



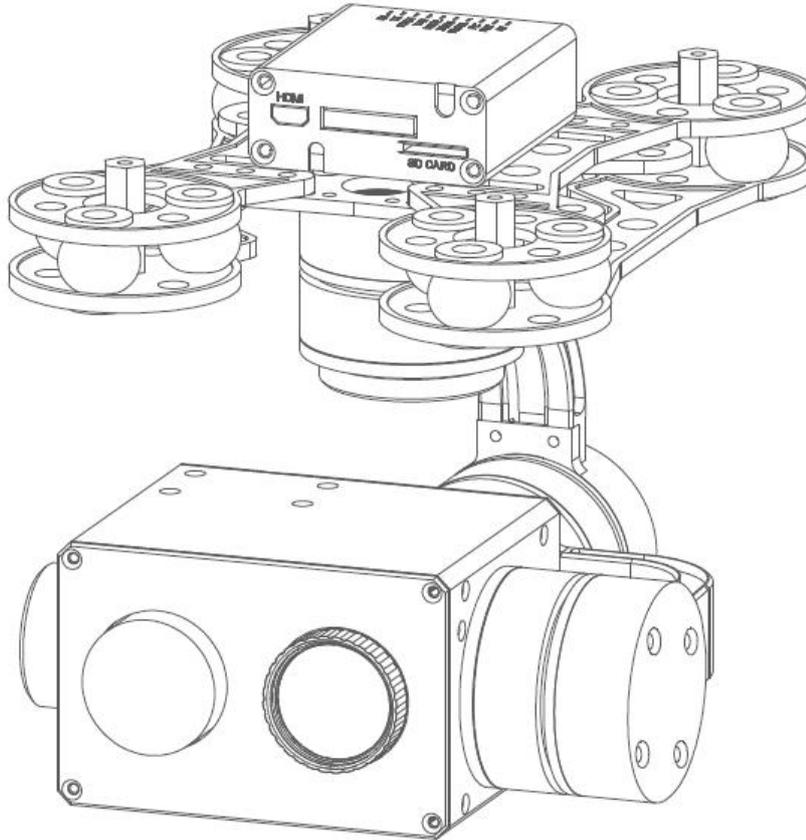
**FOXTECH HOBBY Co., Ltd**

Add: (3rd Floor) No.9 Haitai Fazhan Sixth Avenue

XiQing District Tianjin China

Web: [www.foxtechfpv.com](http://www.foxtechfpv.com)

## **FH310IR-TR 10X Optical Zoom Camera with 3-axis Gimbal**



### **Warning and Disclaimer**

Make sure not to adjust the gimbal or change its mechanical structure by yourself. Be sure to mount the camera to gimbal before power on, and then install the gimbal on the aircraft.

To avoid gimbal performance degradation or damage caused by imbalanced payload, please do not add other peripherals for the gimbal camera (filter, hood, etc). When in aerial photography, make sure your aircraft flight control system is working at the safe mode.

We strongly recommend that you remove aircraft propellers before doing gimbal configuration. Use extra non-power battery for gimbal. Keep children away from the preset flight region.

Considering that we are not able to control user's specific usage, installation, assembly, modification ( including the use of non-specified parts ), and improper use. Direct or indirect damage or injury caused by the behavior above, our company will not cover any loss and responsibility.

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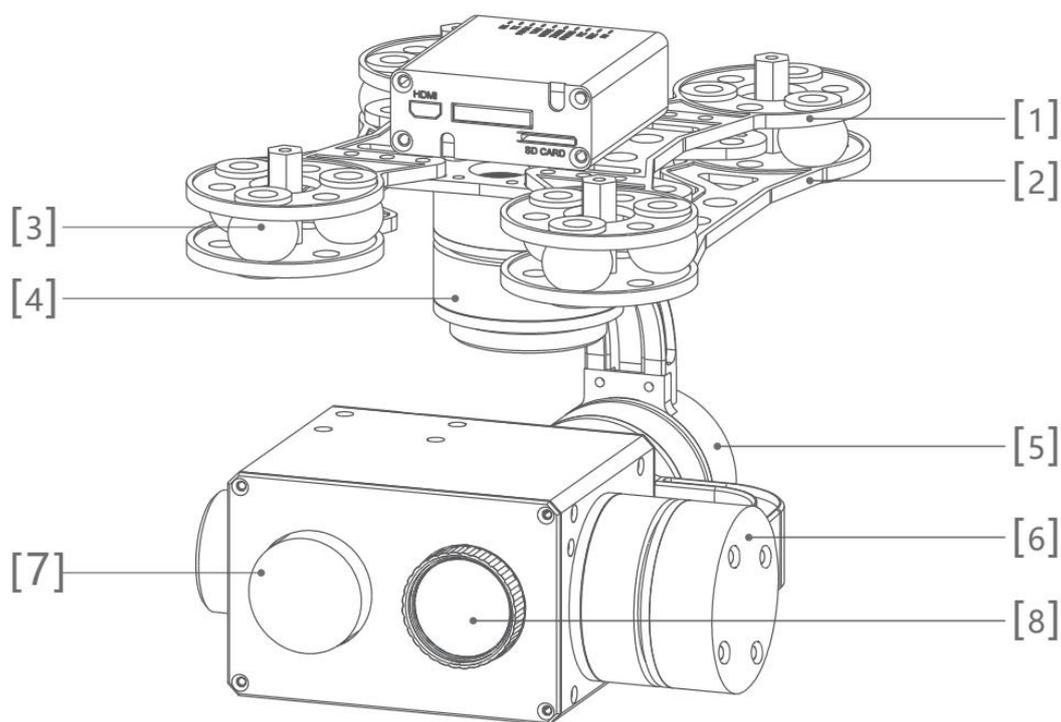
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### Main features

- 1) Weight: 879g
- 2) 1/3 inch 4MP CMOS sensor
- 3) 10X optical zoom, 1080P/60 HDMI output
- 4) 1080P/30 H.264 video recorded for on-board TF card
- 5) Thermal camera: 640X480, 25HZ, radiometric
- 6) Auto object tracking function
- 7) Geotagging
- 8) PWM control and serial command control
- 9) Convenient wiring hub for RC receiver and video output
- 10) 3-axis high stabilized gimbal system
- 11) One key back to home position

### Gimbal description



[1] Upper damper board

[3] Rubber damper

[5] Roll axis motor

[7] Thermal camera

[2] Lower damper board

[4] Yaw axis motor

[6] Pitch axis motor

[8] HD zoom camera

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Sensor	1/3 inch 4MP CMOS SENSOR
Video output	1080P/60 HDMI
Video recorded	1080P/30 H.264
Focal length	10X optical focal zoom,4.9-49mm
Wide Dynamic	Up to 105dB
Auto focus	Less than 1S
Low illumination	0.05lux@F1.6(color),0.01lux(white/black),0lux(IR)
FOV	H:WIDE 61.11° ±5% TELE 7.65° ±5% V:WIDE 35.2° ±5% TELE 4.12° ±
Aperture	Φ 12.0
Vertical Roll / Horizon Mirror/Static	Support
Input voltage	3S-6S
Rotate range	Pitch:±90° Roll:±45° Yaw:±150°
Angle amount of jitter	Pitch and roll:±0.02° Yaw:±0.03°
Control interface	PWM and serial command
Working Current	Static current:240mA(@12V) Dynamic current:320mA(@12V)



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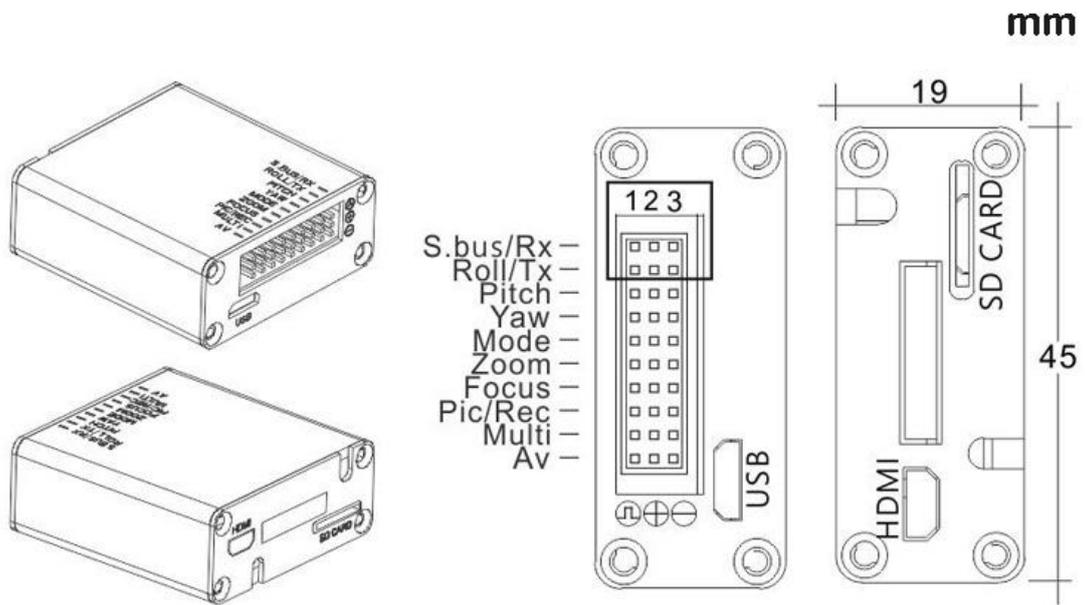
Thermal camera		
	Working system	Un-cooled long wave (8 $\mu$ m~14 $\mu$ m)
	Detector pixels	640×480
	Pixel size	17 $\mu$ m
	Focusing	
	Emissivity correction	Emissivity 0.01~1 adjustable
	NETD	≤40mK(@25℃)
	MRTD	
	Image enhancement	Automatically adjusts image brightness and contrast
	Color palette	
	Automatic non-uniformity correction function	Yes(with or without shutter)
	Time synchronization function	Yes
	Temperature measurement mode	Temperature bar (pseudo display) HT LT field center temperature
Tracking index	Temperature warning	Warning temperature -20℃~150℃
	Data refresh rate	50Hz/25Hz
	Output lag	<10ms
	Tracking velocity	±32 pix/frame
	Target size	16x16 pixels to160x160 pixels



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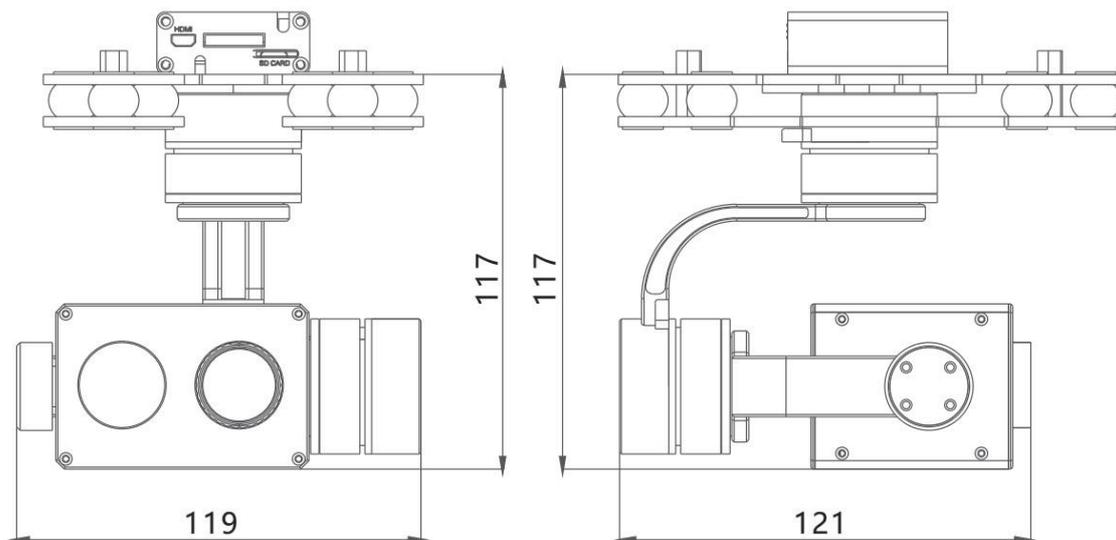
### Gimbal wiring hub drawing



### Dimension

54.00~102.00  
(Distance adjustment based on 4mm unit)

Unit : mm



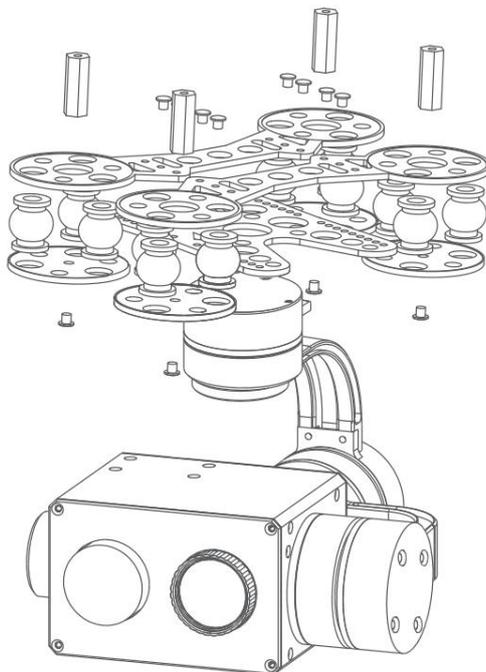


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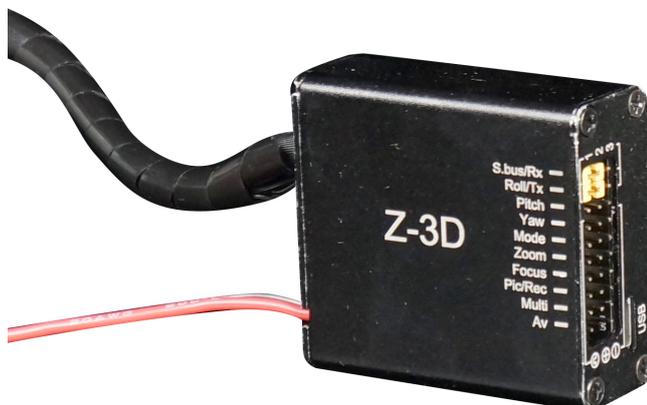
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## Installation



## Gimbal and camera control via PWM





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### **Gimbal control**

1)Yaw axis control:speed mode,connect Stick channel(or 3-position switch channel, push stick to middle position to stop)

2)Pitch axis control:speed mode,connect Stick channel(or 3-position switch channel, push stick to middle position to stop)

3)Mode control:angle mode,connect knob channel(speed mode: connect 3-position switch channel or rocker channel)

If connecting knob channel,rotate to one end,the gimbal is at lowest speed when controlling YAW and PITCH axis.

Rotate the knob to any position,gimbal is at higher speed when controlling YAW and PITCH axis.Rotate to knob to another end,gimbal back to center position.

4)Multi:tracking control,connect 3-position switch channel

Middle to low:quit tracking mode,cursor disappear

Low to middle:go to tracking mode,cursor appear

Middle to high:one square appears,object is locked,tracking is activated

Middle to high again:re-track mode,cursor appears in the square.Gimbal is still tracking the object,now you can move the cursor to track another object(middle to high stick again).

### **Camera control**

1)Zoom control:daylight sensor zoom control,connect 3-position switch or stick channel

2)Focus:Picture in picture switch and palette switch,connect 3-position switch channel. Middle to Low:palette switch.

Middle to High:picture in picture switch.

3)PIC/REC:taking picture/recording,connect 3-position switch channel Middle to high,recording start

Middle to high again,recording stop

Middle to low,taking picture

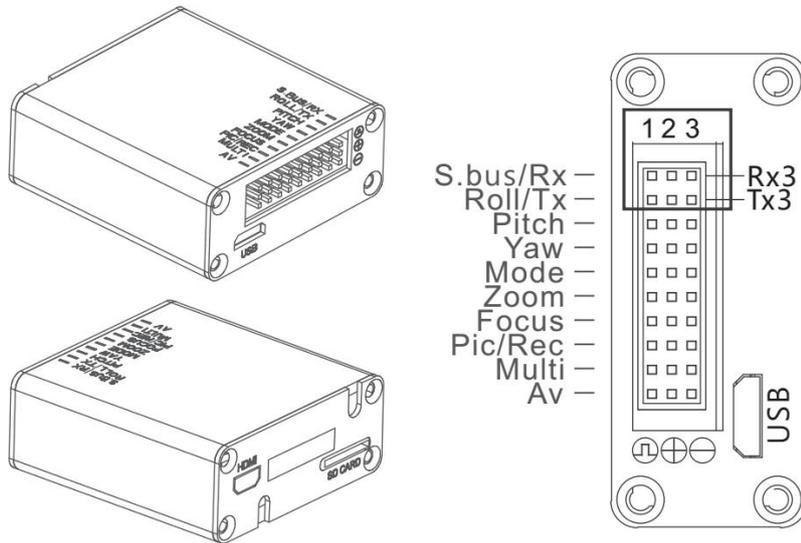
Middle to low,taking another picture



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### GPS data overlay and serial port wiring diagram

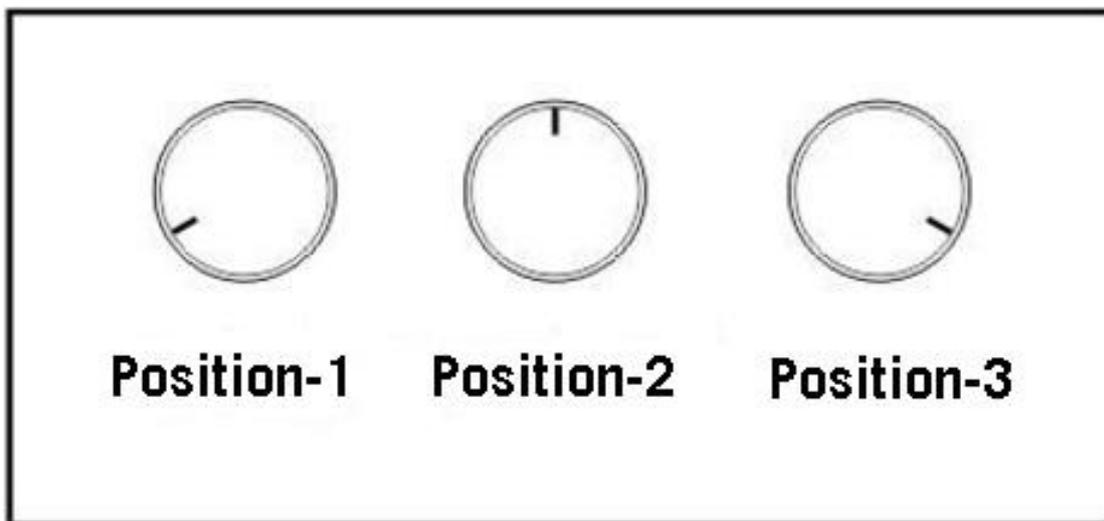


GPS Baud rate:115200,8,1,null

Serial ports will be needed(marked by the black box,see photo above),please connect RX1 and RX2,TX1 and TX2,with wire jumper.TX and RX from external serial cable connect to TX3 and RX3 respectively.GND from external serial cable connect to GND of the wiring hub.

**Please notice:DO NOT connect 5V and GND to the ports marked by the black box.**

### Mode function description(connect "MODE"to knob channel)





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Rotate knob to position-3:low speed lock mode.The gimbal will move at the lowest speed when controlling YAW and PITCH,and gimbal YAW axis will not follow drone flight direction.

Rotate knob to any position except position-3:variable speed follow mode.Gimbal speed will be faster(the speed depends on the angle you rotate the knob, the bigger the faster).

Rotate knob to position-1, gimbal back to home position.

Flip 1 time between position 2 and position 1,gimbal goes back to home position

Flip 2 times between position 2 and position 1,gimbal goes to speed mode.

Flip 3 times between position 2 and position 1,gimbal goes to angle mode.

Flip 4 times between position 2 and position 1,gimbal goes to accelerometer calibration

Flip 5 times between position 2 and position 1,gimbla goes to gyro calibration

**Notice:**gimbal will goes to gyro calibration automatically if the gimbal stays still with the power on.The gimbal will works in the mode that is used last time.The factory work mode for the gimbal is angle mode.