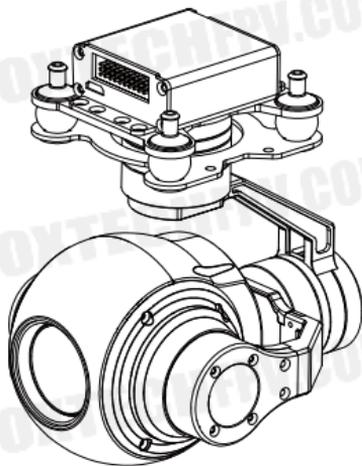


EH10 10X

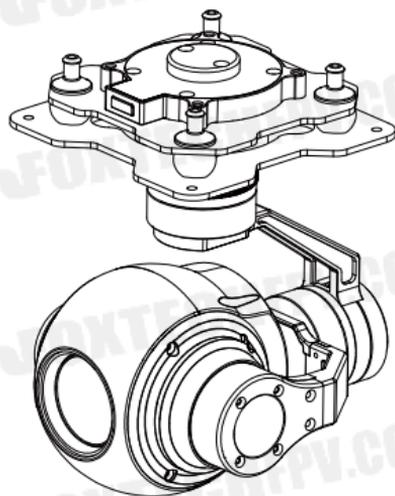
Optical Zoom Camera With 3-axis Gimbal

User Manual

V1.0 2022.4



Standard Version

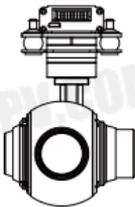
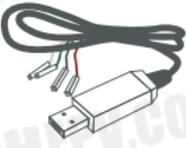


Quick-mount Version

FOXTECH

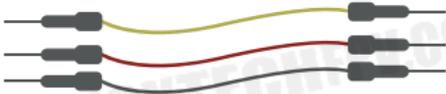
1. In the Box

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			

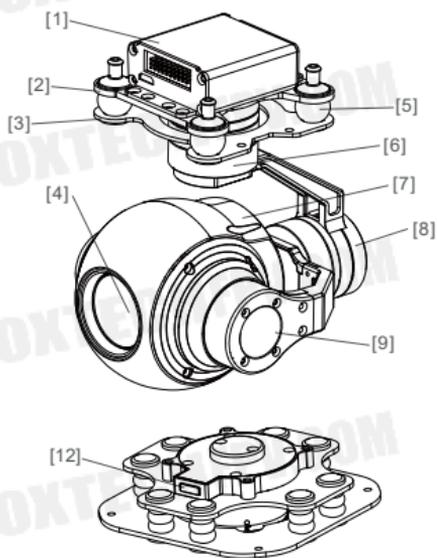
B. Quick-mount Version

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			

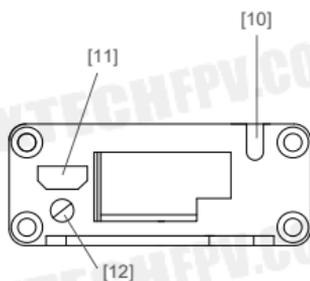
TTL / S.BUS Control Cable x 1 pc	
TTL Connect Cable x 3 pcs	
Ethernet Cable x 1 pc	

2. Installation Instruction

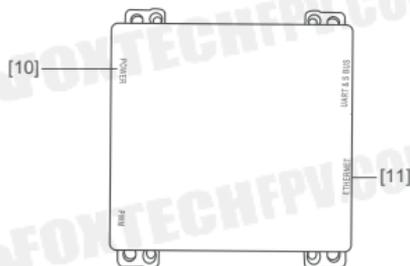
2.1 Overview



Quick-mount



Control Box Back Side
(Standard Version)



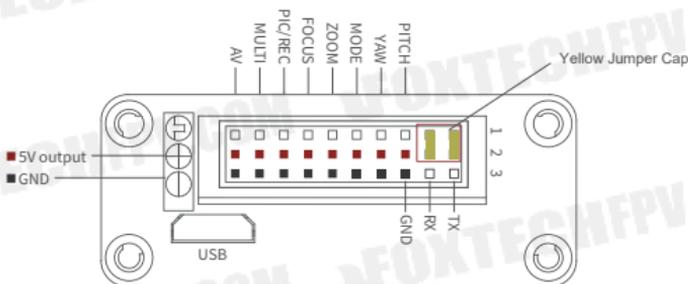
(Quick-mount Version)

- | | |
|-------------------------|--------------------------------|
| [1] Control box | [7] TF card slot |
| [2] Upper damping board | [8] Roll axis motor |
| [3] Lower damping board | [9] Pitch axis motor |
| [4] FHD zoom camera | [10] 3-6S power interface |
| [5] Damping ball | [11] Ethernet interface |
| [6] Yaw axis motor | [12] Quick-mount unlock button |



- 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)

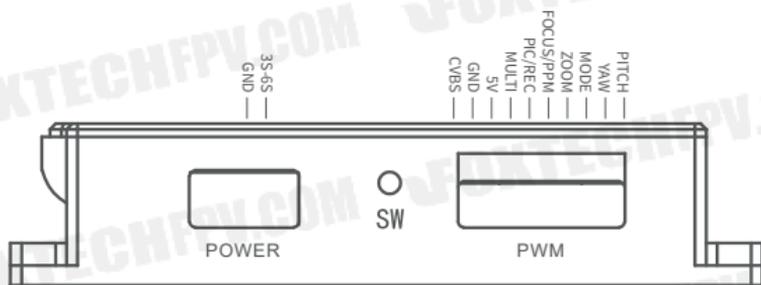


- The input voltage cannot be higher than 6S.
- The pin insertion interface cannot be connected with power supply.
- The yellow jumper cap cannot be removed

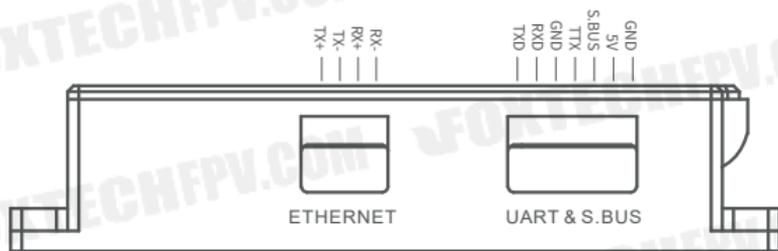
2.2.2 Control Box Printing (Quick-mount Version)



Front Side



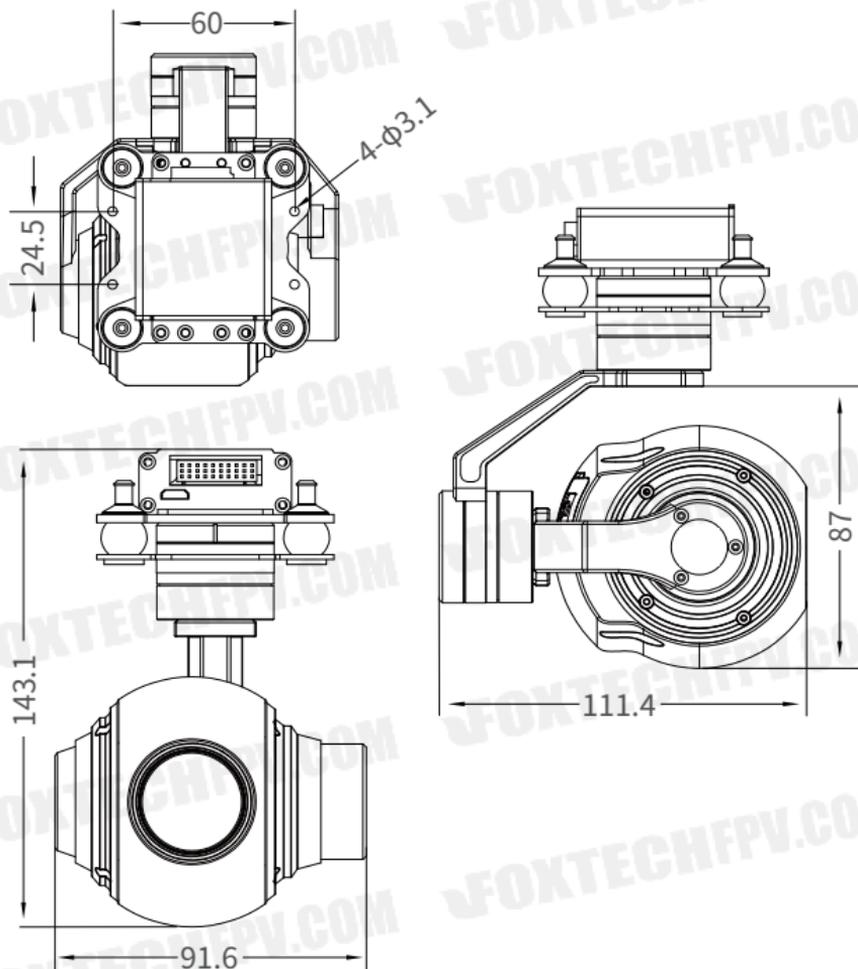
Left Side



Right Side

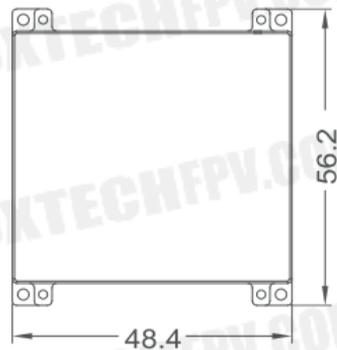
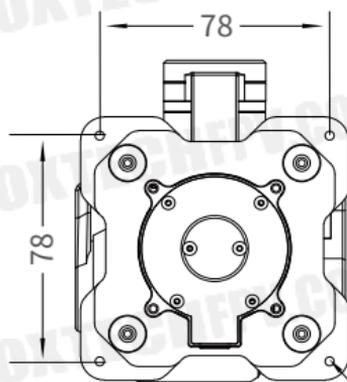
2.3 Device Dimensions (Standard Version)

Unit: mm

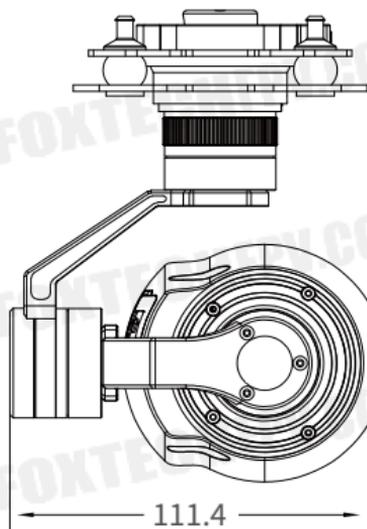
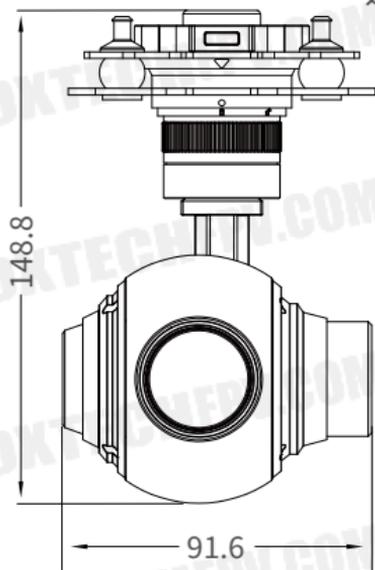


2.3 Device Dimensions (Quick-mount Version)

Unit: mm

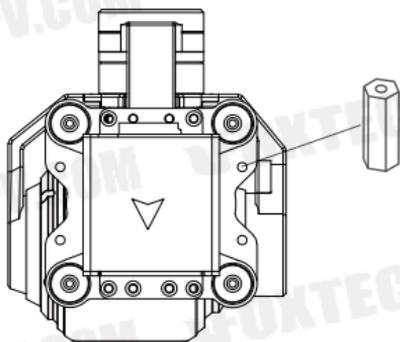


Control Box



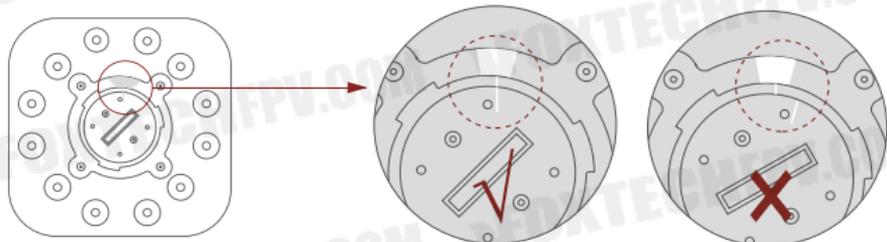
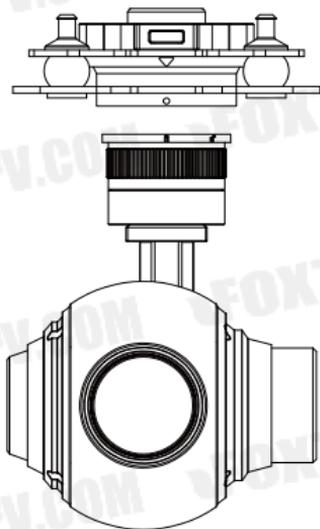
2.4 Install Mounting Part

- (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 (Quick-mount version is the same).

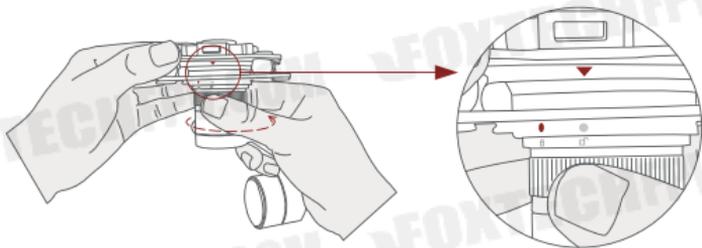


Front

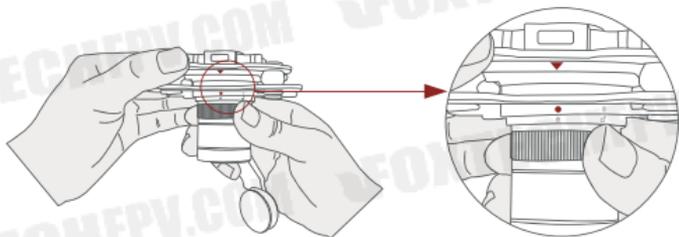
2.5 Quick-mount Version Release Instruction



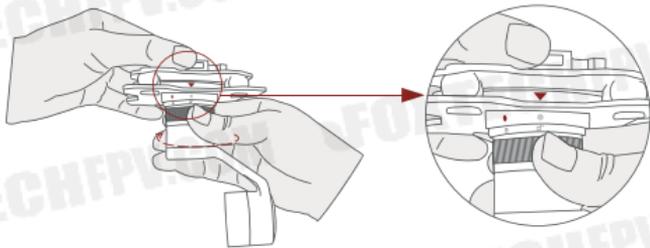
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)



2. Align the white dot (unlock icon) to the red triangle (below unlock button), push the gimbal into the plate 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 plate has been locked.



4. To unlock the gimbal, 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 plate.

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: no HDMI output

Network: Ethernet output interface, support RTSP/UDP video streaming. Default: RTSP output.

IP address: RTSP: //192.168.1.160:554/stream0, output resolution: 1080P, frame rate: 25fps, bit rate: 4M.

AV: no AV output



- When using user interface software Viewlink for network connection, the network of external device (computer) should be the IP address: 192.168.1.2 (choose the last byte among 2~254, can not be 160 same as the gimbal), subnet mask: 255.255.255.0, Default gateway: 192.168.1.1, 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

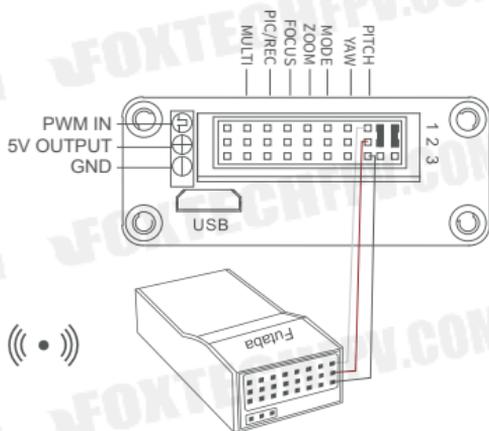
3.1 PWM Control

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

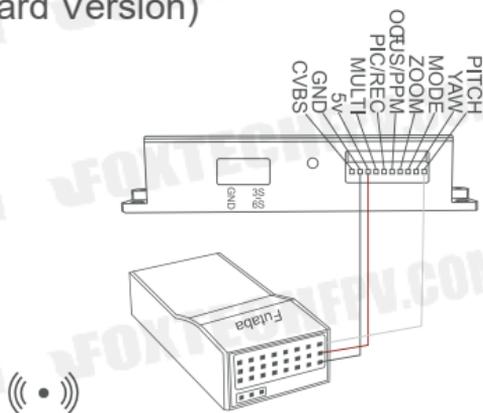


Receiver

Connection Diagram (Standard Version)



Remote Controller



Receiver

Connection Diagram (Quick-mount 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

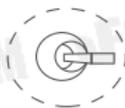
High Gear
Pitch Down

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

Low Gear
Yaw Left



Position 2

Middle Gear
Yaw Stop



Position 3

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

Low Gear



Position 2

Middle Gear



Position 3

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:

4.1) Operate 1 time continuously and quickly, from position 2 - 3 - 2, to Home position.

4.2) Operate 2 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2, the camera lens looks vertically down.

4.3) 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)

4.4) 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

Low Gear
Zoom Out



Position 2

Middle Gear
Stop Zoom



Position 3

High Gear
Zoom In

6) Focus (not functional for this channel)

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

Low Gear



Position 2

Middle Gear



Position 3

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: Backup channel



Position 1

Low Gear



Position 2

Middle Gear



Position 3

High Gear

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):

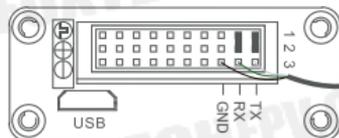
Gimbal Camera

Cable

TX ↔ RX (White)

RX ↔ TX (Green)

GND ↔ GND (Black)



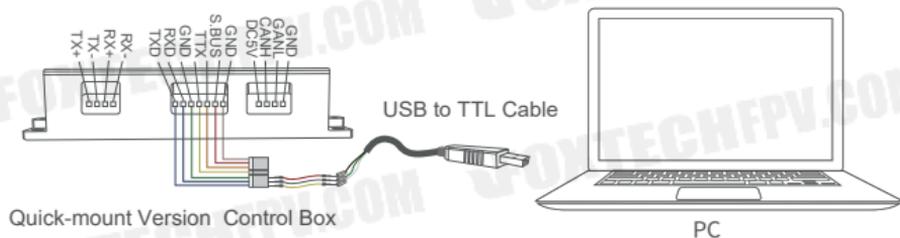
Control Box

USB to TTL Cable



PC

Connection Diagram (Standard Version)



Connection Diagram (Quick-mount 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 the Seeker-40 software to test the functions directly. Users may choose to develop their own software, please contact technical support for TTL control protocol file.

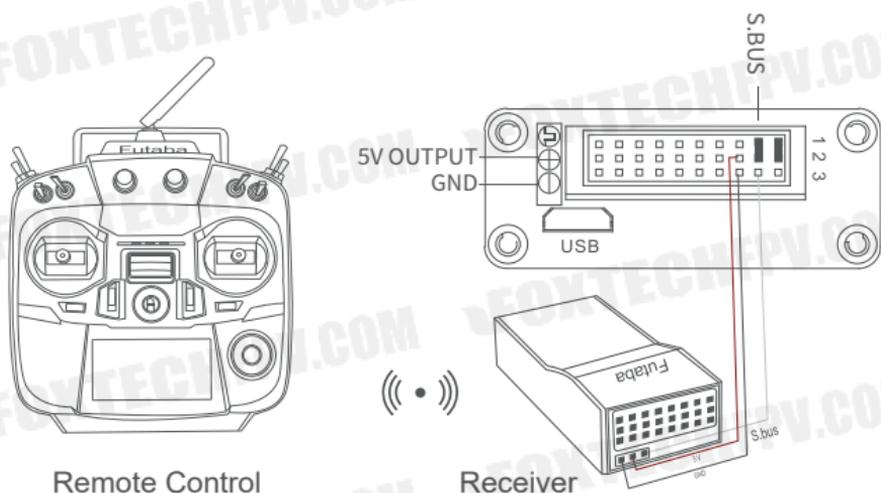


- Connect serial port of gimbal to pins, DO NOT connect with power supply.
- The default baud rate of serial port is 115200, which can be changed according to the docking equipment.

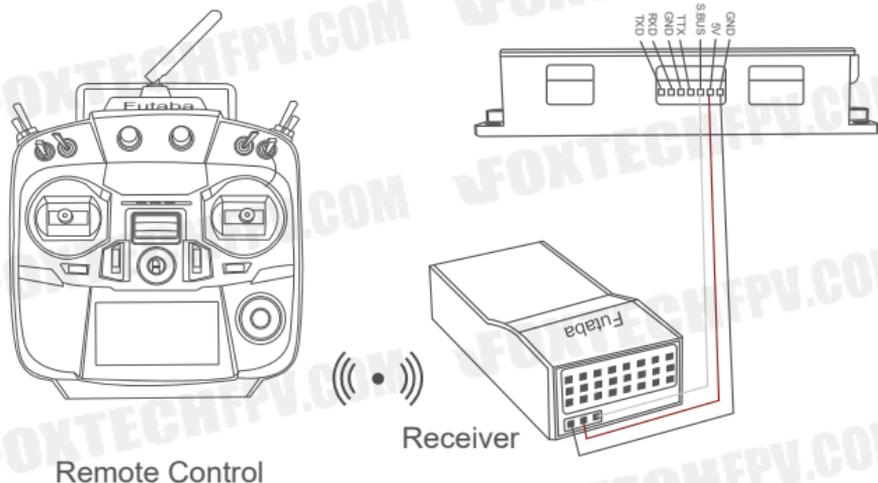
3.3 S.BUS Control

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):



Wiring Diagram (Standard Version)



Wiring Diagram (Quick-mount 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

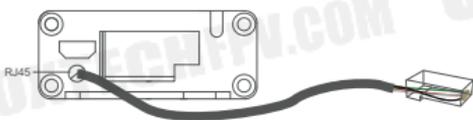


- User can set the channels by setting serial command according to the actual requirement. The S.Bus channel position can be arranged in any sequence within channel 1-15 to connect with the flight controller or remote control.
- TTL control and S.bus control cannot coexist at the same time for standard version. The default 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 cameras with Ethernet output, the default IP address is: 192.168.1.160, 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.



Standard Version



PC



Quick-mount Version



PC

4. Specification

Hardware Parameter	
Working voltage	12V
Input voltage	3S ~ 6S
Output voltage	5V (connect with PWM)
Dynamic current	450~700mA @ 12V
Idle current	450mA @ 12V
Working environment temp	-20℃ ~ +60℃
Output	IP (720p/1080P 25/30fps)
Local-storage	SD card (Up to 128G,class 10, FAT32)
Photo storage format	JPG (1920*1080/1280*720)
Video storage format	MP4 (1080P/720P 25fps/30fps)
Control method	PWM / TTL / S.BUS / TCP
Gimbal Spec	
Mechanical Range	Pitch/Tilt: -60°~120°, Roll: ±35°, Yaw/Pan: ±360°*N (IP output version)
Controllable Range	Pitch/Tilt: -45°~90°, Yaw/Pan: ±360°*N (IP output version)
Vibration angle	Pitch/Roll: ±0.02°, Yaw: ±0.02°

One-key to center	√
Camera spec	
Imager Sensor	1/3" Panasonic CMOS Sensor
Total pixel	2.48M
Picture quality	Full HD 1080 (1920*1080)
Optical zoom	10x, f = 5.1mm ~ 51mm
Digital zoom	32x
Angle of View (D, H, V)	D: 68°(Wide end) ~ 6.7° (Tele end)
	H: 54°(wide end) ~ 4.9°(tele end)
	V: 31°(wide end) ~ 4.0°(tele end)
Sync system	Progressive Scan
Sync. System Internal	Internal
S/N ratio	more than 50dB
Min illumination	Color : 0.5 lux , BW : 0.1lux Color DSS : 0.125 lux , BW DSS : 0.025 lux
Gain Control (AGC)	Off / On

White balance	Auto / One Push / Manual / Indoor / Outdoor
Shutter speed	1/30(25) ~ 1/30,000 sec
Focus	Auto / One Push / Manual
Iris	0 ~ 20 steps
Exposure	Mode / AGC / Shut Speed / Iris / DSS / Flickerless / Brightness / WDR/BLC / D&N
Defog	Yes
OSD	Yes
Packing Information	
N.W.	473g / 538g (Quick-mount version)
Product meas.	91.6*111.4*143.1mm (including control box) / 91.6*111.4*148.8mm(Quick-mount Version)
Accessories	1pc gimbal camera device, screws, USB to TTL cable / High quality box with foam cushion
G.W.	860g
Package meas.	200*200*150mm

5. FAQ

1. How to modify the IP address of EH10?

A: Enter "192.168.1.168" at IE web, and go into the IP CAMERA interface -- download the activeX control and login the control as an administrator. Username: admin, Password: 123456, and click the "system setup" menu-- modify the IP camera in "Network configuration".

2. How to modify the bit rate of EH10?

A: Enter "192.168.1.168" at IE web, password: 123456, and enter "Configuration" -- "Audio and Video" -- "Code parameter" -- "bitrate" column to modify the bitrate value Kb/s

3. Does EH10 support taking photos during recording?

A: Yes