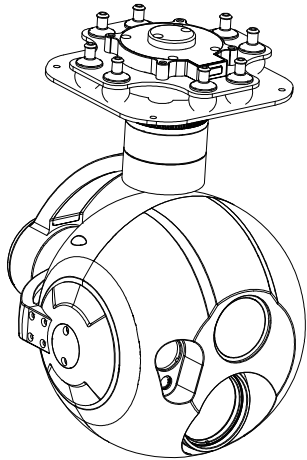
A20KTR 20x EO 4K Triple Sensors AI Object Tracking and LRF Gimbal Camera

User Manual



Please scan QR code for more details,
or visit our website:
www.viewprotech.com

Disclaimer and Warning

Congratulations on purchasing your new Viewpro product. Please read this entire document carefully. Failure to read or follow instructions and warnings in this document may result in damage to your Viewpro product. Disassemble the gimbal camera by user is not permitted, as which may cause the camera does not work normally.

Viewpro accepts no liability for damage, injury or any legal responsibility incurred directly or indirectly from the use of this project. The user shall observe safe and lawful practices including, but no limited to, those set forth in the manual.

Legends



Warning



Important Note

1.Product Introduction

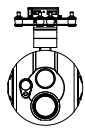
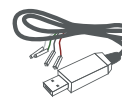
1.1 Introduction

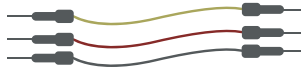
A20KTR is a 4K 3-axis high resolution triple sensors gimbal camera. It is integrated with a 20x optical zoom camera which adopts a 8.51MP high resolution EO sensor,a resolution of 640*512 35mm lens uncooled long wave IR thermal imager sensor and a range up to 3000 meters laser rangefinder. It supports optical zoom, picture in picture mode switch,thermal color pallette switch, photographing and video, target tracking, thermal digital zoom, laser range, and AI auto recognition of vehicle and human.

It features with aluminum alloy housing and anti-interference. The 3 axis gimbal can achieve stabilization in yaw, roll and pitch. Integrated with damping system, gimbal can greatly reduce mechanical vibration to stabilize image. Image quality is still stable even under 30x hybrid zoom. A20KTR is controled via ViewLink software,

which can achieve the image output by ethernet,gimbal control, firmware upgrade and other parametter setting and amendment,etc. And it also features with AI auto reconigze multiple targets of human and vehicles, and tracking function. A20KTR is widely used in UxS industries of public security, electric power, fire fighting, zoom aerial photogra phy and other industrial applications.

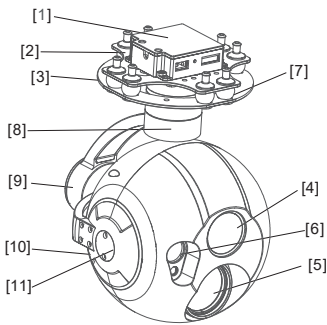
1.2 In the Box

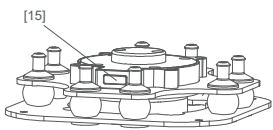
Gimbal (Standard Version) ×1		Gimbal (Viewport Version) ×1	
Aluminum Cylinder ×4		USB to TTL line ×1	
M3 screw ×8			
Power Line ×1			
PWM Control line ×1			
Serial port/S.bus Control lin ×1			

Connect serial port line ×3	
Ethernet line ×1	

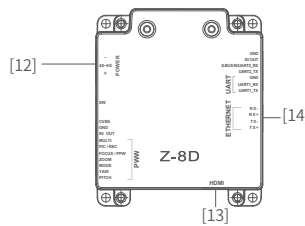
2. Installation Instruction

2.1 Overview





Viewport



Control Box

[1] Control box
[2] Upper damping board
[3] Lower damping board
[4] FHD zoom camera
[5] Infrared thermal camera
[6] laser rangefinder
[7] Damping ball
[8] Yaw axis motor
[9] Roll axis motor
[10] TF card slot
[11] Pitch axis motor
[12] 4S~6S power interface
[13] Micro HDMI interface
[14] Ethernet interface
[15] Viewport unlock button



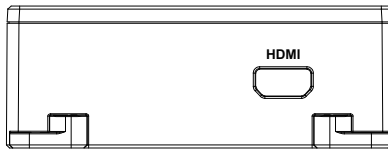
- Please ensure that there isn't any obstacle while the motor rotating.
- Please remove the obstacle immediately if gimbal camera is blocked during rotation.



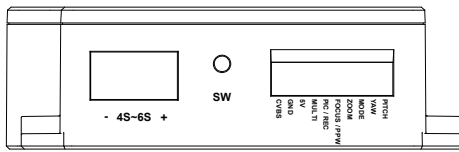
- Don't use laser ranging against glass within 5meters.
- Don't put the infrared thermal camera towards the sun, magma, laser, etc. in case any burn to the camera.

2.2 Control Box Printing

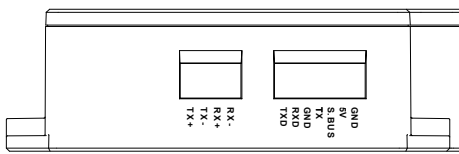
Front Side



Left Side

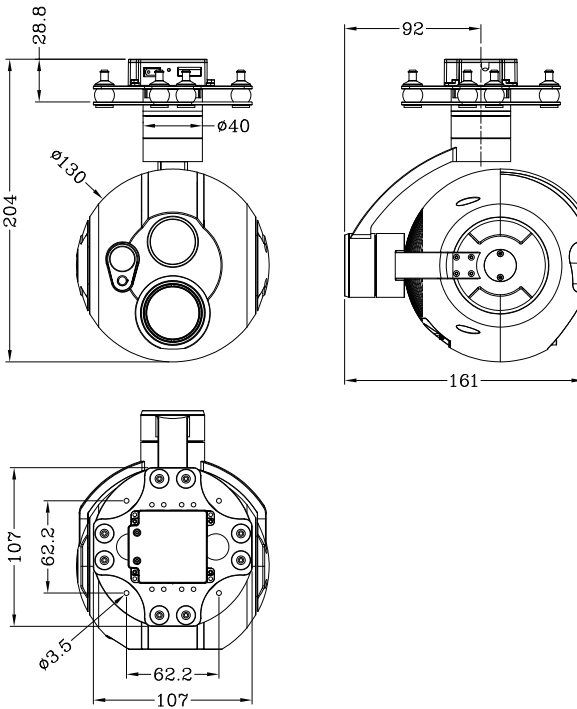


Right Side



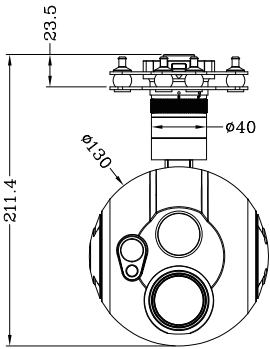
2.3.1 Device Dimensions (Standard Version)

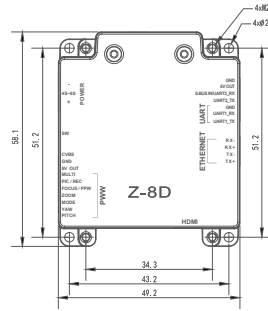
Unit: mm



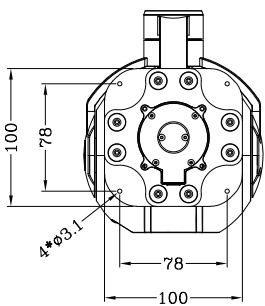
2.3.2 Device Dimensions (Viewport Version)

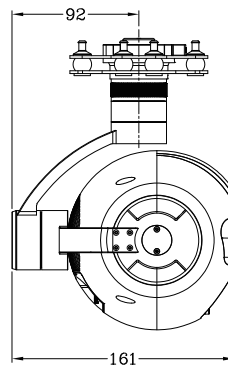
Unit: mm





Control Box



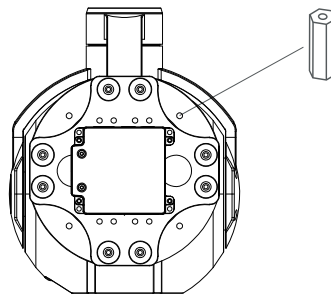


2.4 Install Mounting Part

(1) Find out the arrow icon on the gimbal (that is the lens direction when camera is power on) , and keep its direction same as the specified direction of UxS.

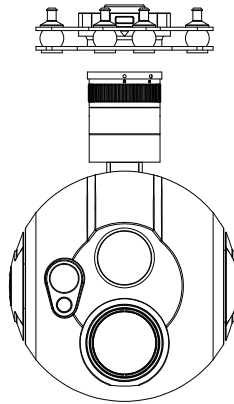
(2) Fix one end of the Aluminum Cylinder on the screw hole of lower damping board, and use M3 screw to fasten it.

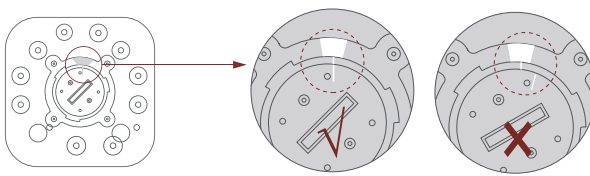
(3) According to the provided screw hole dimension you can make suitable mounting holes on the UxS mounting board, and fixes the other end of the Aluminum Cylinder on the mounting board of the UxS (Viewport version is the same).



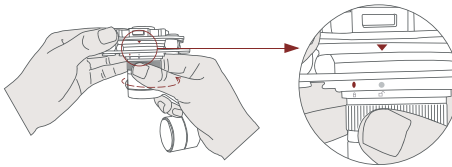
Front

2.5 Viewport Release Instruction

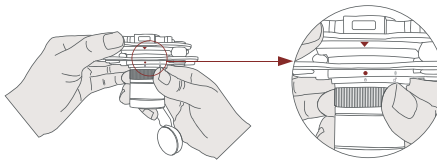




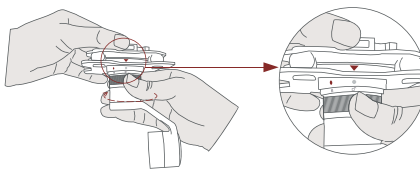
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)



2. Align the white dot (unlock icon) to the red triangle (below unlock button), push the gimbal into the Viewport completely and then rotate the gimbal camera anticlockwise.



3. When you hear "click" sound (when red dot is aligned to the red triangle) means the gimbal camera and Viewport has been locked.



4. To unlock the Viewport, you need to press on unlock button and rotate the gimbal camera clockwise till the white dot align to the red triangle. Then pull the gimbal out from the Viewport.

2.6 Install TF Card

TF (Micro SD card): Install the TF card to the card slot (Re. 2.1 Overview). Support max 256GB. Request Class 10 (10m/s) transmission speed or higher and FAT32 format.



- Make sure device is power off when inserting the TF card, hot plugging is not supported.

2.7 Image Output Interface

Description of all image output interfaces in the gimbal:
HDMI output: Micro HDMI port, supports 1080P@60fps, connects to external monitors or video transmitters for real-time preview.

Network output: Standard RJ45 port, supports RTSP / UDP / RTMP. Default: RTSP, stream at rtsp://192.168.2.119:554, 1080P@30fps, 2Mbps bitrate (max 4K configurable). All parameters user-adjustable.

Analog output: not supported.

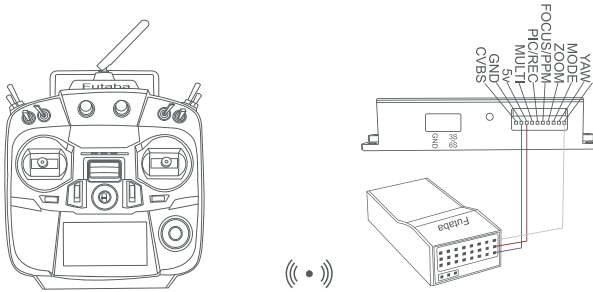
- Video output varies by model, refer to actual product. Due to 360° continuous yaw rotation, this gimbal series does not support HDMI. And SDI and HDMI are mutually exclusive and cannot be configured together on the same device.
- When using user interface software Viewlink for network connection, the network of external device (computer) should be the IP address: 192.168.2.2 (choose the last byte among 2~254, can not be 119 same as the gimbal), subnet mask: 255.255.255.0, Default gateway: 192.168.2.1, and all firewalls of the computer must be closed. Then enter the IP address of the gimbal camera, Open Video, the video stream can be outputted.

3. Signal Control

3.1 PWM Control

Control the gimbal camera functions by the multiplex pulse width modulation signal outputted by PWM channel of the remote control receiver. The camera needs up to 7 control channels of PWM. You can choose needed functions according to actual usage to reduce the required number of PWM channels.

3.1.1 PWM Connection Diagram (Connect pitch channel as example)



Remote Controller

Receiver

Connection Diagram

3.1.2 PWM Control Operation Instruction

1) Pitch (PWM Pitch channel in to control Pitch. Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1

Low Gear
Pitch Up



Position 2

Middle Gear
Pitch Stop



Position 3

High Gear
Pitch Down

2) Yaw (PWM Yaw channel in to control Yaw. Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1

Low Gear
Yaw Left



Position 2

Middle Gear
Yaw Stop



Position 3

High Gear
Yaw Right

3) Mode (PWM Mode channel in to adjust speed control/one key to Home position etc functions. Rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1
Low Gear



Position 2
Middle Gear



Position 3
High Gear

Position 1: Low speed mode, control pitch / yaw with this mode at lowest speed
Position 2: Middle speed mode, control pitch / yaw with this mode at middle speed
Position 3: High speed mode, control pitch / yaw with this mode at highest speed
(If it is controlled by rotary knob, the speed will change according to switch position)

Function of continuous switching:

3.1) Operate 1 time continuously and quickly, from position 2 - 3, to Home position.

3.2) Operate 2 times continuously and quickly, from position 2 - 3 - 2 - 3, the camera lens looks vertically down.

3.3) Operate 3 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3, to disable Follow Yaw Mode (gimbal yaw not follows by frame)

3.4) Operate 4 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3 - 2 - 3, to enable Follow Yaw Mode (gimbal yaw follows by frame)

4) Zoom (PWM Zoom channel in to control Zoom. Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1

Low Gear
Zoom Out



Position 2

Middle Gear
Stop Zoom



Position 3

High Gear
Zoom In

5) Focus (PWM Focus channel is to control PIP, IR color palette switch, 3-gear switch as example.)



Position 1

Low Gear
PIP switch



Position 2

Middle
Gear



Position 3

High Gear
IR color palette switch

Switch from Position 2 to 1: Picture in Picture. EO+IR , IR+EO, EO only, IR only. Switch from Position 2 to 3: IR color switching: white hot, black hot, pseudo color

6) Pic/Rec (PWM Pic/Rec channel in to control take picture and record. Joystick, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1
Low Gear



Position 2
Middle Gear



Position 3
High Gear

Switch from Position 2 to 1 to take a picture.
OSD display “IMG PHOTOING” at the left top corner and the picture is stored in TF card.

Switch from Position 2 to 3 to start “ Record ” , and repeat the operation to stop recording.
During recording, OSD display information of “REC 00 00 00”, as current recording time, and the remaining capacity of TF card. It will show the “TFXXXMB” when stop recording. When the storage capacity of TF card is full , “TF FULL” is shown on screen. If no TF card is inserted, “ NO TF” is shown on screen. Please insert the TF card before using.

7) Multi: IR digital zoom / tracking control



Position 1
Low Gear



Position 2
Middle Gear



Position 3
High Gear

Switch from Position 2 to 1: IR digital zoom, 1x~4x
Switch from Position 2 to 3:

- Exit the tracking, display the cross cursor. Adjust the cross cursor to lock target object and start tracking

Switch from Position 3 to 2:

- Cancel tracking

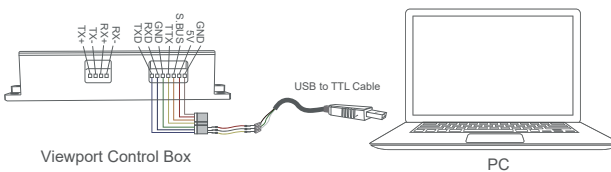
3.2 Serial Port / TTL Control

TTL communication requirements: TTL signal is 3.3V, baud rate: 115200, data bit 8, stop bit 1, no parity, HEX send and receive.

Connection Diagram (PC - USB to TTL Cable- Gimbal Camera as example):

Gimbal Camera **Cable**

TX ⟷ RX (White)
RX ⟷ TX (Green)
GND ⟷ GND (Black)



Connection Diagram

Diagram of USB to TTL Cable:

Connect the camera to the upper computer by USB to TTL cable (Adopt connection method of TX to RX, RX to TX, GNG to GND at Dupont ends of the provided USB to TTL cable, connect to the specified TTL of the gimbal, and the USB end of the cable connect to computer).

Install Viewlink control software to test the functions directly. Users may choose to develop their own software, please contact technical support for TTL control protocol file.

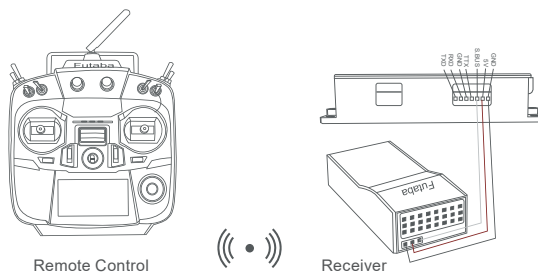
ViewLink is a user interface developed by Viewpro for Viewpro gimbal cameras, you can download it from Viewpro website (www.viewprotech.com) or ask distributors for installation package.

- Connect serial port of gimbal to pins, DO NOT connect with power supply.
- The default baud rate of serial port is 115200, which can be changed according to the docking equipment.

3.3 S.BUS Control

Control the gimbal camera functions by one combining signals. Connect the external S.Bus to S.Bus port on the control box, and the external S.bus signal GND connect to the GND interface of the control box.

Wiring Diagram (Take Futaba remote control for example):



Remote Control Receiver

Wiring Diagram

S.Bus control mode: default S.Bus signal channel 7-13 to control gimbal camera functions (the function of channel is consistent with corresponding channel in PWM function description)

Channel 7: Yaw Control
Channel 8: Pitch Control
Channel 9: Mode Control
Channel 10: Zoom Control
Channel 11: Focus Control
Channel 12: Pic/Rec Control
Channel 13: Multi Backup



- User can set the channels by setting serial command according to the actual requirement. The S.Bus channel position can be arranged in any sequence within channel 7-13 to connect with the flight controller or remote control.
- TTL control and S.bus control cannot coexist at the same time for standard version. The defualt control is TTL if no requirement. The user can set to S.bus control if needed (please contact with our technical support for the setting instruction.)

3.4 TCP control

For Viewpro gimbal cameras with Ethernet output, the default IP address is: 192.168.2.119, control port: 2000. You can send the corresponding protocol to realize TCP control after connecting.

The TCP control protocol is [Frame header: EB + command ID: 90 + data body (serial port protocol) + Checksum (CS = body checksum, checksum is calculated as a sum of all bytes of data body modulo 256)]. Or directly use UI Viewlink to control after TCP connection.

3.5 Laser Rangefinder

A20KTR build-in infrared (IR) laser rangefinder.



1. The LRF of A20KTR is default turned off to prolong life-span, can open It and choose ranging frequency in Viewlink main interface -LRF section manually.

2.If you don't use Viewlink, you can send below serial port commands to set the laser rangefinder working methods:

- Single Use: 55 AA DC 05 1C 20 00 39
- Continuous ranging: 55 AA DC 05 1C 40 00 59
- Turn off again: 55 AA DC 05 1C A0 00 B9

3. Some cases might cause the distance show 0:

A. The distance is out of range

B. Target is too small to be ranged within the valid distance

C. The IR laser rangefinder can't get distance information from reflective objects (glass, water, rain) or over-inclined objects.

4.Specification

Overall Specifications	
N.W.	1010g
Product meas.	161*130*201.8mm
Input voltage	14.8V~25.2V
Dynamic current	950~1500mA @ 16V
Power consumption	Average 15.2W, Max 24W
Working environment temp.	-20℃ ~ +50℃
IP rate	IP4X
Output	Micro HDMI(1080P 30fps/60fps) / IP (RTSP/UDP 4K/1080P/720P 30fps H264/H265)
Storage	TF card (Up to 256G,class 10, FAT32)
Picture in TF Card	JPG(4K:3840*2160)
Video in TF Card	MP4(4K@30fps)
Control method	PWM / S.BUS / UART (TTL) / TCP / UDP
Gimbal Spec	
Mechanical Range	Pitch/Tilt: -125°(Up)～115°(Down), Roll: ±70°, Yaw/Pan: ±300° / ±360°*N (IP output version)
Controllable Range	Pitch/Tilt: -45°～110°, Yaw/Pan: ±290° / ±360°*N (IP output version)
Vibration angle	Pitch/Roll/Yaw: ±0.02°
One-key to center	√

EO Camera Spec	
Imager Sensor	1/2.5" "Exmor R" CMOS
Total pixel	8.51MP
Optical zoom	20x, F2.0 to F3.8, f = 4.4~88.4 mm, up to 30x with Super Resolution
Field of View (H, V)	H: 70.2°(Wide end) ~ 4.1°(Tele end) V: 43.1°(Wide end) ~ 2.3°(Tele end)
Digital zoom	12x (240x with optical zoom)
Min illumination	1.6 lux (1/30 sec, 50%, ICR off, High Sensitivity mode Off) 0.4 lux (1/30 sec, 50%, ICR Off, High Sensitivity mode On) 0.21 lux (50%, ICR off, Slow Shutter 1/4s, High sensitivity off) 0.06 lux (50%, ICR off, Slow shutter 1/4s, High sensitivity on)
S/N ratio	50dB
Recommended illumination	100 to 100000 lux
shutter speed	1/1 to 1/10000 sec
Exposure control	Auto, Manual, Priority mode(shutter priority & iris priority)
Focus	Auto/Manual
Min. working distance	80 mm (Wide end), 800 mm (Tele end)
Backlight compensation	Yes
Auto ICR	Yes
Noise Reduction	Yes
Image stabilization(EIS)	Yes
Defog	Yes

IR Thermal Imager Spec	
Focus Length	35mm
Horizontal FOV	12.5°
Vertical FOV	10.0°
Diagonal FOV	16.0°
Detective Distance (Man: 1.8x0.5m)	1458 meters
Recognize Distance (Man: 1.8x0.5m)	365 meters
Identification Distance (Man: 1.8x0.5m)	182 meters
Detective Distance (Car: 4.2x1.8m)	4472 meters
Recognize Distance (Car: 4.2x1.8m)	1118 meters
Identification Distance (Car: 4.2x1.8m)	559 meters
Working mode	Uncooled VOxlong wave (8μm~14μm) thermal imager
Detector pixel	640*512
Pixel pitch	12μm
Focusing method	Athermal prime lens
NETD	≤50mK@F1.0 @25℃
Color palette	White hot, Black hot, Iron Red
Digital zoom	1x ~ 8x
Radiometric function(optional)	Thermometry range optional：-20℃~+150℃, 0℃~+550℃
	Thermometry accuracy: ±3℃ or +3%(take larger value)@23℃ ±3℃, Thermometry range 5m

EO / IR Camera Object Tracking	
Update rate of deviation pixel	30Hz
Output delay of deviation pixel	<30ms
Minimum object contrast	0.05
SNR	4
Minimum object size	32*32 pixels (at 4K resolution). The target size is positively correlated with the resolution.
Maximum object size	Unrestricted
Tracking speed	Horizontal: Tracking target width in pixels * 2 (pixels/frame) Vertical: Tracking target height in pixels * 2 (pixels/frame)
Object memory time	2s
EO Camera AI Performance	
Targets type	Car and human
Simultaneous detection quantity	≥ 10 targets
Min contrast ratio	0.05
Min target size	40*20 pixels (at 4K resolution). The recognized target size is positively correlated with the resolution.
Car detection rate	≥85%
False alarm rate	≤10%
Laser Rangefinder	
Range	20~3000m
Frequency	1~10Hz
Accuracy	±1m
Light Beam	1535±5nm pulse laser
Divergent Angle	≤0.5 mrad
Rangefinder	Measure the distance between the object at the center of screen and the laser rangefinder

5. FAQ

Q1: Forgot the camera IP after changing it?

To restore the default IP (192.168.2.119):

1) Format a TF card to FAT32. (If it is already FAT32, formatting is not necessary.)

2) Copy the file systemconf_def.ini to the root directory of the TF card.

3) Power on the gimbal and wait for 3 minutes, the IP address will automatically reset to 192.168.2.119.

4) Power off the gimbal.

5) Confirm that the file systemconf_def.ini is disappeared from the card — this means the reset was successful.

6) Insert the card back and power on. The IP should now be restored to 192.168.2.119.

Q2: How to set the video storage format of A20KTR?

Answer: Supports 4K image storage and 4K 30fps video storage.

Q3: Does A20KTR support taking photos during recording?

Answer: Yes.