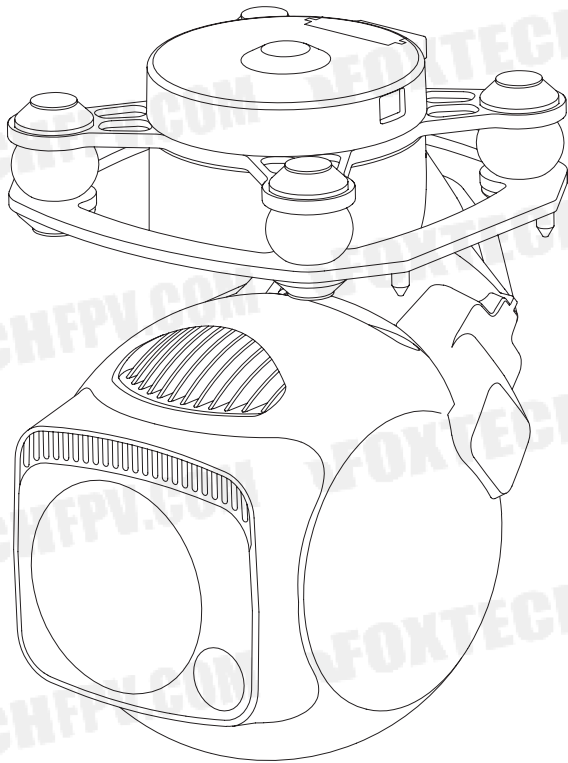


# SYK-10L 4K

User Manual

V1.0 2023.07



# Using this Manual – Legend



Important



Tips



Explanation

## Caution

1. The SYK-10L 4K equipped with a laser night vision 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 SYK-10L 4K 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

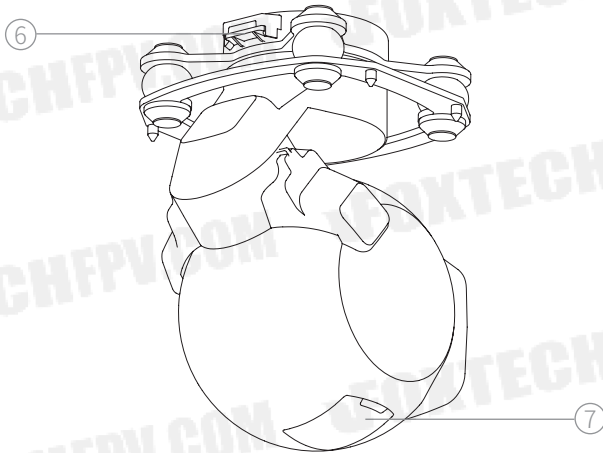
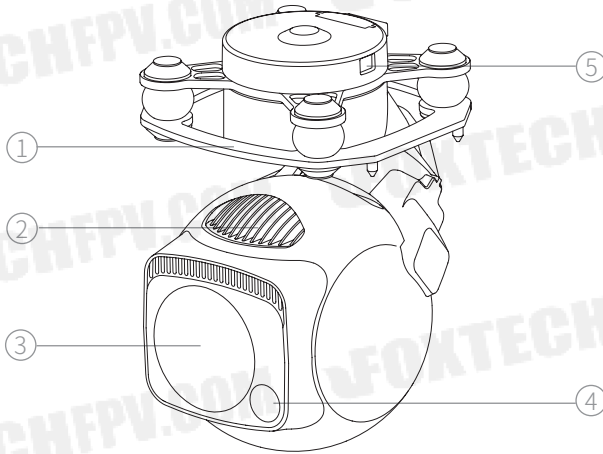
The SYK-10L 4K equips with a high-accuracy 3-axis nonorthogonal gimbal and an 8.29M pixels 40x zoom camera. User can quickly switch to a highly magnified zoom camera view after recognizing a target in a wide camera view. Thanks to the laser night vision module, the SYK-10L 4K can provide a clear image even in complete dark environments. The SYK-10L 4K have target tracking functions. The gimbal camera can constantly track the target selected on screen.

The SYK-10L 4K 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 night vision 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 SYK-10L 4K is able to spin continually around its yaw axis. With the GCU, the SYK-10L 4K 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 SYK-10L 4K 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

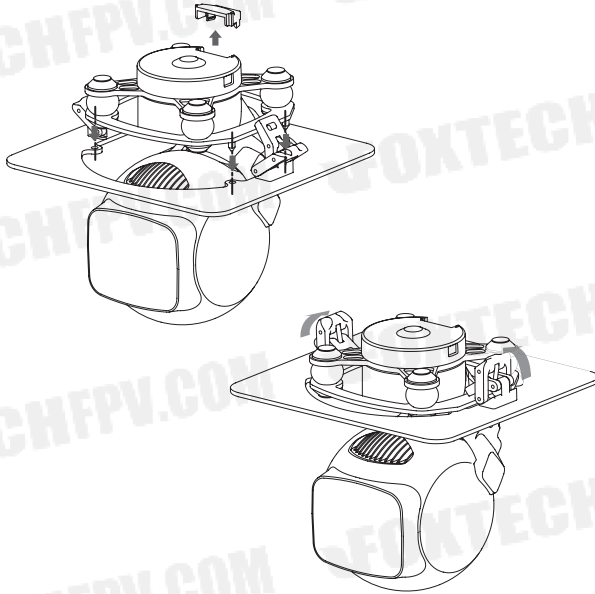


1. Damping Platform
3. Zoom Camera
5. Update Port
7. MicroSD Card Slot

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 nor the quick-release locks.
- ⚠ Gently plug or unplug the cable. Avoid hardly 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 MicroSD card should be configured as HDD-FAT32 mode.

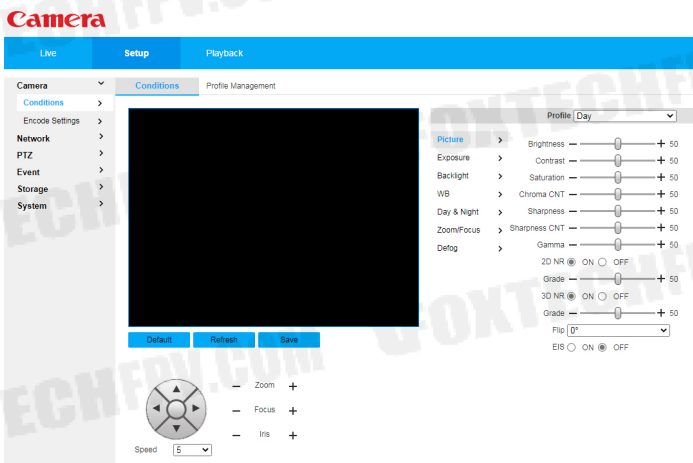


## Configuring & Updating Firmware

- ⚠ 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 192.168.1.121 and 192.168.1.108.
- ⚠ 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 the net port of the GCU with the network conversion module. Power on the devices.
2. Visit <http://192.168.1.108/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.

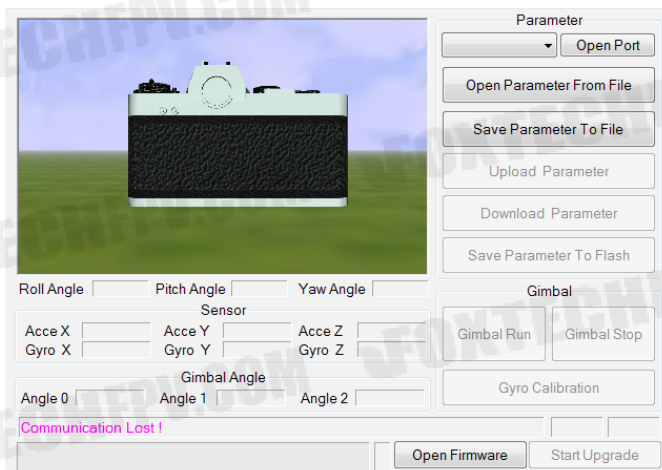
#### 4. Network - Platform

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.

### Updating Firmware

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. Open GimbalConfig software. Choose the COM port corresponding to the config module. Click "Open Port" and confirm the software and the gimbal are connected.
3. Click "Open Firmware", choose the firmware file, click "Start Upgrade" and wait for the updating complete.



## Appendix Specifications

General	
Product Name	SYK-10L 4K
Dimensions	85.8*86*129.3 mm
Weight	405 g
Operating Voltage	14 ~ 53 VDC
Power	6.7 W(AVG, light off) / 55 W(Peak, light on)
Mounting	Downward / Upward
Gimbal	
Gimbal Type	3-axis Nonorthogonal Mechanical Stabilization
Angular Vibration Range	$\pm 0.01^\circ$
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: 2.07M
Lens	Focal Length: 4.8~48 mm Aperture: f1.7~f3.2 HFOV: $60.2^\circ \sim 6.6^\circ$ VFOV: $36.1^\circ \sim 3.7^\circ$ DFOV: $67.2^\circ \sim 7.6^\circ$
Electronic Shutter speed	1~1/30000 s
Optical Zoom Rate	10X
Equivalent Digital Zoom Rate	4X
Min Illumination	IRCUt off: 0.01Lux / F1.5 IRCUt on: 0.001Lux / F1.5
Object Detection Distance	Person: 1449 m, Vehicle: 1904 m
Object Identification Distance	Person: 289.8 m, Vehicle: 308.9 m
Object Verification Distance	Person: 144.9 m, Vehicle: 190.4 m
Laser Night Vision	
Wavelength	$850 \pm 10$ nm
Effective illumination distance	$\leq 200$ m
Beam Angle	$8^\circ$
Laser Safety	Class 3B (IEC 60825-1:2014)

Image & Video	
Image Format	JPEG
Image Resolution	3840 x 2160
EXIF	Shooting point coordinate
Video Format	MP4
Video Resolution	4K@30 fps
Stream Encode Format	H.264, H.264H, H.264B, H.265, MJPEG
Stream Network Protocol	ONVIF, HTTP, RTSP, TCP, UDP, RTP
Storage	
Supported SD Cards	Supports a Speed Class 10 MicroSD card with a capacity of up to 128GB
Environment	
Operating Temperature	-20°C ~ 50°C
Storage Temperature	-40°C ~ 60°C
Operating Humidity	≤ 85%RH (Non-condensing)