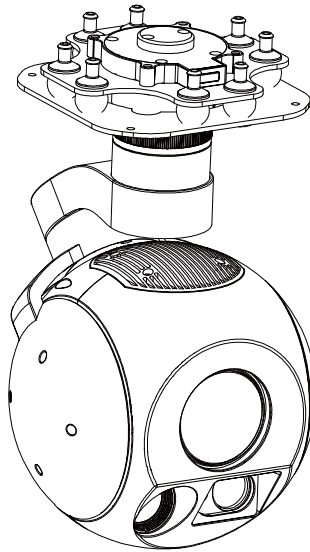
A40TR Pro 40x EO + IR+ LRF
AI Object Tracking Gimbal Camera

User Manual



Please scan the QR code for more detailsor visit our website:
www.viewprotech.com

Warning

Thank you for purchasing Viewpro product. Please read this user manual carefully to make sure the correct operation of this product. Failure to follow instructions and operate in accordance with the instruction in this user manual may damage the product. Do not disassemble or assemble the product by yourself, otherwise it may be damaged or not work properly. Viewpro has no ability for any damage that caused by users' incorrect operation, installation and reassembling in directly or indirectly.

Warning Signs

Warning

Important Note

Important Notes

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

2. When using the infrared thermal imager lens, do not aim at strong energy sources, such as the sun, laser beams, lava, etc. The temperature of the measured target must be less than 800°C, otherwise the lens will be burned and cause irreversible damage.

3. When cleaning the dirty on surface of lens, make sure the cleaning cloth is soft and dry.

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 cause blurred image.

5. 5.Do not plug or unplug the TF card when power on; after plugging and unplugging the TF card, please make sure that the TF rubber plug is tightly covered to prevent the power on self-check from failing.

6. Never watch the laser rangefinder straightly!

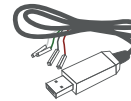
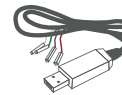
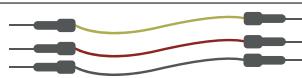
1. Product Introduction

1.1 Introduction

A40TR Pro is a 3-axis high-precision gimbal camera. It is integrated with a 40x optical zoom camera which adopts a 2.13MP high resolution EO sensor,a resolution of 640*512 19mm lens uncooled long wave IR thermal imager sensor and a range upto 3000 meters laser rangefinder. It supports optical zoom, photographing and video, target tracking, thermal digital zoom, laser range, and AI auto recognition of vehicle and human.OSD can display the information of gimbal 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. 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 3 axis gimbal can achieve stabilization in yaw, roll and pitch. Integrated with damping system, gimbal can greatly reduce mechanical vibration to stabilize image. A40TR Pro is widely used in UAV industries of public security, electric power, fire fighting, zoom aerial photography and other industrial applications.

To avoid sunburning the thermal lens, the thermal camera shutter will be automatically shut down when gimbal movies upwards by more than 10° and "IR protection is ON!" pops up on the screen, the thermal image does not work at this moment. When the pitch angle is less than 10°, the thermal camera shutter is open automatically; when the EO displays the full screen, the thermal shutter will also close automatically.

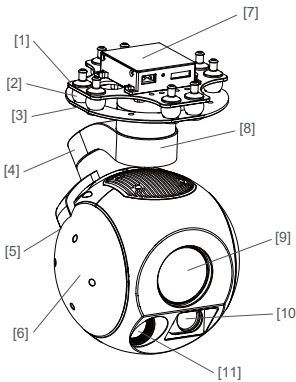
1.2 Packing List

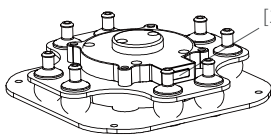
A. Standard Version			
Gimbal Camera X 1 pc		USB to TTL Cable x1pc	
Aluminum Cylinder x 4 pcs		M3 Screw x 8 pcs	
Power Cable x 1 pc			
B. Viewport Version			
Gimbal Camera X 1 pc		USB to TTL Cable x1pc	
Aluminum Cylinder x 4 pcs		M3 Screw x 8 pcs	
Power Cable x 1 pc			
PWM Control Cable x 1 pc			
TTL / S.BUS Control Cable x 1 pc			
TTL Connect Cable x 3 pcs			

Ethernet Cable x 1 pc	

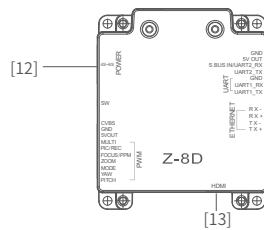
2. Installation Instruction

2.1 Overview





Viewport

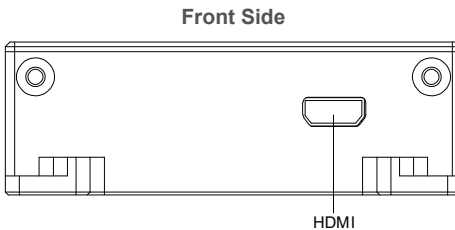


Control Box

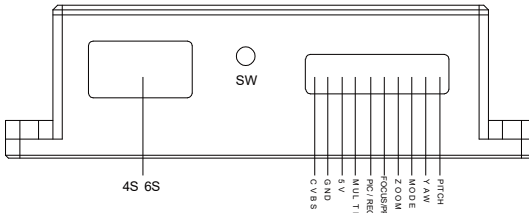
[1] Upper damping board
[2] Damping ball
[3] Lower damping board
[4] Roll axis motor
[5] TF card slot
[6] Pitch axis motor
[7] Control box
[8] Yaw axis motor
[9] FHD zoom camera
[10] Laser ranger
[11] Infrared thermal camera
[12] 4-6S power interface
[13] Micro HDMI interface
[14] Ethernet interface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

- Make sure no obstacle while the motor is rotating.
- If it is blocked during rotation, please remove the obstacle immediately.

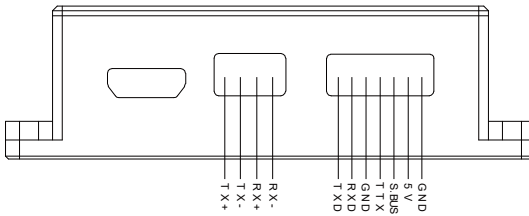
2.2.1 Control Box Printing (Standard Version)



Left Side



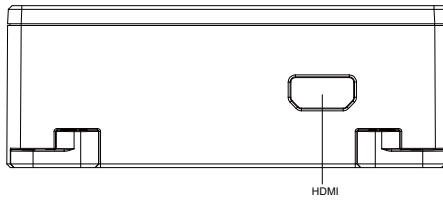
Right Side



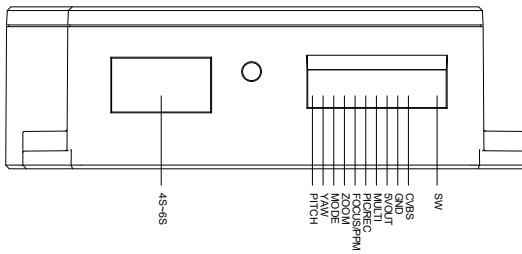
- The input voltage of gimbal camera must not be over 6s.
- The pin interface mustn't be connected with any power supply.
- Don't remove the yellow jumper cap.

2.2.2 Control Box Printing (Viewport Version)

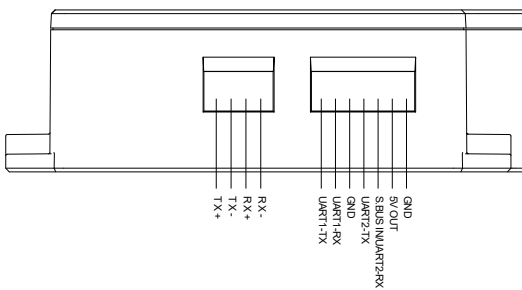
Front Side



Left Side

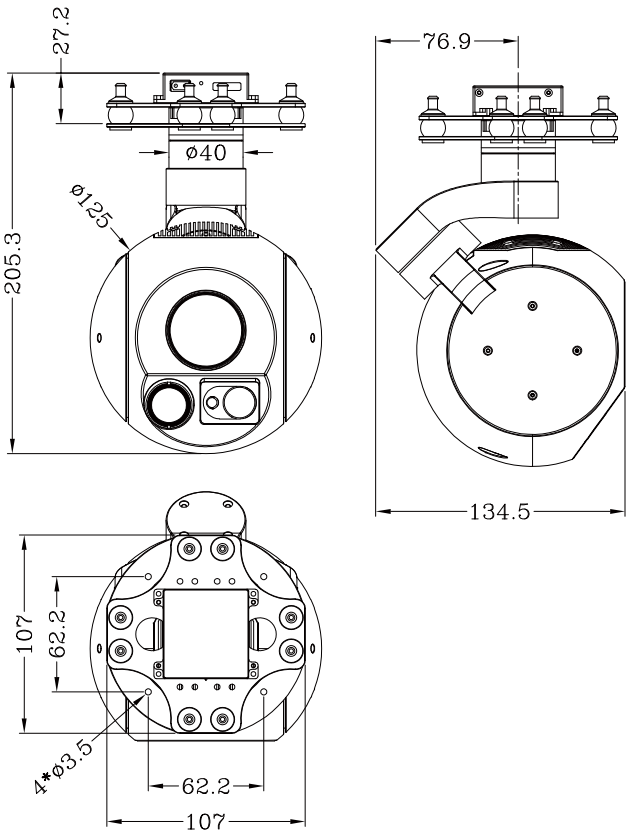


Right Side



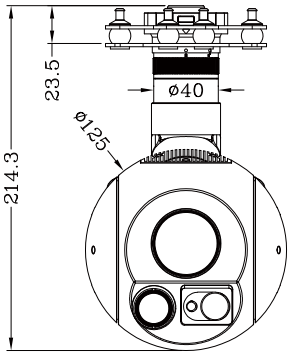
2.3.1 Device Dimensions (Standard Version)

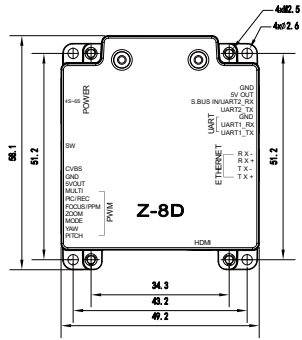
Unit: mm



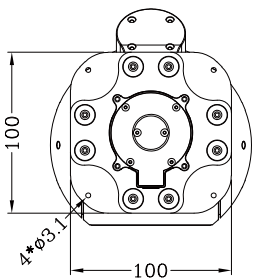
2.3.2 Device Dimensions (Viewport Version)

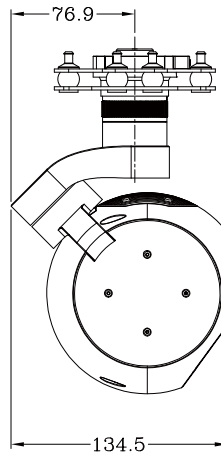
Unit: mm





Control Box



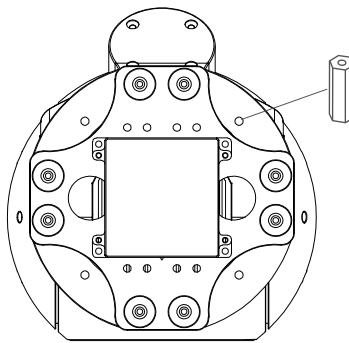


2.4 Install Mounting Part

(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 UAV.

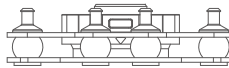
(2) Fix one end of the copper cylinder on the screw hole of lower damping board, and use M3 screw to fasten it.

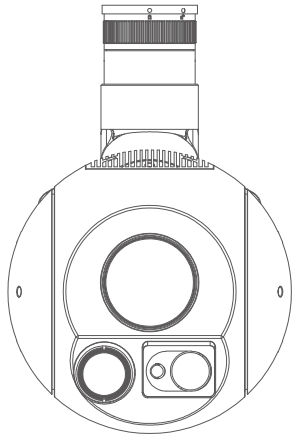
(3) According to the provided screw hole dimension and the actual situation, the user can add suitable mounting holes on the UAV mounting board, and fixes the other end of the copper cylinder on the mounting board of the UAV (Viewport version is the same).

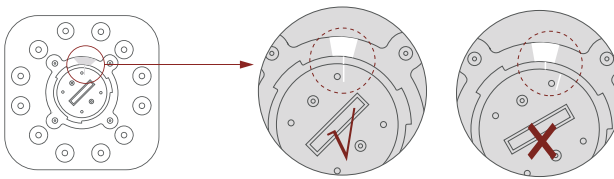


Front

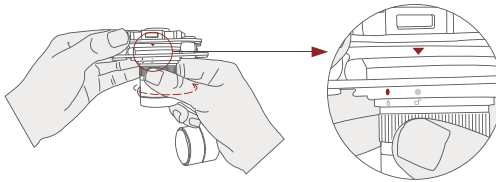
2.5 Viewport Release Instruction



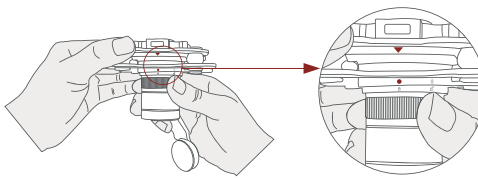




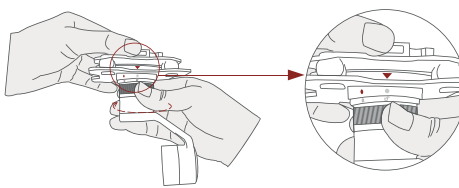
1.Make sure the two white stripes indicated in above picture are aligned with each other. If not aligned, please adjust it manually.



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 counter-clockwise.



3.When you hear a "click" sound (red dot is aligned to the red triangle) means that 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):

Insert the TF card to the card slot (Re. 2.1 Overview). It support maximum capacity of 128GB, and require Class 10 (10m/s) transmission speed or higher and FAT32 or exFAT format.

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

2.7 Image Output Interface

HDMI: Micro HDMI, HD 1080P 60/30fps, default output 1080P 60fps.

Ethernet: Ethernet/IP, default format of RTSP, IP address: rtsp://192.168.2.119:554, resolution: 1080P, frame rate: 30fps, bit rate: 4M.

AV: This modle has no AV output.

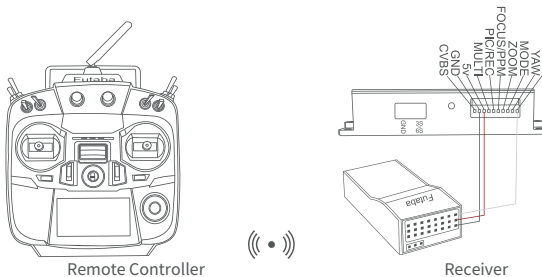
- Above output mode is optional, Please subject to your actual product.
- When using user interface software Viewlink for network connection, the network of external device (computer) should be the IP address: 192.168.2.2 (choose the last byte among 2~254, but must not be 119 same as the gimbal), subnet mask: 255.255.255.0, Default gateway: 192.168.2.1, and all firewalls of the computer must be turned off. Then enter the IP address of the gimbal camera, Open Video, the video stream can be output.

3. Signal Control

3.1 PWM Control

Control the functions of gimbal camera through the multiplex pulse width modulation signal outputted by PWM channel of the remote control receiver. The gimbal camera needs 7 control channels of PWM at most. Users can choose the required function channels, and reduce some PWM channels accordingly in usage.

PWM Connection Diagram (Connect pitch channel as an example)



Connection Diagram

PWM Control Operation Instruction

3.1.1 Pitch Channel: Connect PWM Pitch channel to control Pitch by Joystick, rotary knob and 3-gear switch on remote control. Take 3-gear switch as an example.

Position 1

Low Gear
Pitch Up

Position 2

Middle Gear
Pitch Stop

Position 3

High Gear
Pitch Down

3.1.2 Yaw Channel: Connect PWM Yaw channel to control Yaw by Joystick, rotary knob and 3-gear switch on remote control. Take 3-gear switch as an example.

Position 1

Low Gear
Yaw Left

Position 2

Middle Gear
Yaw Stop

Position 3

High Gear
Yaw Right

3.1.3 Mode Channel: Connect PWM Mode channel to adjust speed control and One-key to Center by rotary knob or 3-gear switch on remote control. Take 3-gear switch as an example.

Position 1

Low Gear

Position 2

Middle Gear

Position 3

High Gear

Switch position 1: Low speed mode, contr ol pitch / yaw to move at lowest speed;
Switch position 2: Middle speed mode, control pitch / yaw to move at middle speed;
Switch position 3: High speed mode, control pitch / yaw to move at highest speed.
(When it is controlled by rotary knob, the speed will change according to switch position)

Function of continuous switch:

1.Switch one time from position 2 - 3 quickly, to Home position.
2.Switch twice from position 2 - 3 - 2 - 3 continuously and quickly, the camera lens is positioned vertically downward.
3.Switch 3 times from position 2 - 3 - 2 - 3 - 2 - 3 continuously and quickly, to close Follow Yaw Mode.

4.Switch 4 times from position 2 - 3 - 2 - 3 - 2 - 3 - 2 - 3 continuously and quickly, to start Follow Yaw Mode.

3.1.4 Zoom Channel: Connect PWM zoom channel to control Zoom by rotary knob and 3-gear switch on remote control. Take 3-gear switch as an example.

Position 1

Low Gear
Zoom Out

Position 2

Middle Gear
Stop Zoom

Position 3

High Gear
Zoom In

3.1.5 Focus Channel: Connect PWM Focus channel to control PIP, IR color palette switch by rotary knob and 3-gear switch. Take the 3-gear switch as an example.
Switch from Position 2 to 1: turn to Picture in Picture mode and four display mode (IR、IR+EO、EO、EO+IR) switch cyclically.
Switch from Position 2 to 3: IR color (black hot, white hot, pseudo color) switch cyclically.

Position 1

Low Gear
PIP switch

Position 2

Middle Gear
No control

Position 3

High Gear
IR color palette switch

3.1.6 Pic/Rec Channel: Connect PWM Pic/Rec channel to control “Photograph” and “Record” by rotary knob or 3-gear switch on remote control. Take 3-gear switch as an 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” video, and repeat the operation to stop recording.
During recording, OSD display information of “REC 00 00 00”, 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.

3.17 Multi Channel: Connect Multi Backup channel to control digital zoom and tracking by rotary knob or 3-gear switch on the remote control. Take 3-gear switch as an example.

Position 1

Low Gear

Position 2

Middle Gear

Position 3

High Gear

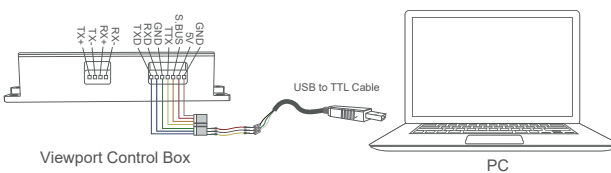
Switch from Position 2 to 1: IR thermal imager digital zoom, 1X,2X, 3X, 4X.
Switch from Position 2 to 3: Display the tracking box at the center of screen, start tracking.
Switch from Position 3 to 2: Cancel tracking.

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 an 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.

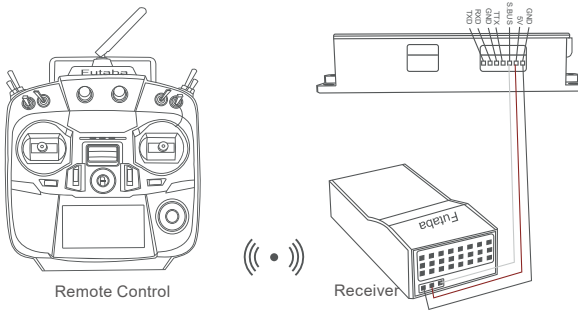
3.3 S.BUS Control

Control the gimbal camera functions by one combining signals. Connect the externa 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.

Take Futaba's S.Bus remote control for example:

Connect receiver's S.Bus port with gimbal camera. The receiver working power (5V) is supplied from gimbal camera.

Wiring Diagram



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 the corresponding channel in PWM function description)

Channel7: 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

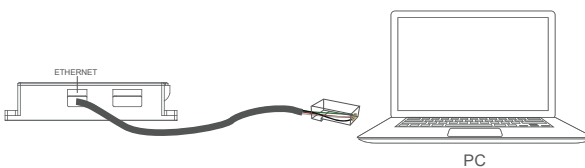
- User can set the channels by setting serial command according to the actual requirement. The S.Bus channel position can be arranged in any sequence within channel 1-15 to connect with the flight controller or remote control.

- 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.



Ethernet wiring diagram

4.Specification

Hardware Parameters	
Working voltage	16V
Input voltage	4S ~ 6S
Output voltage	5V (connect with PWM)
Dynamic current	700~2000mA @ 16V
Working environment temp.	-20℃ ~ +60℃
Output	micro HDMI(1080P 30fps/60fps) / IP (RTSP/UDP 720p/1080p 30fps)
Local-storage	TF card (Up to 128G, class 10, FAT32 or ex FAT format)
Photo storage format	JPG(1920*1080)
Video storage format	MP4 (1080P 30fps)
Network Read Card	HTTP Read TF Card Online
Control method	PWM / TTL / S.BUS / TCP(IP output) / UDP(IP output)
Geotagging	Support, display time and GPS coordinate in picture exif
Gimbal Spec	
Mechanical Range	Pitch/Tilt:-60°～130°, Roll: ±40°, Yaw/Pan: ±300° / ±360°*N (IP output version)
Controllable Range	Pitch/Tilt: -45°～125°, Yaw/Pan: ±290° / ±360°*N (IP output version)

Vibration angle	Pitch/Roll: ±0.02°, Yaw： ±0.02°
One-key to center	√
EO Camera spec	
Imager Sensor	SONY 1/2.8" CMOS
Picture quality	Full HD 1080 (1920*1080)
Effective pixel	2.13MP
Lens optical zoom	40x, f=4.25mm(wide end)~170mm(tele end), F1.6~F4.95
Digital zoom	32x
Min object distance	0.1 / 1.5 / 3.0 / 5.0 / 10.0 m
Horizontal viewing angle	66.35°(wide end) ~ 1.9°(tele end)
Sync system	Internal
S/N ratio	more than 50dB
Exposure control	Auto, Manual, Priority mode (shutter priority & iris priority)
Focusing system	Auto , One Push, Manual
White balance	Auto, Indoor, Outdoor, One Push , Manual
Shutter speed	1/1s to 1/30,000s
Auto ICR	Yes
Image stabilization	Yes
Progressive scan mode	Yes
Backlight compensation	Yes

Defog	Yes
OSD	Yes
IR Thermal Imager Spec	
Focus Length	19mm
Coating Film	DLC
Horizontal FOV	22.9°
Vertical FOV	18.4°
Diagonal FOV	29.0°
Detective Distance (Man: 1.8x0.5m)	792 meters
Recognize Distance (Man: 1.8x0.5m)	198 meters
Verified Distance (Man: 1.8x0.5m)	99 meters
Detective Distance (Car: 4.2x1.8m)	2428 meters
Recognize Distance (Car: 4.2x1.8m)	607 meters
Verified Distance (Car: 4.2x1.8m)	303 meters
Working mode	Uncooled long wave (8μm~14μm) thermal imager
Detector pixel	640*512
Pixel pitch	12μm
Focusing method	Athermal prime lens
NETD	≤50mK @F.0 @25℃)
Color palette	White hot, black hot, pseudo color

Digital zoom	1x ~ 8x
Sync correct time	Yes
Camera Object Tracking	
Update rate of deviation pixel	30Hz
Output delay of deviation pixel	<30ms
Minimum object contrast	5%
SNR	4
Minimum object size	16*16 pixel
Maximum object size	256*256 pixel
Tracking speed	±48 pixel/frame
Object memory time	100 frames
AI auto-zoom	Yes
IR Laser Rangefinder	
Range	for car ≥ 3000m; for human ≥ 2000m
Minimum range	15m
Frequency	1~10Hz
Accuracy	±1m
Light Beam	1535±5nm pulse laser
Divergent Angle	~0.6 mrad
Location Resolving	Latitude and longitude of target
Ranefinder	Target distance measuring

EO Camera AI Performance	
Targets type	Car and human
Simultaneous detection quantity	≥ 10 targets
Min contrast ratio	5%
Min target size	5×5 pixel
Car detection rate	≥85%
False alarm rate	≤10%

Packing Information	
N.W.	1135g(Viewport Version)
Product meas.	134.2*125*208.6mm / 134.2*125*214.3mm (Viewport Version)

5.FAQ

1.What is the video output mode of the A40TR Pro HDMI?
Answer: HDMI1080P60fps (default) / HDMI1080P30fps

2.Does A40TR Pro support taking picture during video recording?
Answer: Yes.

3.How does A40TR Pro store photos and videos?

Answer: The photo resolution saved in the TF card is 1920*1080, and the saved video is 1080P 30fps.

IIf there is any latest version of this user manual, please visit the website through “http://www.viewprotech.com/index.php” .

Viewpro Elec. Ltd
Website: www.viewprotech.com
Tel: +86 755 86052484
Support: info@viewprotech.com
Address: Rm 1101~1103, 11th Fl, Bld D, Aotekexing Science Park, No.10 Qiongyu Rd, Yuehai Subdist, Nanshan Distr, Shenzhen, China