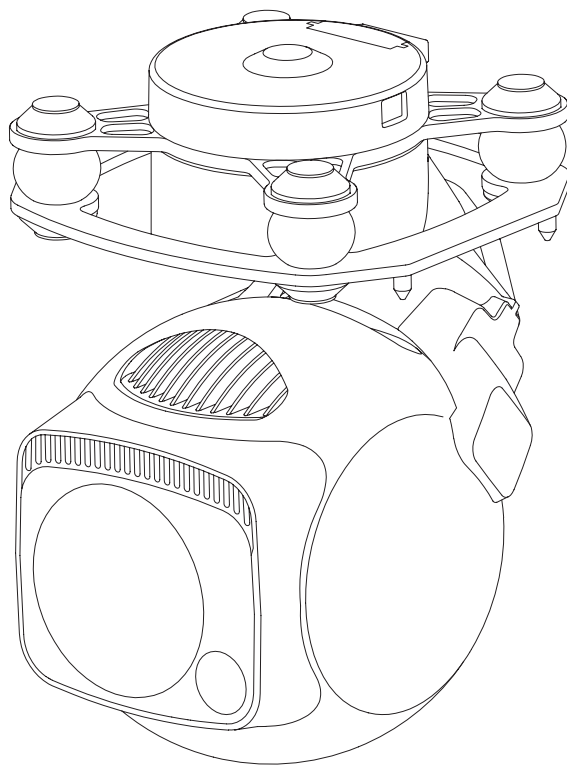


V1.2

2024.03

D-80Pro

User Manual



Using this Manual – Legend



Important



Tips



Explanation

Revision History

Date	Document Version
2023.06.19	V1.0
Date	Document Version
2023.10.16	V1.1

1. Installation: Add requirement of gimbal cooling.[P3]
2. Configuring & Updating Firmware:
 - 2.1 Modify default IP address of GCU (192.168.1.121 → 192.168.144.121) and default IP address of camera (192.168.1.108 → 192.168.144.108).[P4]
3. Configuring & Updating Firmware - Camera Configuring :
 - 3.1 Modify address of camera configuring webpage (http://192.168.1.108 → http://192.168.144.108).[P4]
4. Add explanation of real-time video playing.[P9]
5. Appendix 1 Specifications:
 - 5.1 Add parameters of laser lighting module (Laser power and Beam Diameter).[P10]
 - 5.2 Modify supported stream network protocol (Delete HTTP, TCP, UDP, RTP).[P11]
 - 5.3 Modify supported maximum SD card capacity (128GB → 256GB).[P11]

Date	Document Version
2024.03.12	V1.2

1. Appendix 1 Specifications: Modify parameters of object detection/ identification/ verification distance of zoom camera.[P10]

Caution

1. The D-80_{Pro} equipped with a laser lighting module, which is a Class 3B invisible laser. DO NOT exposure eyes to the beam within 12 meters or observe the beam by any optical instrument. DO NOT place any inflammable within 20 centimeters in front of the lighting module.
2. When not in use, store the D-80 in the package box. The recommended storage environment is a relative humidity less than 40% at a temperature of $20 \pm 5^\circ$ C. If the lenses fog up. The water vapor will usually dissipate after turning on the device for a while.
3. Do not place the product under direct sunlight, in areas with poor ventilation, or near a heat source such as a heater.
4. Do not frequently power on/off the product. After it is turned off, wait at least 30 seconds before turning back on, otherwise the product life will be affected.
5. Make sure the gimbal port and gimbal surface are free from any liquid before installation.
6. Make sure the gimbal is securely installed onto the aircraft, the microSD card slot cover is clean and firmly in place.
7. Make sure the gimbal surface is dry before opening the microSD card slot cover.
8. Do not plug or unplug the microSD card during use.
9. Do not touch the surface of the camera lenses and keep it away from hard objects. As doing so may lead to blurred images and affect the imaging quality.
10. Clean the surface of the camera lenses with a soft, dry, clean cloth. Do not use alkaline detergents.
11. When not receiving valid carrier INS data, the yaw shaft of the gimbal will drift about 15 degrees per hour because of the earth rotation. To make sure the gimbal attitude corrects, it is necessary to transmit valid carrier INS data, usually the GNSS should be positioning.

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Introduction

Synopsis

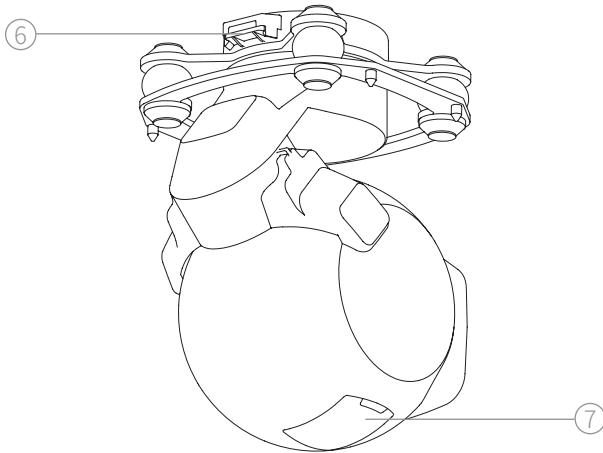
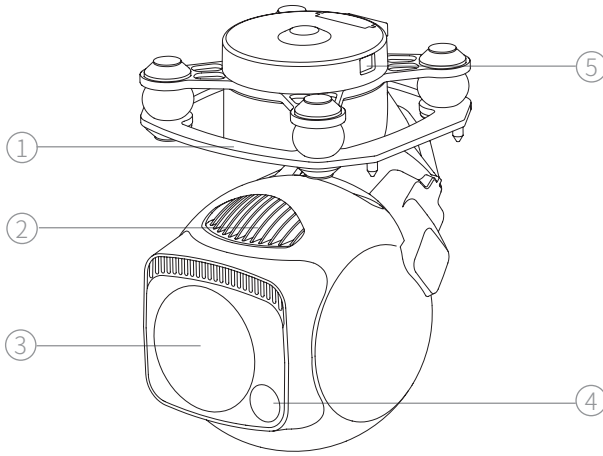
The D-80_{Pro} equips with a high-accuracy 3-axis nonorthogonal gimbal and an 8.29M pixels 40x zoom camera. User can quickly switch to a highly magnified zoom camera view after recognizing a target in a wide camera view. Thanks to the laser lighting module, the D-80_{Pro} can provide a clear image even in complete dark environments. The D-80_{Pro} have target tracking functions. The gimbal camera can constantly track the target selected on screen.

The D-80_{Pro} can be mounted tool-lessly onto multiple carriers, whether downward or upward. With the GCU and the Dragonfly software, user can watch the image from the camera and control the gimbal real-timely on a computer.

Characteristics

- Carries an 8.29M pixels 40x zoom camera, which provides a video resolution of 4K@30fps and an image resolution of 3840x2160.
- Laser lighting module ensures the cameras getting a clear image even in complete darkness.
- Features auto target tracking, which can constantly track the target selected on screen.
- Low-profile spherical shape and 3-axis nonorthogonal mechanical stabilized structure, minimize the gyration radius and the wind resistance of the gimbal. The D-80_{Pro} is able to spin continually around its yaw axis.
- With the GCU, the D-80_{Pro} supports network, UART and S.BUS control. The GCU supports both private protocol and MAVlink protocol.
- Thanks to the Dual-IMU complementary algorithms with IMU temperature control and carrier AHRS fusion, the D-80_{Pro} provides a stabilization accuracy at $\pm 0.01^\circ$.
- Can be mounted onto multiple carriers, whether downward or upward.
- With the GCU and the Dragonfly software, user can watch the image and control the gimbal without protocol ducking.
- Screen supports overlaying OSD information such as latitude, longitude and altitude. Image supports shooting point coordinate EXIF save.
- Supports ONVIF protocol.
- 14~53 VDC wide voltage input.

Overview

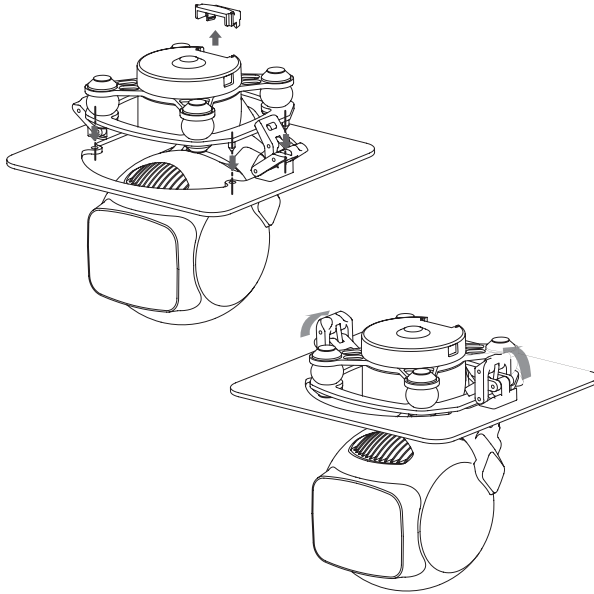


- 1. Damping Platform
- 3. Zoom Camera
- 5. Update Port
- 7. MicroSD Card Slot

- 2. Heatsinkz
- 4. Laser Lighting Module
- 6. Control Port

Installation

1. Remove the control port protector.
2. Align and insert the 4 pins into the locating holes of the mount platform. Press down the lock catch to fix the gimbal. The gimbal can be also fixed with screws through the holes on the damping platform.
3. Plug the gimbal control cable into the control port and install the port protector back.



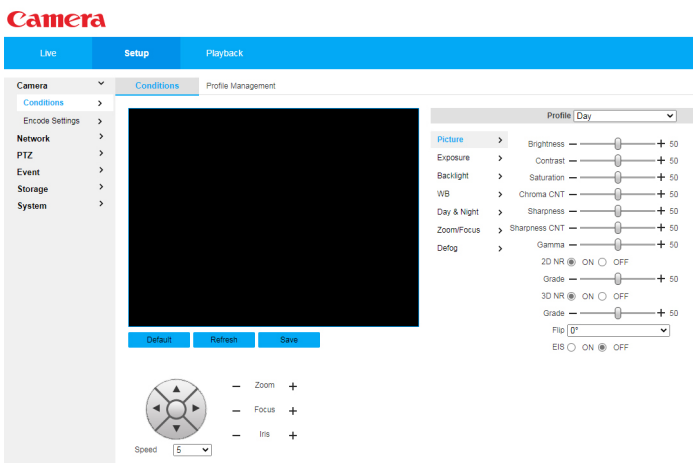
- ⚠ While upward mounted or mounted at carriers with large vibration or impact, the gimbal should be fixed with screws not the quick-release locks.
- ⚠ Gently plug or unplug the cable. Avoid hard pull the cable.
- ⚠ Avoid squash the cable while installing the port protector.
- ⚠ Ensure the microSD card slot cover is firmly in place to prevent dust or moisture entering during usage or storage.
- ⚠ The gimbal heats while operating. Please ensure the device good cooling.

Configuring & Updating Firmware

- ⚠ Ensure the gimbal and the GCU have both been updated to the latest firmware before use. Otherwise, usage may be affected.
- ⚠ Ensure the driver of the config module is installed on the computer before configuring or updating the firmware.
- ⚠ Before configuring, the computer should be set to a static IP address, which is in the same network segment with the GCU and the camera (without IP address conflicts). The default IP address of the GCU and the camera are 192.168.144.121 and 192.168.144.108.
- ⚠ Do not power off the device while updating the firmware. Restart the device once firmware update is complete.

Configuring the Camera

1. Connect the gimbal and the GCU with the gimbal control cable. Connect the computer and ETH port of the GCU with the network conversion module. Power on the devices.
2. Visit <http://192.168.144.108/cgi-bin/config> on the computer (if the IP address of the camera has been changed, the IP address in the URL should be replaced with the current camera IP address).
3. Input username and password (default as "user" / "0000").
4. Download and install plugin as prompt after login. After installation, the web page will refresh and display live view of the camera. Click Setup to set the camera. The interface is as follow.



1. Camera-Conditions

- **Picture**

Brightness / Contrast / Saturation / Chroma CNT / Sharpness / Sharpness CNT / Gamma

User can adjust the image parameters according to requirement.

2D NR / 3D NR

Used to suppress noise. The higher the noise reduction grade, the fewer the noises, yet the worse the image.

- **Exposure**

Mode

Auto: The camera automatically adjusts exposure parameters according to environment to make sure the overall brightness of the image in normal range.

Aperture priority: The aperture is fixed. The camera adjusts shutter speed and gain according to environment to make sure the optimal overall brightness of the image.

Shutter priority: The shutter speed is fixed. The camera adjusts aperture and gain according to environment to make sure the optimal overall brightness of the image.

Gain priority: The gain is fixed. The camera adjusts aperture and shutter speed according to environment to make sure the optimal overall brightness of the image.

Manual: Adjust aperture, shutter and gain of the camera manually.

Exposure Comp

Set the compensation of the exposure.

AE recovery

Auto exposure will be recovered after the recovery time while the camera is set as non-automatic exposure mode.

- **Backlight**

Set backlight to improve the adaptability of the camera in complex illuminant, which supports BLC (Backlight Compensation), HLC (Highlight Compensation) and WDR (Wide Dynamic Range).

- **WB (White Balance)**

The D-80Pro provides multiple WB modes to adapt different applications.

- **Zoom / Focus**

Digital Zoom

Enable / disable digital zoom

Zoom Speed

The larger the zoom speed is, the faster the zoom is.

Mode

Manual: The camera does not focus unless it is triggered manually.

Auto: The camera automatically focuses while zooming, switching ICR or detecting scene variation.

Semi Auto: The camera automatically focuses while zooming or switching ICR.

Fast Semi Auto / Fast Auto: Similar to Semi Auto / Auto but faster.

Far Limit

The camera only focuses on objects farther than the limit. The camera chooses optimal limit while the far limit is set as auto.

Sensitivity

Configure sensitivity to adjust the smoothness and anti-jamming of the focus. The lower sensitivity, the smoother. The higher sensitivity, the stronger anti-jamming.

AF Tracking

Enable AF tracking to get a better image while zooming. Disable AF tracking to improve focus speed.

Lens Init

Click to initialize the lens of the camera, which calibrates the zooming and focusing.

- **Defog**

Enable defog to get a clearer image blurred by smog, vapor or dust.

The intensity of defog can be set manually or automatically.

2. Camera - Encode Setting

- **Video**

Set main / sub stream parameters or enable / disable sub stream in this page.

Video Codec: Set the encode mode of the video, which supports H.264, H.264H, H.264B, H.265 and MJPEG.

Resolution: 3840x2160, 1920x1080, 1280x1024, 1280x960 or 1280x720

Frame Rate (FPS): 1~30 fps

Bit Rate Type: CBR (Constant Bit Rate) or VBR (Variable Bit Rate).



The image quality can only be set in VBR mode.



The bit rate type can only be set as CBR in MJPEG encode mode.

Bit Rate / Max Bit Rate: Bit rate in CBR mode. Max bit rate in VBR mode.
I Frame Interval: Quantity of P frame between adjacent two I Frames, which varies with frame rate. It is recommended as two times of frame rate.

Watermark Settings: Check to enable watermark. The watermark, which is 128 characters at maximum, can only be made up of numbers, letters, underscores and hyphens.

- **Overlay**

Channel Title

Set channel title displayed on live view. User can adjust the position of the title by dragging it on preview.

Time Title.

Set time title displayed on live view. User can enable / disable week display and adjust the position of the title by dragging it on preview.

OSD Info

Set preset point, gimbal coordinates and zoom rate displayed on live view. User can adjust the positions of the information by dragging them on preview.

Text Overlay

Set text and its alignment displayed on live view. User can adjust the positions of the information by dragging them on preview.

Font Size

Set the font size of the overlay information.

Picture

Set the uploaded picture displayed on live view. User can adjust the positions of the picture by dragging it on preview.



The text overlay and picture overlay cannot be enabled at the same time.

OSD Warning

Set if the warning is displayed on live view. User can adjust the positions of the warning by dragging it on preview.

GPS Position

Set if the GNSS coordinates are displayed on live view. User can adjust the positions of the coordinates by dragging it on preview.

3. Network - General


- **TCP/IP**


Host Name: Set the name of current camera, no longer than 15 characters.

Mode: Set the IP address acquisition methods of the camera. The IP address, subnet mask and default gateway should be set manually in Static mode, which do not need to be set up in DHCP mode.

4. Network - Platform

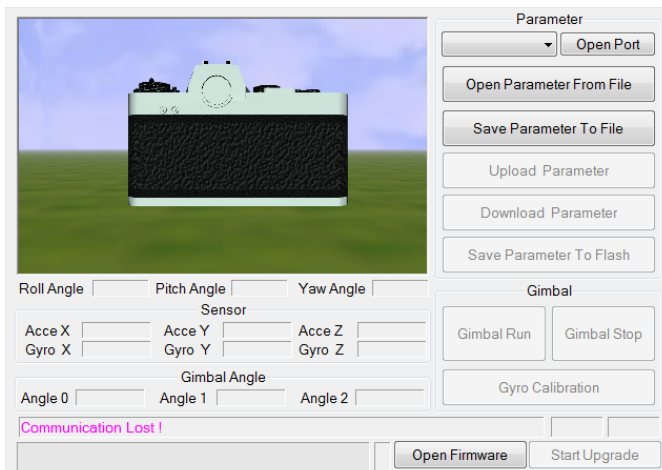
Configure the parameters of the platform as required.

 Except settings mentioned above, please keep other settings as default, otherwise may cause the gimbal not working properly.

 Click "Save" to enable the settings after setup. Restart the gimbal to enable the configurations to take effect.

Gimbal Firmware Updating

1. Connect the gimbal and the GCU with the gimbal control cable. Connect the computer and the gimbal update port with the config module. Power on the devices.
2. Run GimbalConfig software. Choose the COM port corresponding to the config module. Click "Open Firmware", choose the firmware file, click "Start Upgrade" and wait for the updating complete.



Real-time Video Playing

Example as camera IP address 192.168.144.108:

Main Stream (default as 3840x2160 @30fps, corresponding to Stream 4 in GCU):

`rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=0`

Sub Stream 1 (default as 352x240 @20fps, corresponding to Stream 2 in GCU):

`rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=1`

Sub Stream 1 (default as 1920x1080 @30fps, corresponding to Stream 1 in GCU):

`rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=2`

Appendix Specifications

General		
Product Name	D-80Pro	
Dimensions	Gimbal: 85.8 x 86 x 129.3mm GCU: 45.4 x 40 x 13.5mm	
Weight	Gimbal: 405g GCU: 18.6g	
Operating Voltage	14 ~ 53 VDC	
Power	Gimbal: 6.7W (AVG, light off) / 55 W (Stall, light on) GCU: 1.8W	
Mounting	Downward / Upward	
Gimbal		
Gimbal Type	3-axis Nonorthogonal Mechanical Stabilization	
Angular Accuracy	$\pm 0.01^\circ$	
Controllable Range	Pitch: $-157^\circ \sim +70^\circ$, Yaw: $\pm 360^\circ$ constantly	
Max Controllable Speed	Pitch: $\pm 200^\circ /s$, Yaw: $\pm 200^\circ /s$	
Zoom Camera		
Image Sensor	1/2.8" CMOS; Effective Pixels: 8.29M	
Lens	Focal Length: 4.8~48mm Aperture: f1.7~f3.2 HFOV: $60.2^\circ \sim 6.6^\circ$ VFOV: $36.1^\circ \sim 3.7^\circ$ DFOV: $67.2^\circ \sim 7.6^\circ$	
Resolution	3840 x 2160	
Pixel Pitch	1.45 μ m	
Electronic Shutter speed	1~1/30000 s	
Optical Zoom Rate	10x	
Equivalent Digital Zoom Rate	4x	
Min Illumination	Night Vision off: 0.01Lux / F1.5 Night Vision on: 0.001Lux / F1.5	
Object Detection Distance	EN62676-4:2015	Person ^[1] : 1449m Light vehicle ^[2] : 1904m Large vehicle ^[3] : 4057m
	Johnson Criteria	Person: 16552m Light vehicle: 50759m Large vehicle: 108138m
Object Identification Distance	EN62676-4:2015	Person: 290m Light vehicle: 381m Large vehicle: 811m
	Johnson Criteria	Person: 4138m Light vehicle: 12690m Large vehicle: 27035m

Object Verification Distance	EN62676-4:2015	Person: 145m Light vehicle: 190m Large vehicle: 406m
	Johnson Criteria	Person: 2069m Light vehicle: 6345m Large vehicle: 13517m
Laser Lighting Module		
Wavelength	850±10nm	
Laser Power	0.8W	
Beam Angle	8°	
Beam Diameter	14m @ 100m	
Effective Illumination Distance	≤ 200m	
Laser Safety	Class 3B (IEC 60825-1:2014)	
Image & Video		
Image Format	JPEG	
Maximum Image Resolution	3840 x 2160	
EXIF	Shooting point coordinate	
Video Format	MP4	
Maximum Video Resolution	4K@30fps	
Stream Encode Format	H.264, H.264H, H.264B, H.265, MJPEG	
Stream Network Protocol	ONVIF, RTSP	
Storage		
Supported SD Cards	Supports a Speed Class 10 MicroSD card with a capacity of up to 256GB	
Environment		
Operating Temperature	-20°C~ 50°C	
Storage Temperature	-40°C~ 60°C	
Operating Humidity	≤ 85%RH (Non-condensing)	

- [1] Reference dimension of person: 1.8x0.5m. Critical dimension under Johnson criteria is 0.75m.
- [2] Reference dimension of light vehicle: 4.2x1.8m. Critical dimension under Johnson criteria is 2.3m.
- [3] Reference dimension of large vehicle: 6.0x4.0m. Critical dimension under Johnson criteria is 4.9m.