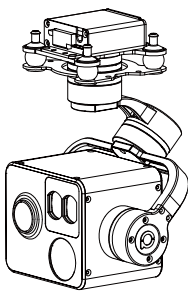# Viewpro

Mini Z10TIRM 10x Optical Zoom EO + IR Dual-Sensor Laser Rangefinder Object Tracking Gimbal Camera

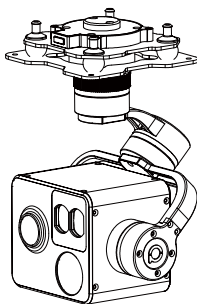| User Manual | 使用说明 |

Standard Version
标准版

Viewport Version
快拆版

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, which may cause the camera does not to 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 not limited to, those set forth in the manual.

Legends: ⊘ Warning   ⚠ Important Note

1.Product Introduction

1.1 Introduction

Min Z10TIRM is the lightest LRF Viewpro gimbal camera currently which with weight 598g. It is a powerful 3-aixs is a powerful 3-axis gimbal integrated with a 4.08MP 10x optical zoom camera, 24mm lens 640*512 IR thermal sensor and 1.5km laser rangefinder. It supports visible optical zoom, IR thermal and visible PIP switch, IR color palette switch, photographing and video, target tracking, thermal digital zoom and laser ranging. When the external GPS and time input, the OSD can display angle, zoom times, target GPS location, target distance measured, real-time, tracking frame, photo and video status, also can select to turn off the OSD. It features fast
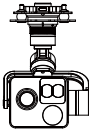
focus and sensitive distance measurement. The high-precision laser rangefinder can accurately resolve the GPS location and distance of the object within 1500 meters. The 3 axis gimbal can achieve stabilization in yaw, roll and pitch. The integrated design of damping system and gimbal can greatly reduce mechanical vibration.

Mini Z10TIRM 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

[1]
[2]
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[12]
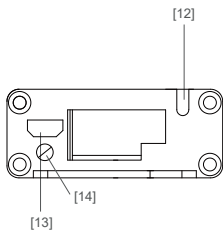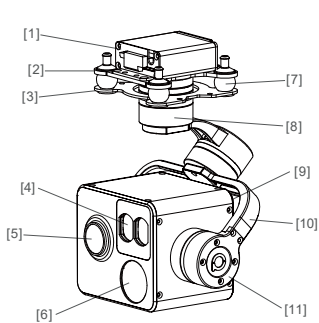
Control Box Back Side
(Standard Version)

[13]
[14]

[15]

Viewport

[12]

Viewpro

[13]
[14]
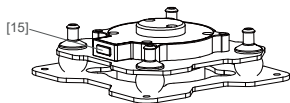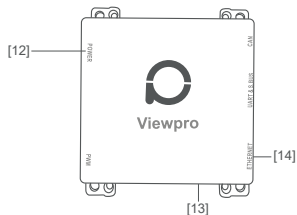
(Viewport Version)

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

2.2.1 Control Box Printing (Standard Version)
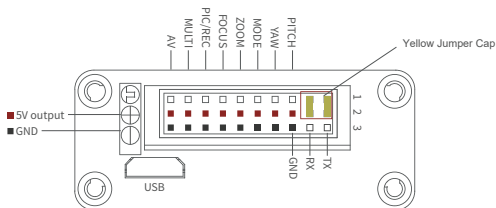
- The input voltage cannot be higher than 6S.
- The pin insertion interface cannot be connected with power supply.
- The yellow jumper cap cannot be removed.

2.2.2 Control Box Printing (Viewport Version)

HDMI

Front Side

3S-6S
GND

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

POWER   SW   PWM

Left Side

TX+
TX-
RX+
RX-

TXD
RXD
GND
TTX
S.BUS
5V
GND

ETHERNET   UART & S.BUS
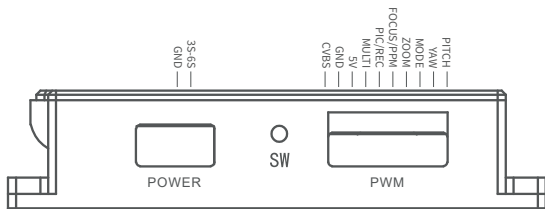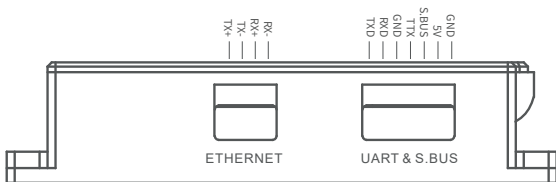
Right Side

2.3.1 Device Dimensions (Standard Version)

Unit: mm
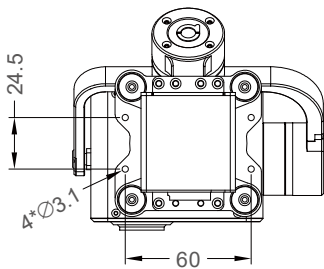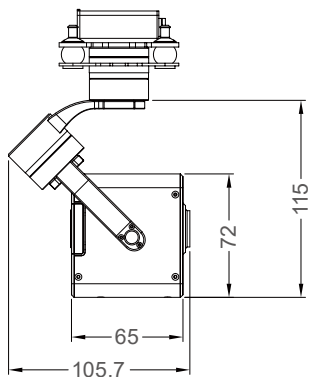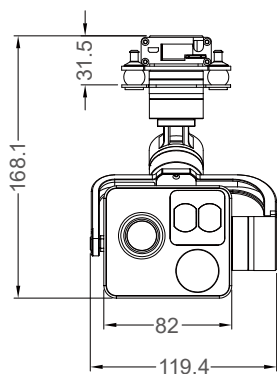
2.3.2 Device Dimensions (Viewport Version)

Unit: mm
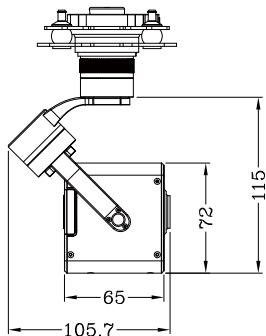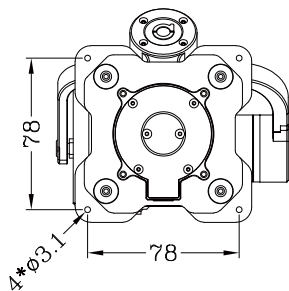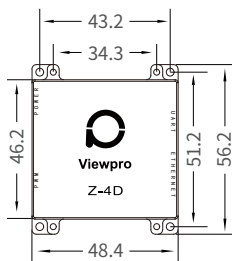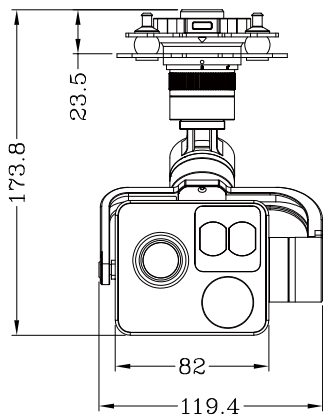
2.4 Install Mounting Part

(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).
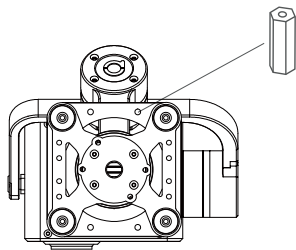
Front

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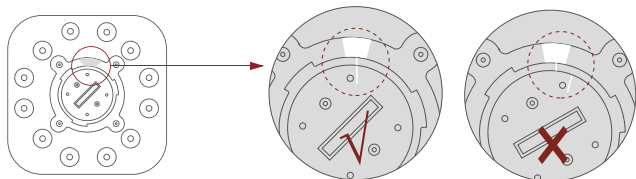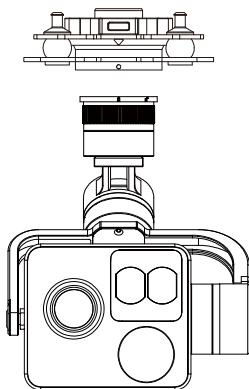
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)
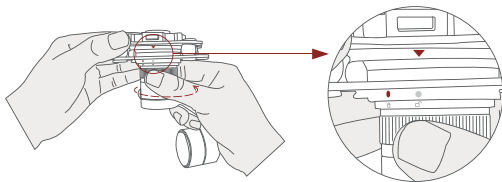
2. Align the white dot (unlock icon) to the red triangle (below unlock button), push the gimbal into the Viewport completely and then rotate the gimbal camera anticlockwise.
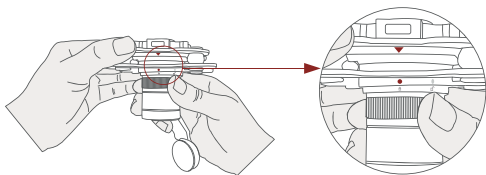
3. When you hear "click" sound (when red dot is aligned to the red triangle) means the gimbal camera and Viewport has been locked.
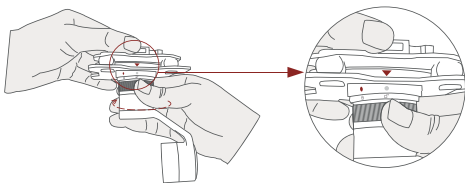
4. To unlock the Viewport, you need to press on unlock button and rotate the gimbal camera clockwise till the white dot align to the red triangle. Then pull the gimbal out from the Viewport.

2.6 Install TF Card

TF (Micro SD card): Install the TF card to the card slot (Re. 2.1 Overview). Support max 128GB. Request Class 10 (10m/s) transmission speed or higher and FAT32 or exFAT format.

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

2.7 Image Output Interface

HDMI: Micro HDMI output, HD 1080P 60/50/30/25fps, 1080P 60fps as default. (Optional)

Network: Ethernet output interface, support RTSP/RTMP/UDP/ONVIF 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

⚠️ Above output mode is optional, HDMI and SDI output cannot coexist at the same time. 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, 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
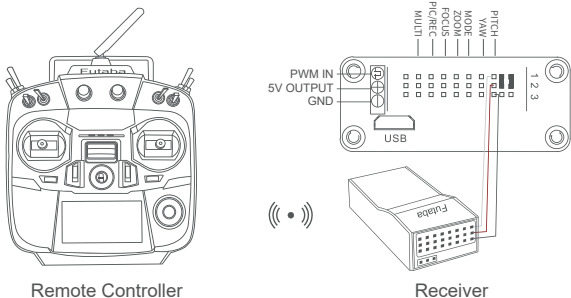
Connection Diagram(Standard Version)
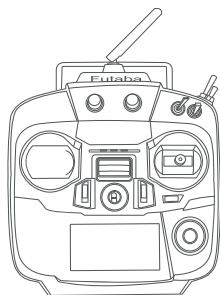
Remote Controller   Receiver
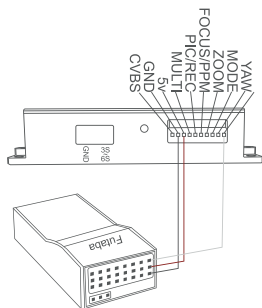
Connection Diagram (Viewport Version)

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	Position 2	Position 3
Low Gear Yaw Left	Middle Gear Yaw Stop	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	Position 2	Position 3
Low Gear	Middle Gear	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)

4) **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)

5) 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

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

Position 1	Position 2	Position 3
Low Gear	Middle Gear	High Gear
PIP switch	No control	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.

7) 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	Position 2	Position 3
Low Gear	Middle Gear	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.

8) Multi: IR digital zoom / tracking control

Position 1	Position 2	Position 3
Low Gear	Middle Gear	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

RX ⟷ TX (Green)
TX ⟷ RX (White)
GND ⟷ GND (Black)
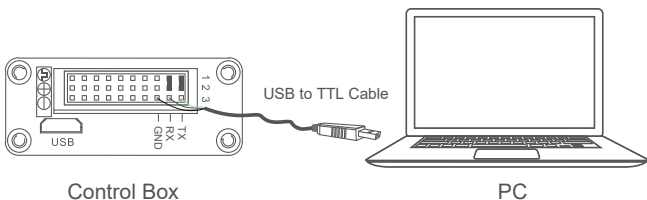
Connection Diagram Standard Version
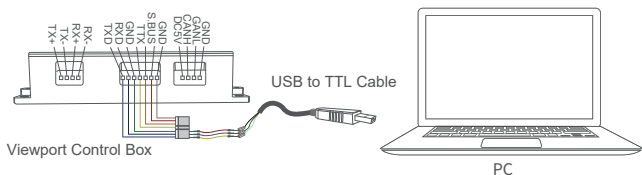
Connection Diagram Viewport Version

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):

S.BUS

5V OUTPUT
GND

1 2 3

USB

Futaba

S.bus

((•))

Remote Control

Receiver
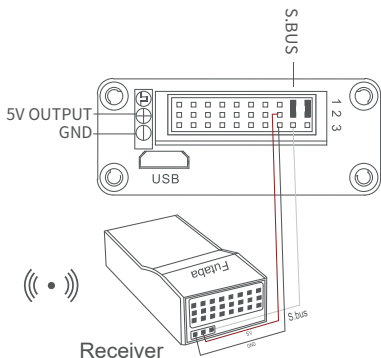
Wiring Diagram Standard Version

TXD
RXD
GND
T TX
S.BUS
GND
5V

Futaba

((•))

Receiver
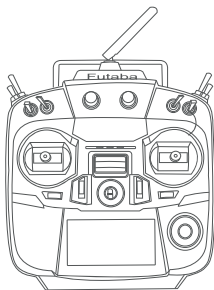
Remote Control
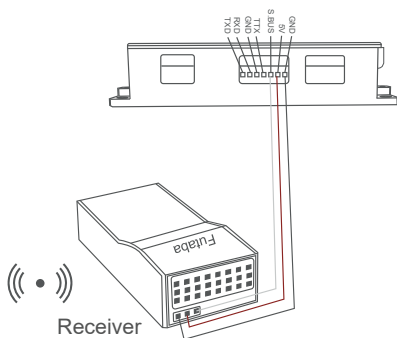
Wiring Diagram Viewport Version

S.Bus control mode: default S.Bus signal channel 9-15 to control gimbal camera functions (the function of channel is consistent with corresponding channel in PWM function description)

Channel 9: Yaw Control
Channel 10: Pitch Control
Channel 11: Mode Control
Channel 12: Zoom Control

Channel 13: Focus Control
Channel 14: Pic/Rec Control
Channel 15: 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 the standard version. The default control is TTL if no requirement. The user can set to S.bus control if needed (please contact 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	12V
Input voltage	3S ~ 6S
Output voltage	5V (connect with PWM)
Dynamic current	1000mA @ 12V
Idle current	800mA @ 12V
Working environment temp.	-20℃ ~ +60℃
Output	IP(1080P/720p 25/30fps) /HDMI 1080P
Local-storage	TF card (Up to 128G, class 10, FAT32 or ex FAT format)
Photo storage format	JPG(1920*1080 / 1280*720)
Video storage format	MP4 (1080P/720P 25fps/30fps)
Control method	TTL / TCP/PWM
Gimbal Spec	
Mechanical Range	Pitch/Tilt: -30°～115°, Roll: ±40°, Yaw/Pan: ±360°*N
Controllable Range	Pitch/Tilt: -25°～90°, Yaw/Pan: ±360°*N
Vibration angle	Pitch/Roll: ±0.02°, Yaw: ±0.02°

One-key to center	√
EO Camera Spec	
Imager Sensor	1/3-type CMOS(Progressive Scan)
Picture quality	Full HD 1080 (1920*1080)
Effective pixel	4.08MP
Lens optical zoom	10x, F=3.3~33.0mm, F1.8~3.4
Digital zoom	None
Min object distance	10mm(wide end) to 800mm(tele end)
Horizontal viewing angle	58.2°(wide end) ~ 6.9°(tele end)
Sync system	Internal
S/N ratio	more than 50dB
Min illumination	0.5 lx (1/30s, F1.8, 50%)
Gain	Auto / Manual
White balance	ATW1 (Narrow), ATW2 (Wide), One push, manual (B, R),indoor,outdoor
Shutter speed	1/1s to 1/10,000s
Backlight compensation	Yes
Aperture control	16 steps
OSD	Yes

IR Thermal imager spec	
Lens size	24mm
Horizontal FOV	18.2°
Vertical FOV	14.6°
Diagonal FOV	23.2°
Detective Distance (Man: 1.8x0.5m)	1000 meters
Recognize Distance (Man: 1.8x0.5m)	250 meters
Verified Distance (Man: 1.8x0.5m)	125 meters
Detective Distance (Car: 4.2x1.8m)	3067 meters
Recognize Distance (Car: 4.2x1.8m)	767 meters
Verified Distance (Car: 4.2x1.8m)	383 meters
Working mode	Uncooled long wave (8μm~14μm) thermal imager
Detector pixel	640*512
Pixel size	12μm
Focusing method	Athermal prime lens
Emissivity correction	0.01~1

NETD	≤50mK (@25℃)	
MRTD	≤650mK (@characteristic frequency)	
Image enhancement	Auto adjust image brightness and contrast ratio	
Color palette	White, iron red, pseudo color	
Auto Non-uniform correction	Yes (no shutter)	
Digital zoom	1x ~ 12x	
Sync correct time	Yes	
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

IR Laser Rangefinder	
Range	5~1500 meters
Resolution	0.5m
Working current:	80mA （max)
Light Beam	905nm pulse laser
Divergent Angle	3 mrad
Laser pulse frequency	1HZ
Power	< 1 mW (safe for eye)
Ranging mode	Pulse
Location Resolving	Latitude and longitude of target
Ranefinder	Target distance measuring
Packing Information	
N.W.	598g(Standard version) , 675g (Viewport version)
Product meas.	119.4*101.7*157.3mm
Accessories	1pc gimbal camera device, screws, copper cylinders, damping balls, damping boards, TTL cable / Hight quality plastic box with foam cushion
G.W.	2113g
Package meas.	300*250*200mm

5. FAQ

1.How to deal with whitening visible image of Mini Z10TIRM in foggy weather?
A: Enable defogging mode

2.Does Mini Z10TIRM support taking photos during recording?
A: Yes

3.How to set the storage format of Mini Z10TIRM ?
A: When the IP output resolution is set to 1280*720, the storage resolution is 1920 * 1080; Storage resolution is 1280 * 720 when the IP output resolution is set to 1920*1080; The video frame rate saved in the TF card is the same with the one set during IP output. The frame rate is 25fps or 30fps for optional.

4. Does Mini Z10TIRM support simultaneous TCP control for multiple devices?
A: Yes.

5.How to switch the target position or the current aircraft position of OSD for Mini Z10TIRM?
A: Send the serial command for switching. After command is sent successfully, reboot gimbal to save setting. Display the target GPS position "AA 55 0F 31 FF", display the current GPS position of the aircraft "AA 55 0F 30 FF".

6.How to set Mini Z10TIRM network encoding?
A: You can use "camera configure tool V12.13" to set the resolution, bit rate, net push mode,Encoder format, frame rate, packet format, record format.

Viewpro Support: **www.viewprotech.com/support**