V3.0

2022.12

Z-9A

User Manual

Using this Manual – Legend

 Important

 Tips

 Explanation

Caution

1. The Z-9A 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 Z-9 in the package box. The recommended storage environment is a relative humidity less than 40% at a temperature of 20±5° C. If the lenses fog up. The water vapor will usually dissipate after turning on the device for a while.
3. Do not expose the thermal camera lens to a strong energy source such as sun, lava or laser beam. The temperature of the observation target should not exceed 800°C , otherwise it will cause permanent damage.
4. Do not place the product under direct sunlight, in areas with poor ventilation, or near a heat source such as a heater.
5. 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.
6. Make sure the pod port and pod surface are free from any liquid before installation.
7. Make sure the pod is securely installed onto the aircraft, the microSD card slot cover is clean and firmly in place.
8. Make sure the pod surface is dry before opening the microSD card slot cover.
9. Do not plug or unplug the microSD card during use.
10. 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.
11. Clean the surface of the camera lenses with a soft, dry, clean cloth. Do not use alkaline detergents.
12. When not receiving valid carrier INS data, the yaw shaft of the pod will drift about 15 degrees per hour because of the earth rotation. To make sure the pod attitude corrects, it is necessary to transmit valid carrier INS data, usually the GNSS should be positioning.

Catalog

Introduction

Synopsis

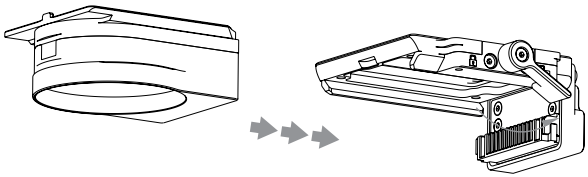
The Z-9A equips with a high-accuracy 3-axis gimbal, a 2.07M pixels 120x hybrid zoom camera and a long-wave thermal camera, which can provide visual and infrared images simultaneously. Combined with the laser lighting module and starlight level night vision function, the Z-9A can provide a clear visual light image even in complete dark environments. Thanks to the laser range finder, the Z-9A can provide the location of a target and the distance to it that improves working efficiency.
The Z-9A can be mounted tool-lessly onto unmanned aerial vehicles with its quick-release port. It is able to be applied on multiple industries such as firefighting, forest police, public security, search & rescue and environment protection.

Characteristics

- Carries a 120x hybrid zoom (30x optical zoom) camera, a 25mm focal length thermal camera, an 1800m laser range finder and 2 laser lighting modules.
- 3-axis mechanical stabilized structure which is able to spin continually around its yaw axis.
- With the Dual-IMU complementary algorithms with IMU temperature control and carrier AHRS fusion, the Z-9A provides a stabilization accuracy at $\pm 0.01°$.
- Image supports shooting point coordinate EXIF save.
- Support remote screen projection and docking command platform.
- Can be mounted tool-lessly onto unmanned aerial vehicles with its quick-release port.

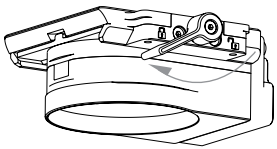
Installation

Turn the locking knob to release position, and push the pod along the guide rail at a constant speed until it makes a slight "click". Turn the locking knob to lock position.



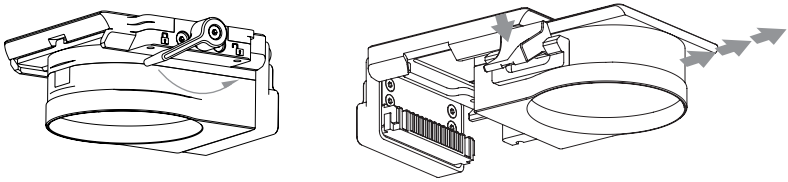
⚠ Make sure the load is installed and locked after installation!

Do not install or remove the load while it is powered on, otherwise it may cause damage to the equipment!



Disassembly

Turn the locking knob to release position. Press and hold the release position on the other side and remove it.



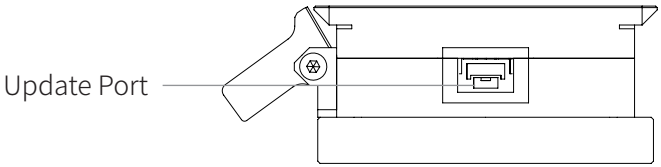
Pod Controls

See "Image Viewing and Pod Control" in the AZ-1R User Manual for control instructions.

Calibration & Firmware Upgrade

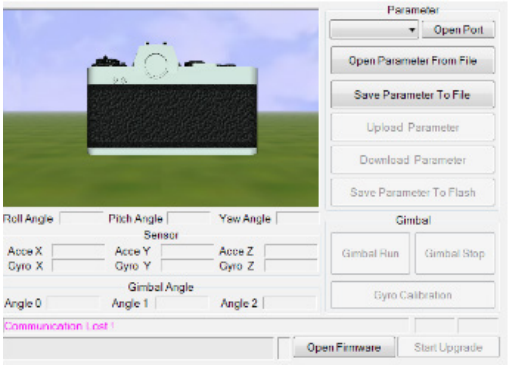
Adjust Software Installation & Settings

1. Install the driver of the config module.
   Win32 runs: CP210xVCPInstaller_x86.exe
   Win64 runs: CP210xVCPInstaller_x64.exe
2. Connect the update port of the gimbal and the computer with the config module.



3. Right-click [My Computer]-[Management]-[Device Manager]-[Port] (COM and LPT) to view the port number of the adjustment module.

4. Run GimbalConfig.exe, select the corresponding serial port number, and click "Open Port".



Calibration

Keep the pod still and click "Gyroscope calibration". When the "calibration success" is displayed in the lower left corner of the software, the calibration is complete.

Updating

Firmware upgrade steps:

1. Power on the pod and ensure that the pod and software have been successfully connected;
2. Decompress the firmware upgrade package, click the "Open Firmware" button in the software, select the upgrade package file you just decompressed, and click "Start upgrade" until the progress bar is completed, indicating that the upgrade is successful.

Just remain the pod still while calibrating. It is not necessary to hold the pod at its neutral position.

If error occurs during updating, check the cable connection and power supply, and repeat updating.

When not receiving valid carrier INS data, the yaw shaft of the pod will drift about 15 degrees per hour because of the earth rotation. To make sure the pod attitude corrects, it is necessary to transmit valid carrier INS data, usually the GNSS should be positioning.

Configuring

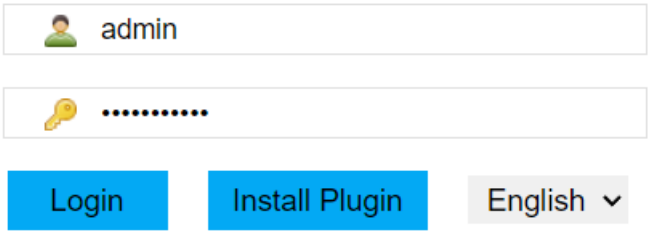
Video Stream Address

Main Stream:
rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=0
Subcode Flow:
rtsp://user:0000@192.168.144.108:554/cam/realmonitor?channel=1&subtype=1
realmonitor?channel=1&subtype=1

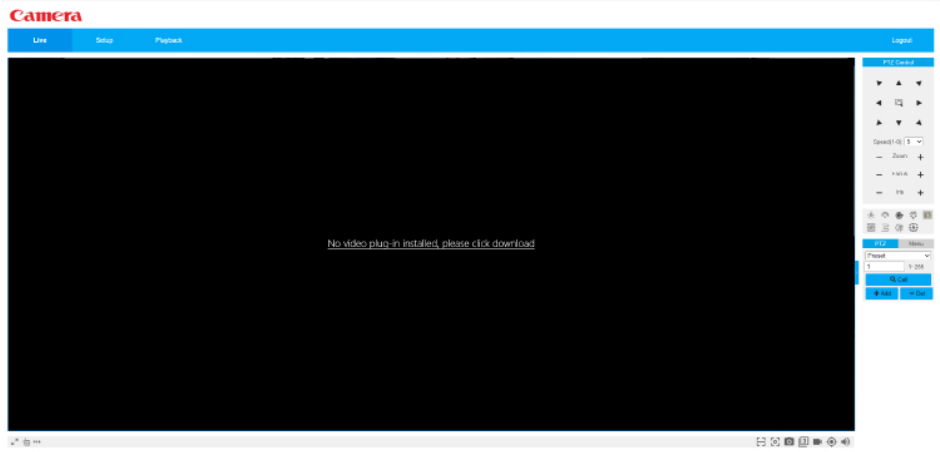
Log in to the Web Interface

1. Open Internet Explorer, Enter the movement IP address (http://192.168.144.108/) in the address box, and press [Enter]. The connection is successful.

2. Enter the user name and password to access the Web interface (the default administrator user name is admin and the password is admin123). Upon the first login, a dialog box is displayed prompting you to change the password.



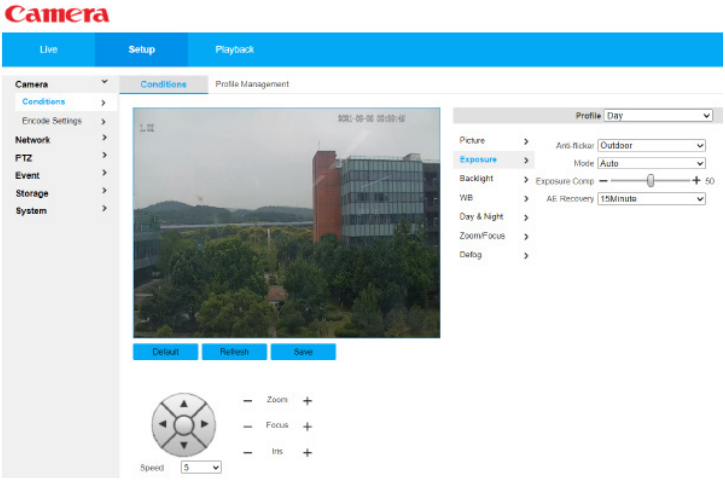
After successful login. As shown below:



3. Download and install the plug-in as prompted. After the plug-in is installed, the plug-in installation page is automatically closed, and the Web client is automatically refreshed. As shown below:

Exposure Setting

The exposure Settings are shown in the figure, and the parameters in the figure are factory default parameters.

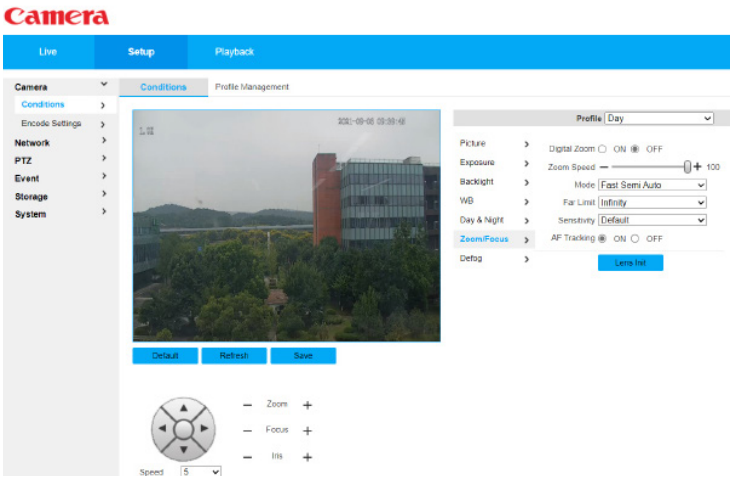


1. Mode: Set the camera's exposure mode, including automatic, manual, aperture priority, shutter priority and gain priority modes. The default value is "automatic" mode
    - In automatic exposure mode, when the overall brightness of the image is within the normal exposure range, the brightness of the image is automatically adjusted according to different scenes.
    - In aperture priority mode, it is better to fix the aperture as the set value, and automatically achieve the brightness value by preferently driving the exposure time and then driving the gain.
    - In shutter priority mode, the user can customize the shutter range, and the system automatically adjusts the aperture size and gain according to the brightness of different scenes.
    - In gain priority mode, the gain value and exposure compensation value can be adjusted manually.
    - In manual exposure mode, the gain value, shutter value and aperture value can be manually adjusted and long exposure is supported.

2. Gain range: Set the exposure gain. The value ranges from 0 to 100.
3. Shutter: Adjust the camera exposure time. The larger the shutter value, the darker the image, and the brighter the image.
4. Shutter range: Set the camera exposure time, the value range is 0 ~ 1000, the unit is ms.
5. Aperture: Set the light quantity of the camera. The larger the aperture value, the brighter the image, and the darker it is.
6. Exposure compensation: Set the exposure compensation value. The value ranges from 0 to 100.
7. Automatic exposure recovery: After setting to non-automatic exposure mode, automatic exposure can be restored after the set time; You can set off, 5 minutes, 15 minutes, and 1 hour. The default is 15 minutes.
8. 2D noise reduction /3D noise reduction: This value is used to suppress noise, and the larger the level, the smaller the noise, and the picture is fuzzy.
9. Level: Set the degree of noise reduction. The value ranges from 0 to 100. The larger the value, the greater the degree of noise reduction.

Zoom Focusing

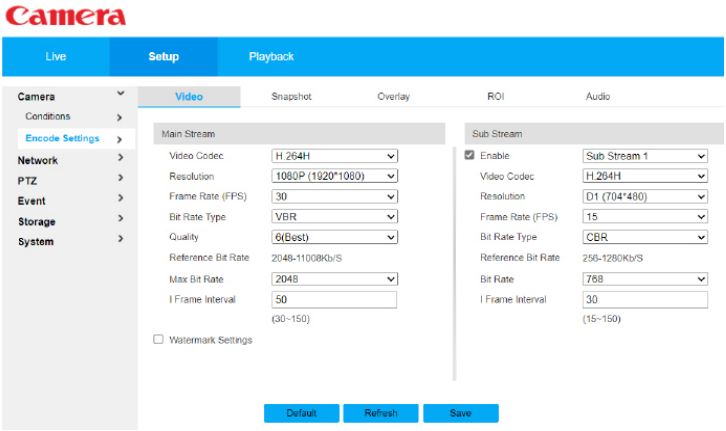
The zoom focusing interface is shown in the figure, and the Settings in the figure are factory default parameters.



1. Digital multiplier: Set whether to enable the digital multiplier function. The default value is "Off".
2. Zoom speed: Set the zoom speed of the camera, the larger the value, the faster the zoom speed, the default is 100.
3. Mode: Trigger mode to control focus, which can be semi-automatic, automatic, manual, fast semi-automatic or fast automatic.
    - Semi-automatic: The focus is actively triggered by the detection of varix, ICR switching and other operations.
    - Automatic: The focus is automatically triggered when operations such as scene changes, magnification, and ICR switching are detected.
    - Manual: The user automatically adjusts the focus position, and the device does not automatically trigger the focus.
    - Fast semi-automatic: The detection of varix, ICR switch and other operations will actively trigger the focus, focusing speed is faster.
    - Fast automatic: When the scene changes and magnification, ICR switching and other operations will actively trigger focusing, focusing speed is faster.
4. Nearest focusing distance: Set the nearest focusing distance to focus on the scene outside this distance, where the automatic option will automatically select the appropriate closest distance according to the different magnification values.
5. Sensitivity: Set the focus of the smooth or anti-interference ability, the lower the value, the more stable, the higher the anti-interference.
6. Zoom tracking: If this function is turned on, the image will be relatively clear during the zoom process; If this function is turned off, the doubling speed will be higher during the doubling process. The default value is "Off".
7. Lens initialization: Click the button to automatically initiate a lens, and the device lens will perform a stretching action to correct the zoom and focus of the lens.

Coding Settings (Video Stream)

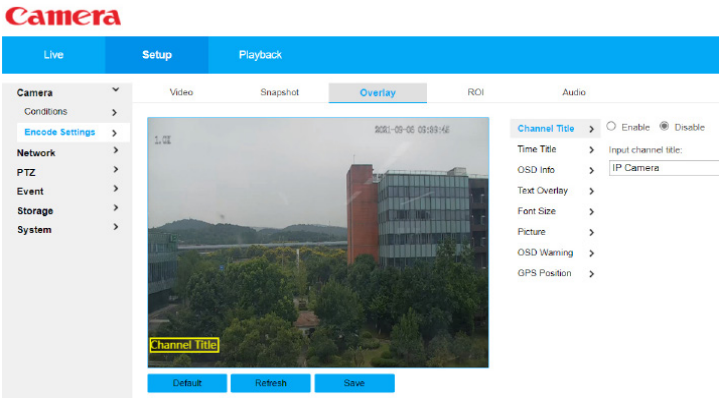
The video stream interface is shown in the figure, and the Settings in the figure are factory default parameters.



1. Encoding mode: Select H.264, H.264H, H.264B, H.265, MJPEG.
2. Resolution: Includes a variety of resolution types, each corresponding to a different recommended stream value.
3. Frame rate (FPS) : 1 frame/second ~ 50 frames/second; The frame rate varies with the device model and resolution.
4. Stream control: including fixed stream and variable stream
   - The image quality can be set only in variable stream mode and cannot be set in fixed stream mode.
   - In MJPEG encoding mode, the stream control mode can only be fixed stream.
5. Reference stream value: According to the resolution and frame rate set by the user, the user is recommended to set a reasonable stream value range.
6. Code stream:
   - In variable stream mode, this value is the upper limit of the stream. In fixed stream mode, the value is a fixed value.
   - Refer to the Reference Stream Values for the best reference range.

7. I-frame interval: Indicates the number of P-frames between two I-frames. The range varies with the frame rate. The maximum value is 150.
8. Watermark Settings: By verifying the watermark characters, you can check whether the video is tampered with, select the enable item to enable the watermark function; The default watermark character is DigitalCCTV The watermark contains a maximum of 128 characters, including digits, letters, underscores (_), and hyphens (-).
9. Enable substream: The Enable check box controls whether substream is enabled. It is enabled by default.

Coding Settings (Video Overlay)



1. Channel title: Set whether to display the channel title in the monitoring screen. The position of the channel title can be adjusted by dragging the "Channel title" box (factory Settings: Off).
2. Time title: Set whether to display the time in the monitoring screen, you can choose whether to display the week, you can adjust the position of the time title by dragging the "time title" box (factory Settings: off).

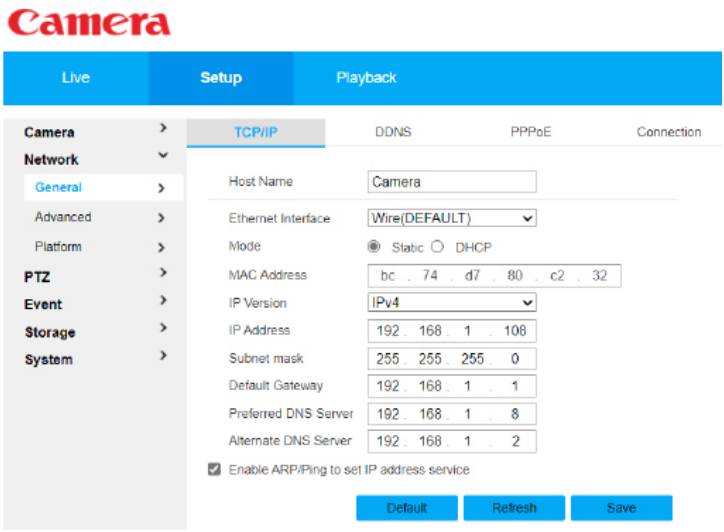
3. OSD information: Set whether to display preset points, pod coordinates, variable times, geographic/road information, etc., in the monitoring screen. You can drag the OSD Information box to adjust the position of the OSD information on the monitoring screen.
   (Factory Settings: preset point off, variable times open)
4. Image overlay: Set whether to display the superimposed picture in the video screen. Click Upload picture to add a local picture to the video monitoring window. You can adjust the position of the overlay image by dragging the yellow box.
   (Factory Settings: default off, can be turned on to display the crosshair)
   - The location/road information and picture overlay in OSD information cannot be enabled at the same time.
5. Abnormal superposition: Set whether to display abnormal information in the monitoring screen (factory Settings: on).
6. GPS coordinates: Set whether to display latitude and longitude information in the monitoring screen (factory Settings: off).

Network Settings

This section describes how to set the IP address and DNS server of the camera to ensure that the camera can communicate with other devices on the network.

- Before setting network parameters, ensure that the camera is correctly connected to the network.
- If no routing device exists on the network, assign an IP address in the same network segment.
- If a routing device exists on the network, set the gateway and subnet mask.

The TCP/IP interface is shown in the figure. The Settings in the figure are factory default parameters.



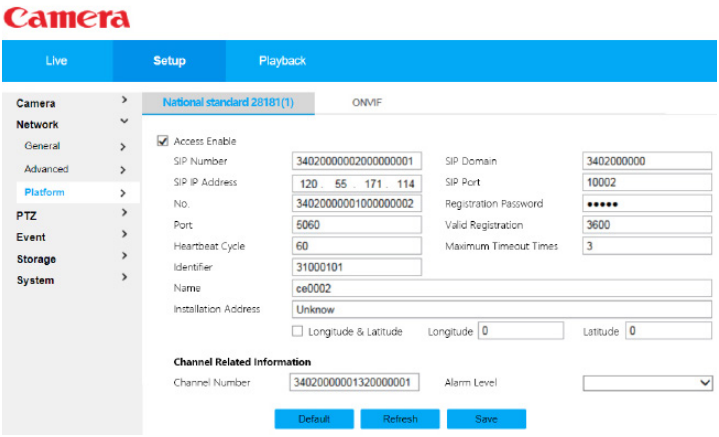
1. Host name: Set the name of the current host. The maximum length is 15 characters.
2. Nic: Select the NIC to be configured. Wired by default.
   If the device has multiple nics, you can change the default NIC. If the default NIC is reset, restart the device.
3. Mode: Static mode and DHCP mode are available. When the DHCP mode is selected, the IP address, mask, and gateway are unavailable. If static mode is selected, you need to manually set the IP address, mask, and gateway.
4. MAC address: Displays the MAC address of the device.
5. IP version: IPv4 and IPv6 address formats can be selected. Currently, both IP addresses are supported and can be accessed.

6.I P address: Enter the corresponding number to change the IP address.

7. Subnet mask: Set according to the actual situation, subnet prefix number font, input 1 ~ 255, subnet prefix part identifies a specific network link, usually includes a hierarchical structure.
   The device checks the validity of all IPv6 addresses. The IP address and default gateway must be in the same network segment, that is, the subnet prefix must have the same length field.
8. Default NMS: Set this parameter based on the actual situation and must be in the same network segment as the IP address.
9. First DNS service :DNS server IP address.
10. Standby DNS service: Enter the standby IP address of the DNS server.
11. Enable ARP/Ping to set the device IP address. If you know the MAC address, you can run the ARP/Ping command to change and set the device IP address. Within two minutes, you can Ping a packet of a specific length to set the IP address of the device. After two minutes, the service stops. After the IP address is set successfully, the service stops immediately. Enable If the Ping packet is disabled, the IP address cannot be set.

Platform Access

National Standard 28181 refers to the "Security security video surveillance network system transmission, exchange, control technical requirements" (GB/T 28181-2011), the industry referred to as: SIP national standard.
This standard specifies the security security video surveillance network system (hereinafter referred to as the "network system") in the information transmission, exchange, control of the interconnection structure, communication protocol structure, transmission, exchange, control of the basic requirements and security requirements, as well as control, transmission process and protocol interface and other technical requirements.



1. SIP server number :28181 Server platform number.
2. SIP server domain name :28181 server platform domain name number.
3. Set SIP server IP address to the IP address of the 28181 server.
4. SIP server port: Port 28181.
5. Heartbeat period: indicates the keepalive interval between the device and the 28181 server.
6. Heartbeat timeout times: Collects the number of heartbeat timeout times between the device and the 28181 server. If the heartbeat timeout times exceed this number, the device automatically disconnects the communication with the 28181 server.
7. Module identifier: indicates how the device communicates with the 28181 server, which is generally a value agreed between the device side and the server side.

Video Playing

Use the Dragonfly Pod display control software, or enter the stream address in the streaming media player such as VLC, EasyPlayer, etc., to play the video. Make EasyPlayer as an example:

Windows Version

EasyPlayer operation steps are as follows:

1. Decompress the package
2. Open the application: EasyPlayer-RTSP
3. Enter the stream address and click "Play"

Android Version

1. Install the EasyPlayerRTSP APP
2. Open the APP and tap the "+" sign
3. Enter the stream address and click OK

Appendix 1 Specifications

Item		Parameters	
General	Dimensions	173 x 144 x 206mm	
	Weight	1110g	
	Operating Voltage	20~53V	
	Power	16.5W (AVG, ranging & lighting off) 60W (Stall, ranging & lighting on)	
	Protection Rating	IP43	
Gimbal	Angular Vibration Range	±0.01°	
	Maximum Controllable Speed	Pitch: ±200° /s, Yaw: ±200° /s	
	Controllable Range	Pitch: -120°～ +60° , Yaw: ±360° constantly	
Zoom Camera	Image Sensor	1/2.8″ CMOS; Effective Pixels: 2.07M	
	Lens	Focal Length: 4.7~141mm HFOV: 60°～ 2.3° VFOV: 36.9°～ 1.3° DFOV: 68.4°～ 2.6°	
	Optical Zoom Rate	30x	
	Equivalent Digital Zoom Rate	4x	
	Min Illumination	Night Vision off: 0.05Lux / F1.6 Night Vision on: 0.005Lux / F1.6	
	S/N	⩾ 55dB（AGC off，Weight on）	
	Object Detective Distance	EN62676-4:2015	Person[1]: 2128.2m Vehicle[2]: 2797.1m
		Johnson Criteria	Person: 24310.3m Vehicle: 74551.7m

Item		Parameters	
Zoom Camera	Object Identification Distance	EN62676-4:2015	Person: 425.6m Vehicle: 559.4m
		Johnson Criteria	Person: 6077.6m Vehicle: 18637.9m
	Object Verified distance	EN62676-4:2015	Person: 212.8m Vehicle: 279.7m
		Johnson Criteria	Person: 3038.8m Vehicle: 9319.0m
Thermal Camera	Thermal Sensor	Uncooled VOx Microbolometer	
	Lens	Focal Length: 25mm HFOV: 17.5° VFOV: 14° DFOV: 22.3°	
	Resolution	640 x 512	
	Pixel Pitch	12μm	
	Spectral Band	8~14μm	
	Sensitivity (NETD)	<50mk(@25°C，f#=1.0)	
	Temperature Measurement Range	Class1：-20~150°C Class2：0~550°C	
	Temperature Measurement Accuracy	±3°C or ±3% of the reading (take the greater) @ ambient temperature -20~60°C	
	Object Detective Distance	Johnson Criteria	Person: 1041.7m Vehicle: 3194.4m
	Object Identification Distance		Person: 260.4m Vehicle: 798.6m
	Object Verified Distance		Person: 130.2m Vehicle: 399.3m

Item		Parameters
Laser Range Finder	Wavelength	905nm
	Measuring Range	5-1800m (12m vertical surface with 20% reflectivity)
	Measuring Accuracy	±0.3m(< 300m) / ±1.0m(> 300m)
	Beam Angle	2.5mrad
	Measuring Method	Pulse
	Max Laser Power	< 1mW
	Laser Safety	Class 1M (IEC 60825-1: 2014)
Laser Lighting Module	Wavelength	850±10nm
	Laser Power	0.8W x2
	Beam Angle	8° + 30°
	Effective Illumination Distance	⩽ 200m
	Laser Safety	Class 3B (IEC 60825-1:2014)
Image & Video	Output Video Resolution	1080P@30fps
	Store Video Resolution	1080P@30fps
	Image Resolution	1920 x 1080
	Stream Encode Format	H.264, H.264H, H.265
	Stream Network Protocol	ONVIF, GB/T28181, HTTP, RTSP, TCP, UDP, RTP
	Supported SD Card	Supports a TF card with a capacity of up to 256GB

Item		Parameters
Enviro-nment	Operating Temperature	-20°C～ 60°C
	Storage Temperature	-20°C～ 70°C
	Operating Humidity	⩽ 85%RH (Non-condensing)

[1] Person: 1.8 x 0.5m
[2] Vehicle: 4.2 x 1.8m