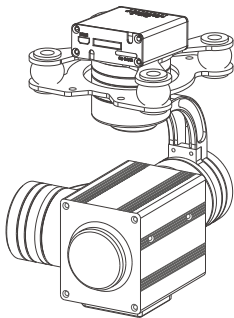


User manual

FH310Z 1080P HD 10X Optical Zoom Camera with 3-axis Gimbal



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High-precision gimbal

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10X zoom camera

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Gimbal introduction

FH310Z Gimbal is a high-precision gimbal.

When it leaves the factory, all the parameters have been debugged, and the user will install the camera and install it directly onto the aircraft. It can achieve horizontal, roll and pitch at three directions to increase stability. Adopt the integrated design of shock absorber and gimbal, mechanical vibration can be greatly reduced. The gimbal can be widely used in UAV applications, such as public security, electricity, firefighting, zoom aerial photography.

Object tracking function(optional)

1、 Function description

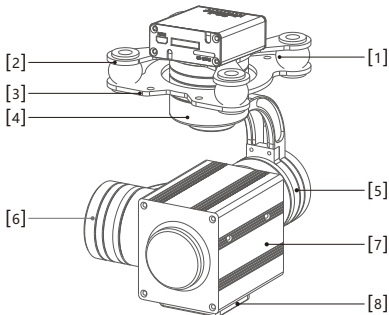
Build-in normalization ,cross-correlation and tracking algorithm, combining with object missing recapture algorithm, achieve stable track of the target.

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

2、 Tracking performance

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

Gimbal description



[1]Damping sphere

[5]Roll axis motor

[2]Upper plate of gimbal board

[6]Pitch axis motor

[3]Under plate of gimbal board

[7]Pitch axis motor

[4]YAW axis motor

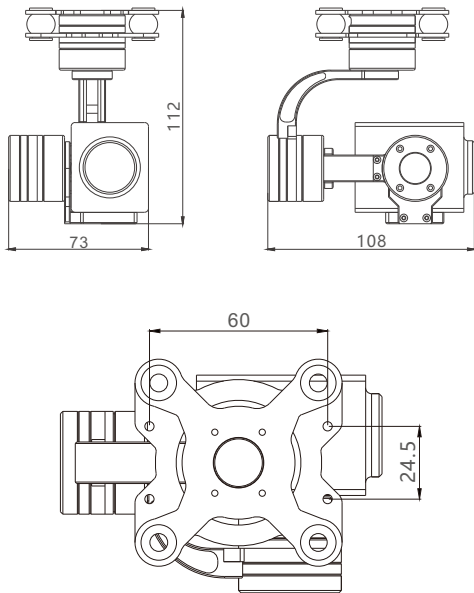
[8]Camera mounting base



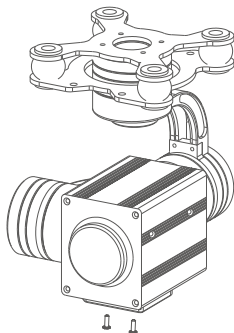
Please make sure that the motor is not stopped by any object during the rotation , if the gimbal is blocked during rotation, please remove the obstruction immediately.

Gimbal dimensional drawing

unit:mm



Installing



Mechanics@Electronic characteristics

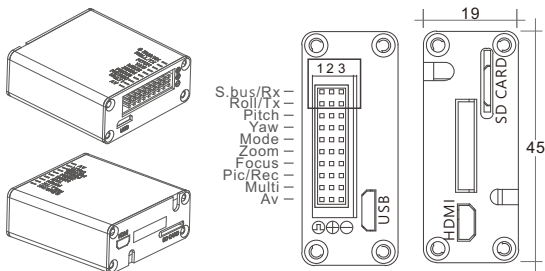
Voltage	3S~6S(12V)	Quiescent current	240mA@12V
Working current	320mA@12V	Work environment	-10°~+50°
Size	L105*W91*H98mm	Weight	395g

Working characteristics

Pitch angle range of action: -90°~+90°
Roll angle range of action: -45°~+45°
Yaw angle range of action: -150°~+150° Non-polar rotation
Angle jitter: pitch and roll direction $\pm 0.02^\circ$, horizontal direction $\pm 0.03^\circ$

Gimbal signal wire box

unit:mm



Connection of control box and wiring instructions

1、 Camera control line

Zoom: camera zoom control line, connect PWM receiver on third gear, or rocker.

Focus: camera manual focus control line, connect receiver on third gear, or rocker. If not connect, the camera will focus automatically after zooming.

Pic/Rec: photography/video, mode switching, video and photography control, connect receiver on third gear.

Switch from middle to high: photography/video mode switching

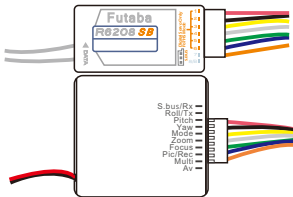
Switch from middle to low:

(1) In the video mode : if video record is stop , video record starts ,if video record is starting , switch from middle to low again, the video record will stop;

(2) In the photo mode: take a pictures

Multi : Multi control channel for other function, such as tracking, laser light. IR cut , etc

AV: analog output signal



Gimbal PWM signal instructions :

YAW directional channel: speed mode ,connect rocker channel, (or third gear switch channel, stopping need third gear to middle position.)

PITCH Pitch channel : speed mode ,connect rocker channel, (or third gear switch channel, stopping need third gear to middle position.)

MODE gimbal one button back and speed adjustment : angle mode, A knob or a third gear channel switch.

Functional descriptions of mode (regard the third switch channel mode as the example)



Turn the knob to the three position: Low speed & not follow yaw mode, at this moment, the joystick controls YAW and PITCH, gimbal has the lowest speed of movement, its yaw does not follow the rotation of the aircraft;

Turn the knob to any position above three:variable speed & following mode, at this moment, the joystick controls YAW and PITCH, The movement speed of gimbal rises(Speed varies with position) ,gimbal works in follow yaw mode.

Turn the knob to the one position: high speed following mode.

Toggle switches one time between position -2 and -1 rapidly, gimbal returns to the home position;

Toggle switches two times between position -2 and -1, gimbal use speed mode (profile 1)

Toggle switches three times between position -2 and -1, gimbal use angle mode (profile 2);

Toggle switches four times between position -2 and -1, calibrate the accelerometer.

Toggle switches five times between position -2 and -1, calibrate the gyroscope

Note: Gimbal turns on in the static state, and the gyroscope is automatically calibrated ;The working mode of gimbal at the next boot time is the mode used last time, factory mode is speed mode.

Camera profile (introduction)

10X zoom camera has 4Mega valid pixels, supports 10 times optical autofocus, possess HD 1080P video. There are two video streams in the camera, One is 1080P 30FPS, local H.264 compression, stored in the device SD card, Another video output 1080p60FPS HDMI HD signal for the wireless transmission, According to the characteristics of UAV photography application, we design fast auto-focus speed , small size, and support PWM and TTL serial control.

Parameter index

- 1、 Adopt 1/3 inch, 4 million pixels CMOS SENSOR
- 2、 The output resolution is 1920*1080P/60 fps.
- 3、 Lens imported from Japan, higher definition
- 4、 10 times optical zoom lens, 5Mega HD lens.
- 5、 Zoom focal length $f=4.9\sim 49\text{mm}$, aperture diameter 12.
- 6、 AV analog output, 1080P30 video stream in local TF card storage.
- 7、 Real time fast focus function, the focus time $<1\text{s}$.
- 8、 Support Flip vertically , horizontal mirror , stationary picture, automatic white balance, automatic gain, automatic color correction.
- 9、 Wide temperature range, temperature range from .
- 10、 Support serial protocol control.
- 11、 Horizontal observation range: from 53.2° (close focus) to 5.65° (far focus).
Vertical observation range: from 39.8° (close focus) to 4.2° (far focus).
Focusing observation range: from 66.6° (close focus) to 7.2° (far focus).

Functional characteristics

Zoom Range

Zoom focal length $f=4.9\sim 49\text{mm}$, zoom ranges up to 10 times, exhibiting image detail Perfectly.

The speed of focusing

Design for UAV aerial photography , according to aerial characteristics, using fast focus algorithm, focus time $<1\text{s}$.

Wide dynamic

Adopt 105d B wide dynamic range, in the presence of backlit or strong light, The view of the over bright and over dark regions can still be captured at the same time.

Ultra low illumination

The device can still clearly display image features in Ultra low illumination or poor light environment.

Output interface

machine core is simulated by CVBS, 1080P HDMI output, 1080P local storage H2.54Compression storage

Multiple control modes

Support PWM control and serial command control.(Any fly control channel can be used to control the ZOOM multiples).