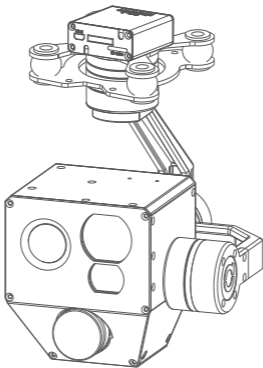




## User manual

### Z10TIRM

Z10TIRM 10x Zoom EO + IR Dual Sensor Laser Ranger Camera Gimbal



Images are for reference only, please subject to the actual product.

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## Gimbal Introduction

Z10TIRM is a pinpoint-precision professional 3-axis gimbal with a 10x 1080P optical zoom camera which features high stability, small size, light weight and low power consumption. The 3-axis gimbal based on FOC motor control technology, adopts pinpoint-precision encoder in each motor.

The speed of Z10TIRM gimbal is adjustable, LOW speed mode is used for large zoom range, the control will be more accurate; Fast speed mode is used for small zooming range, which makes the gimbal control sensitive and quick. Also the one-key to center function will allow the gimbal return to initial position automatically and rapidly.

Z10TIRM supports PWM, S.BUS and serial command control, suitable for close range remote control or remote data command control.

## Object Tracking Function

### 1. Function description

Build-in normalization, cross-correlation and tracking algorithm, combining with object missing recapture algorithm, achieve stable track of the target.

Support custom characters of user OSD, adaptive gate, cross cursor, tracking information display.

### 2. Tracking Performance

- 1) Update rate of deviation pixel 50Hz
- 2) Output delay of deviation pixel <15ms
- 3) Minimum object contrast 5%
- 4) The minimal signal-to-noise ratio (SNR) 4
- 5) Minimum object size 16\*16 pixel
- 6) Maximum object size 160\*160 pixel
- 7) Tracking speed 32 pixel/frame
- 8) The mean square root values of pulse noise in the object position <0.5 pixel
- 9) Object memory time 100 frames



## Packing list

Gimbal\*1



Screw pack\*1

Screw pack\*1  
(M3\*5mm button head hexagon screw\*4)

Copper cylinders\*4

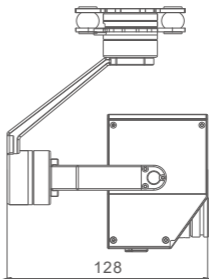
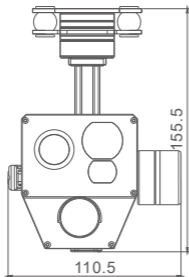


Damping balls\*4

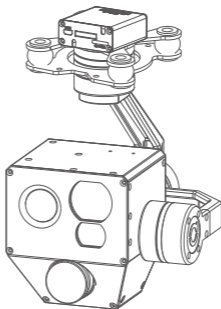


## Gimbal Dimension

Unit : mm



## Installing



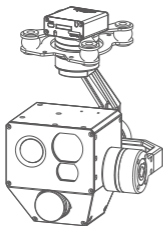
### Mechanics@Electronic Characteristics

Input voltage	3S~ 4S	Idle current	450mA@12V
Dynamic current	500mA@12V	Working environment temp	-10°C ~ +60°C
Temp	-30°C~+80°C	Weight	590g
Size	L110.5 *W 128*H155.5mm		

### Working Characteristics

Pitch/Tilt: Pitch angle range of action : $\pm 90$
Roll: Roll angle range of action : $\pm 85^{\circ}$
Yaw/Pan: Yaw angle range of action : $\pm 170^{\circ}$
Vibration angle: Pitch/Roll: $\pm 0.01^{\circ}$ , Yaw: $\pm 0.01^{\circ}$

## Connection of Control Box and Wiring Instruction

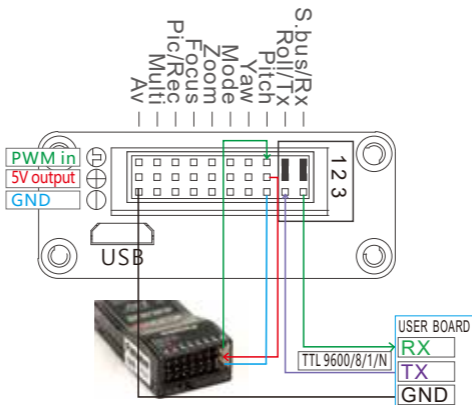


HDMI: micro HDMI OUTPUT

1080P 60fps default

SD card: max 128G, class10

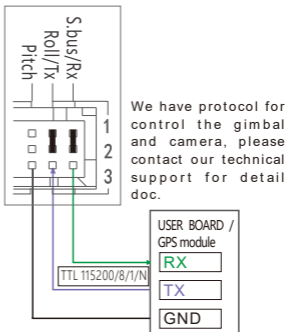
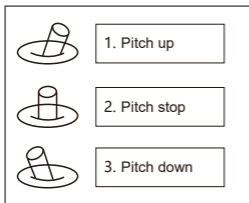
FAT32 or exFAT format



S.bus/Rx: connect to Rx2 for track function.

Roll/ Tx: connect to Tx2 for track function.

Pitch: PWM in, pitch control

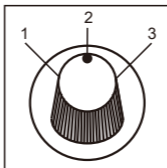


Yaw: PWM in, Yaw control





Mode: Change the speed / home position



Position 1: Lowest speed for pitch and yaw.

Position 2: Middle speed for pitch and yaw.

Position 3: Highest speed for pitch and yaw. The speed is continuously quickly from 1 to 3.

One click: Home position.

Two click: Look down.

Three click: Yaw not followed by frame.

Four click: Yaw followed by frame.

Five click: Restore the factory settings.

(Click = from 2 to 3 and back to 2 quickly)

ZOOM: Zoom the camera

Focus: Focus the camera



1. Zoom tele



2. Stop zoom



3. Zoom wide



1

Switch 2 to 1: IR color white hot, black hot, pseudo color



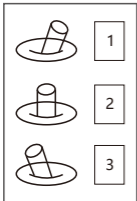
2



3

Switch 2 to 3: Picture in Picture. EO+IR , IR+EO, EO only, IR only.

## Pic /Rec picture / Start record, stop record



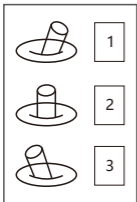
Switch 2 to 1:

Start record / stop record. start record, the OSD display rec hh:mm:ss ; stop record, the OSD display STBY.

Switch 2 to 3: Take a picture.

OSD display ' REC IMG' a second.

## Multi: Tracking control



Position 1 exit the tracking

Switch 1 to 2: Display the cross cursor. Adjust the object to the cross cursor.

Switch 2 to 3: Start tracking. Change the object during tracking.

Switch 3 to 2: Display the cross cursor, use Pitch/Yaw to adjust the cross cursor.

Switch 2 to 3: Start tracking.

AV: NO AV output this model.

## 640 19mm Thermal Imager Parameter

<b>Horizontal FOV</b>		32°
<b>Vertical FOV</b>		24°
<b>Diagonal FOV</b>		39.4°
<b>Detective Distance(M an:1.8x0.5m)</b>		559meters
<b>Recognize Distance(M an:1.8x0.5m)</b>		140meters
<b>Verified Distance(M an:1.8x0.5m)</b>		70meters
<b>Detective Distance(Car:4.2x1.8m)</b>		1714meters
<b>Recognize Distance(Car:4.2x1.8m)</b>		428 meters
<b>Verified Distance(Car:4.2x1.8m)</b>		214 meters
Thermal Imager Spec	<b>Working mode</b>	Uncooled long wave (8 $\mu$ m~14 $\mu$ m) thermal imager
	<b>Detector pixel</b>	640*480
	<b>Pixel size</b>	17 $\mu$ m
	<b>Focusing method</b>	Athermal prime lens
	<b>Emissivity correction</b>	0.01~1
	<b>NETD</b>	≤50mK (@25℃)
	<b>MRTD</b>	≤650mK (@characteristic frequency)
	<b>Image enhancement</b>	Auto adjust image brightness and contrast ratio
	<b>Color palette</b>	Black, white, pseudo color
	<b>Auto Non-uniform correction</b>	Yes (no shutter)
	<b>Digital zoom</b>	1x, 3x
	<b>Sync correct time</b>	Yes
	<b>Temperature type</b>	Temperature bar ( pseudo color display) max temp, min temp, FOV center temp
<b>Temperature warning</b>	-20℃~120℃	
Thermal Object Tracking	<b>Update rate of deviation pixel</b>	25Hz
	<b>Output delay of deviation pixel</b>	<3ms
	<b>Minimum object size</b>	16*16 pixel
	<b>Maximum object size</b>	128*128 pixel
	<b>Tracking speed</b>	±32 pixel/frame
	<b>Object memory time</b>	100 frames (4s)

## 10x Visible Light Camera Specifications

<b>Imager Sensor</b>	1/3 type progressive scanning CMOS
<b>Picture quality</b>	Full HD 1080 (1920*1080)
<b>Effective pixel</b>	4.08MP
<b>Video output</b>	1080p/60, 1080p/50, 1080p/30, 1080p/25
<b>Min illumination</b>	0.5 lx (1/30s, F1.8, 50%)
<b>Illumination range</b>	100 lx ~100,000 lx
<b>Gain</b>	Auto / Manual
<b>Shutter speed</b>	1/1s to 1/10,000s
<b>Sync system</b>	Internal
<b>Exposure compensation</b>	-12dB ~+ 12dB
<b>Backlight compensation</b>	ON / OF
<b>Gamma correction</b>	standard
<b>Aperture control</b>	16 steps
<b>White balance</b>	ATW1 (Narrow), ATW2 (Wide), single touch, manual (B, R)
<b>Ae</b>	optical zoom10.5x
<b>Lens (wide end ~ tele end )</b>	F=3.2~33.6mm
	F1.8~3.4
	Automatic, manual, priority mode (shutter/aperture)
<b>Horizontal viewing angle</b>	62°(wide end) ~ 6.5°(tele end)
<b>Zoom mode</b>	Standard / Variable / Direct
<b>Zoom movement time</b>	1.5s
<b>Focusing on the system</b>	Automatic, manual, single-touch, Autofocus sensitivity
<b>Min object distance</b>	10mm(wide end) to 800mm(tele end)
<b>Horizontal resolution</b>	Above center 800TV line