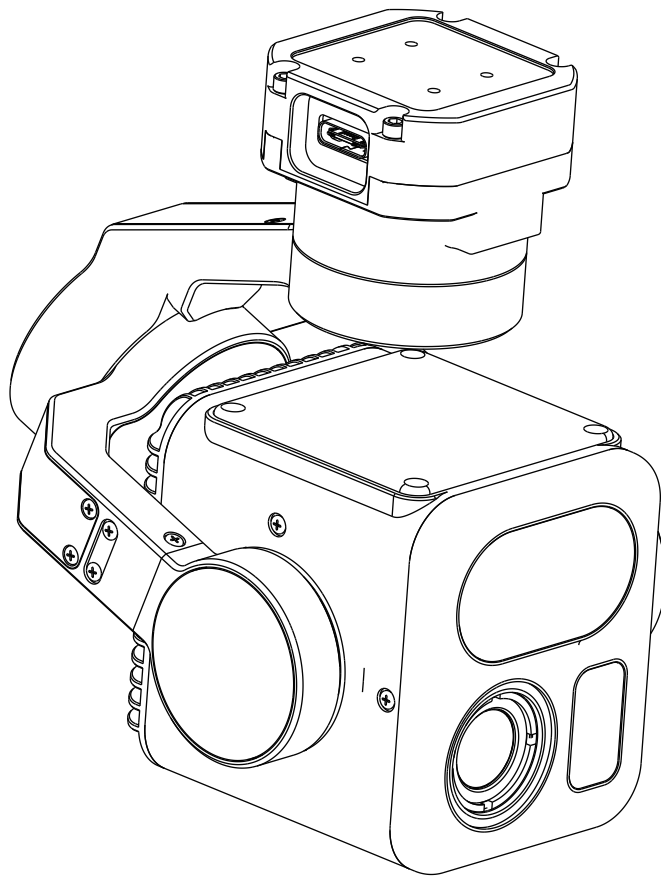


# K40T-MINI Quad-Sensor Gimbal Camera User Manual

V1.1 202610



# CONTENT

|                                               |    |
|-----------------------------------------------|----|
| Product Overview .....                        | 01 |
| Product Specifications .....                  | 01 |
| Gimbal Dimensions .....                       | 03 |
| Product Installation .....                    | 03 |
| Hardware Interfaces .....                     | 05 |
| Product Control Interfaces and Protocols..... | 06 |
| Gimbal Camera App Guide .....                 | 07 |
| Product Firmware Upgrade .....                | 14 |
| Product Use Precautions .....                 | 14 |

## 1. Product Overview

The K40T-MINI gimbal camera is a high-performance multi-sensor UAV payload designed for drone inspection. It integrates a 48 MP wide-angle camera, a 48 MP telephoto camera, an infrared camera, and a laser rangefinder. It can track moving targets and identify heat sources. Its proprietary dual-spectrum super-resolution fusion algorithm combines visible-light imagery with 640-resolution thermal imagery to output fused images at 1080p resolution, capturing details in both daylight and darkness. It performs especially well in high-altitude target tracking and data collection, providing powerful support for public security, firefighting, electric power, water conservancy, forestry, and maritime operations.

## 2. Product Specifications

|                             |                                                                 |
|-----------------------------|-----------------------------------------------------------------|
| Weight                      | 267 g $\pm$ 5 g                                                 |
| Operating Voltage           | 12–18 V                                                         |
| Number of Axes              | 3-axis mechanical stabilization                                 |
| Software Angle Limits       | Pitch: -90° to +30°   Yaw: -120° to +120°                       |
| Mechanical Angle Range      | Pitch: -135° to +45°   Roll: -45° to +45°   Yaw: -135° to +135° |
| Maximum Control Speed       | 180°/s                                                          |
| Angle Jitter                | $\pm$ 0.005°                                                    |
| Interfaces                  | Ethernet / Serial / SBUS                                        |
| Gimbal Modes                | Recognition, Auto-Tracking                                      |
| Operating Temperature       | -40°C to +65°C                                                  |
| Communication Protocols     | Serial protocol / MAVLink                                       |
| IP Rating                   | IP54                                                            |
| Power Consumption           | 12 W                                                            |
| Hybrid Zoom                 | 100×                                                            |
| Visible-Light Resolution    | 48 MP (wide-angle, telephoto)                                   |
| TF Card Photo Format        | JPG                                                             |
| TF Card Video Format        | MP4                                                             |
| Recording Resolution        | 4K @30 fps                                                      |
| Encoding Formats            | H.264, H.265                                                    |
| AI Recognition and Tracking | Supported                                                       |

## Wide-Angle Camera Specifications

|                         |                          |
|-------------------------|--------------------------|
| Sensor Size             | 1/2 in                   |
| Wide-Angle Focal Length | 4.49 mm                  |
| Effective Pixels        | 48 MP                    |
| Wide-Angle Aperture     | F2.8                     |
| FOV                     | H: 71° V: 56° D: 84° ±1° |

## Telephoto (Fixed-Focus) Camera Specifications

|                  |            |
|------------------|------------|
| Sensor Size      | 1/2 in     |
| Effective Pixels | 48 MP      |
| Focal Length     | 25 mm ±5%  |
| Aperture         | F2.4       |
| FOV              | DFOV 18.8° |

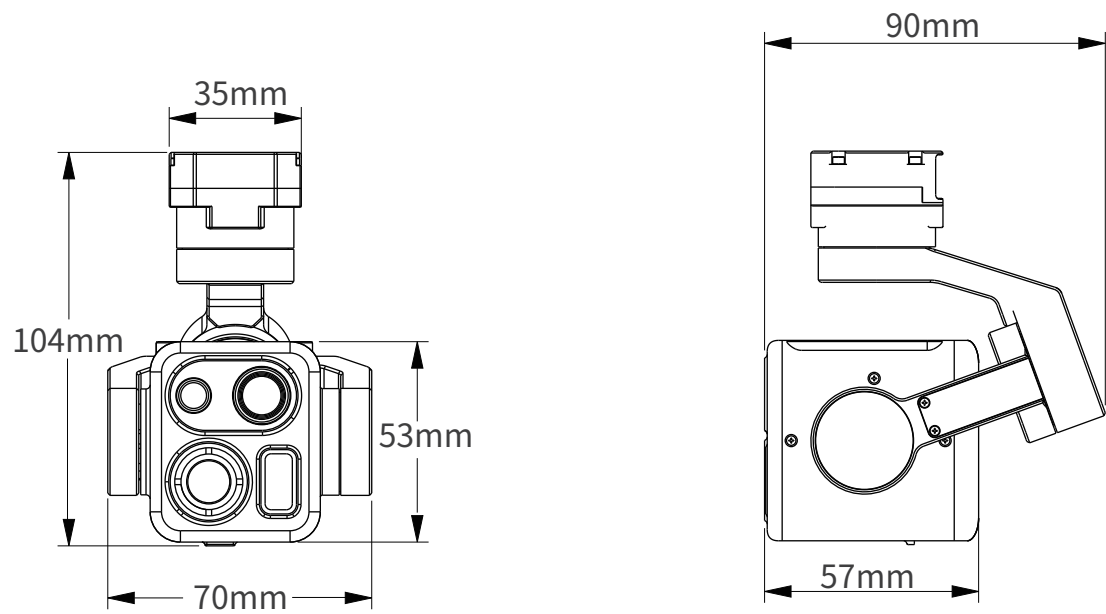
## Thermal Camera Specifications

|                               |                                                    |
|-------------------------------|----------------------------------------------------|
| Detector Type                 | Vanadium oxide (VOx) microbolometer                |
| Resolution                    | 640 × 512                                          |
| Frame Rate                    | 30 fps                                             |
| Pixel Pitch                   | 12 μm                                              |
| Spectral Response             | 8–14 μm                                            |
| NETD                          | ≤30 mK (@25°C, F#1.0)                              |
| Thermal Lens Focal Length     | 9.1 mm                                             |
| Aperture                      | F1.0                                               |
| Field of View                 | 48.3° (H) × 38.6° (V), 62.4° (D)                   |
| Temperature Measurement Range | High gain: -20°C to +150°C Low gain: 0°C to +550°C |

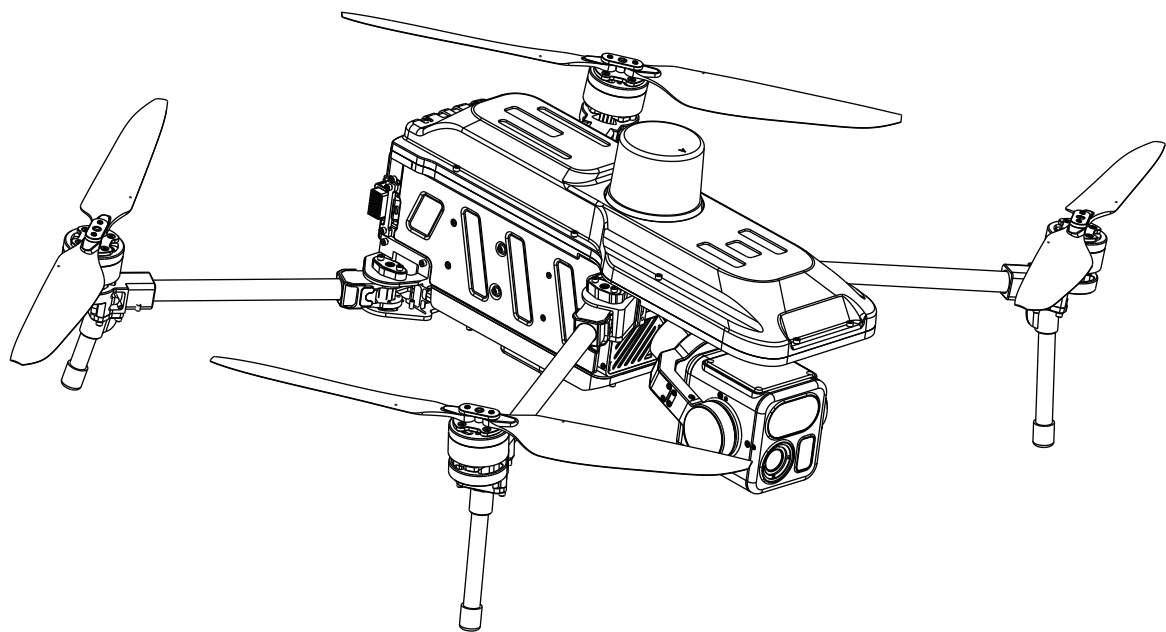
## Laser Rangefinder Specifications

|                   |          |
|-------------------|----------|
| Ranging Range     | 3-1200m  |
| Ranging Accuracy  | ±1m      |
| Range Resolution  | 0.1 m    |
| Laser Divergence  | 3.2 mrad |
| Laser Type        | 905nm    |
| Ranging Frequency | 1-10Hz   |

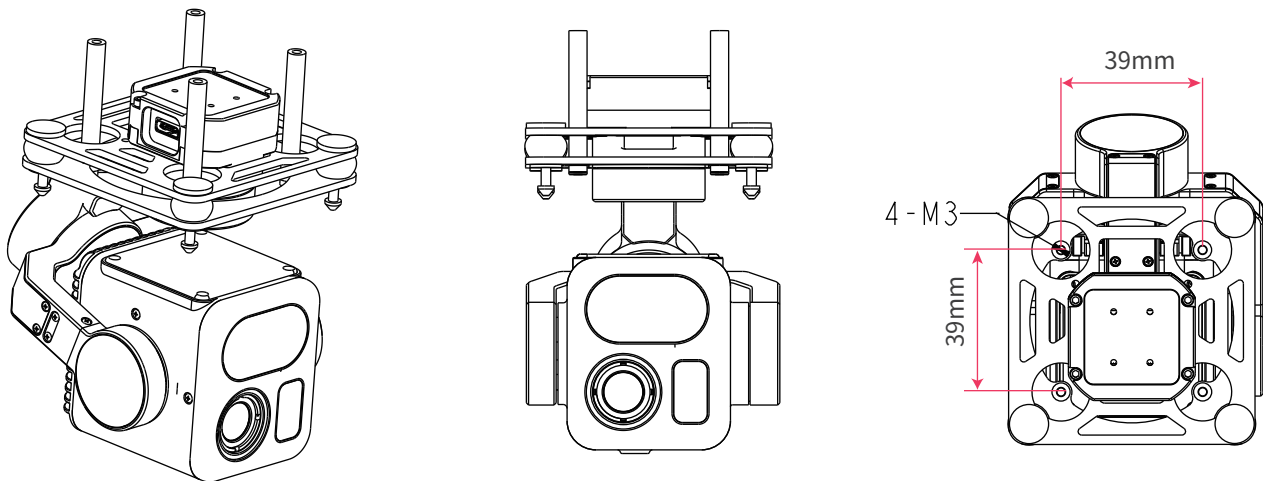
3. Gimbal Dimensions



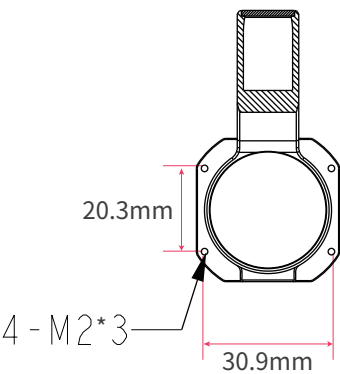
4. Product Installation



Installation Example 2

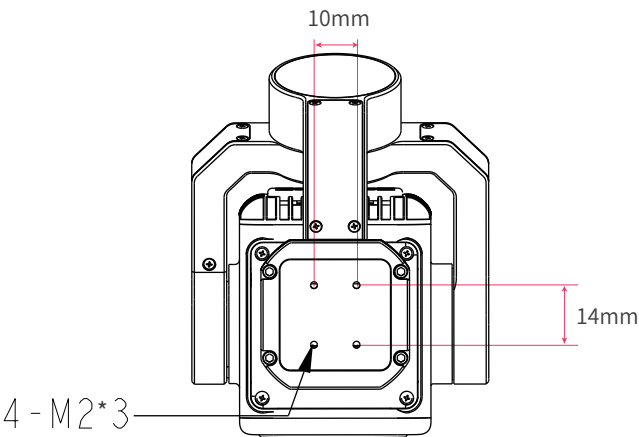


Installation Method 1



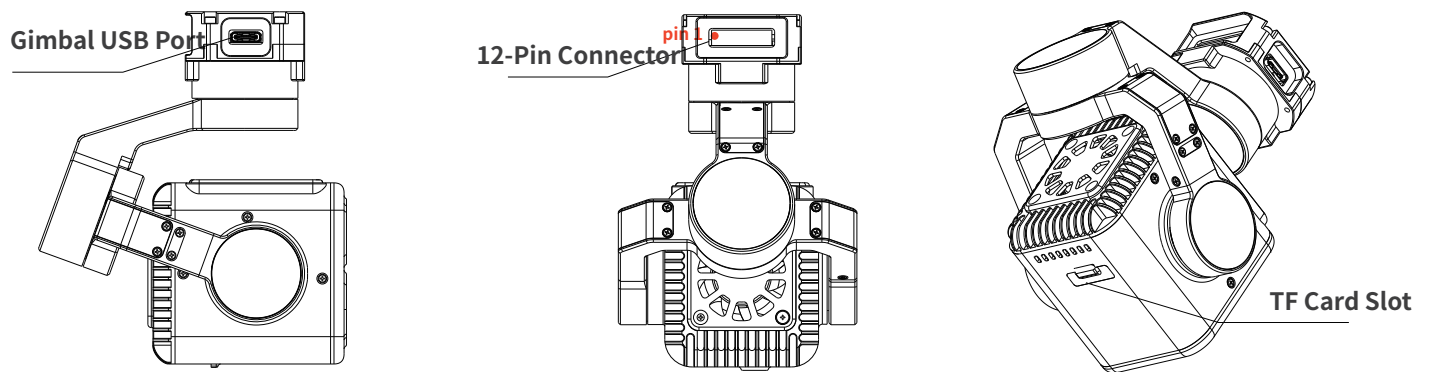
Upper mounting holes: four M2 × 3 mm screws  
Hole spacing: 20.3 mm and 30.9 mm.

Installation Method 2



Upper mounting holes: four M2 × 3 mm screws  
Hole spacing: 10 mm and 14 mm.

## 5. Hardware Interfaces



| Model             | Interface Type    | Function                                                 |
|-------------------|-------------------|----------------------------------------------------------|
| Gimbal USB        | USB Port          | Gimbal upgrade and debugging                             |
| TF Card Interface | TF Card Interface | Photo/video storage; camera and gimbal firmware upgrades |

| Pin No. | Model                        | Interface Type          | Pin Definition | Function          |
|---------|------------------------------|-------------------------|----------------|-------------------|
| 1       | 12PIN(GH1.25mm)<br>Connector | Power Interface         | GND            | GND               |
| 2       |                              | Power Interface         | GND            | GND               |
| 3       |                              | Power Interface         | 12V-18V        | Power Input       |
| 4       |                              | Power Interface         | 12V-18V        | Power Input       |
| 5       |                              | Communication Interface | T+             | Network Interface |
| 6       |                              | Communication Interface | T-             | Network Interface |
| 7       |                              | Communication Interface | R+             | Network Interface |
| 8       |                              | Communication Interface | R-             | Network Interface |
| 9       |                              | Communication Interface | SBUS           |                   |
| 10      |                              | Communication Interface | GND            |                   |
| 11      |                              | Communication Interface | TX             | TTL Serial Port   |
| 12      |                              | Communication Interface | RX             | TTL Serial Port   |

## Gimbal-to-UAV System Connection Diagram

Important:

1. The K40T-MINI serial port can receive gimbal-camera control commands and flight-controller attitude data to improve stabilization accuracy and performance.

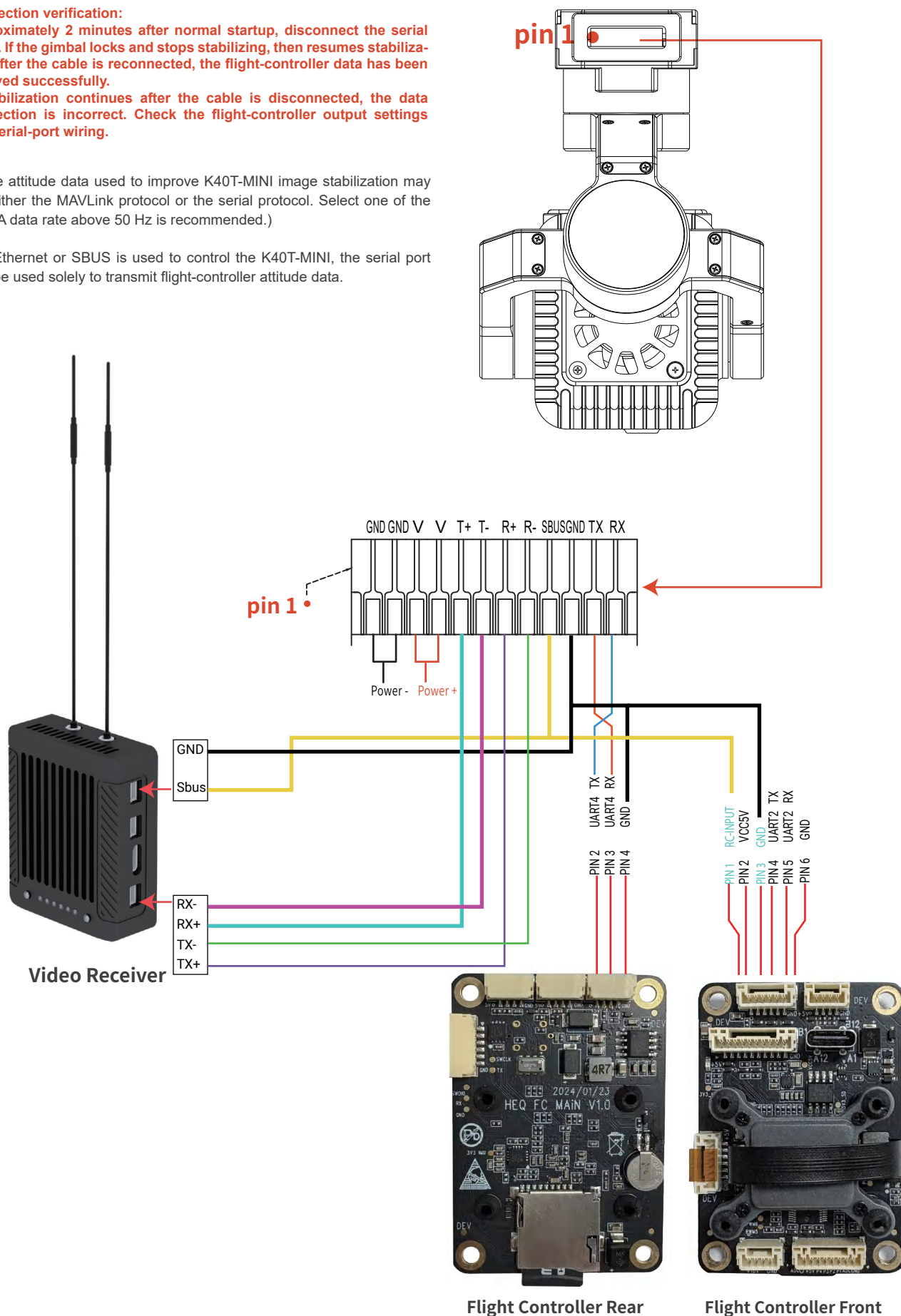
### Connection verification:

Approximately 2 minutes after normal startup, disconnect the serial cable. If the gimbal locks and stops stabilizing, then resumes stabilization after the cable is reconnected, the flight-controller data has been received successfully.

If stabilization continues after the cable is disconnected, the data connection is incorrect. Check the flight-controller output settings and serial-port wiring.

2. The attitude data used to improve K40T-MINI image stabilization may use either the MAVLink protocol or the serial protocol. Select one of the two. (A data rate above 50 Hz is recommended.)

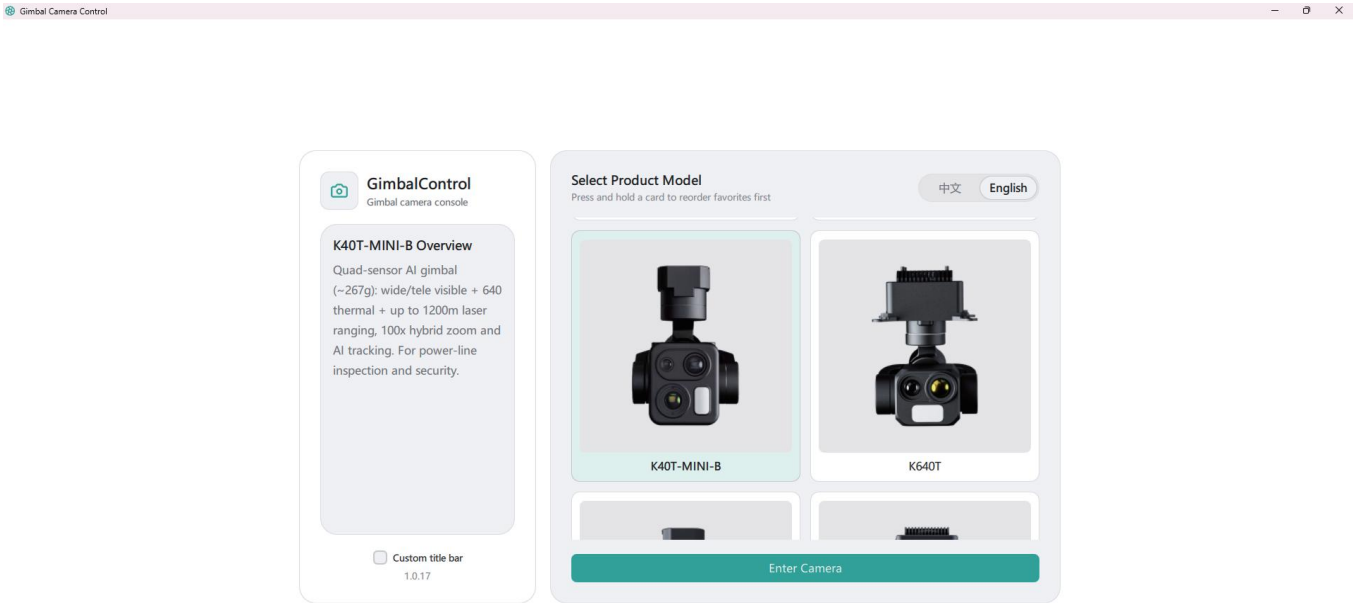
3. If Ethernet or SBUS is used to control the K40T-MINI, the serial port may be used solely to transmit flight-controller attitude data.



## 6. Gimbal Camera App Guide

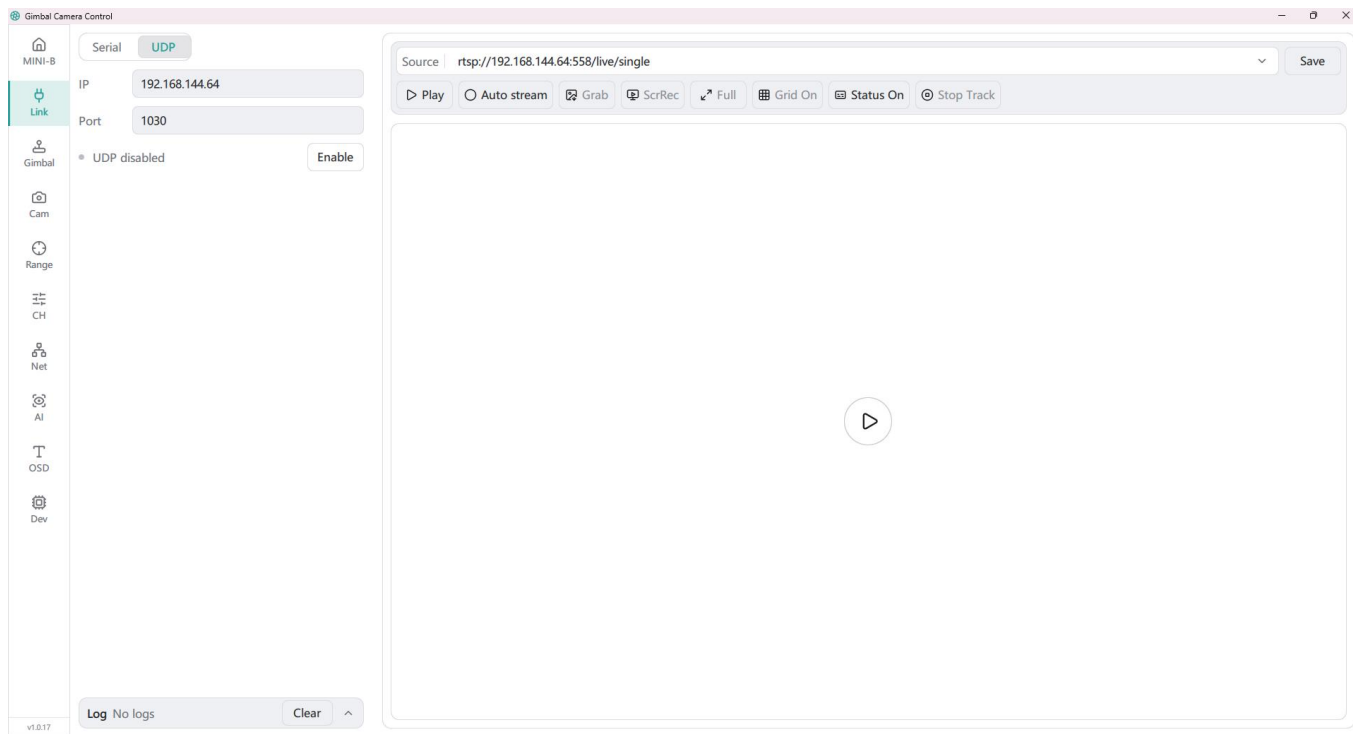
Obtain the app from the device supplier.

### 6.1 App Interface



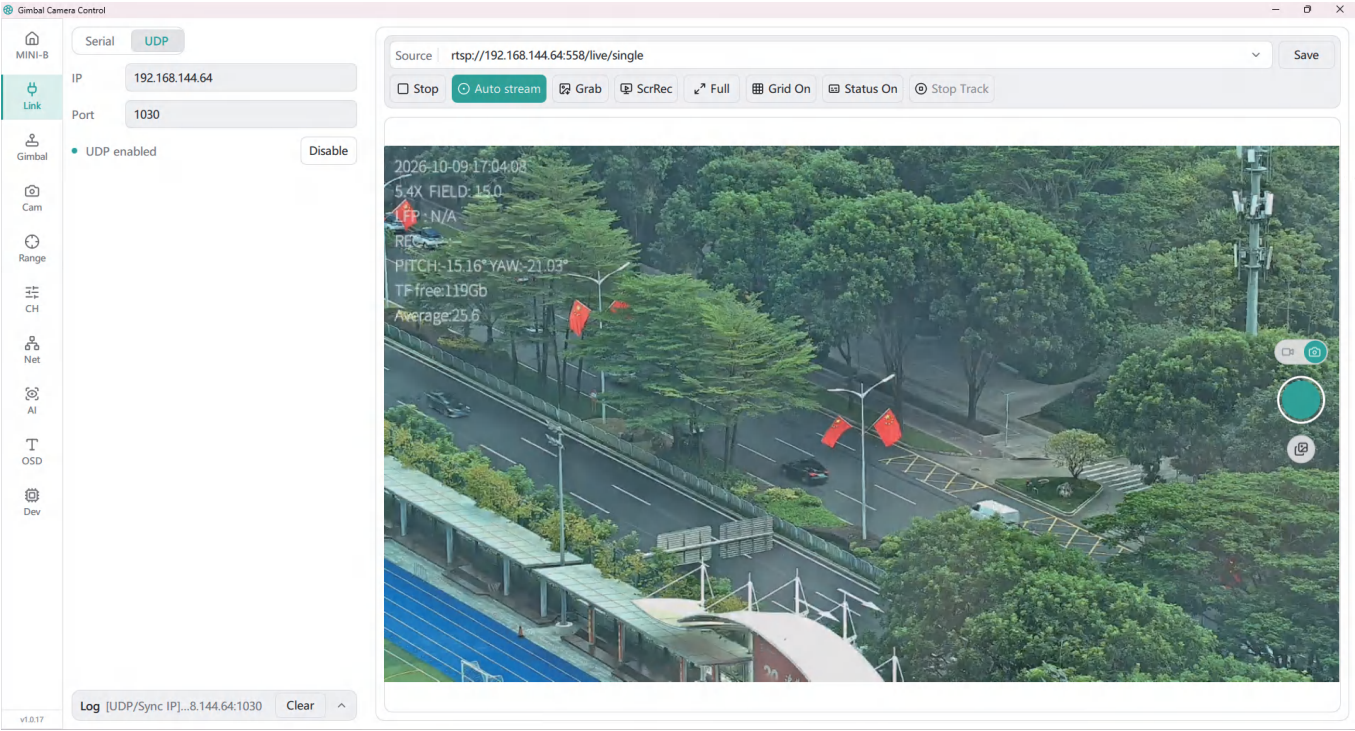
Open the gimbal camera app and select K40T-MINI-B. To change the language, click the language selector in the upper-right corner.

After opening the corresponding product page, the interface appears as follows:



6.2 Connection Settings

- 1. After selecting the model, confirm that the camera IP address, port, and stream URL are correct. If not, enter the parameters for the camera. (The app uses the camera factory settings by default.)
- 2. Communication with the camera and video streaming are available only after the camera has finished starting up.
- 3. Select UDP on the left and click "Enable" to connect to the camera.
- 4. Click "Play" below the stream URL, or click "Auto Stream", to play the camera stream continuously until the camera is turned off or the stream is interrupted.
- 5. After changing the stream URL, click "Save" and then "Auto Stream" to load the new video stream.

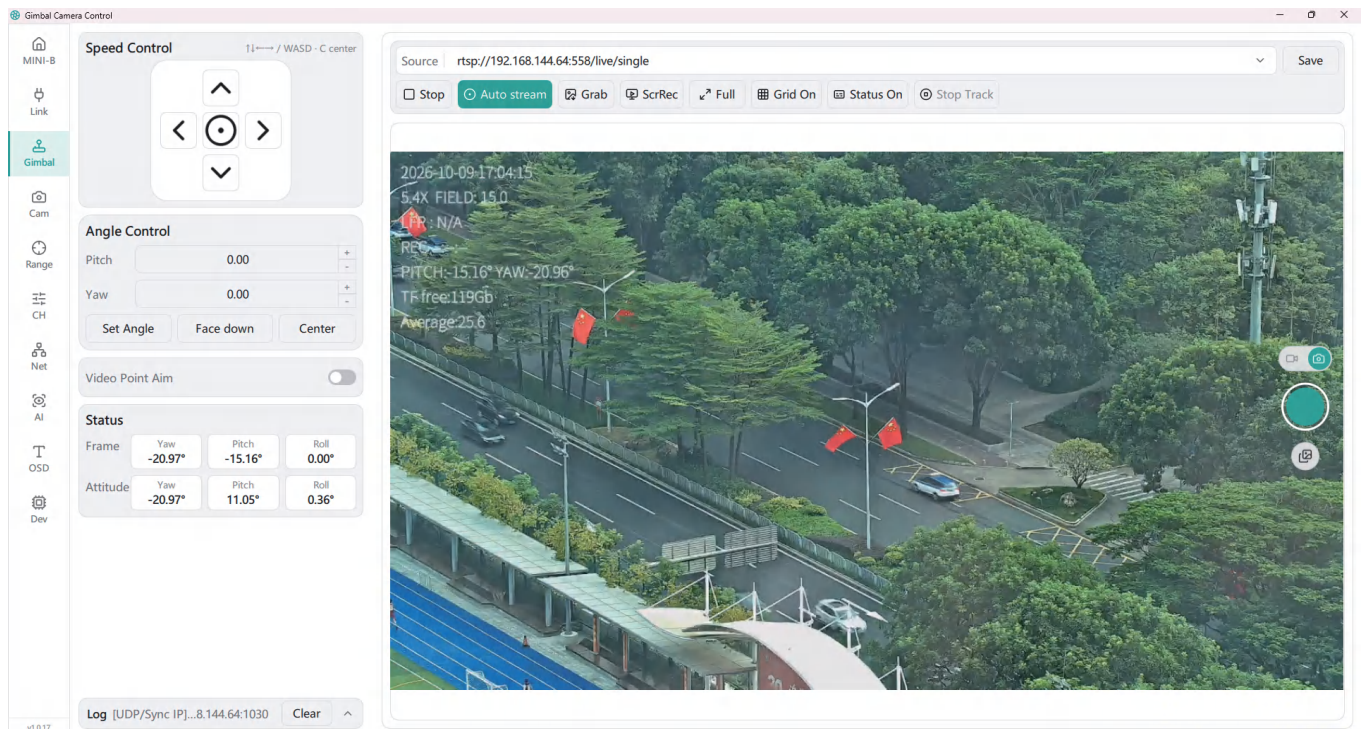


Select either a serial or UDP connection as needed. Configure the parameters as follows:

| Interface Type   | Parameter / Setting                            | User Configurable |
|------------------|------------------------------------------------|-------------------|
| Serial Baud Rate | Default: 115200                                | No                |
| UDP Address      | Default: 192.168.144.64                        | Yes (IP address)  |
| Video Stream URL | Default: rtsp://192.168.144.64:558/live/single | Yes (IP address)  |

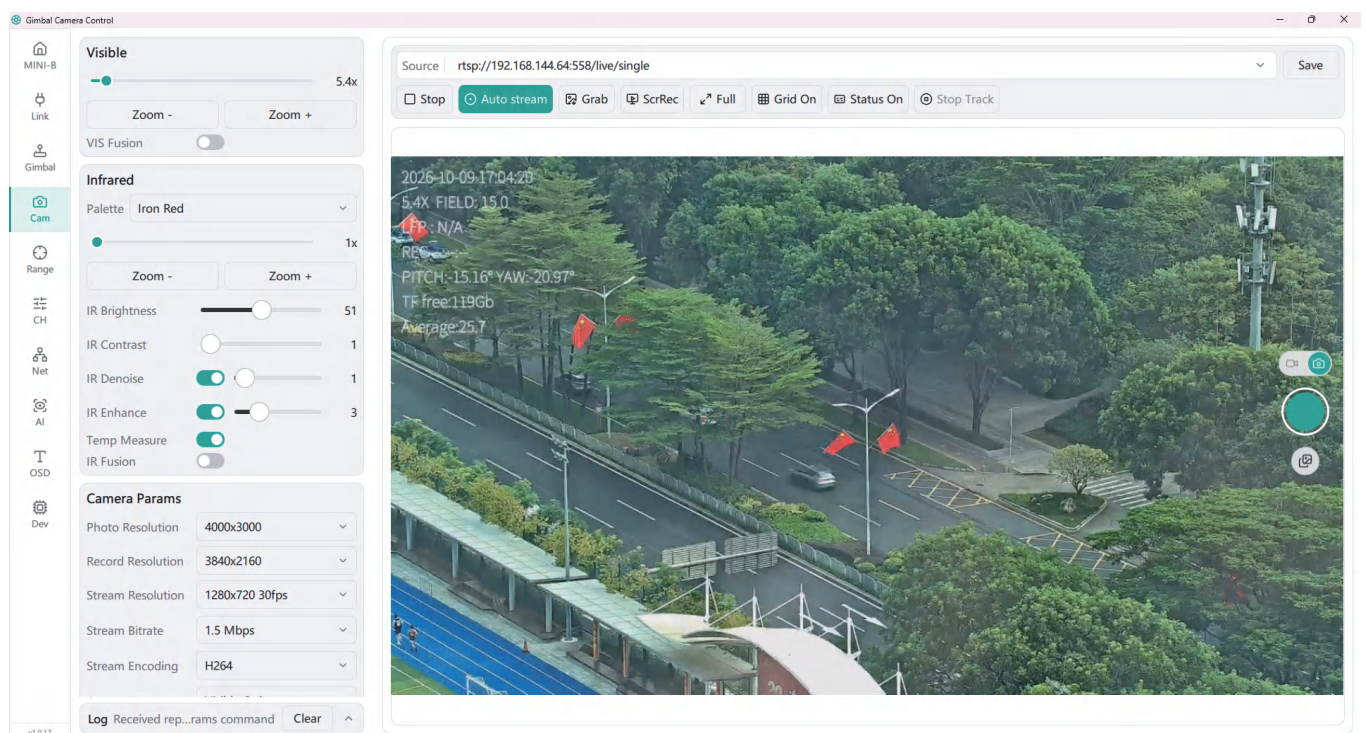
### 6.3 Gimbal Settings

1. Use the arrow keys or W, A, S, D, and C to move the camera up, down, left, or right and to recenter it.
2. The gimbal supports angle control. Enter the pitch and yaw angles, or click "Nadir 90°" or "Recenter".
3. After enabling point-to-aim mode, click a position in the video to center the view on that position and move the camera accordingly.
4. While the camera is moving, the app displays the corresponding frame angles and attitude angles in real time.



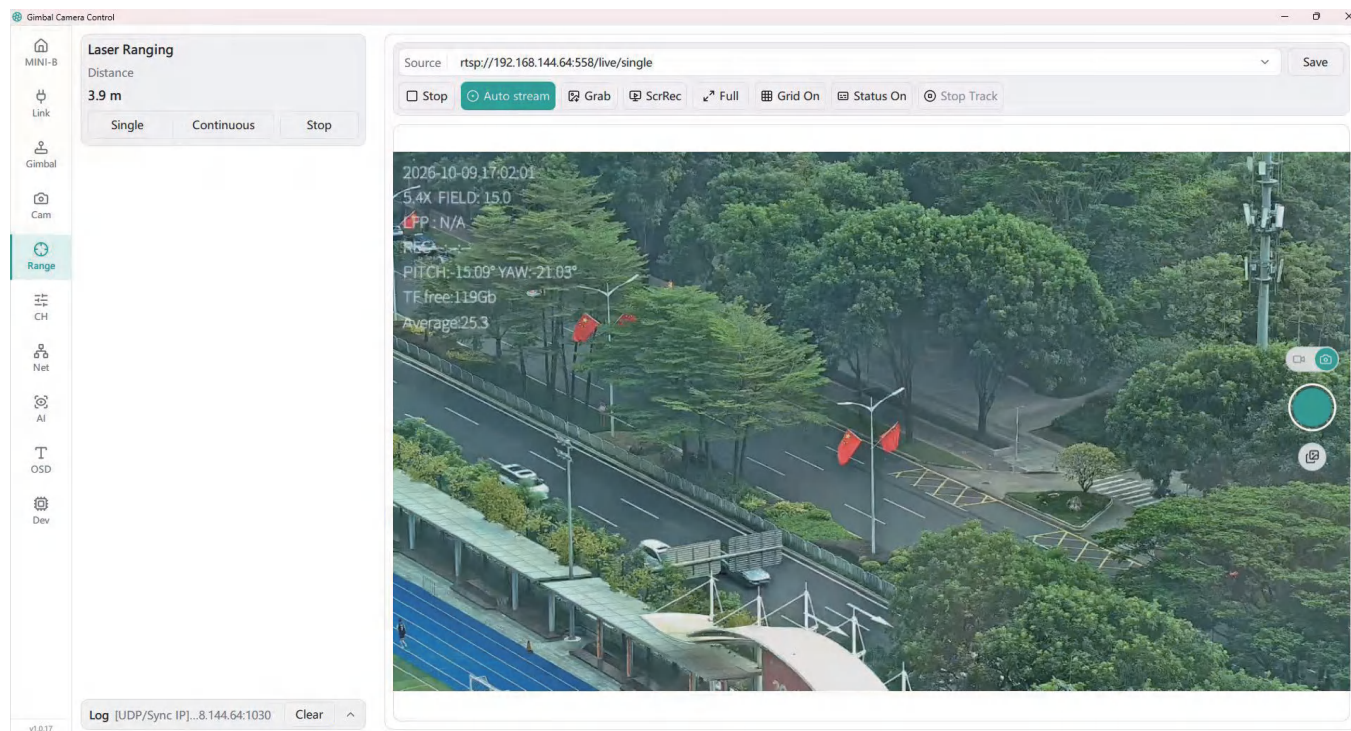
### 6.4 Camera Settings

1. Switch the camera video output among visible light, infrared, and split-screen modes.
2. For the selected video output, change the zoom level and enable image fusion.
3. In infrared video mode, adjust the infrared parameters to modify the thermal image.
4. Change the photo and recording resolutions as needed.
5. Change the video-transmission resolution, bit rate, and encoding format as needed.



## 6.5 Laser Ranging

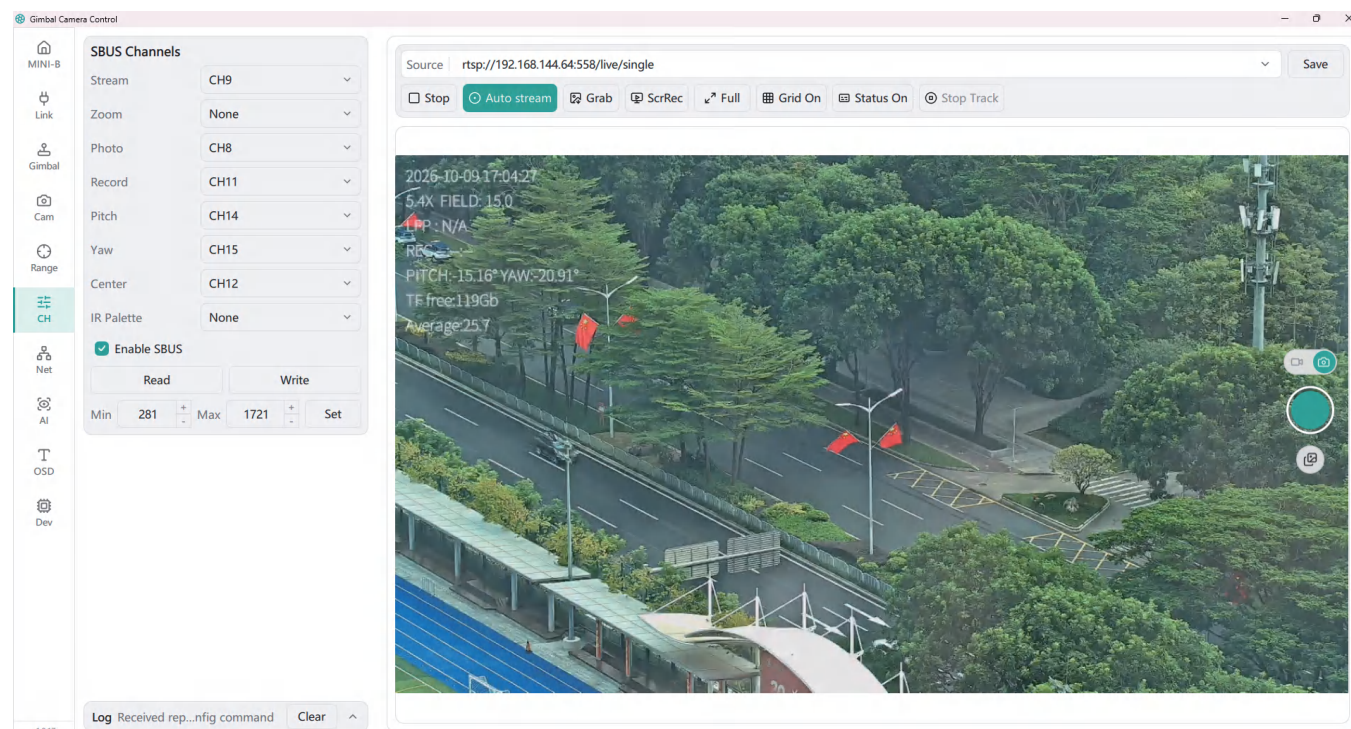
When the camera is aimed at a target within the effective ranging range (minimum 3 m), click to start single or continuous ranging.



## 6.6 SBUS Channel Mapping

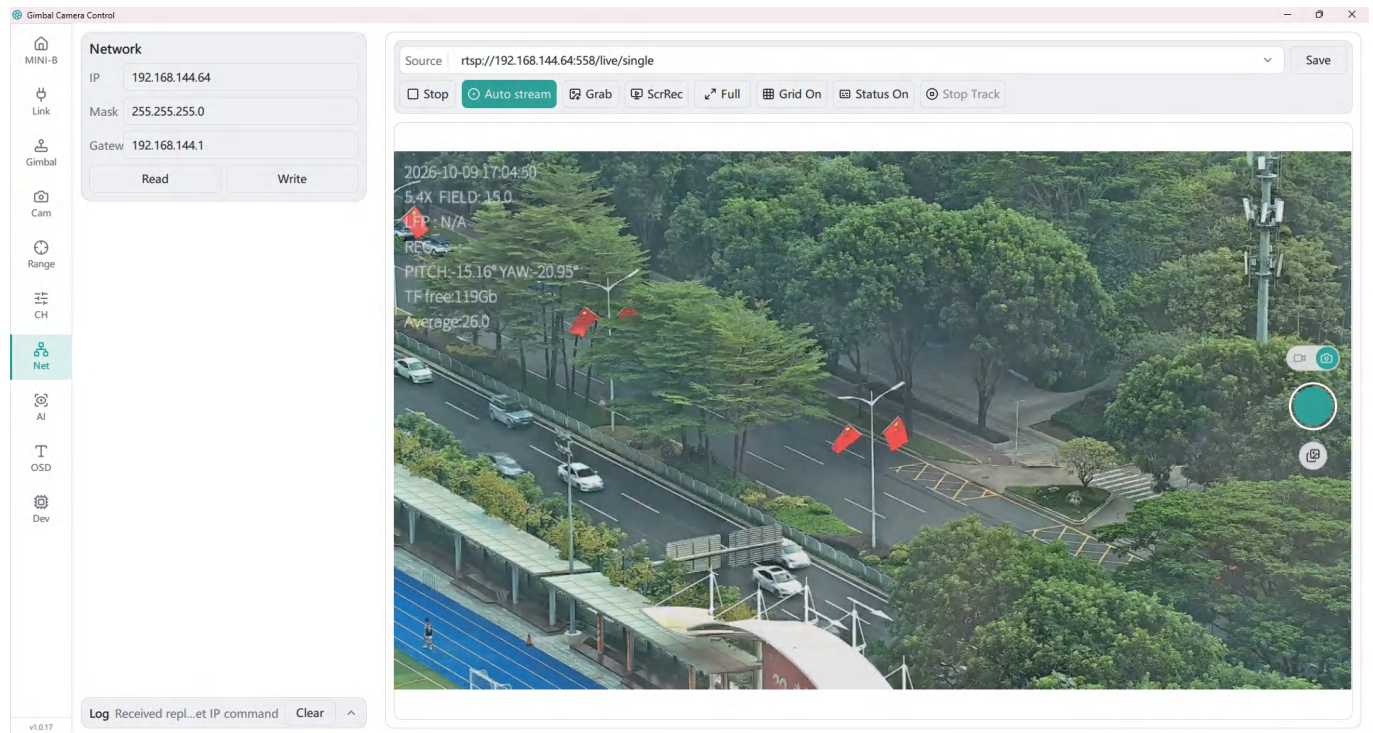
1. When using SBUS to control the gimbal camera, open this page to configure channel mapping. After assigning the channels, click "Write" to save the settings. Click "Read" to retrieve the current mapping.
2. Available channel-value ranges vary by remote-controller brand. Reference ranges for three common controllers are shown below:

Yunzhao Remote Controller: 282–1722   Remote Controller B: 281–1721   SIYI Remote Controller: 272–1712



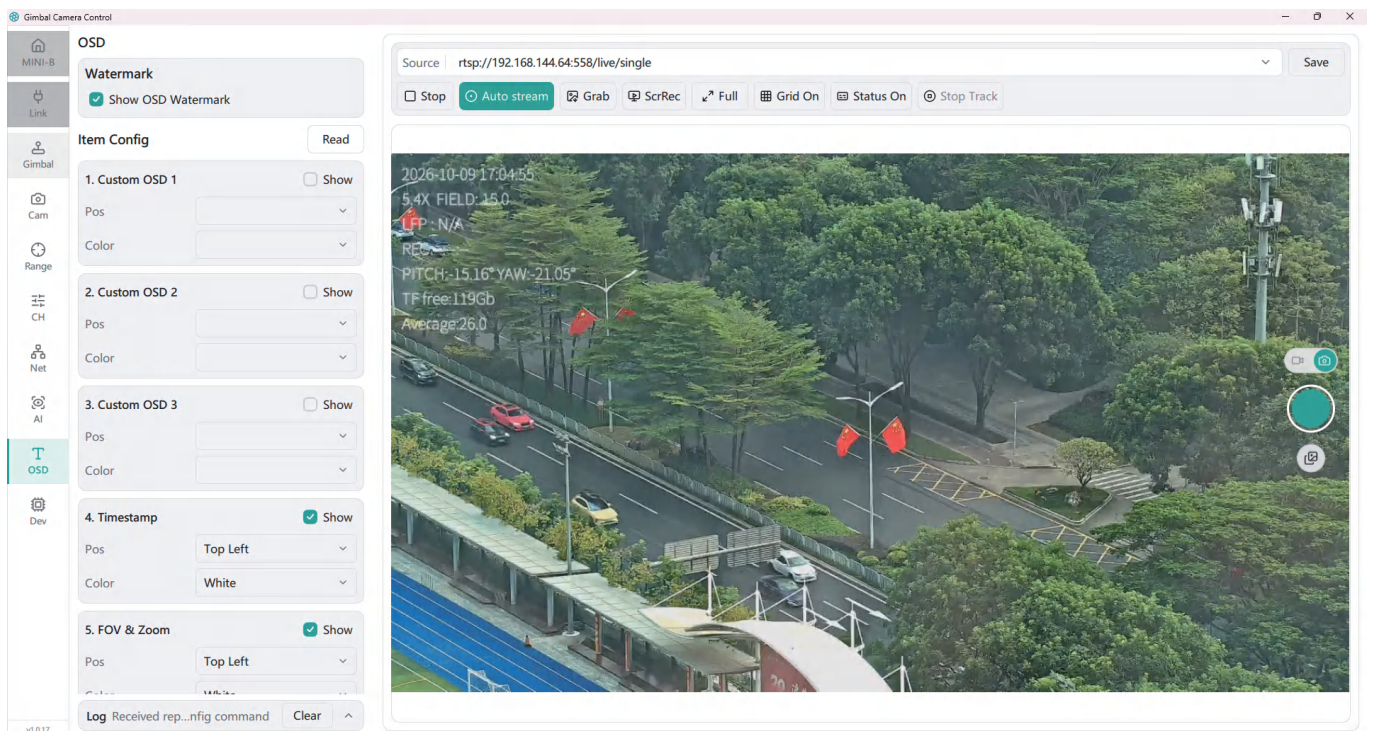
## 6.7 Camera IP Network Settings

Set the IP address as required and record the new address to avoid losing access to the device. If the IP address is forgotten, contact the device supplier for support.



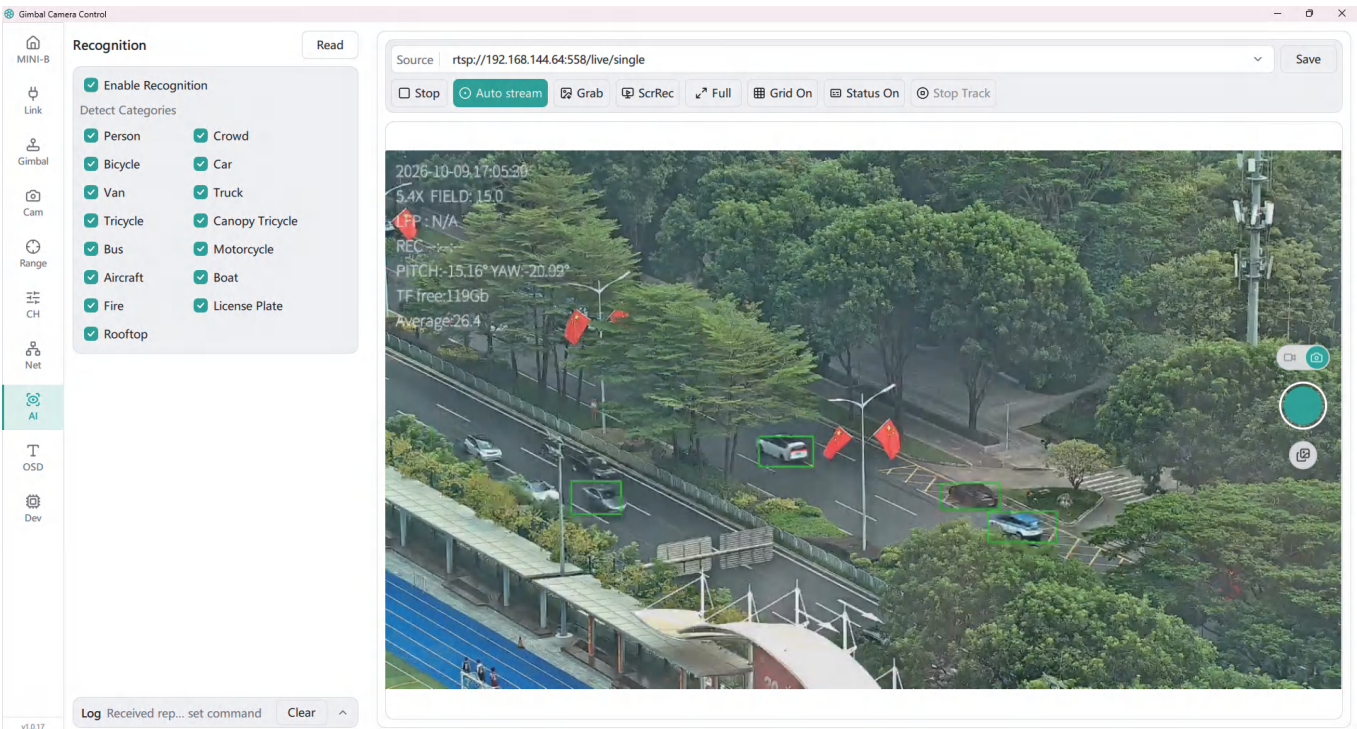
## 6.8 OSD Watermark Settings

1. Use OSD Settings to enable or disable the watermark and change its items, positions, and colors.
2. Select "Show OSD Watermark" to display the watermark. It is enabled by default; clear the option to hide it.
3. Item settings show the current video watermarks. Enable or disable individual items and change their positions or colors. Reselect Show to apply the changes.



## 6.9 AI Recognition

Ten common recognition models are built in. Select a model and click "Start Recognition"; detected targets are marked with green boxes. The default models were trained on aerial-view imagery and are recommended for elevated viewpoints.

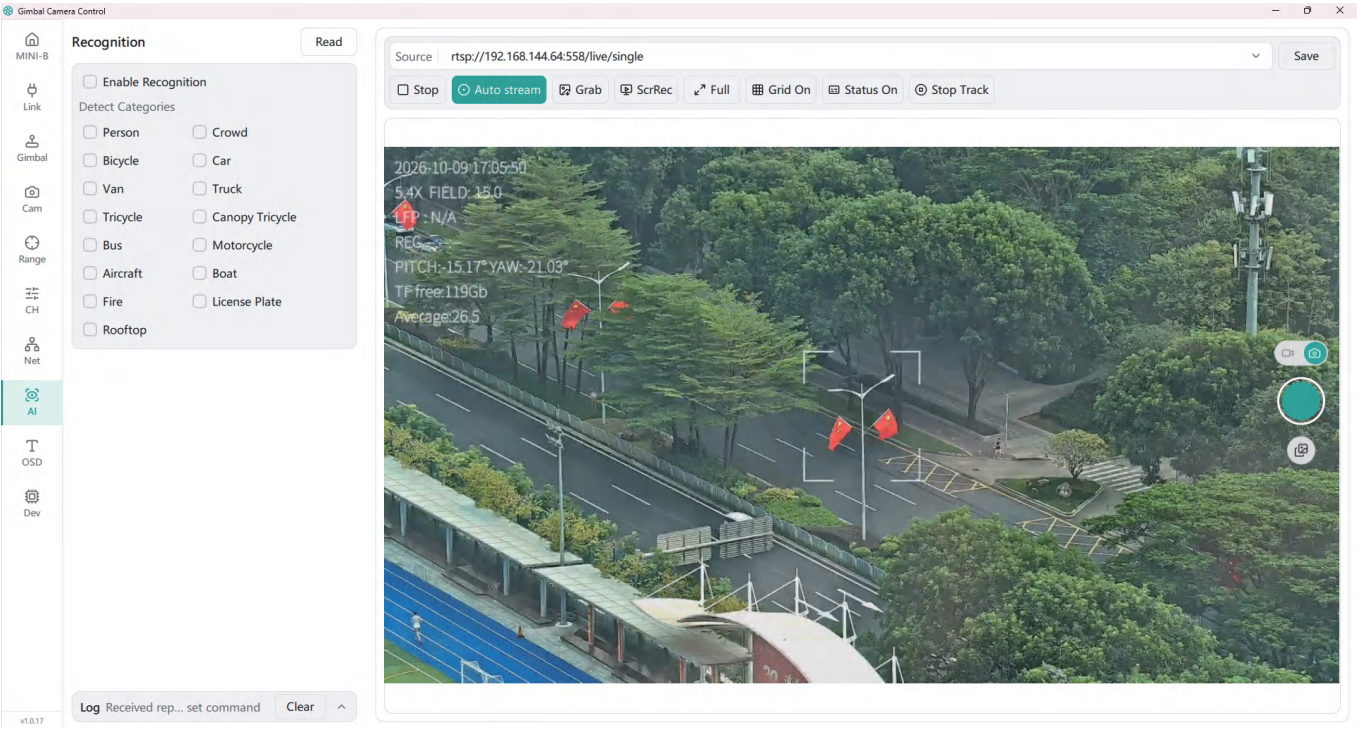


## 6.10 Box-Select Tracking

Drag a box around the target to track it. After the target is locked, a white box appears and the gimbal automatically keeps the target in the center of the frame.

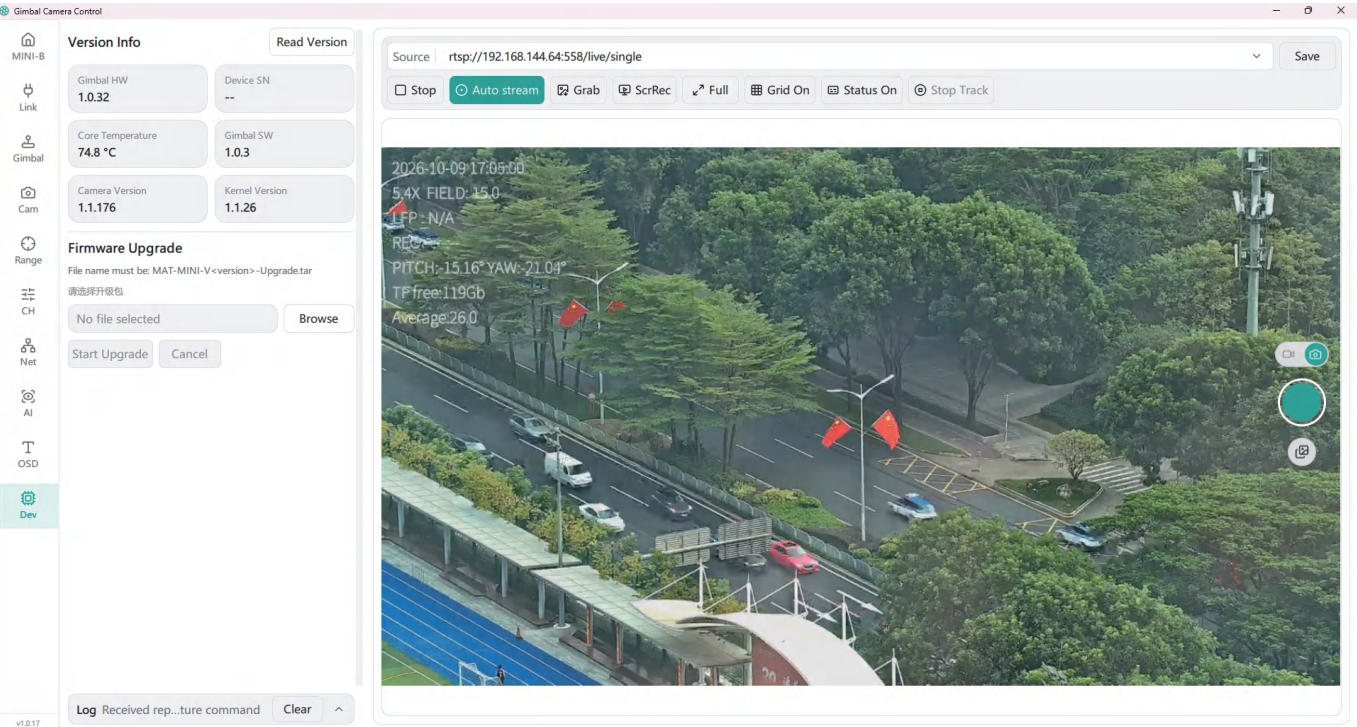
Tracking works better for recognized targets when AI recognition is enabled.

AI recognition and box-select tracking are continuously improved, and additional recognition models will be added. Contact the device supplier for the latest app, device firmware, 3D files, and user manuals.



### 6.11 Device Information

- 1. After the camera is connected normally, the camera version information is read automatically.
- 2. With a UDP connection, the camera serial protocol can be changed when the camera version is 1.0.90 or later.
- 3. When the camera is connected normally, firmware can be upgraded through the app. Click "Select File" and upload the firmware package for the corresponding model to start the upgrade. The camera version must be 1.0.90 or later.



## 7. Product Firmware Upgrade

The K40T-MINI Quad-Sensor Gimbal Camera requires separate upgrades for the camera firmware and the gimbal firmware.

### 7.1 Camera Firmware Upgrade Procedure

Place the file in the root directory of the SD card, then power on the device. Do not extract the file. Wait approximately 3 minutes for the upgrade to complete.

|                                                                                                                |                |       |            |
|----------------------------------------------------------------------------------------------------------------|----------------|-------|------------|
|  MAT-MINI-V1.0.39-Upgrade.tar | 2026/3/9 11:48 | 360压缩 | 192,550 KB |
|----------------------------------------------------------------------------------------------------------------|----------------|-------|------------|

### 7.2 Gimbal Firmware Upgrade Procedure

Place the file in the root directory of the SD card, then power on the device. During the upgrade, the gimbal motors will disengage. After a successful upgrade, the gimbal will repeat its self-test and resume stabilization.

|                                                                                                                          |                |        |        |
|--------------------------------------------------------------------------------------------------------------------------|----------------|--------|--------|
|  K40T-MINI-B_APP_V1.0.0.28_20260122.bin | 2026/3/9 14:46 | BIN 文件 | 102 KB |
|--------------------------------------------------------------------------------------------------------------------------|----------------|--------|--------|

## 8. Product Use Precautions

### 8.1 Storage Environment

Store the camera at room temperature in a dry, well-ventilated environment to prevent lens fogging caused by excessive humidity. If the lens fogs, the moisture will normally dissipate after the device has operated for a period of time. Recommended storage conditions are 20 ±5°C and relative humidity below 40%.

### 8.2 Avoid High-Energy Sources

Do not point the thermal camera lens directly at high-energy sources such as the sun, molten lava, or a laser beam. The observed target temperature must not exceed 800°C. Otherwise, the camera may burn out and suffer permanent damage.

### 8.3 Avoid High Heat and Frequent Power Cycling

Do not place the product in direct sunlight, in a poorly ventilated area, or near a heater or other heat source. Avoid frequent power cycling. After shutdown, wait at least 30 seconds before turning the product on again to prevent a reduction in service life.

### 8.4 IP Rating

Under stable laboratory conditions, the K40T-MINI meets the IP54 rating defined in IEC 60529. This protection is not permanent and may decrease after extended use.

### 8.5 Lens Cleaning and Protection

Do not touch the lens surface with your fingers or hard objects, as this may scratch the lens or reduce image quality. Clean it gently with a soft, dry, clean cloth. Do not use alkaline cleaning agents.

### 8.6 Technical Support

If you have any questions, contact the device supplier for technical assistance.