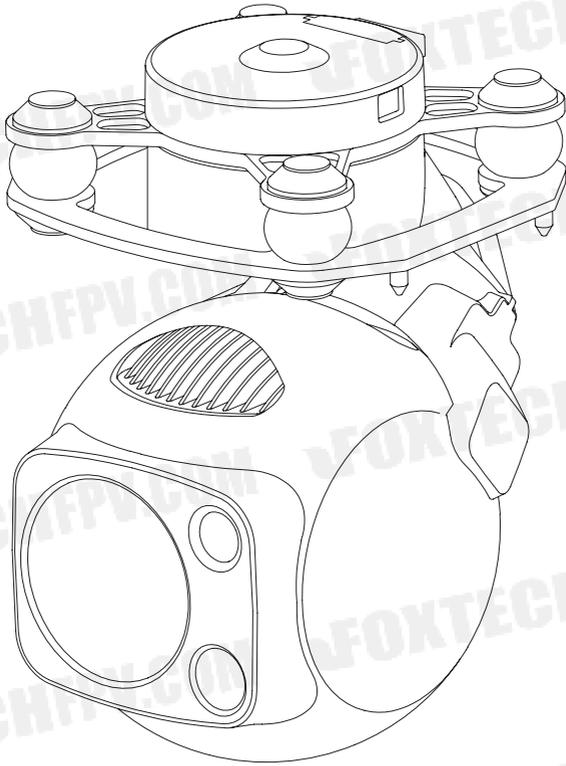


SYK-10L AI

User Manual

V1.0 2023.07



Using this Manual – Legend



Important



Tips



Explanation

Caution

1. The SYK-10L AI 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 AI 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 AI equips with a high-accuracy 3-axis nonorthogonal gimbal, a wide-angle camera and a 30x 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 SYK-10L AI can provide a clear image even in complete dark environments.

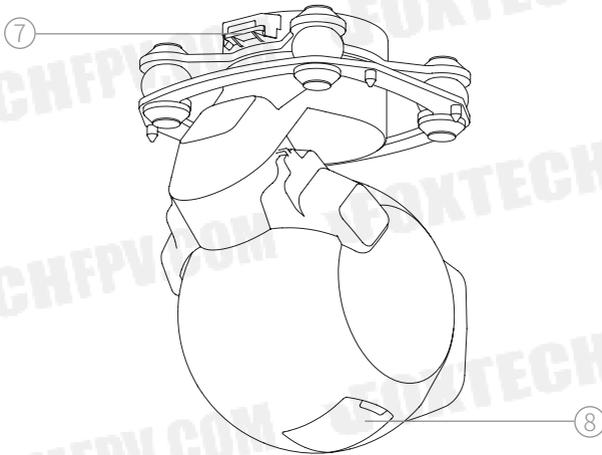
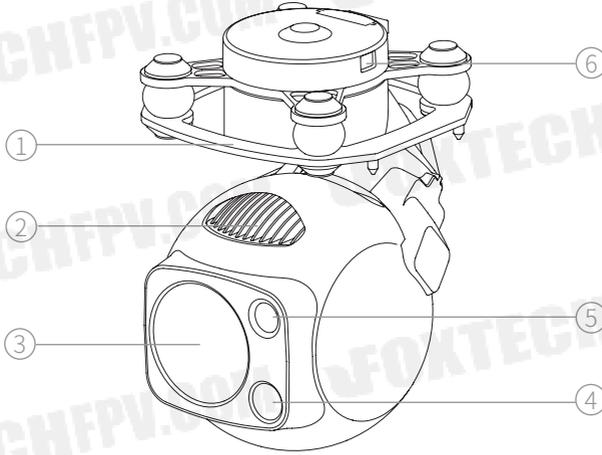
The SYK-10L AI has AI multi-object detection and tracking function. The gimble camera can intelligently identify the persons and vehicles in the image, and constantly track one of them.

The SYK-10L AI 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-time on a computer.

Characteristics

- Features AI multi-object detection and tracking, which can constantly track one of the persons and vehicles intelligently identified in the image.
- Combination of wide-angle camera and 30x zoom camera, which can quickly switch between overall and detailed view.
- Laser night vision module ensures the cameras getting a clear image even in complete darkness.
- 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 AI is able to spin continually around its yaw axis.
- With the GCU, the D-80AI 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 AI 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. (EXIF save is not supported temporarily and will be supported by firmware updating)
- 14~53 VDC wide voltage input.

Overview

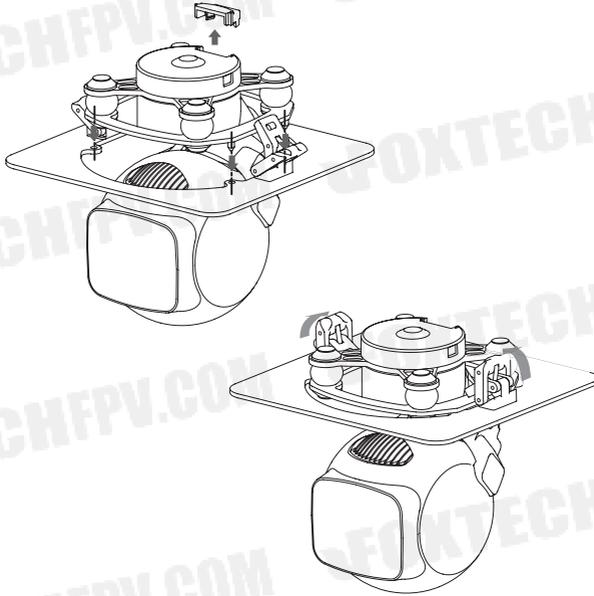


1. Damping Platform
2. Heatsinkz
3. Zoom Camera
4. Wide Camera
5. Laser Lighting Module
7. Control Port

6. Update Port
8. MicroSD Card Slot

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. Configure the camera in the web page, and click "save" to enable the configuration.

IP Address:

Gateway:

Udp target:

Udp port:

Stream Bitrate:

Output Resolution: Output FPS:

Stream Mode:

Encode Format:

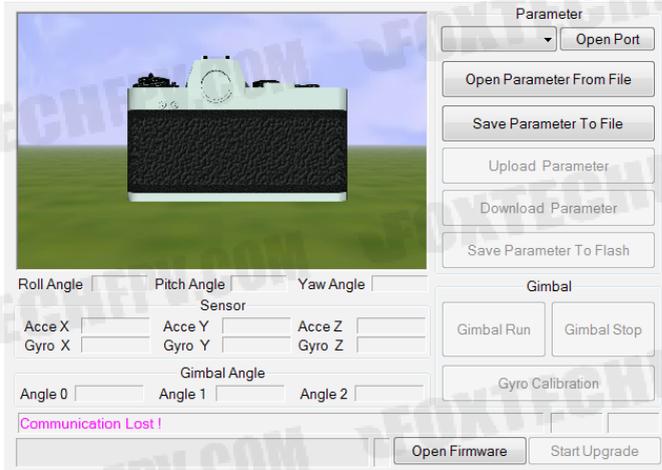
Save Format:

Save Stream Bitrate:

- IP Address / Gateway
Camera IP Address / Camera Gateway.
- Udp target / Udp port
Should be configured while the stream is in UDP mode.
- Stream Bitrate
Image transfer rate, which is in the unit of bps. The higher the stream bitrate, the clearer the transferred image, yet the higher request to the bandwidth of the image transmission system. The recommended range is [2048~8192].
- Output Resolution / Output FPS
Default as 1080P / 25FPS
- Stream Mode
Stream Media / UDP / GB/T28181. Default as Stream Media. The Stream Media is RTSP mode; it is necessary to configure the UDP target and UDP port in UDP mode; the GB/T28181 mode is unavailable temporarily.
- Encode Format
H.264 / H.265. Default as H.264.
- Save Format
Default as MP4.
- Save Stream Bitrate
Image storage rate, which is in the unit of bps. The higher the storage bitrate, the clearer the storage image, yet the higher request to the storage rate of the MicroSD card. The recommended range is [2048~9216].

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 AI
Dimensions	85.8*86*129.3 mm
Weight	429 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: $-157^\circ \sim +80^\circ$, Yaw: $\pm 360^\circ$ constantly
Max Controllable Speed	Pitch: $\pm 200^\circ /s$, Yaw: $\pm 200^\circ /s$
Wide Camera	
Image Sensor	1/2.8" CMOS; Effective Pixels: 2.07M
Lens	Focal Length: 2.4 mm HFOV: 98.5° VFOV: 44.3° DFOV: 101.7°
Zoom Camera	
Image Sensor	1/2.8" CMOS; Effective Pixels: 2.07M
Lens	Focal Length: 4.7~47 mm HFOV: $61.3^\circ \sim 6.8^\circ$ VFOV: $36.9^\circ \sim 3.9^\circ$ DFOV: $68.4^\circ \sim 7.8^\circ$
Optical Zoom Rate	10X
Equivalent Digital Zoom Rate	3X
Min Illumination	IRCU off: 0.01Lux / F1.6 IRCU on: 0.0015Lux / F1.6
Object Detection Distance	Person: 709.4 m, Vehicle: 932.4 m
Object Identification Distance	Person: 141.9 m, Vehicle: 186.5 m
Object Verification Distance	Person: 70.9 m, Vehicle: 93.2 m

Laser Night Vision	
Wavelength	850±10 nm
Effective Illumination distance	≤ 200 m
Beam Angle	8°
Laser Safety	Class 3B (IEC 60825-1:2014)
AI Multi-object Detection & Tracking	
Object Size	16x16 ~ 128x128 px
Object Identification Delay	< 40 ms
Tracking Speed	±32 px / field
Tracking Deviation Refresh Rate	30 Hz
Tracking Deviation Output Delay	≤ 5 ms
Image & Video	
Image Format	JPEG
Image Resolution	1920 x 1080
EXIF *	Shooting point coordinate
Video Format	MP4
Video Resolution	1080P@25 fps
Stream Encode Format	H.264, H.265
Stream Network Protocol	RTSP, UDP
Storage	
Supported SD Cards	Supports a Speed Class 10 MicroSD card with a capacity of up to 128GB
Supported File System	HDD-FAT32
Environment	
Operating Temperature	-20°C ~ 50°C
Storage Temperature	-40°C ~ 60°C
Operating Humidity	≤ 85%RH (Non-condensing)

* Not supported temporarily and will be supported by firmware updating.