VIEWPRO

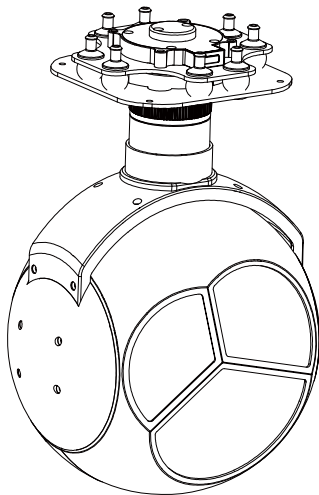## U30TIR-HD
30x EO Triple Sensors High Resolution Thermal Object Tracking Gimbal Camera

For more details please scan the QR code 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

Precautions

1. After using the camera, please store the device in a dry environment to avoid fogging the lens due to excessive ambient humidity. If the lens fogs up, turn on the camera for a while and wait for the fog to dissipate.

2. The camera uses an infrared thermal imaging lens. Do not point it at strong energy sources, such as the sun, laser beams, lava, etc. The temperature of the object observed by the lens must be less than 800°C, otherwise it will burn the camera and cause irreversible damage to it.

3. When cleaning the camera lens, be sure to wipe the lens with a soft and dry cleaning cloth.

4. Do not directly touch or scratch the coating on the surface of the infrared lens with your hands or hard objects, otherwise the coating will be damaged and the image will be blurred.

5. Do not insert or remove the TF card while the power is on; after inserting or removing the TF card, please make sure that the TF rubber plug is tightly covered to prevent the power-on self-test from failing.

6. Never look directly into the laser rangefinder!
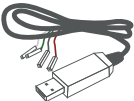
1.Product Introduction

1.1 Introduction

U30TIRM-HD is a 2-axis high resolution sensors gimbal camera. It is integrated with a 30x optical zoom camera which adopts a 2.13MP high resolution EO sensor, a resolution of 1280*1024 50mm lens uncooled long wave IR thermal imager sensor and a range up to 5000 meters laser rangefinder. It supports optical zoom, picture in picture mode switch,thermal color pallette switch, photographing and video, target tracking, thermal digital zoom, and laser rangefinder OSD can display the information of gimbal yaw and pitch angle, optical zoom and FOV of camera, and tracking box. When input the external GPS and time, the GPS latitude and longitude, altitude, and real-time time will be displayed on screen. The OSD also displays aircraft GPS information or the GPS coordinates of the center of the frame as resolved by the pod. OSD on or off is optional. GPS coordinate and shooting time can be also saved in image file.
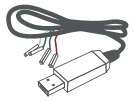
It features with aluminum alloy housing and anti-interference. The 2-axis gimbal can achieve stabilization in yaw and pitch. Integrated with damping system, gimbal can greatly reduce mechanical vibration to stabilize image. Image quality is still stable even under 30x optical zoom. Through heat source detection, 50mm thermal cameras can reveal the damage of equipment or buildings, fire spark in forest, the location of people or animals and more. High-precision laser rangefinders can accurately obtain the GPS position and distance information of objects within 5000 meters and automatically display it on the screen , which improves practicality. And it also features with AI auto reconigze multiple targets of human and vehicles, and tracking function. U30TIRM-HD is widely used in UAV industries of public security, electric power, fire fighting, zoom aerial photography and other industrial applications.
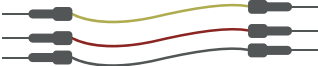
1.2 In the Box

A. Standard Version			
Gimbal Camera x 1 pc		USB to TTL Cable x 1 pc	
Copper Cylinder x 4 pcs		M3 Screw x 8 pcs	
Power Cable x 1 pc			

B. Viewport Version			
Gimbal Camera x 1 pc		USB to TTL Cable x 1 pc	
Copper Cylinder x 4 pcs		M3 Screw x 8 pcs	
Power Cable x 1 pc			
PWM Control Cable x 1 pc			

TTL / S.BUS Control Cable x 1 pc	
TTL Connect Cable x 3 pcs	
Ethernet Cable x 1 pc	

2. Installation Instruction

2.1 Overview

Viewport
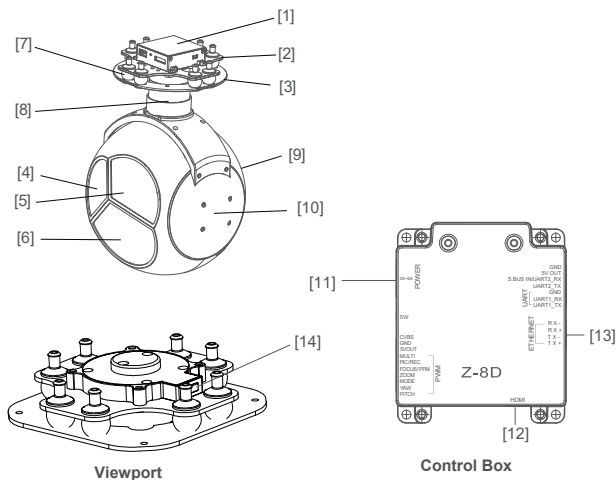
Control Box

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

⚠
- 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 put the infrared thermal camera towards the sun in case any burn to the camera

2.2.1 Control Box Printing (Standard Version)

正面

HDMI

左侧

SW

4S 6S

C V B S
G N D
5 V
M U L T 1
PIC / REC
FOCUS/PPM
Z O O M
M O D E
Y A W
PITCH

右侧

T X +
T X -
R X +
R X -
T X D
R X D
G N D
T T X
S.BUS
5 V
G N D
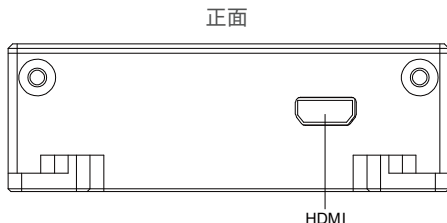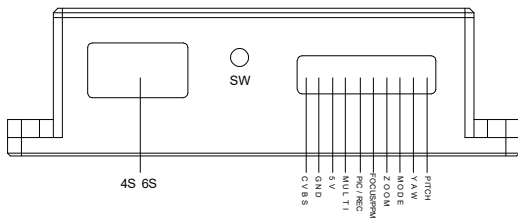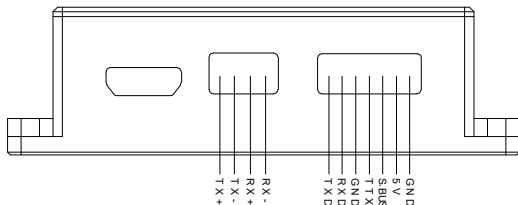
- The input voltage cannot be higher than 6S.
- The pin insertion interface cannot be connected with power supply.
- The yellow jumper cap cannot be removed

2.2.2 Control Box Printing (Viewport Version)

Front Side

HDMI

Left Side

4S-6S

PITCH
YAW
MODE
ZOOM
FOCUS/PPM
PIC/REC
MULTI
5V OUT
GND
CVBS

SW

Right Side

TX+
TX-
RX+
RX-

UART1-TX
UART1-RX
GND
UART2-TX
UART2-RX
S.BUS IN/UART2-RX
5V OUT
GND
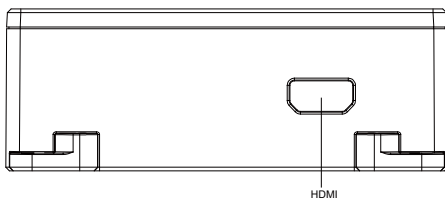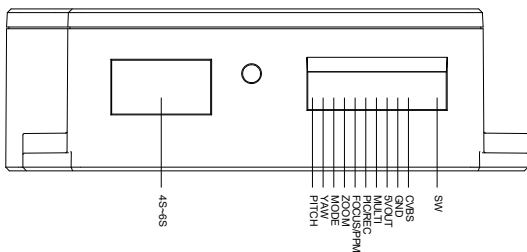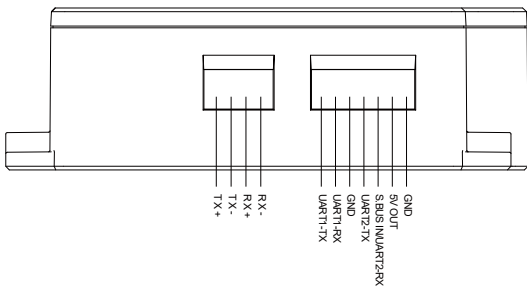
2.3 Device Dimensions (Standard Version)

Unit: mm
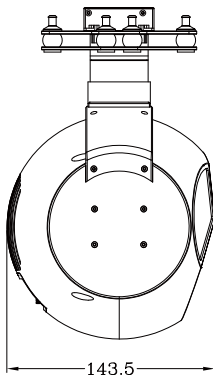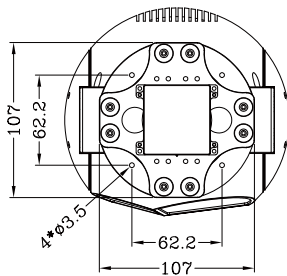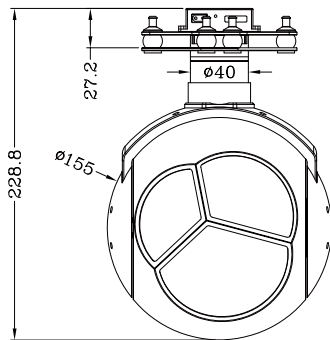
2.3 Device Dimensions (Viewport Version)

Unit: mm
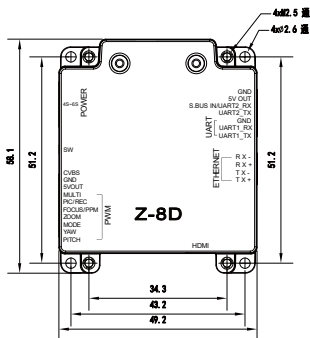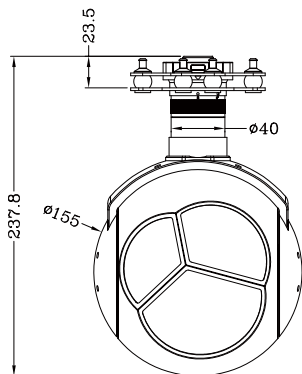
Control Box
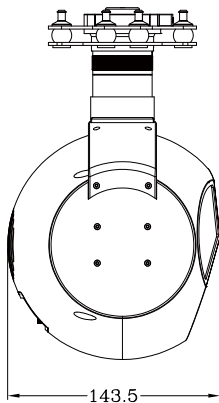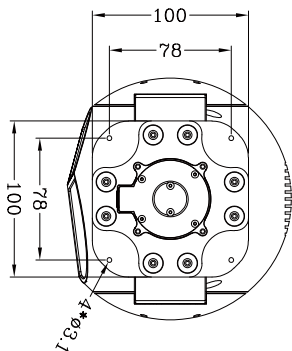
2.4 Install Mounting Part

(1) Find out the arrow on the gimbal which indicating the yaw heading of the payload (i.e. the lens direction when the camera power on), and synchronize with the direction specified by the UAV.

(2) Fix one end of the copper 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 UAV mounting board, and fixes the other end of the copper cylinder on the mounting board of the UAV (Viewport version is the same).
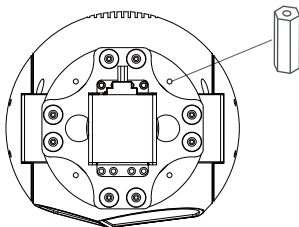
Front

2.5 Viewport Release Instruction
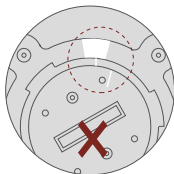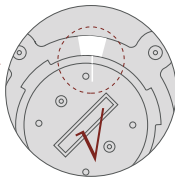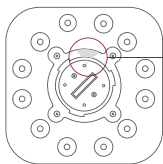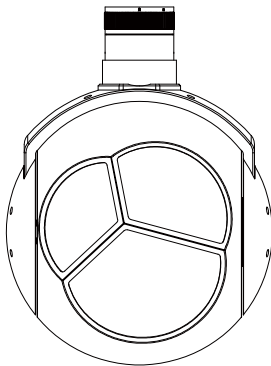
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)
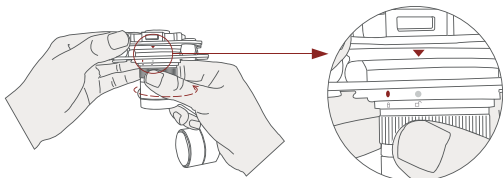
2. Align the white dot (unlock icon) to the red triangle (below unlock button), push the gimbal into the Viewport completely and then rotate the gimbal camera anticlockwise.
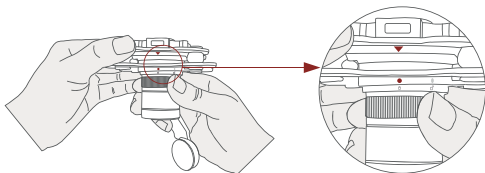
3. When you hear "click" sound (when red dot is aligned to the red triangle) means the gimbal camera and Viewport has been locked.
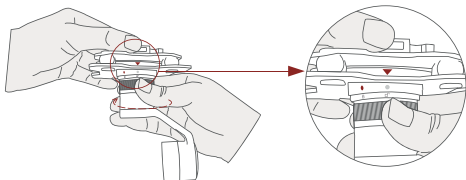
4. To unlock the Viewport, you need to press on unlock button and rotate the gimbal camera clockwise till the white dot align to the red triangle. Then pull the gimbal out from the Viewport.

2.6 Install TF Card

TF (Micro SD card): Install the TF card to the card slot (Re. 2.1 Overview). Support max 512GB. Request Class 10 (10m/s) transmission speed or higher and FAT32.

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

2.7 Image Output Interface

HDMI: No HDMI output for this model.

Network: Ethernet output interface, support RTSP/RTMP/UDP video streaming. Default: RTSP output, IP address: RTSP: //192.168.2.119:554, output resolution: 720P (record in 1080p), frame rate: 25fps, bit rate: 2M (Optional);

SDI: SMA outer screw inner hole interface, 1080P 30fps output. (Optional);

AV: no AV output

⚠ ● 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 6 control channels of PWM (to expand tracking function use up to 7 PWM channels). 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
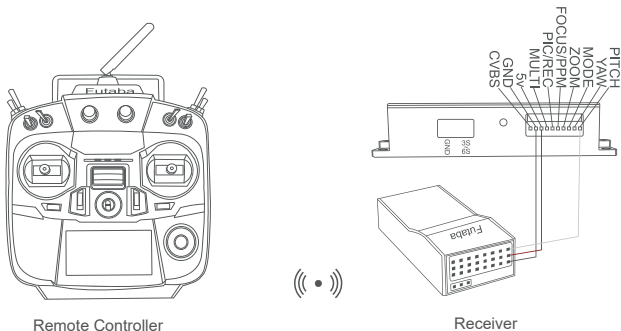
Connection Diagram

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 - 2, to Home position.

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

3.3) Operate 3 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3 - 2, 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 - 2, 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	**Position 2**	**Position 3**
Low Gear	Middle Gear	High Gear
Zoom Out	Stop Zoom	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
No control

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: Take a picture

• OSD display 'REC IMG' a second.

Switch from Position 2 to 3: Start record / repeat operation to stop record

• Start record, the OSD display rec hh:mm:ss.

• Stop record, the OSD display STBY.

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)

USB to TTL Cable

Viewport Control Box

PC
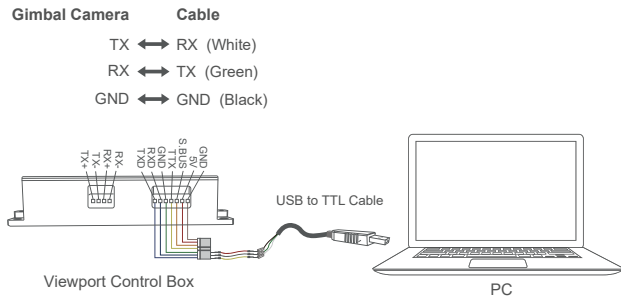
Connection Diagram

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):
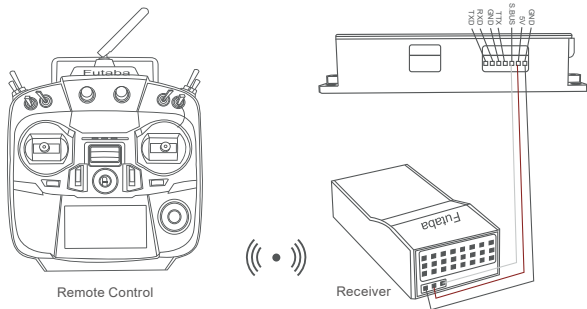
Wiring Diagram

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 1-15 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.

4. Specification

Hardware Parameter	
Working voltage	16V
Input voltage	4S ~ 6S (14.8V~25.2V)
Output voltage	5V (connect with PWM)
Dynamic current	850~1500mA @ 16V
power	-13.6W ~ 24W
Working environment temp.	-20℃ ~ +50℃
Output	IP (RTSP/UDP 720p/1080p 25fps/30fps H264/H265) / SDI (1080P 30fps)
Local-storage	TF card (Up to 512G, class 10, FAT32)
Photo storage format	JPG(1920*1080)
Video storage format	MP4(1080P 30fps)
Control method	PWM / S.BUS / TTL / TCP / UDP
Gimbal Spec	
Angle scope of structure design	Pitch/Tilt: -45°～135°, Yaw/Pan: ±360°*N
Controllable Range	Pitch/Tilt: -40°～125°, Yaw/Pan: ±360°*N
Vibration angle	Pitch/Roll: ±0.02°, Yaw：±0.02°
One-key to center	√

EO Camera spec	
Imager Sensor	1/2.8 Type STARVIS CMOS Sensor
Picture quality	2.13 Million Pixels
Lens optical zoom	30x
	f=4.3mm(wide end) ~129.0mm(tele end)
	F1.6 to F4.7
Horizontal viewing angle	64.0°(wide end) ~ 2.4°(tele end)
Digital zoom	12x (max. 360x with StableZoom)
Min illumination (50%)	0.009 lx (1/30 sec, 50%, High Sensitivity mode Off)
	0.09 lx (1/30 sec, 50%, High Sensitivity mode Off)
Suggested illuminance	100 lx to 100,000 lx
Image S/N	50 dB (Weight On)
Gain	Auto/Manual (0dB to 28dB , 0 to 50.0 dB)
	Max.Gain Limit (10.7 dB to 50.0dB, 10.7 to 50.0dB)
Shutter speed	1/1 sec to 1/10000 sec (22 steps)
Sync system	Internal
Exposure control	Auto, Manual, Priority mode (shutter priority & iris priority), Bright, EV compensation, Slow AE
Backlight compensation	Yes
White balance	Auto, ATW, Indoor, Outdoor, One Push WB, Manual WB, Outdoor Auto, Sodium Vapor Lamp (Fix/Auto/Outdoor Auto)

focus	Auto, Manual
Min object distance	10 mm (Wide end), 1200 mm (Tele end) (Default 300mm)
ICR On/Off	Yes
Noise Reduction	Yes
OSD	Yes
Defog	Yes
IR Thermal Imager Spec	
Focus Length	50mm
Horizontal FOV	17.5°
Vertical FOV	14.0°
Detective Distance (Man: 1.8x0.5m)	2083 meters
Recognize Distance (Man: 1.8x0.5m)	521 meters
Verified Distance (Man: 1.8x0.5m)	260 meters
Detective Distance (Car: 4.2x1.8m)	6389 meters
Recognize Distance (Car: 4.2x1.8m)	1597 meters
Verified Distance (Car: 4.2x1.8m)	799 meters
Working mode	Uncooled long wave (8μm~14μm) thermal imager

Detector pixel	1280*1024
Pixel size	12μm
Focusing method	Athermal prime lens
NETD	≤60mK (@25℃)
MRTD	≤650mK (@characteristic frequency)
Color palette	White, iron red, pseudo color
Digital zoom	1x ~ 4x
Shutter	bi-stable shutter
EO / IR Camera Object Tracking	
Update rate of deviation pixel	50Hz
Output delay of deviation pixel	5ms
Minimum object contrast	5%
SNR	4
Minimum object size	32*32 pixel
Maximum object size	128*128 pixel
Tracking speed	48 pixel/frame
Object memory time	100 frames (4s)
The mean square root values of pulse noise in the object position	< 0.5 pixel

Detector pixel	1280*1024

IR Laser Rangefinder

Range	visibility of not less than 8km in unobstructed conditions@diffuse reflectivity≥0.3, humidity≤80%, Vehicle(2.3m×2.3m), measured distance≥3km; Human((1.75m×0.75m), measured distance≥1.5km; Large target(building, ect), measured distance≥5km;
Accuracy	≤1m（RMS）
Light Beam	1535nm
Divergent Angle	≤0.5mrad
Laser pulse frequency	1~10Hz
Location Resolving	Latitude and longitude of target
Rangefinder	Measure the distance between the object at the center of screen and the laser rangefinder

Features

OSD	Display the gimbal's yaw and pitch angle, magnification, ranging value, card recording duration, aircraft GPS and altitude, target ranging point GPS and altitude, date and time
Geotagging	Display time and GPS coordinate in picture
Card reading online	Support SMB/HTTP to read TF card.
KLV（UDP）	Card recording or Viewlink video playback
ArduPilot / PX4	Support(Mavlink protocol) Optional:Support Ardupilot Follow me feature
Video stitching	EO+IR /IR+EO /EO /IR

Packing Information	
N.W.	1625±10g (Viewport version)
Product meas.	155*143.5*232.1mm / 155*143.5*237.8mm (Viewport version)

5. FAQ

1. How to deal with whitening visible image of U30TIRM-HD in foggy weather?
A: Enable defogging mode.

2. Does U30TIRM-HD support taking photos during recording?
A: Yes.

3. How to set the storage format of U30TIRM-HD ?
A: The format of photos saved in the TF card are JPG 1920*1080, and the videos are MP4 1080P30fps.

4. Does U30TIRM-HD support simultaneous TCP control for multiple devices?
A: Yes.

5. How to switch the target position or the current aircraft position of OSD for U30TIRM-HD?
A: Power on the gimbal, open Viewlink software and input the gimbal network port(default IP: 192.168.2.119 Port: 2000), after TCP connected, you can enter "Setting" to modify.

This user manual is subject to update without notice. For details, please visit

http://www.viewprotech.com/index.php to get the latest product information.

Technical support : support@viewprotech.com