

TOPODRONE 24 (ZV-E10)

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Disclaimer

Designations

Warning

It's important

Tips and advice

Background information

Warning

TOPODRONE P24 is a photogrammetric camera designed for surveying of terrain objects with subsequent processing of materials in any photogrammetric software. TOPODRONE UAV PPK UPGRADE KIT geodetic receiver, working together with the camera, allows you to get high-precision coordinates of photocenters, synchronizing both devices by cable. The GNSS receiver records "raw" measurements in *.UBX format and shutter timestamps.

DO NOT store the TOPODRONE P24 in direct sunlight, in places with poor ventilation or near a heat source.

DO NOT expose the lens of the TOPODRONE P24 to direct sunlight.

DO NOT turn the TOPODRONE P24 on or off for short periods of time. Wait at least 30 seconds before turning the device on or off.

DO NOT use TOPODRONE P24 in humid and dusty environment, it has no IPXX protection, so using the equipment may result in malfunction.

DO NOT insert or remove the memory card while the camera is in use.

DO NOT touch the lens surface with your hands or any sharp objects, otherwise you may scratch the surface of the lens, which will affect the quality of the images.

DO NOT detach the lens while the camera is in use.

DO NOT remove the Micro-SD card while the camera is in use.

When the TOPODRONE P24 camera is not in use, store it in the protective case in which it is shipped. It is recommended that you store the equipment in an environment with a relative humidity of 40% or less and a temperature of $20\pm 5^{\circ}\text{C}$.

Product parameters

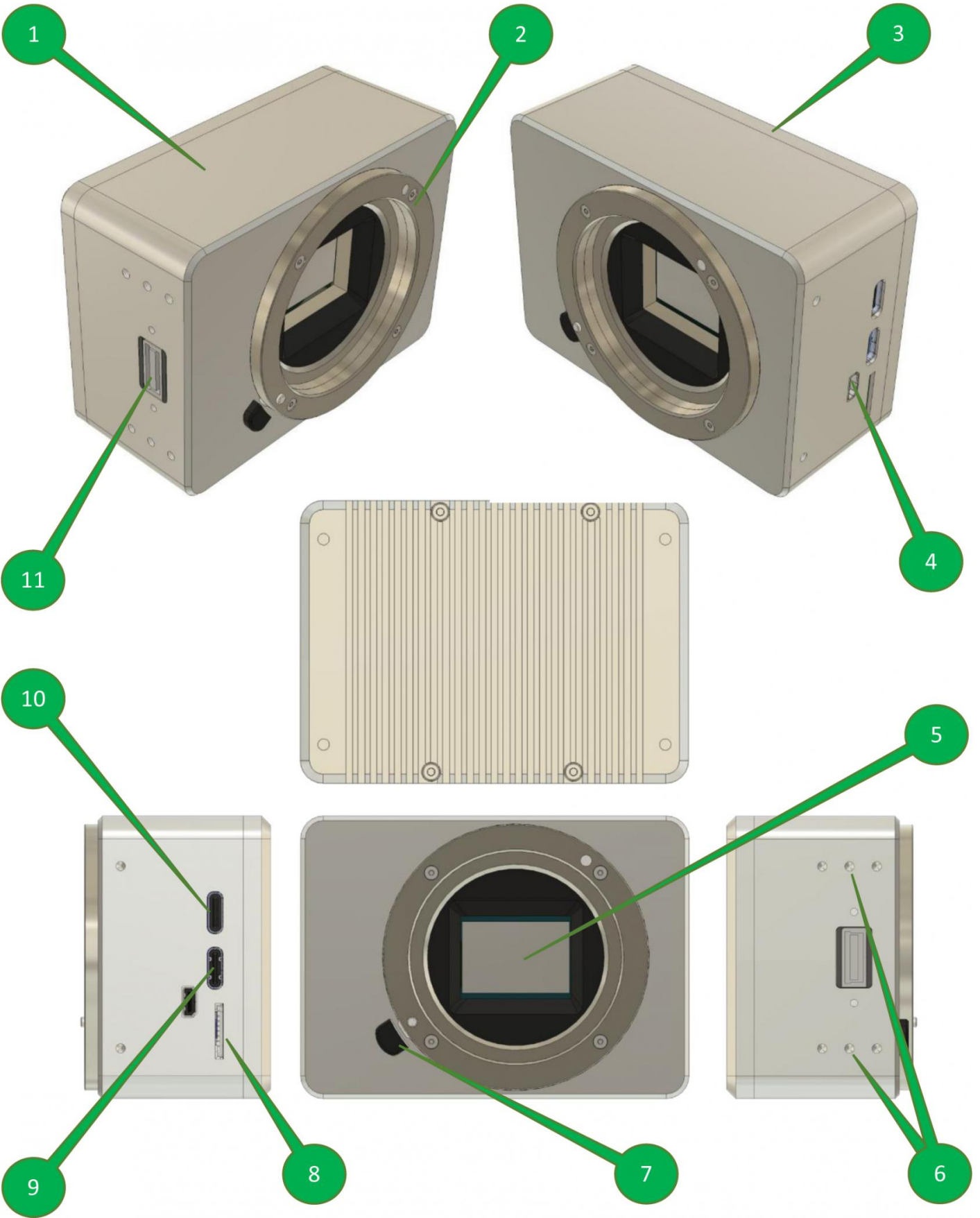
Photogrammetric camera TOPODRONE P24 is equipped with APS-C format sensor with global mechanical shutter and possibility to change lenses. This camera can be mounted on a 3-axis gimbal or together with one of the TOPODRONE laser scanners (depending on the delivery set).

Supply package

1. Photogrammetric TOPODRONE P24 camera - 1 pc.
2. Sony 16 mm SEL16F28 Lens - 1 pc.
3. TOPODRONE PPK UAV GNSS Receiver - 1 pc.
4. GNSS external helix antenna - 1 pc.
5. MicroSD card 16 GB for TOPODRONE PPK UAV GNSS Receiver - 1 pc.
6. MicroSD card 32 GB Photogrammetric TOPODRONE P24 - 1 pc.
7. USB Type-C to SHLD cable - 1 pc.
8. SHLD - SHLD connection cable - 1 pc.
9. * GNSS antenna cable - 1 pc.
10. * 3-Axis Gimbal DJI X-Port - 1 pc.
11. * Protective transport case with spoon (depending on delivery) - 1 pc.
12. * L-shaped platform with screws for attaching to TOPODRONE LiDAR - 1 pc.
13. * Skyport-SHLD adapter (when installed together with TOPODRONE LiDAR) - 1 pc.

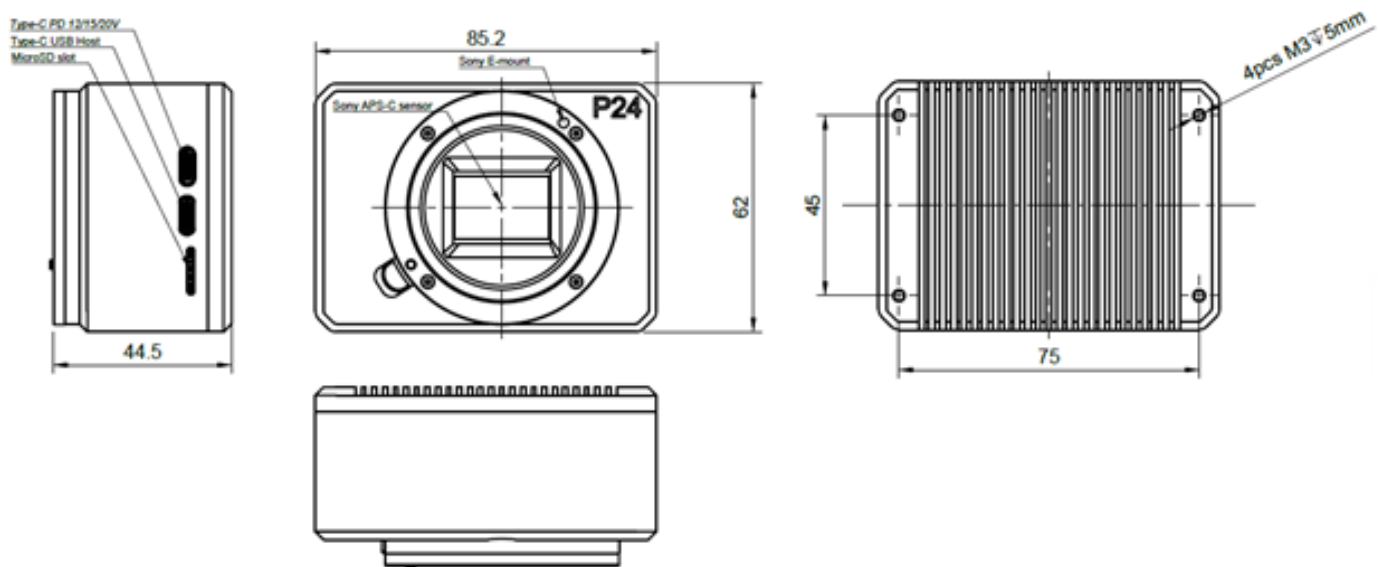
* optionally available

TOPODRONE P24 Scheme



- | | | | |
|----|------------------------|-----|------------------------------------------|
| 1. | Main body | 7. | Bayonet lens release button |
| 2. | Sony E Type bayonet | 8. | Micro-SD card port |
| 3. | Back cover | 9. | USB Type-C 1 (mobile device connection) |
| 4. | Micro-HDMI port | 10. | USB Type-C 2 (external power connection) |
| 5. | APS-C sensor | 11. | SHLD port for UAV connection |
| 6. | Side M3 threaded holes | | |

TOPODRONE P24 dimensions drawing



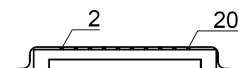
Supported aircraft

The TOPODRONE P24 photogrammetric camera can be used on almost any unmanned aerial vehicle, it is recommended to consult the manufacturer of the equipment.

Full control and live video streaming to the remote control is only possible on DJI Matrice 2** and 3** series drones.

SHLD Pin Description

X1 Connector Pin description



N	Name	N	Name
1	Vin	2	Gnd
3	Vin	4	Gnd
5	Vin	6	Gnd
7	nc	8	nc
9	Trigger Output	10	TimeMark
11	UART TX	12	UART RX
13	nc	14	nc
15	nc	16	nc
17	LAN TX+	18	LAN RX+
19	LAN TX-	20	LAN RX-

Compatible lenses

TOPODRONE P24 supports lenses with Sony E mount. When operating the TOPODRONE P24 on an aircraft-type UAV, it is recommended to use a lens with a fixed focal length and a manual focus adjustment wheel set to infinity.

It comes with a Sony SEL16F28 lens or COLOR-SKOPAR 21mm F/3.5 lens, its specifications are shown in the table below.

Sony SEL16F28 lens

Bayonet	Sony E
Focal length, mm	16 Stock
Equivalent focal length for 35 mm, mm	24
Angle of view (APS-C), °	72



Minimum aperture value	2,8
Maximum aperture value	22
Minimum focusing distance, m	0,24
Size (diameter × length), mm	62 × 22,5
Weight, g	67

COLOR-SKOPAR 21mm F/3.5 lens

Bayonet	Sony E
Focal length, mm	21 Stock
Equivalent focal length for 35 mm, mm	31.май
Angle of view (APS-C), °	58
Minimum aperture value	03.май
Maximum aperture value	22
Minimum focusing distance, m	0,24
Size (diameter × length), mm	62 × 22,5
Weight with a blend, g	243
Weight w/o a blend, g	232



COLOR-SKOPAR 21mm F/3.5 lens

TOPODRONE P24

Specification

Camera type	Mirrorless with interchangeable optics
Bayonet type	Sony E
Image stabilisation	Absent
Number of megapixels	24
Matrix size	APS-C (23.5 x 15.6 mm)
Maximum photo size, pixels	6000 x 4000
Matrix type	CMOS
Cropping factor	1,5
Shooting Modes	Shutter speed priority, Aperture Priority (optional), Manual, Auto
Exposure steps	+/-5 EV in 1/3 step increments
ISO range	100-32000
Shutter speed range, s	30.01.4000
Supported memory card formats	microSD, microSDHC, microSDXC
Maximum supported memory capacity, Gb	256
Supported file system type	FAT32
Built-in battery	Absent
Weight w/o 3-axis gimbal and w/o lens, g	220

Weight w/o 3-axis gimbal with SEL16F28 lens, g	295
Weight with 3-axis gimbal and SEL16F28 lens, g	750
Video capture capability	Absent
Operating temperature range, °C	-20 ... +40
Gimbal tilt angle range, °	-130 ... +140
Gimbal rotation angle range, °	±320

TOPODRONE UAV PPK Upgrade Kit Specifications

TOPODRONE UAV PPK Upgrade Kit is a small GNSS



connect an external

GNSS antenna and integrate with various payloads.

TOPODRONE PPK UAV

KIT Specifications

Supported GNSS systems and frequencies	GPS: L1C/A, L2C; GLONASS: L1OF, L2OF; GALILEO: E1B/C, E5b; BEIDOU: B1I, B2I
Raw measurement recording frequency, Hz	10
Number of GNSS receiver channels, pcs.	184
Supported memory card formats	microSD, microSDHC, microSDXC
Maximum supported memory capacity, GB	16
Supported file system type	FAT32
Minimum number of satellites to initialization, pcs.	8

LED indicators description

LED	Description
Green LED	Indicates the status of the Power Pack

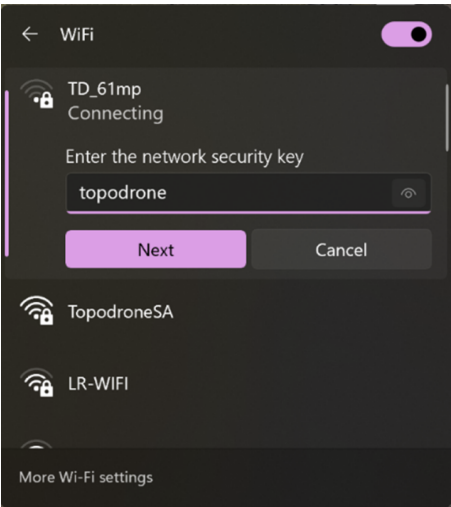
Blue LED	PDOP>10 not lit Flashing slowly $3 < \text{PDOP} < 10$
Orange LED	Indicates the status of recording to the memory card. The LED blinks rapidly during recording. Each flashing corresponds to the recording of 4 kB of data
Red LED	Indicates if there are any errors in the system. If an error occurs, check the memory card

Wi-Fi connection and setting adjusting

To connect to the TOPODRONE P24 via the web interface, the following is required:

1. TOPODRONE P24 itself with external power supply connected (VIA SHLD port or USB Type-C 2 port)
2. Any mobile device with Wi-Fi module and web browser (mobile phone, tablet, laptop, etc.).

To connect to the TOPODRONE P24 via the web interface, do the following steps:

1.	Enable power on the TOPODRONE P24 and wait for 30 seconds, while camera is initializing	
2.	Take your mobile device and stay somewhere not more than 10 meters around TOPODRONE P24	
3.	Open Wi-Fi settings and connect to SSID: TD_61mp, password: topodrone	
4.	After connection to TOPODRONE P24's Wi-Fi open web-browser on your mobile device and go to http://192.168.10.1/	
5.	You will see the camera settings interface, divided to 3 tabs: Main, Settings, HW.	

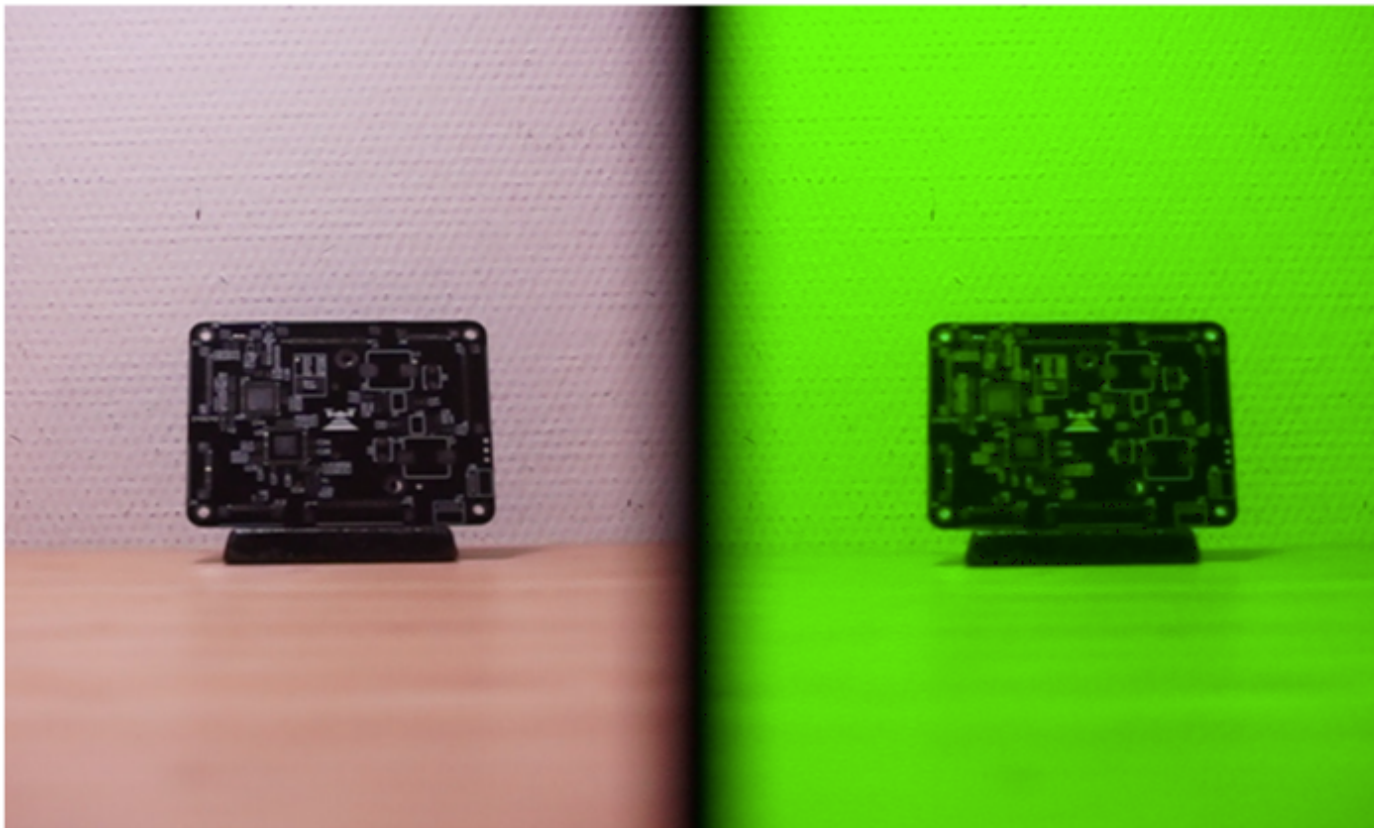
MAIN

SETTINGS

HW

Main Tab

This tab displays the current camera settings and video stream.



Status:

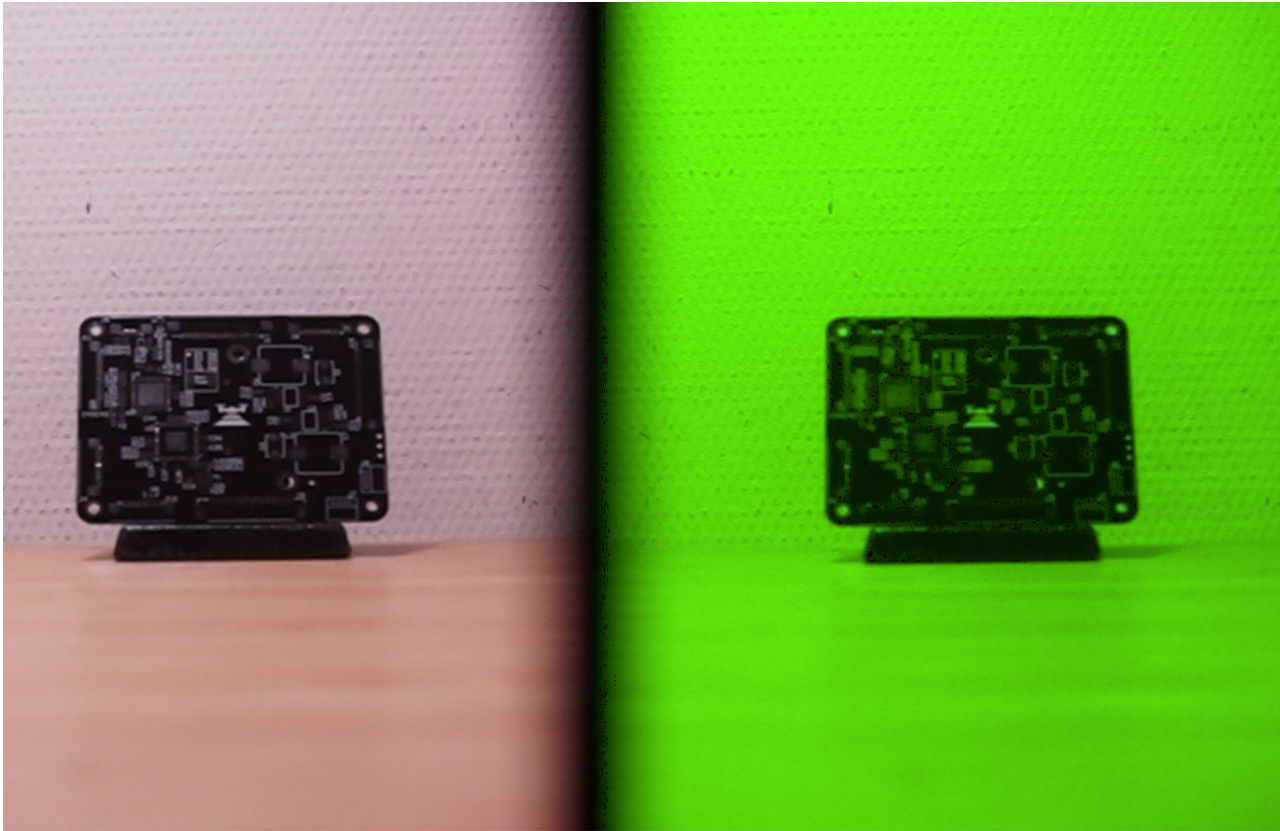
[S] MF ISO400 1/30 N/A EV 0.0 microSD [1696] ZOOM 0%

[S]	MF	ISO400	1/30	N/A	0.0	microSD[1696]	ZOOM 0%
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Operating mode	Focus mode	light sensitivity	Shutter speed	F aperture value	Exposure correction	Number of photos remain	Optical zoom value
Available values: [S] Shutter priority [M] Manual [A] Aperture priority [iA] Intellectual Auto [P] Program Auto	Available values: AF - center point autofocus MF - manual focus	Available values: 50..51200, Auto	Available values: 1/4000..30'	Available values: 2.8..22 (depending on the lens) (n/a = not available on this lens)	Available values: -5.0..+5.0 in 0.3 increments.	Available values: depends on the memory card and the selected photo quality.	Available values: 0-100, magnification depends on the lens

Settings Tab

This tab allows you to change camera settings, described on previous step



<input type="button" value="FOCUS"/>	<input type="button" value="TAKE"/>	<input type="button" value="Start video rec"/>	<input type="button" value="Stop video rec"/>	<input type="button" value="-"/>	<input type="button" value="+"/>
Focus Mode					
1 MF				1 MF	▼
PM					
4 S				4 S	▼
ISO					
9 400				9 400	▼
Shutter					
31 1/30				31 1/30	▼
Aperture					
0 N/A				0 N/A	▼
EV					
16 0.0				16 0.0	▼
WB					
2 Daylight				2 Daylight	▼
JPEG Quality					
2 X.Fine				2 X.Fine	▼

Also, the following settings are also available on the settings page:

WB - White Balance (White Balance Scenario)

Available values: Auto/Daylight/Shade/Cloudy

JPEG Quality - JPEG quality

Available values: STD/Fine/X.Fine/RAW.

[FOCUS] – camera will make focusing if pressed. Available in AF mode only.

[TAKE] – shutter button, camera will take a picture if pressed

[Start video rec] – camera will start video recording if pressed

[Stop video rec] – camera will stop video recording if pressed

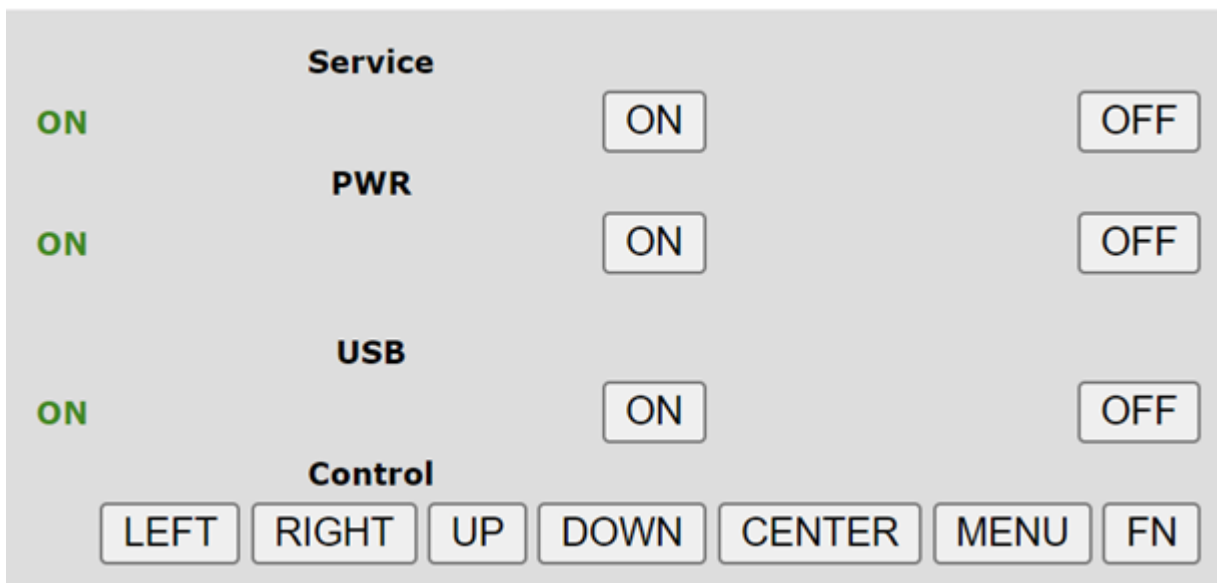
[-] [+] – zoom control buttons if the lens has a zoom control

TOPODRONE P24 requires forced cooling when recording video. Avoid overheating the camera.

The current values of the camera parameters are displayed in the left column.

Tab HW

On the HW tab, use the buttons to navigate through the TOPODRONE P24 menu. This requires an HDMI connection to an external monitor. Use HW tab only for specific custom settings.



Tab HW

On the HW tab, use the buttons to navigate through the TOPODRONE P24 menu. This requires an HDMI connection to an external monitor. Use HW tab only for specific custom settings.

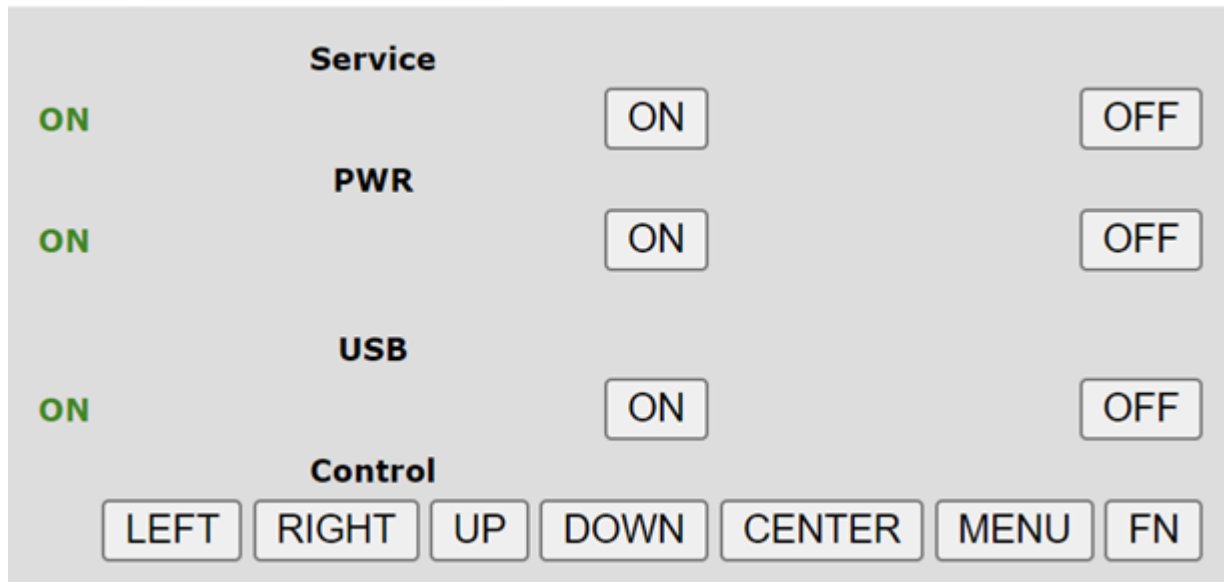


Image Settings for TOPODRONE P24

For more information on adjusting your image settings, check out our Telegram channel at the links below:

[Best Camera Settings. Introduction. Part 1 of 3.](#)

[Best Camera Settings. Semi-automatic and manual shooting modes. Part 2 of 3.](#)

[Best Camera Settings. Tips & Tricks. Part 3 of 3.](#)

Connecting the camera to the Internet

To output TOPODRONE P24 to the Internet, the following components and conditions will be required:

1. Mobile device (smartphone or tablet) running Android OS (only Samsung, Honor, Xiaomi phones are tested, mobile devices from other manufacturers may not work correctly).
 2. 3G/4G/5G mobile internet or Wi-Fi network with internet connection
 3. USB Type-C to Type-C cable for connection to mobile device (supplied with smartphone/tablet)
 4. TOPODRONE P24
-
1. Install TOPODRONE P24 according to the delivery set
 2. Power up TOPODRONE P24 by connecting it to the drone via SHLD port, powerbank or power supply.
 3. Wait for the camera to turn on and boot up.
 4. Connect the USB Type-C cable to a mobile device (smartphone or tablet) running Android and the USB Type-C 1 port on the TOPODORNE P24.
 5. Make sure that the mobile device has an active internet connection via 3G/4G/5G or Wi-Fi.
 6. On (1) mobile device, go to menu: settings / connections / mobile hotspot and modem / USB modem mode.
 7. TOPODRONE P24 is displayed on the Internet.