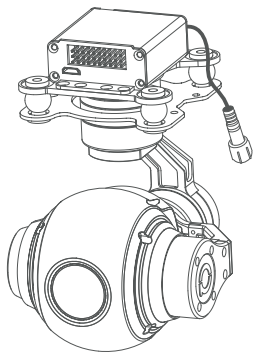
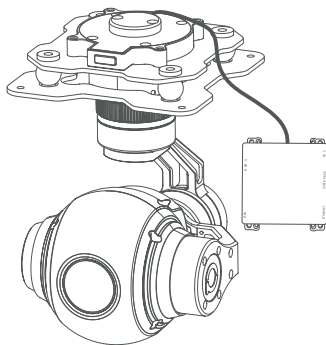


10x Optical Zoom Gimbal Camera

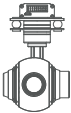
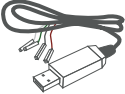



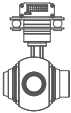
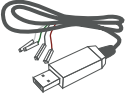






User Manual



Standard Version

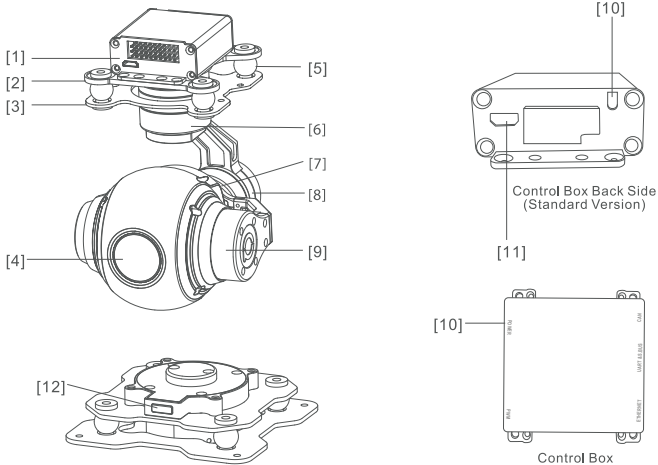


1.2 In the Box

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.			
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			

2. Installation Instruction

2.1 Overview



[1] Control box

[2] Upper damping board

[3] Lower damping board

[4] FHD zoom camera

[5] Damping ball

[6] Yaw axis motor

[7] TF card slot

[8] Roll axis motor

[9] Pitch axis motor

[10] 3-6S power interface

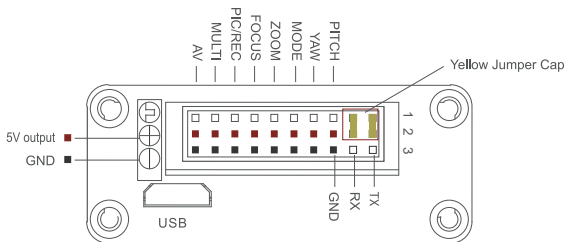
[11] Micro HDMI interface

[12] unlock button



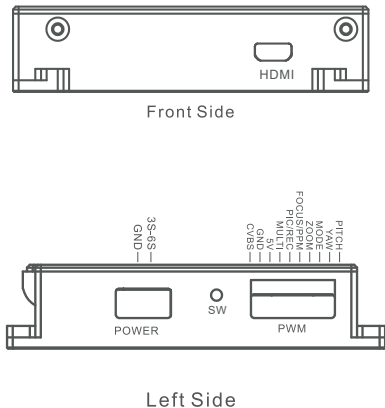
- Please ensure that there isn't any obstacle while the motor rotating.
- Please remove the obstacle immediately if gimbal camera is blocked during rotation.

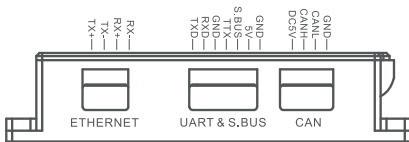
2.2.1 Control Box Printing (Standard Version)



- 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 (Viewport Version)

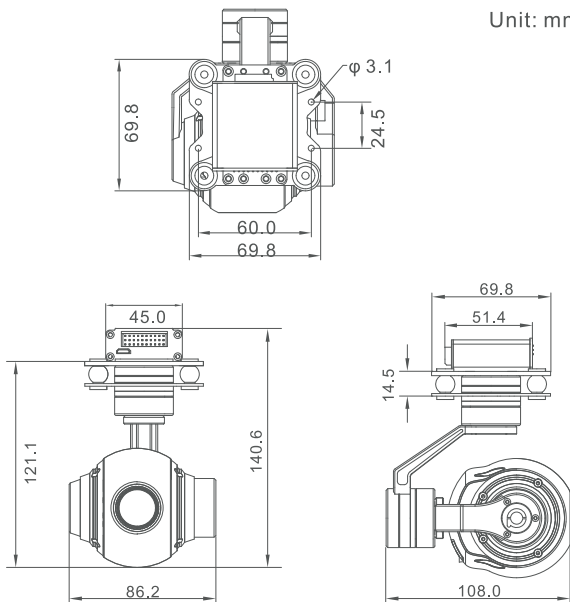




Right Side

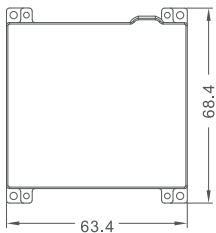
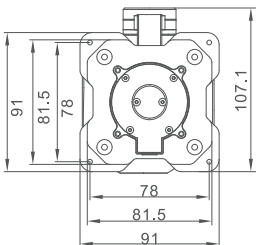
2.3 Device Dimensions (Standard Version)

Unit: mm

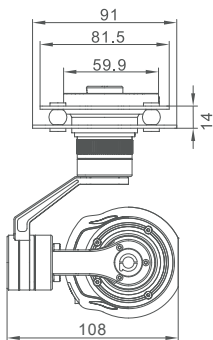
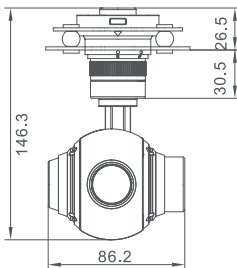


2.3 Device Dimensions

Unit: mm



Control Box

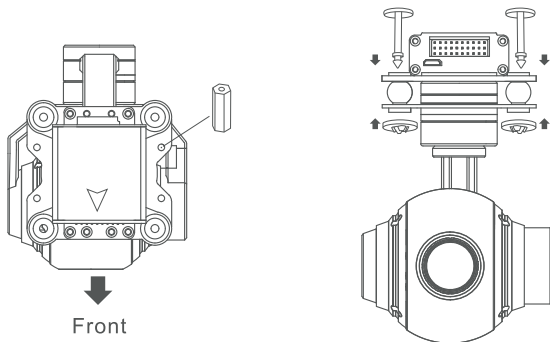


2.4 Install Mounting Part

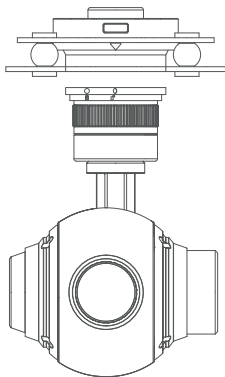
(1) Find out the arrow on the gimbal which indicating the yaw heading of the payload (i.e. the lens direction when the camera power on), and synchronize with the direction specified by the UAV.

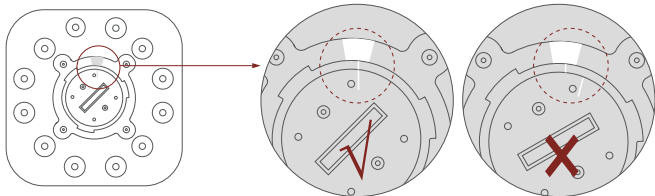
(2) Fix one end of the copper cylinder on the screw hole of lower damping board, and use M3 screw to fasten it.

(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

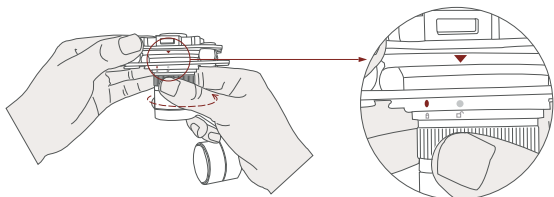


2.5 Release Instruction

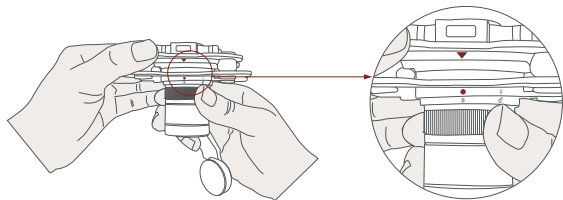




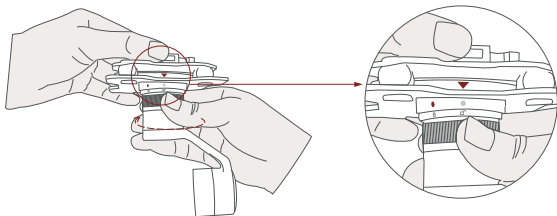
1. Make sure the two white stripes indicated above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)



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 port has been locked.



4. To unlock the port, 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 port.

2.6 Install TF Card

TF (Micro SD card): Install the TF card to the card slot (Re. 2.1.1 Overview). Support max 32GB. Request Class 10 (10m/s) transmission speed or higher and FAT32 or exFAT format.

2.7 Image Output Interface

HDMI: micro HDMI output, FHD 1080P 60fps as default

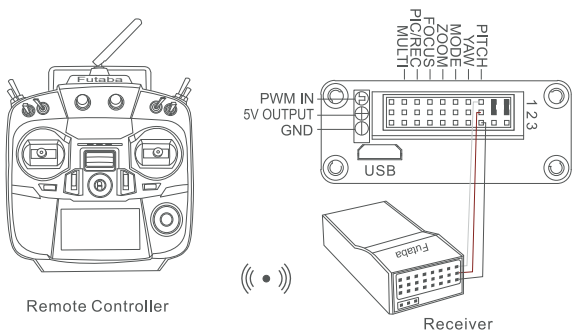
AV: analog signal output, connect with pins AV and GND (Re. 2.1 .1Overview)

3. Signal Control

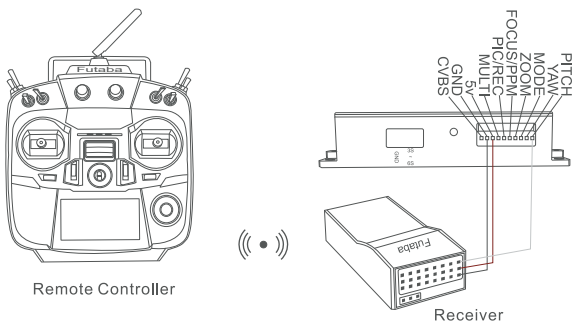
3.1 PWM Control

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)



Connection Diagram Standard Version



Connection Diagram

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)

4.5) Operate 5 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3 - 2 - 3 - 2 - 3 - 2, to restore factory settings

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 (PWM Focus channel in to control Manual Focus, default auto-focus mode. 3-gear switch on remote control are optional. 3-gear switch as example.)



Position 1

Low Gear
Focus Tele



Position 2

Middle Gear
Stop Focus



Position 3

High Gear
Focus Near

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:

Photograph / Record:

- Picture mode: from 2 to 1, take a picture
- Record mode: from 2 to 1, start record, repeat operation to stop record

Switch from Position 2 to 3:

Picture / Record Mode Switch

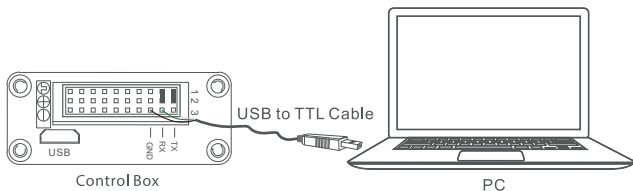
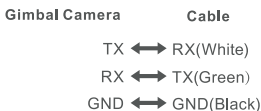
- Picture mode: the number is picture quantity that SD card can store.
- Record mode: the time is recording time.

8) **Multi**: backup PWM channel, no control

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):

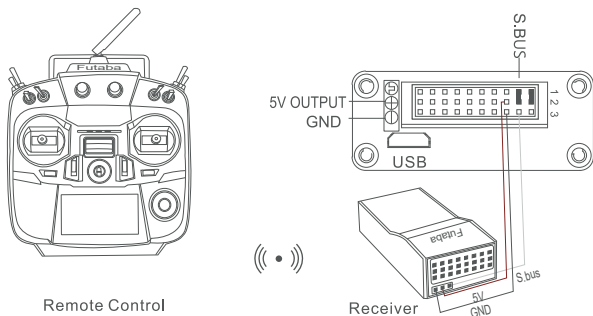


Connection Diagram Standard Version

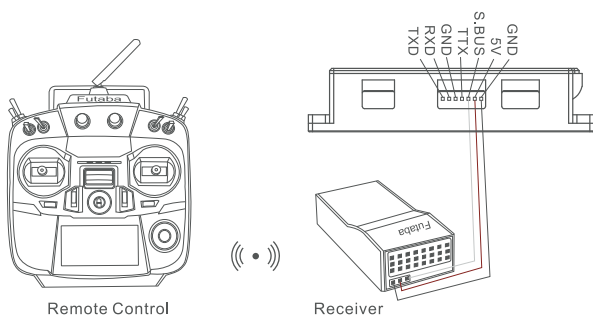
3.3 S.BUS Control

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 as example):



Wiring Diagram Standard Version



Wiring Diagram port 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.

4. Specification

General	
Dimensions	86.2*108*140.6mm (Standard Version) 86.2*108*146.3mm (port Version)
Net Weight	431g (Standard Version) 532g (port Version)
Input Voltage	3S-6S (12V-24V)
Working Voltage	12V
Idle Current	250mA
Working Environment Temp	-20 to 60℃

Gimbal	
Angular Vibration Range	±0.02°
Mount	Non-detachable / Detachable
Controllable Range	Yaw: ±290°, Pitch: -45°~90°
Mechanical Range	Yaw: ±300°, Pitch: ±105°, Roll: ±70°
Max Controllable Speed	Yaw: 300°/s, Pitch: 300°/s
Camera	
Sensor	CMOS: 1/3 inch, Effective Pixels:4MP
Lens	10x optical zoom
FOV	66.6°~7.2°
Focal Length	F=4.9~49mm
Min Focus Distance	1.5m
Digital Zoom	None
Photo Format	JPG
Video Format	MOV
Working Modes	Capture, Record
HD output	1080P30/60fps (default)
AV output	Standard CVBS
Exposure mode	Auto
Exposure Compensation	±2.0 (1/3 steps)

Shutter speed	Auto
Defog	Not Support
White Balance	Auto
Anti flicker	50Hz~60Hz
Day/night switch	Color / Black and white mode
Pal Ntsc TV system	Supported
Local-storage	Micro SD card
Supported File System	FAT32(≤ 32 GB)