

- 1× Caddx Ratel Pro camera
- 1× joystick for settings (menu board)
- 1× cable set
- 1× screw set

Not included: video transmitter (VTX), flight controller (FC), battery, FPV goggles or monitor.

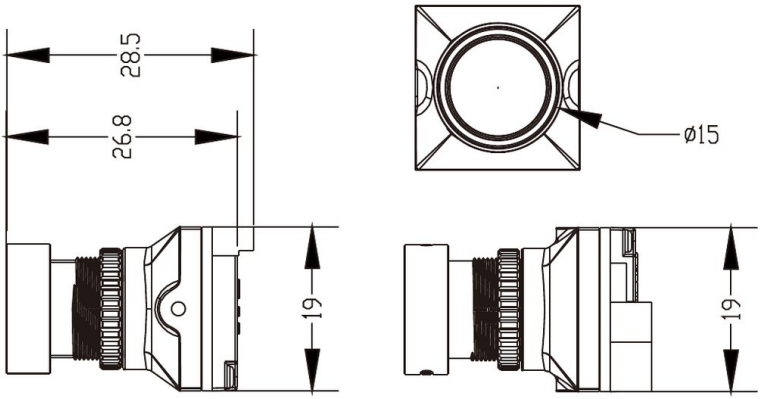
2.3 Specifications

Parameter	Value
Model	Ratel Pro
Image sensor	1/1.8" inch blacklight sensor (BSI)
Horizontal resolution	1500TVL
TV system	NTSC & PAL (changeable)
Image	16:9 & 4:3 (changeable)
WDR	Super WDR (HDR)
Min. illumination	0.00001 lux
Lens	5 Mega
Electronic shutter	PAL: 1/50~100,000 NTSC: 1/60~100,000
FOV	125°
OSD menu	supported
Menu languages	English, Simplified Chinese, Traditional Chinese, Russian, Spanish, Italian, French, Polish, Portuguese, Japanese

Parameter	Value
Day/Night	Auto / Color / B&W / EXT
Dimensions	19 × 19 mm (front face), see Chapter 2.4
Wide power input	DC 4.5–27 V
Weight	8.6 g ※
Video output	CVBS
Synchronization	internal
S/N ratio	> 60 dB (AGC OFF)
DNR	3D-DNR
Operating conditions	temperature −20 °C to +60 °C, humidity 20–80 %
Color	black

※ Weight according to the manufacturer's manual. The manufacturer's product page states 9.5 g. The values from the “Video output” row onwards are taken from the manufacturer's product page.

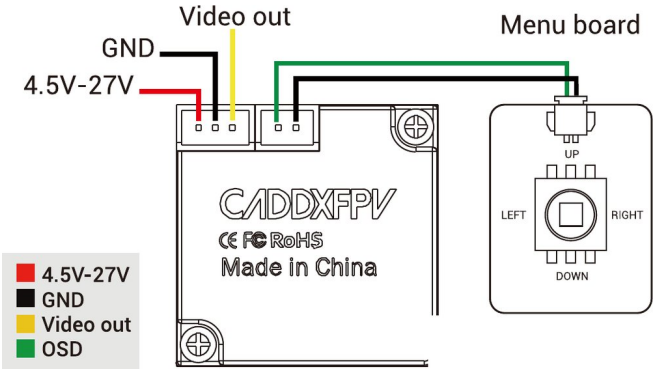
2.4 Dimensions



Camera dimensions in mm (according to the manufacturer's drawing): overall length 28.5 mm, length without lens 26.8 mm, front face 19 × 19 mm, lens diameter 15 mm.

3. Connection and installation

3.1 Connection diagram



Camera connection: on the left the 3-pin power and video connector, on the right the 2-pin connector for the joystick (menu board).

Wire colour	Label	Function
red	4.5V-27V	power +, DC 4.5–27 V
black	GND	ground (−)
yellow	Video out	analog video output (CVBS) – to the video input of the video transmitter (VTX) or a flight controller (FC) with OSD
green	OSD	signal of the joystick for settings (menu board)

3.2 Installation procedure

① Disconnect the drone battery.

② Plug the cable set into the 3-pin connector of the camera. Connect the red wire to a 4.5–27 V power output (e.g. of the flight controller or VTX), the black wire to GND and the yellow wire to the video input of the VTX or of a flight controller with OSD.

③ Mount the camera in a frame or holder for micro-size (19 mm) cameras using the screws from the screw set. Tighten the screws gently.

④ Before closing the drone, check the wiring, connect the battery (without propellers) and verify that the image is displayed in the goggles or on the monitor.

⑤ To adjust the image, connect the joystick to the 2-pin connector of the camera (see Chapter 4). Disconnect the joystick once the settings are complete.

4. Camera menu (OSD)

4.1 Operating the menu

① Disconnect the battery and connect the joystick (menu board) to the 2-pin connector of the camera.

② Switch on the power and check that you can see the camera image in the goggles or on the monitor.

③ **Short press the menu board** to enter the OSD settings.

④ Move between items by tilting the joystick up and down (UP / DOWN); change values by tilting it left and right (LEFT / RIGHT). Items marked with the ↵ symbol contain a submenu – open it by pressing the joystick.

⑤ Save the settings using *SAVE EXIT* in the main menu.

Menu items are displayed in English (or in the selected language), so this manual gives them in their original form. Values in angle brackets < > are examples of how the menu is displayed in the manufacturer's manual; the actual settings of your camera may differ.

4.2 Main menu (MAIN MENU)

Item	Function
AE ↵	exposure settings (brightness, exposure mode, shutter, gain)
WB ↵	white balance
DAY&NIGHT ↵	day and night mode (colour / black-and-white image)
IMAGE ENHANCE ↵	image adjustments (contrast, sharpness, colour gain, noise reduction)
VIDEO SETTING ↵	TV system, image ratio, image flip, WDR
LANGUAGE <ENGLISH>	menu language
RESET	restore default settings
SAVE EXIT	save the settings and exit the menu
EXIT	exit the menu

4.3 AE – exposure

Item	Function
BRIGHTNESS <12>	image brightness
EXPOSURE MODE <GLOBE>	exposure mode
ADVANCED ↵	submenu of advanced exposure settings
– SHUTTER CTRL <AUTO>	electronic shutter control
– GAIN CTRL <AUTO>	signal gain control
RETURN	go back one level

4.4 WB – white balance

Item	Function
MODE <ATW>	automatic white balance
MODE <MWB>	manual white balance; enables the RGAIN and BGAIN items
RGAIN (0–32)	red component gain
BGAIN (0–32)	blue component gain
RETURN	go back one level

4.5 DAY NIGHT – day and night mode

MODE item	Function
<AUTO>	automatic switching between colour and black-and-white image according to lighting
<COLOR>	permanent colour image
<BW>	permanent black-and-white image
<EXT>	another mode offered by the manufacturer (not described in more detail by the manufacturer)

4.6 IMAGE ENHANCE – image adjustments

Each item can be set to <AUTO> (automatic) or <MANUAL> (manual).

Item	Function
CONTRAST	contrast
SHARPNESS	sharpness
COLOR GAIN	colour saturation
3DNR	3D noise reduction
RETURN	go back one level

4.7 VIDEO SETTING – video settings

Item	Function
VIDEO STANDARD <PAL>	TV system PAL / NTSC
HD FORMAT CVBS	video output format (CVBS)
IMAGE RATIO <4:3>	image ratio 4:3 / 16:9
HORIZONTAL INVERTED <OPEN>	horizontal mirroring of the image
VERTICAL INVERTED <OPEN>	vertical flipping of the image
D-WDR <OPEN>	WDR function (wide dynamic range)
RETURN	go back one level

※ Set the image ratio according to the display of your goggles or monitor. Use vertical flipping if the camera is mounted upside down in the drone. Set the TV system (VIDEO STANDARD) to the same value as in the flight controller OSD and the goggles.

5. Maintenance and troubleshooting

5.1 Maintenance

- Clean the lens with a soft optical cleaning cloth. Do not use solvents or abrasive materials.
- After a crash, check the lens, case, cables and connectors. Replace damaged parts.
- Regularly check that the mounting screws are tight and inspect the wires where they may chafe.
- Store the camera in a dry, dust-free place.

5.2 Troubleshooting

Problem	Possible cause and solution
No image	Check the power supply (4.5–27 V), polarity and the connection of the yellow video wire to the VTX / FC input. Make sure the VTX is transmitting and the goggles are tuned to the same channel.
Image rolls or flickers, OSD missing	TV system mismatch. Set PAL / NTSC in the camera (VIDEO SETTING) to the same value as in the flight controller and goggles.
Image is black-and-white in daylight	BW mode is selected in the DAY&NIGHT menu. Select AUTO or COLOR.
Image is mirrored or upside down	Adjust HORIZONTAL INVERTED / VERTICAL INVERTED in the VIDEO SETTING menu.
Image is distorted or cropped	Set IMAGE RATIO according to the aspect ratio of your goggles or monitor display.
Menu does not open	Check the connection of the joystick to the 2-pin connector and the camera power supply. Press the joystick briefly.
Interference or lines in the image	Check the quality of the power supply and the wire routing; route the video wire as far as possible from power wires and the ESC.
Settings were not saved	Exit the menu using SAVE EXIT.

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:** type designation **Ratel Pro**, manufacturer code MN01-4000B.

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.