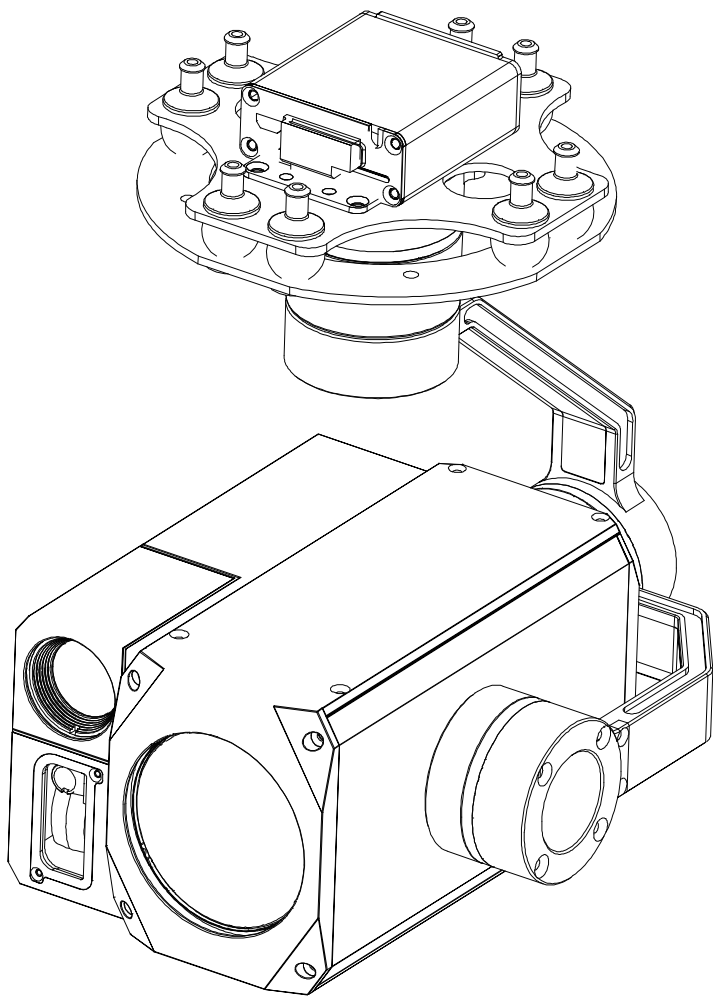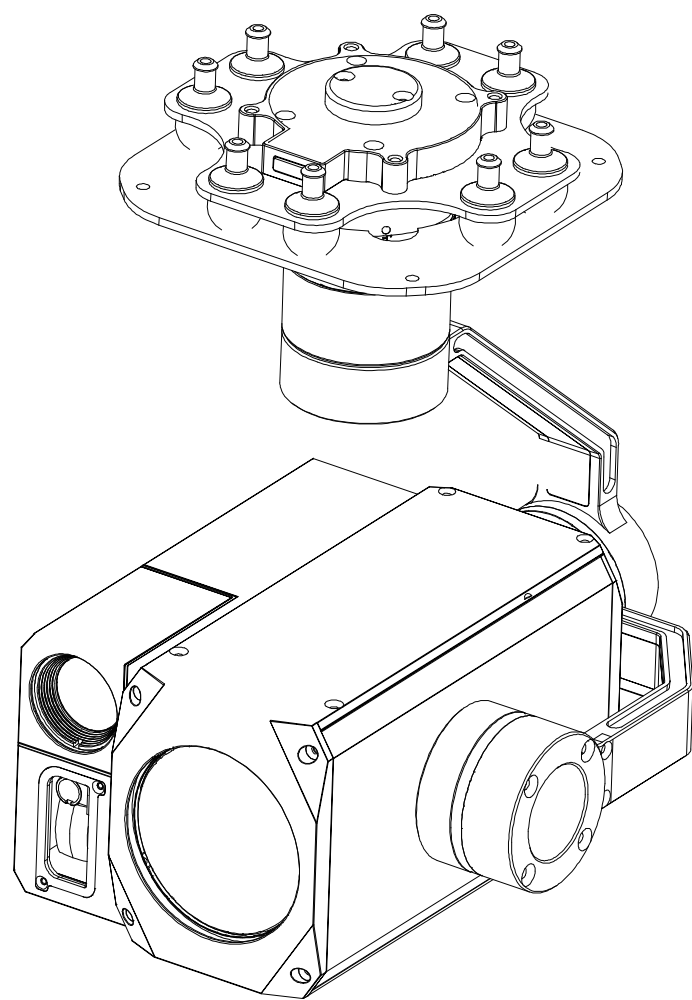# 30x Dual light+laser AI 3-axis high-precision and high-stability gimbal

User Manual

Standard Version

YDport Version

For more details please scan the QR code or visit our website: https://www.iVcan.com

Disclaimer and Warning

Congratulations on purchasing your new YDpro product. Please read this entire document carefully. Failure to read or follow instructions and warnings in this document may result in damage to your YDpro prod-uct. Disassemble the gimbal camera by user is not permitted, as which may cause the camera does not work normally.

YDpro accepts no liability for damage, injury or any legal responsibili-ty incurred directly or indirectly from the use of this project. The user shall observe safe and lawful practices including, but no limited to, those set forth in the manual.

Legends

⊘

Warning

⚠

Important Note

1.Product Introduction

1.1 Introduction

H30T is a triple sensor camera with 3-axis gyro-stabilized gimbal. It in-tegrats with a 30x optical zoom EO camera, 19mm 640*512 12µm pixel pitch IR thermal and 1000m Laser rangefinder.

The EO camera of H30T is equipped with an approximately 417 mil-lioneffective-pixel, 1/1.8" STARVIS night vision CMOS Sensor (min 0.00008 lx ultra low illumination), super image stabilizer and new iris lens. The ICR ON COLOR function enables the camera to capture shots with color even when the IR cut filter is removed. It is effective for color visibility in dark environments.

H30T supports IR thermal and EO picture-in-picture switch, IR color palette switch, photographing and video record, AI recognize and target tracking in both EO and IR image, and Geo-tagging.
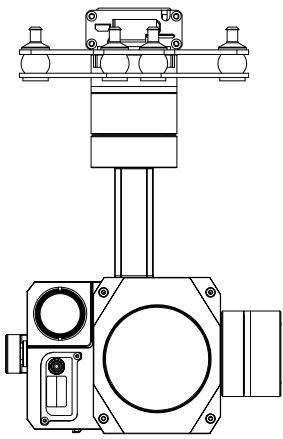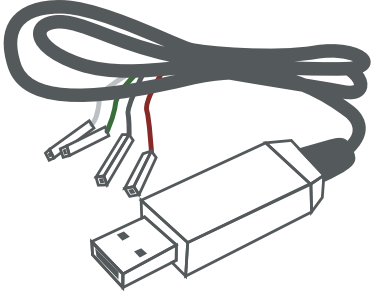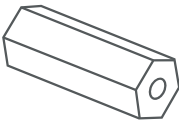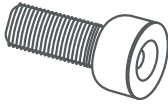
H30T is widely used in UAV applications such as public security, electric
power, fire fighting, disaster prevention, emergency monitoring and inspection, search and rescue, zoom aerial photography and other industrial applications.
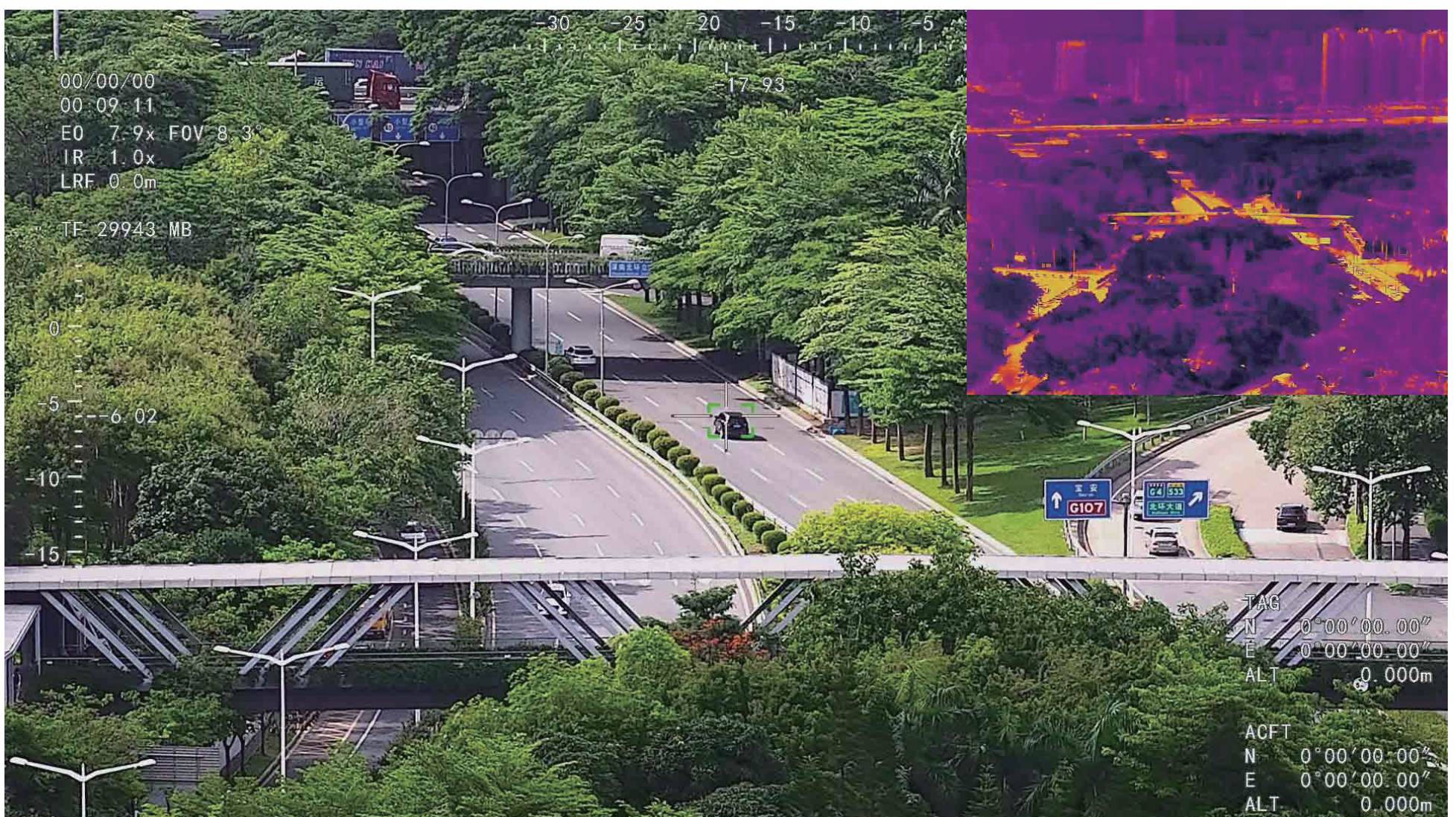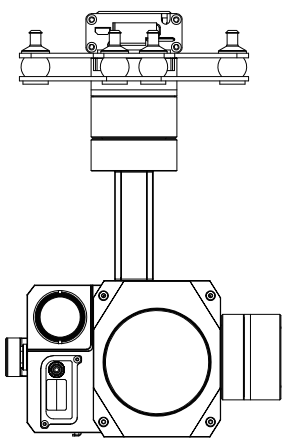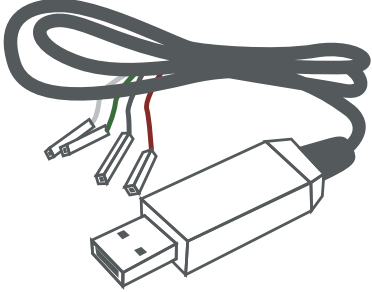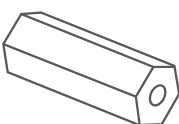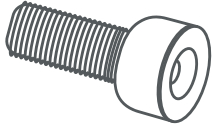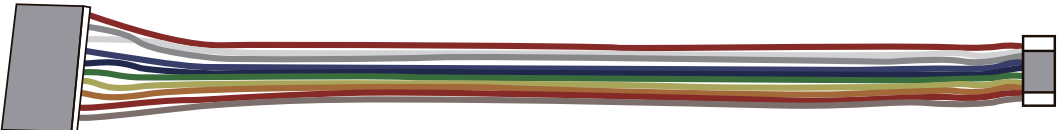

New Rich OSD Display
Simultaneous detection quantity≥ 10 targets
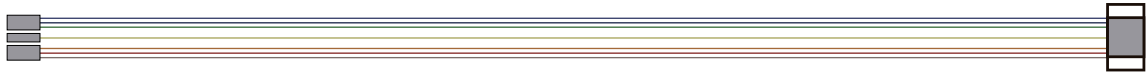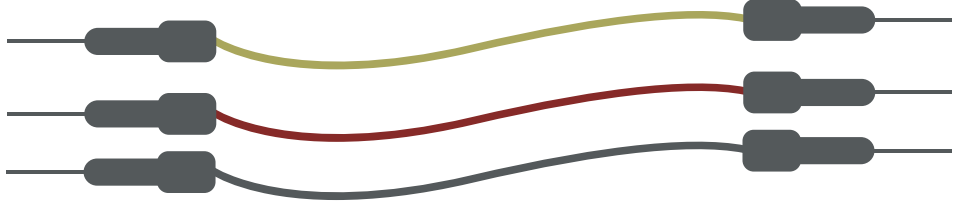
1.2 In the Box

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			
Ethernet Cable x 1 pc			

B. YDport 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

[1]
[2]
[3]
[7]
[8]
[4]
[5]
[6]
[9]
[10]
[11]

[15]

YDport

[12]
[14]
[13]
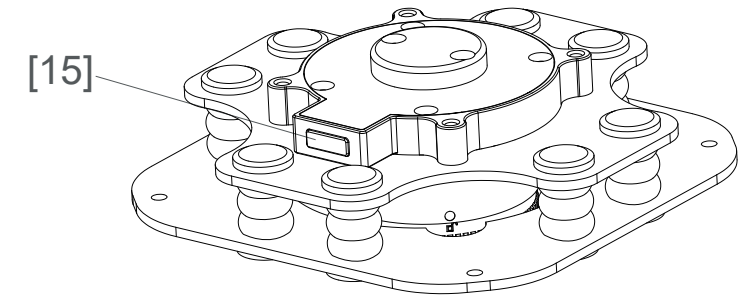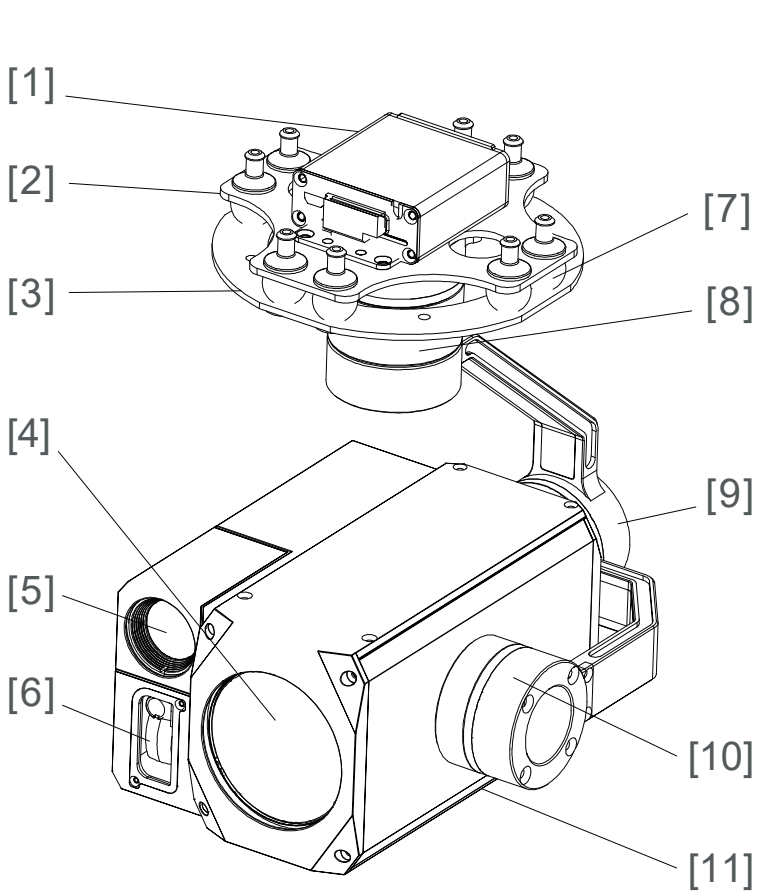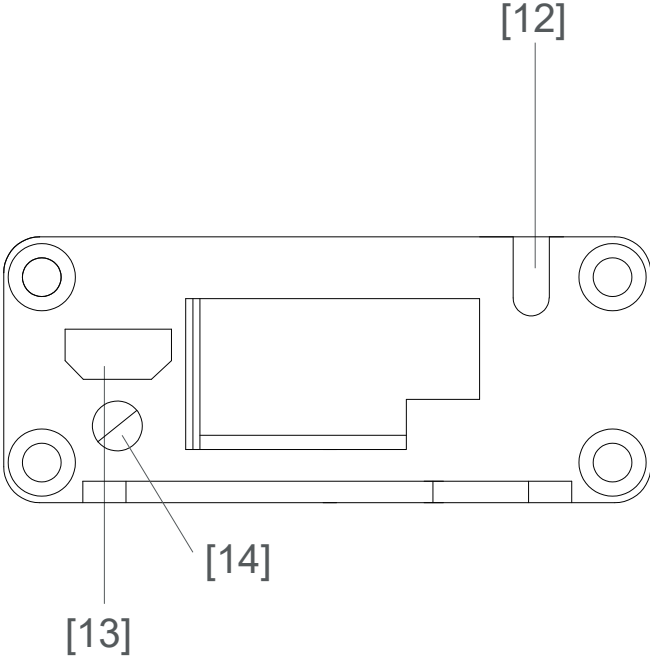
Control Box Back Side
(Standard Version)

[12]
POWER
UART
ETHERNET
PWM
[14]
[13]

(YDport Version)

4.
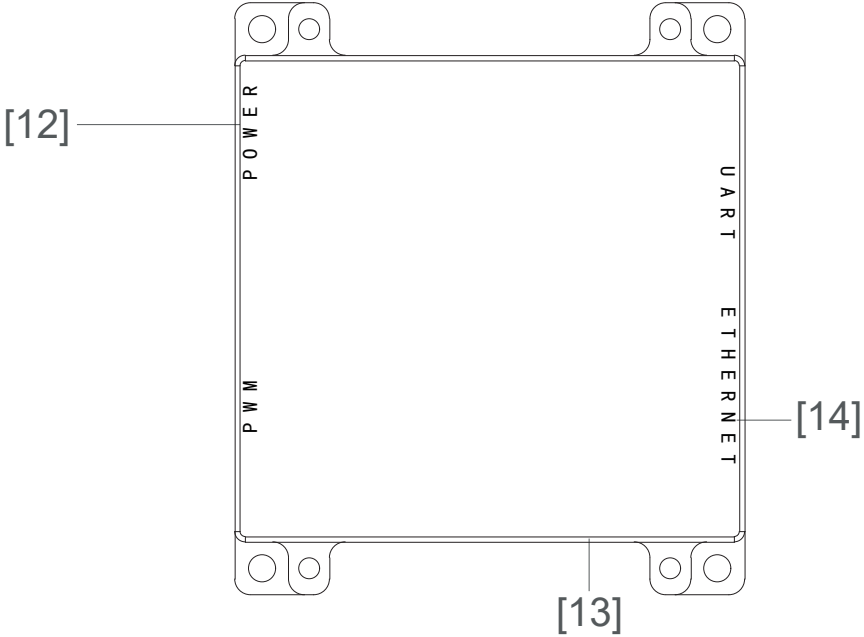
[1] Control box

[2] Upper damping board

[3] Lower damping board

[4] FHD zoom camera

[5] Infrared thermal camera

[6] IR laser rangefinder

[7] Damping ball

[8] Yaw axis motor

[9] Roll axis motor

[10] Pitch axis motor

[11] TF card slot

[12] 12~24V power interface

[13] Micro HDMI interface

[14] Ethernet interface

[15] YDport 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.

🚫 • Don't use laser ranging against glass within 5meters.

• Don't put the infrared thermal camera towards the sun, magma, laser, etc. in case any burn to the camera.

2.2.1 Control Box Printing (Standard Version)

5.
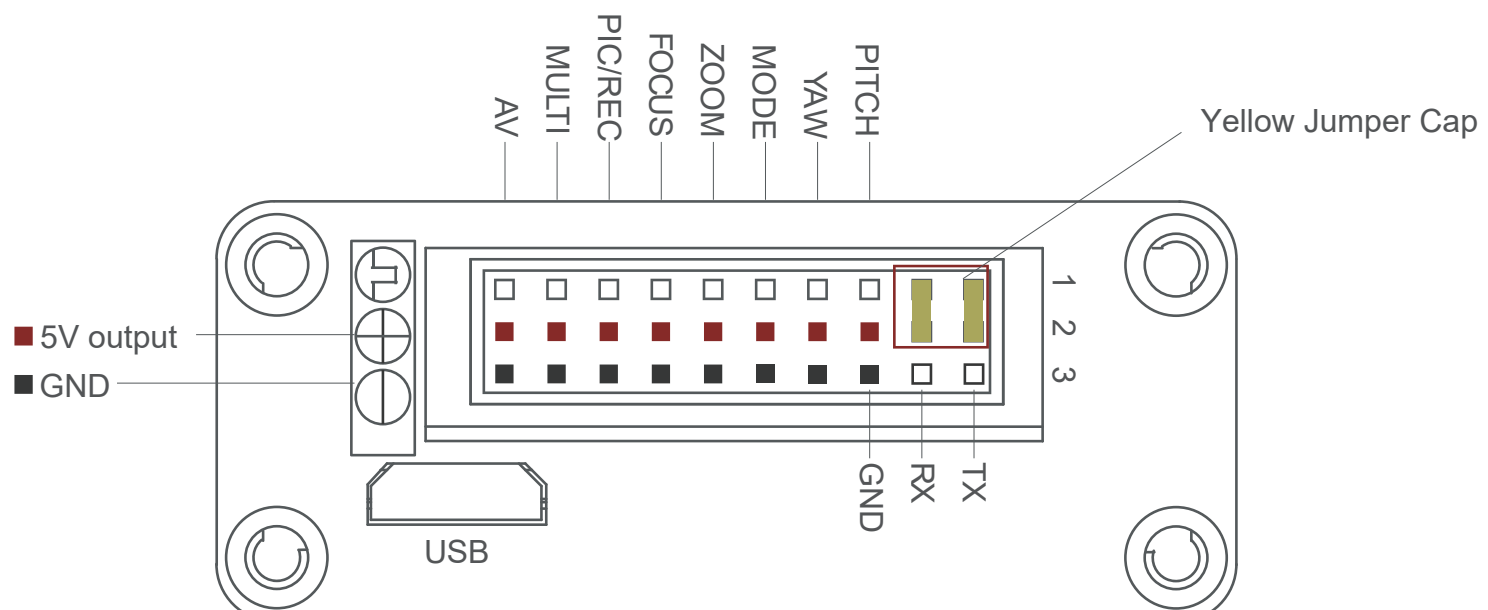
🚫 • The input voltage cannot be higher than 6S.
• The pin insertion interface cannot be connected with power supply.
• The yellow jumper cap cannot be removed

2.2.2 Control Box Printing (YDport Version)

HDMI

Front Side

TX+
TX-
RX+
RX-

TXD
RXD
GND
TTX
S.BUS
5V
GND

Left Side

GND
3S~6S

SW

CVBS
GND
5V
MULTI
PIC / REC
FOCUS / PPM
ZOOM
MODE
YAW
PITCH
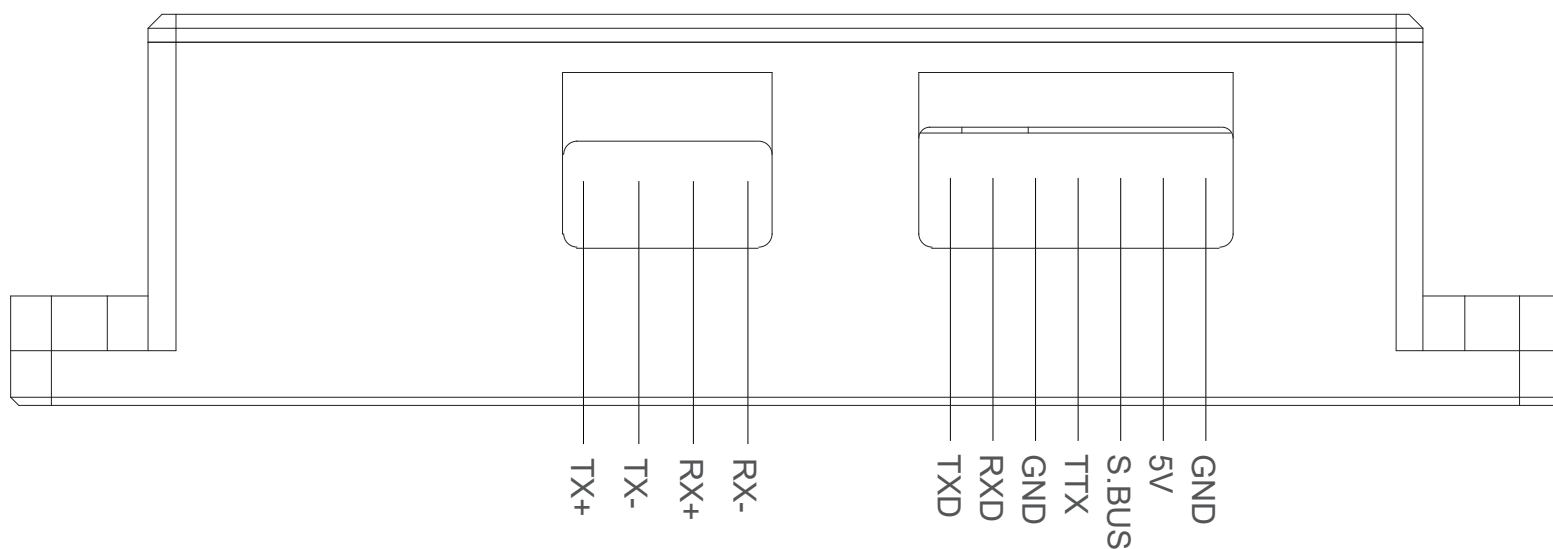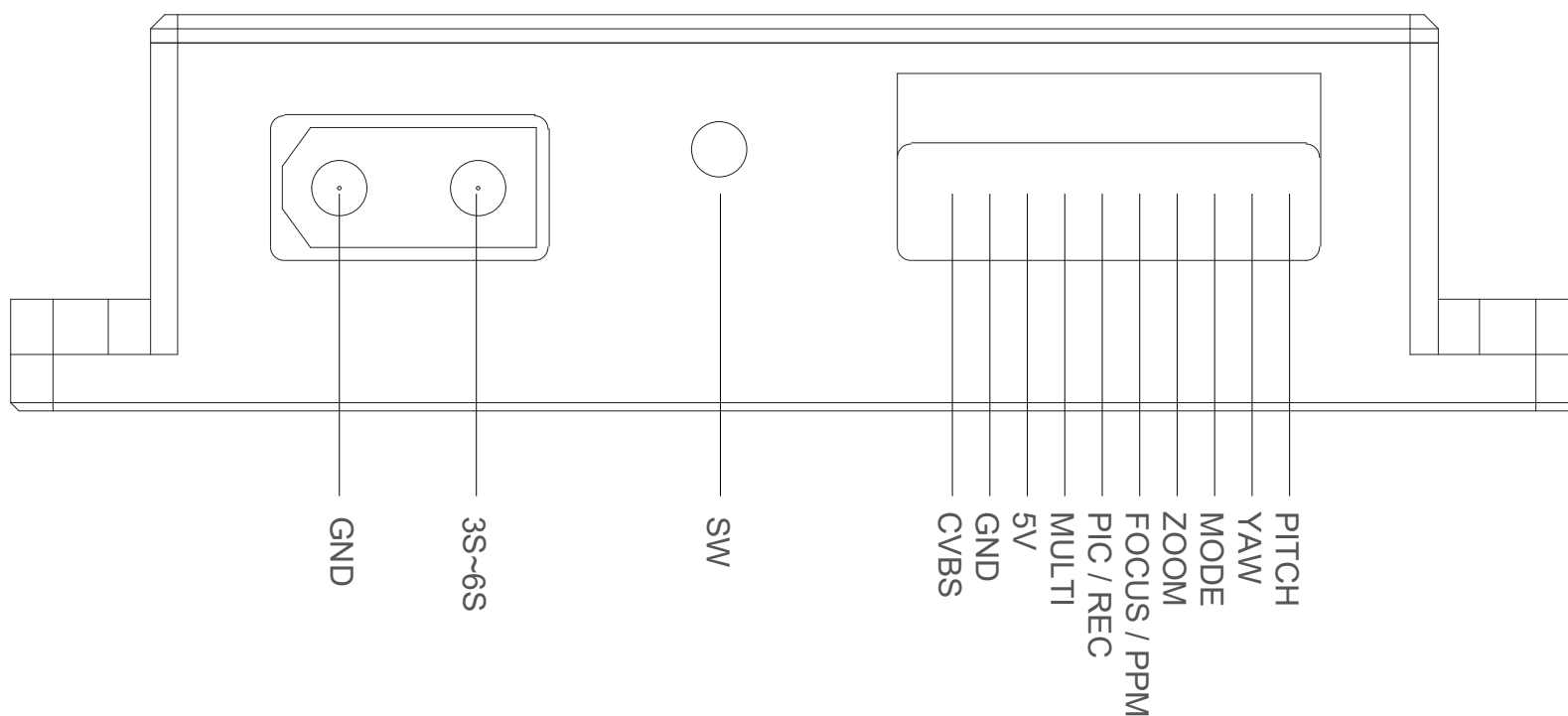
Right Side

2.3 Device Dimensions (Standard Version)

Unit: mm

62.2

4* φ3.5

62.2

32.5

90.5

128.7

124.3

127.5

173.5
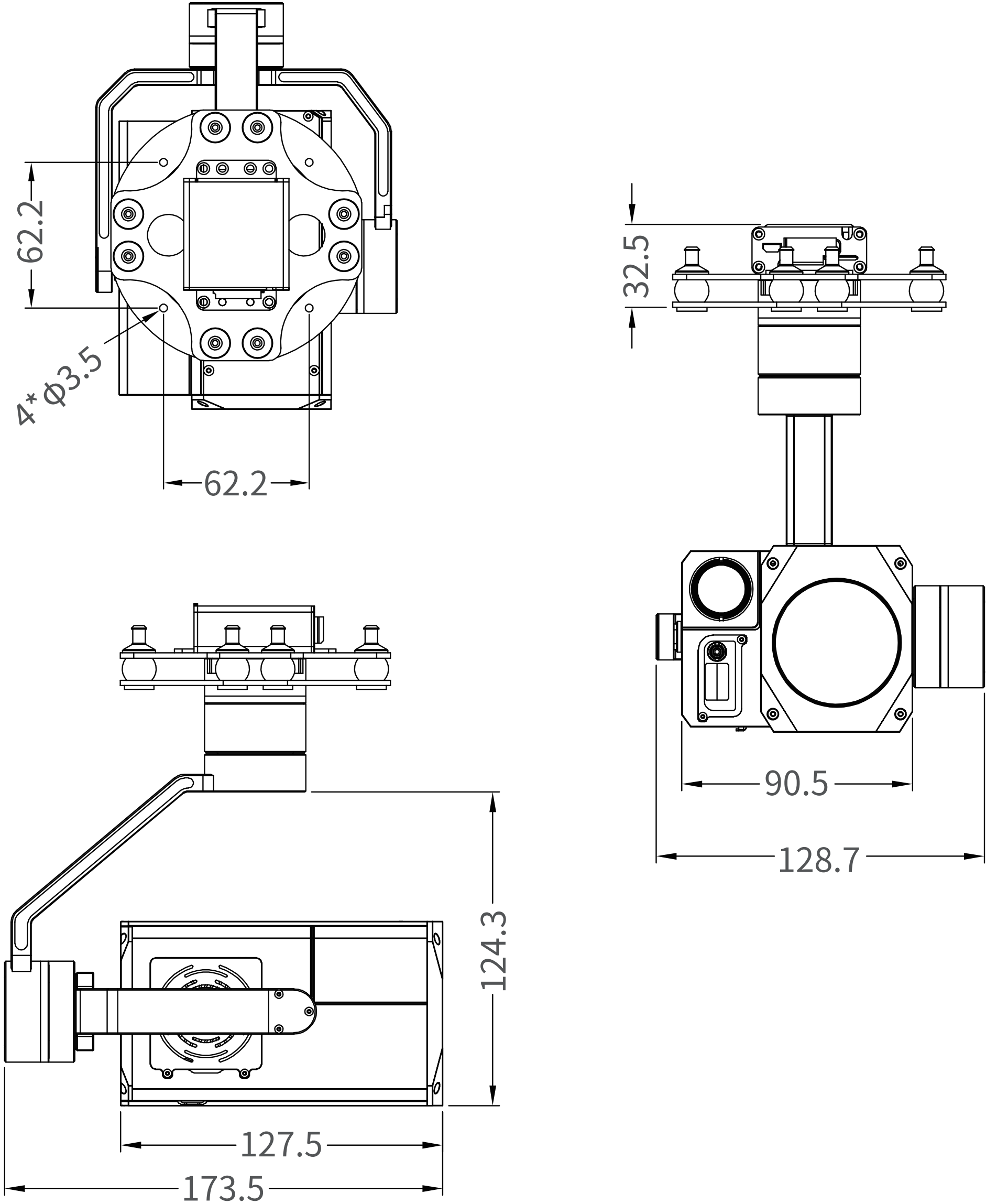
2.3 Device Dimensions (YDport Version)

Unit: mm

4* φ3.1

78

78

43.2

34.3

POWER

PWM

UART

ETHERNET

46.2

51.2

56.2

48.4

Control Box

25.5

204.6

90.5

128.7

124.3

127.5

173.5
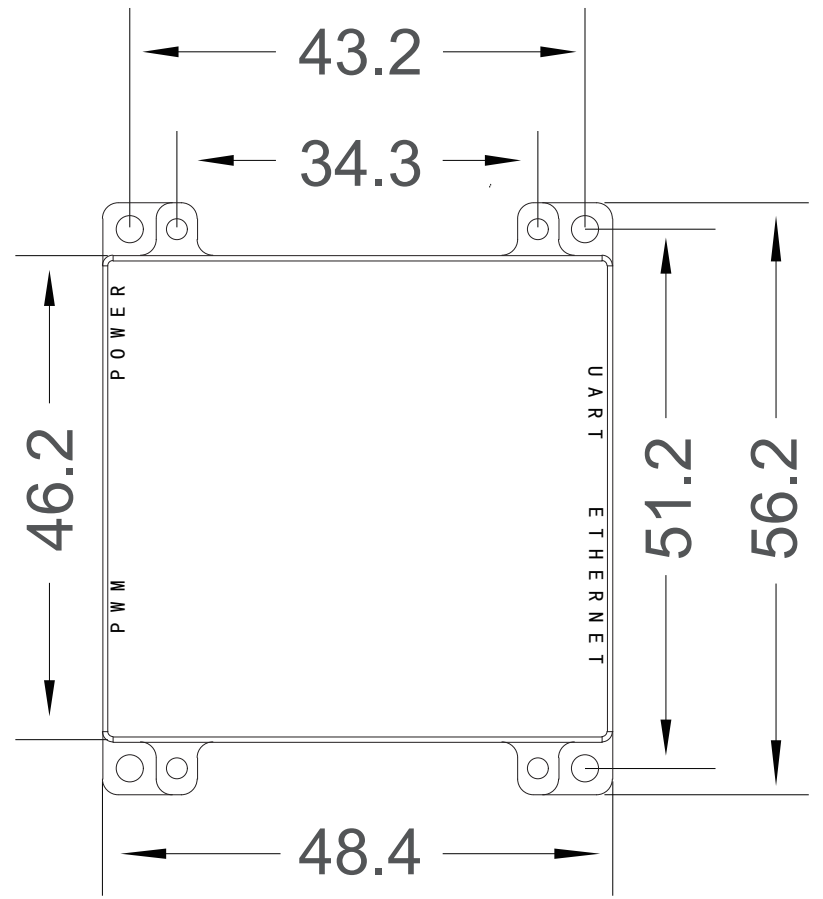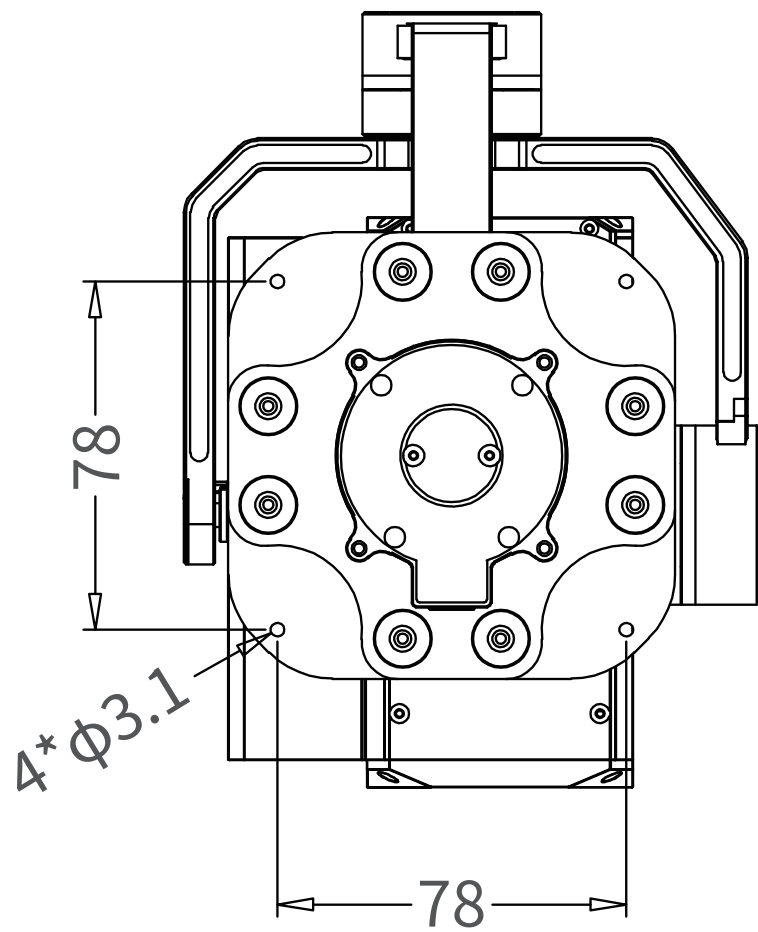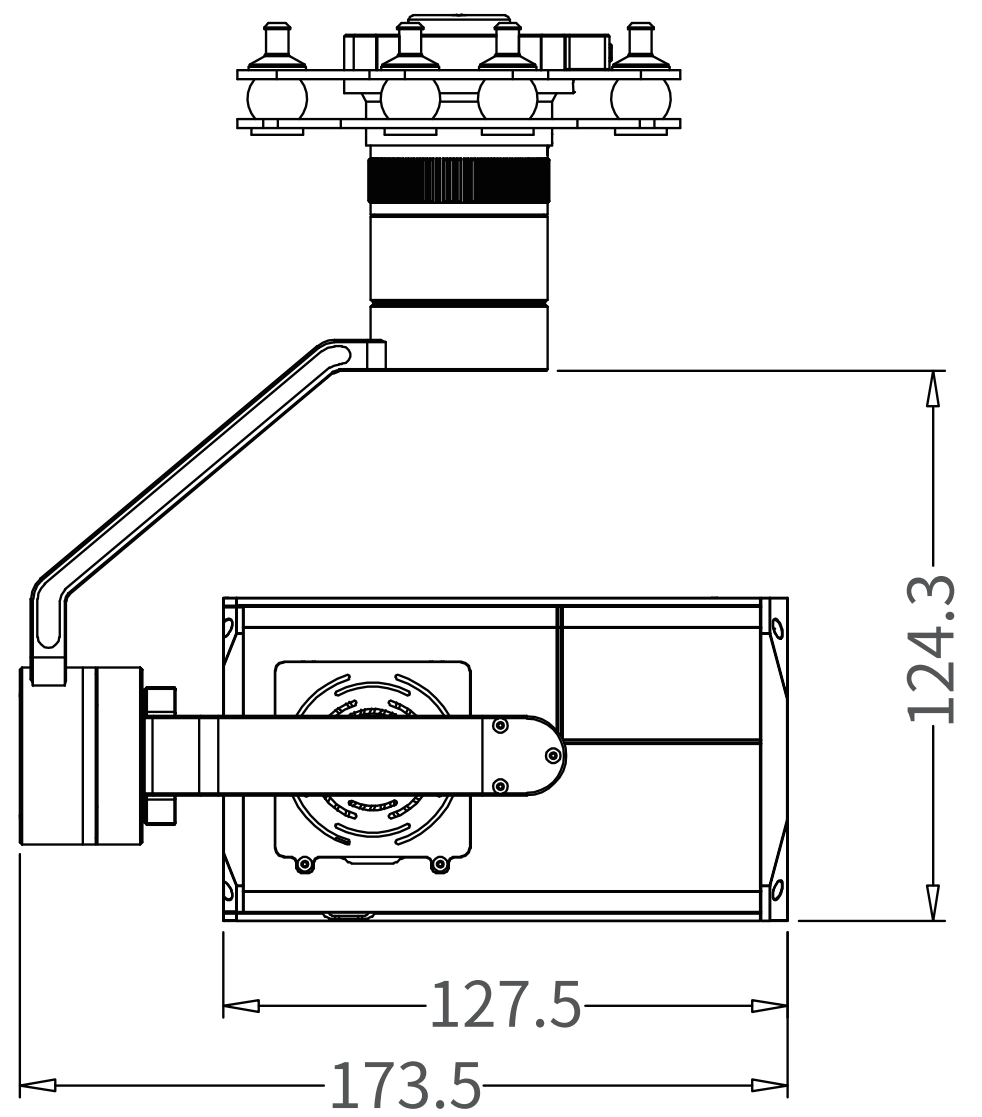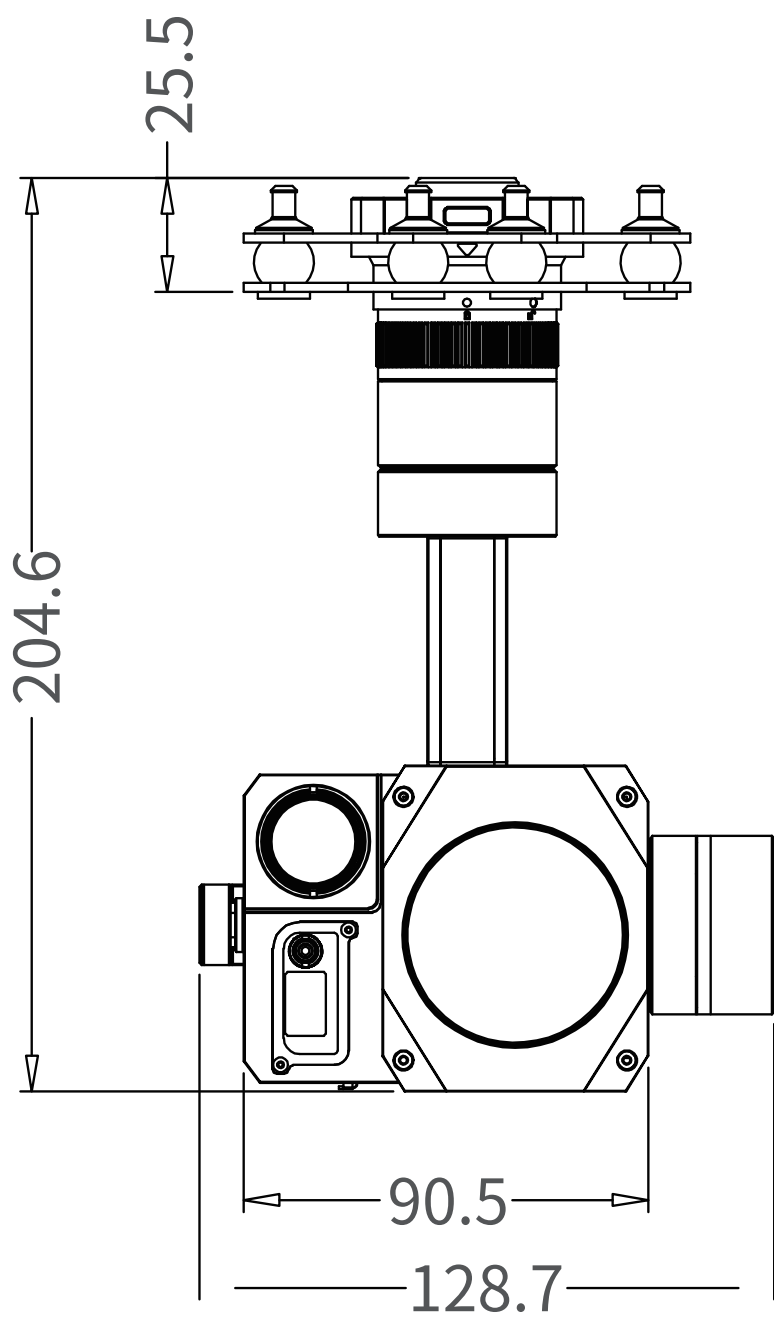
2.4 Install Mounting Part

(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 damp-ing board, and use M3 screw to fasten it.

(3) According to the provided screw hole dimension you can make suit-able mounting holes on the UAV mounting board, and fixes the other end of the copper cylinder on the mounting board of the UAV (YDport version is the same).
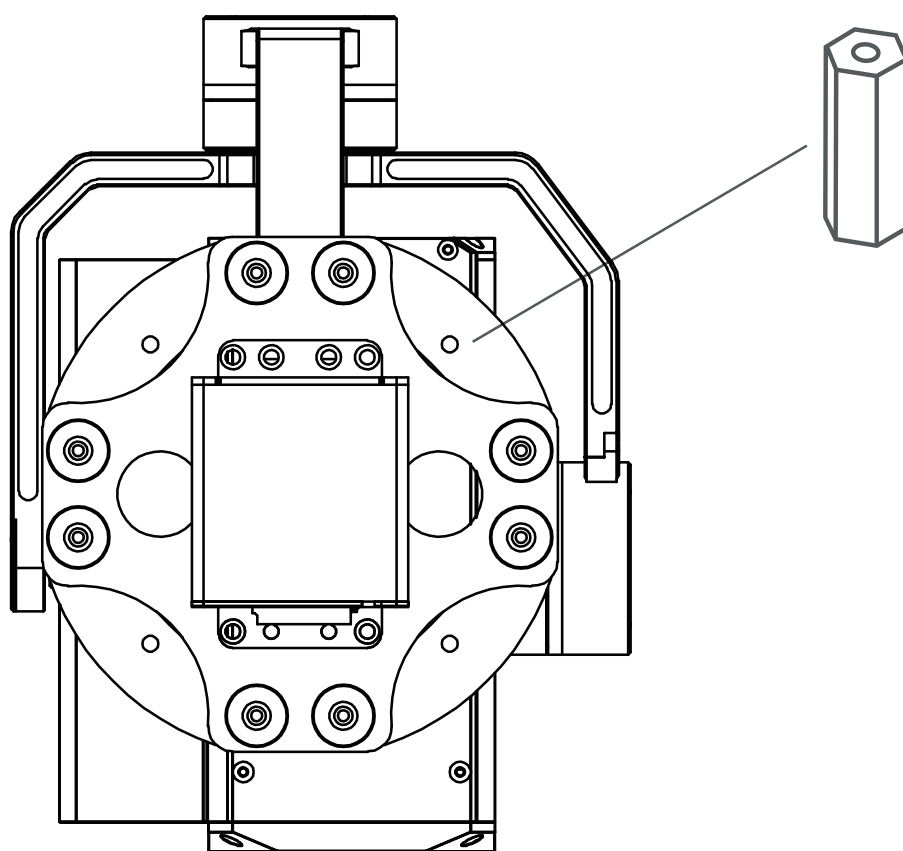
Front

2.5 YDport Release Instruction
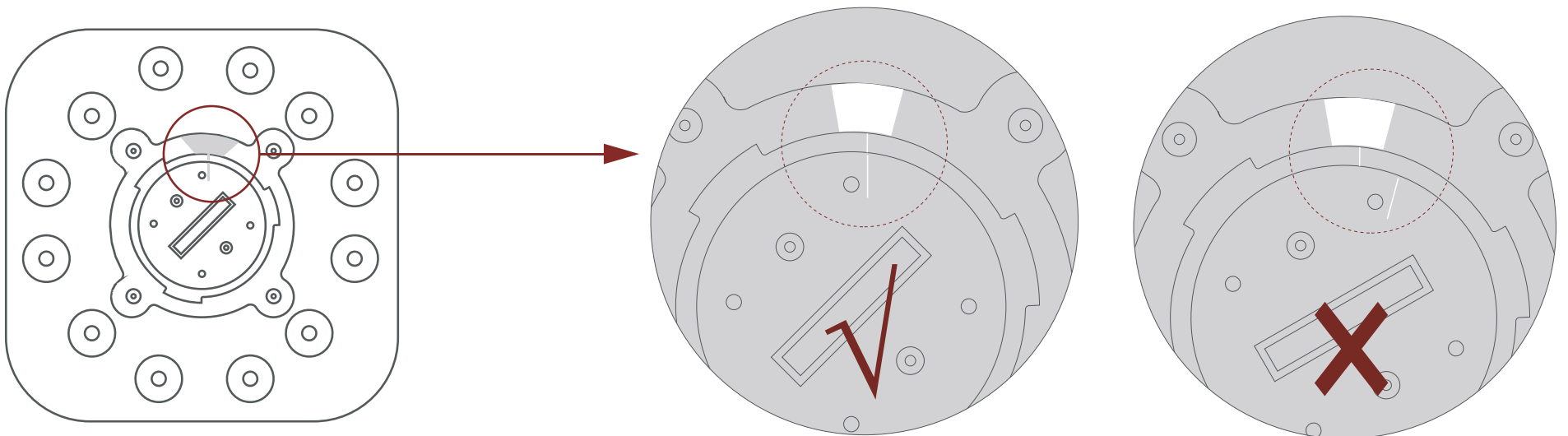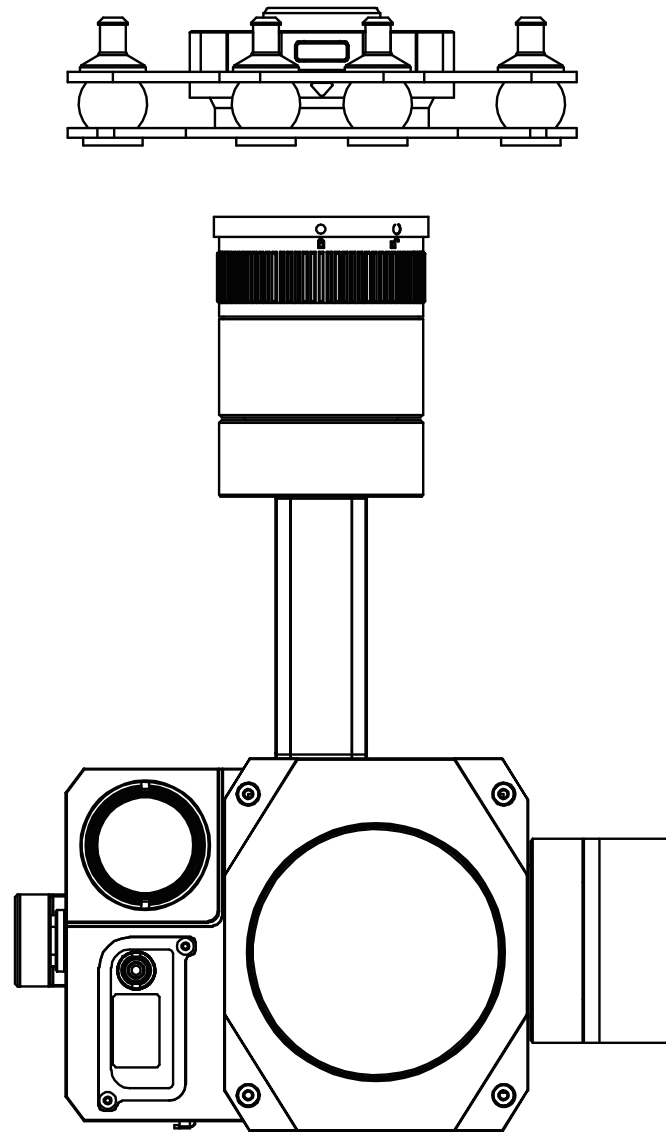
1. Make sure the two white stripes indicated in above picture are aligned with each other. (If the stripes are not aligned to each other, please pinch the connector part and turn it to left manually)
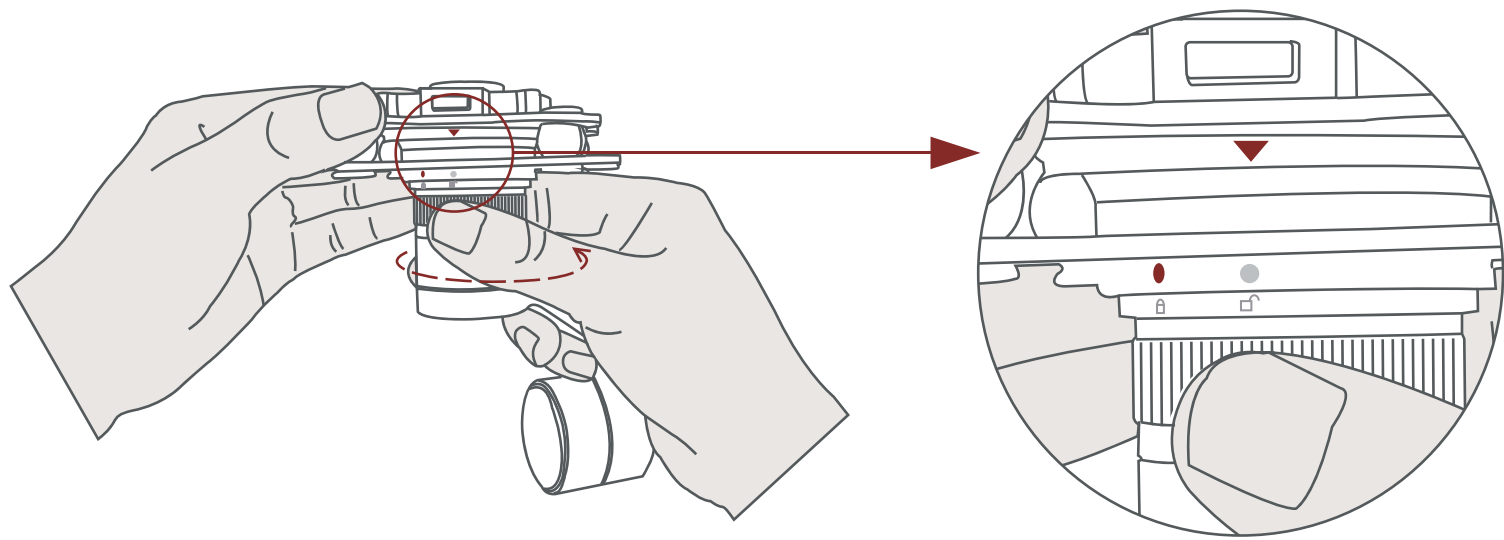
2. Align the white dot (unlock icon) to the red triangle (below unlock button), push the gimbal into the YDport completely and then rotate the gimbal camera anticlockwise.
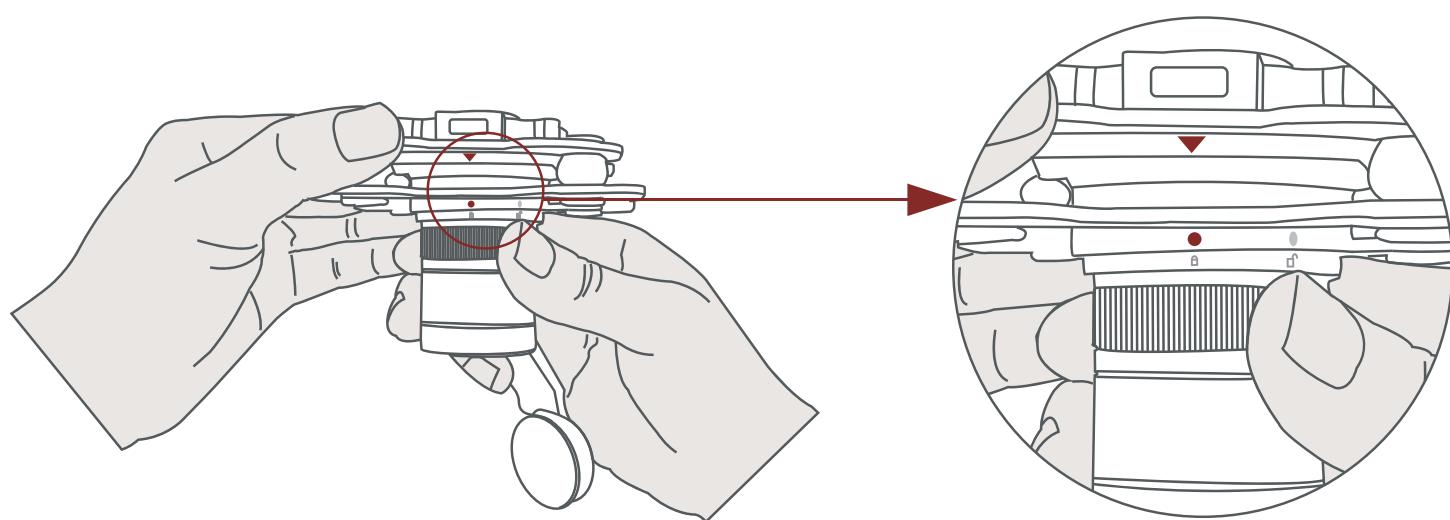
3. When you hear "click" sound (when red dot is aligned to the red tri-angle) means the gimbal camera and YDport has been locked.
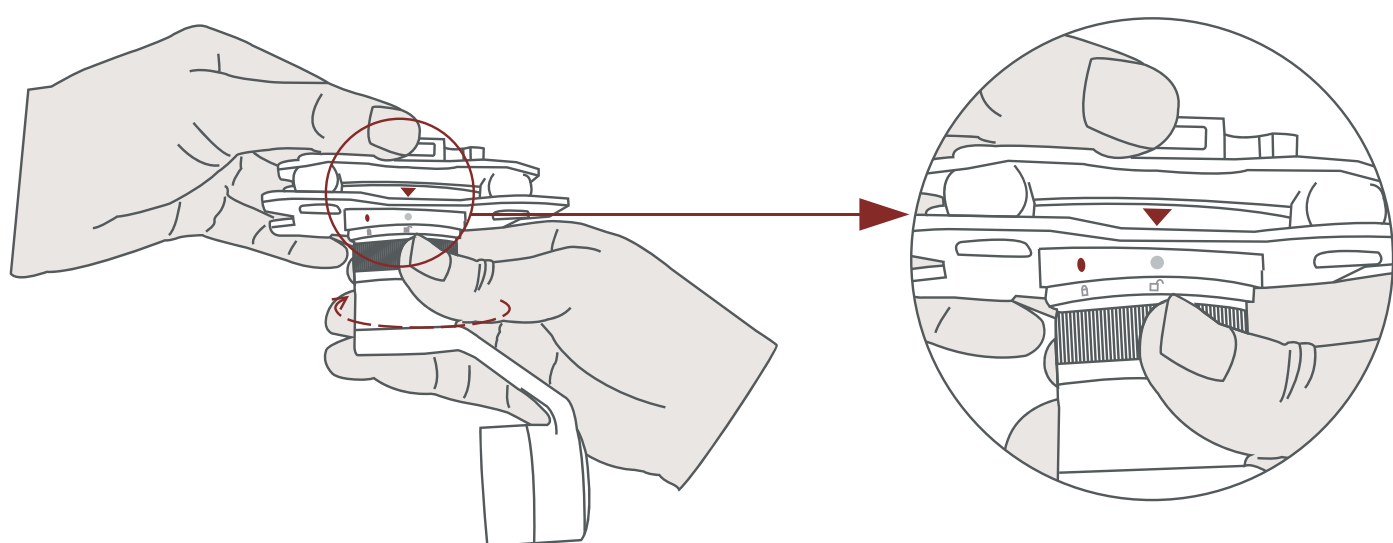
4. To unlock the YDport, you need to press on unlock button and rotate the gimbal camera clockwise till the white dot align to the red tri-angle. Then pull the gimbal out from the YDport.

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: Micro HDMI output, HD 1080P 60/30fps, 1080P 60fps as default.

Ethernet: Ethernet/IP output interface, support RTSP/RTMP/UDP/ONVIF video streaming. Default: RTSP output, IP address: RTSP: //192.168.2.119:554, output resolution: 1080P, frame rate: 30fps, bit rate: 4M.

AV: no AV output

- Above output mode is optional. Please subject to your actual product.

⚠

- When using user interface software YDlink for network connection, the network of external device (computer) should be the IP address: 192.168.2.2 (choose the last byte among 2~254, can not be 119 same as the gimbal), subnet mask: 255.255.255.0, Default gateway: 192.168.2.1, 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)
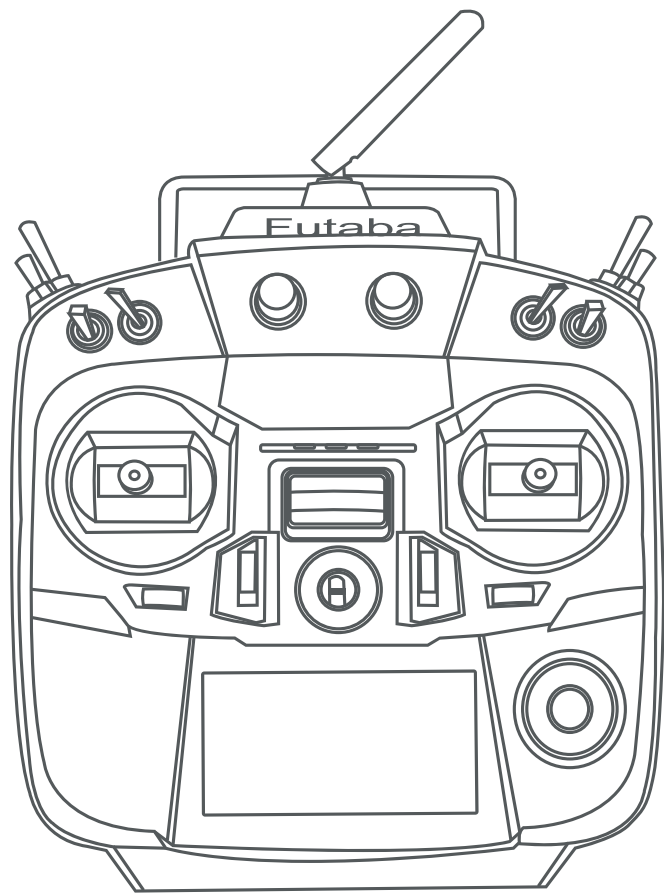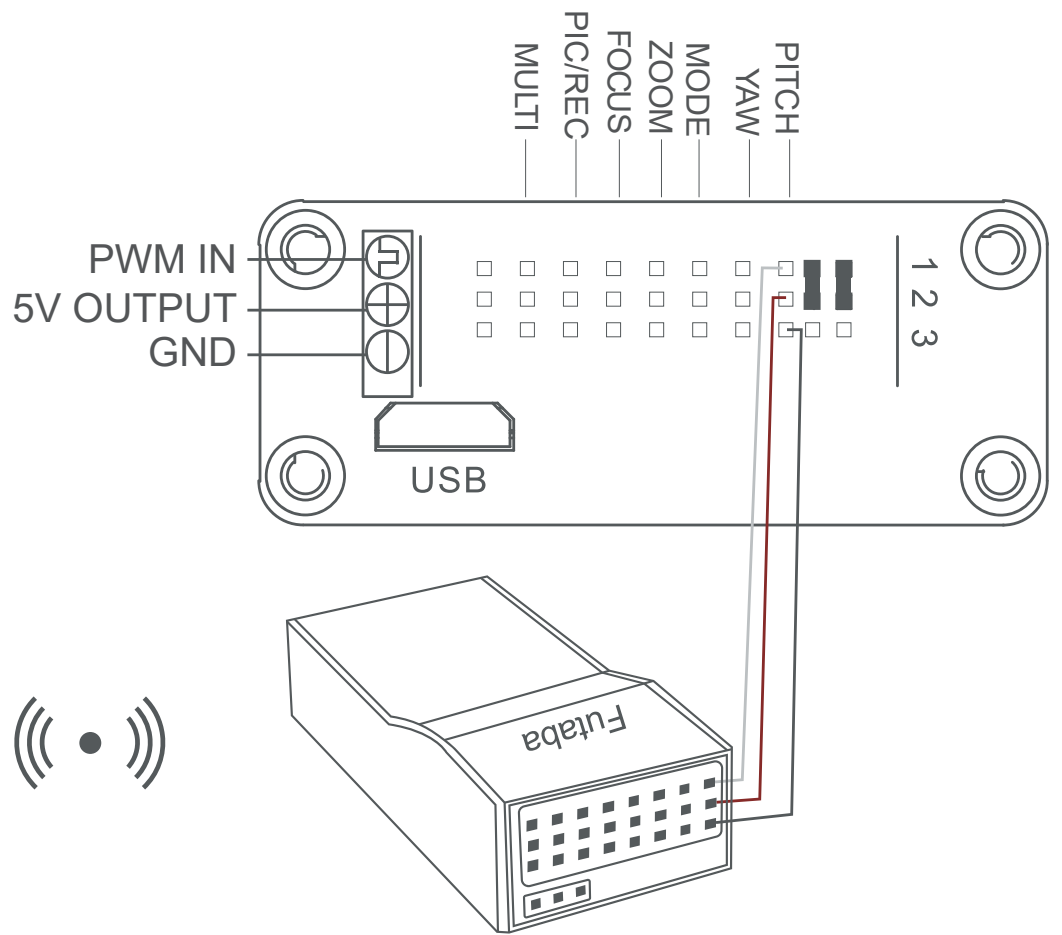
MULTI
PIC/REC
FOCUS
ZOOM
MODE
YAW
PITCH

PWM IN
5V OUTPUT
GND

1 2 3

USB

Remote Controller

Receiver

Connection Diagram (Standard Version)

CVBS
GND
5V
MULTI
PIC/REC
FOCUS/PPM
ZOOM
MODE
YAW
PITCH

GND

3S
6S

Remote Controller

Receiver

Connection Diagram (YDport Version)

14.
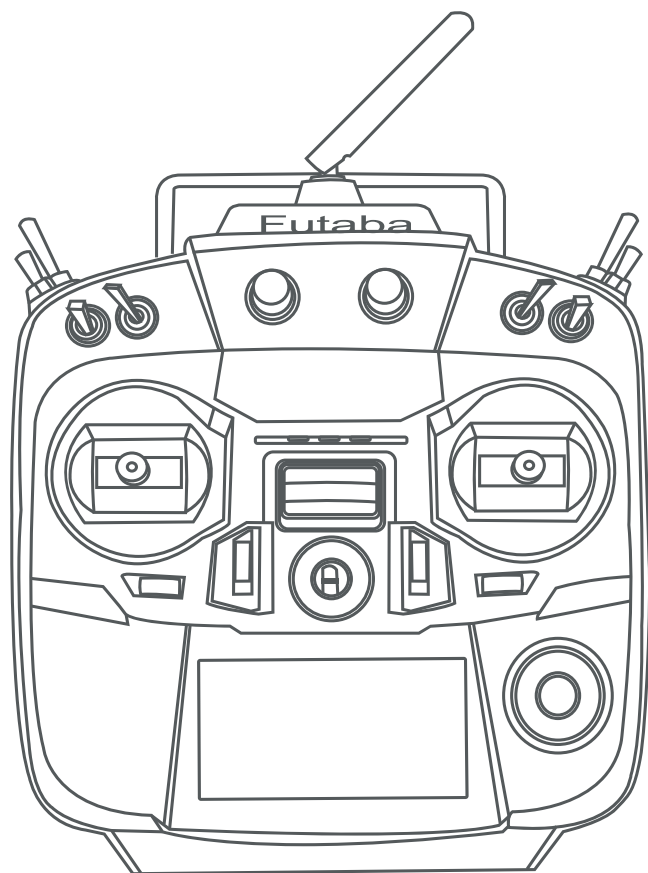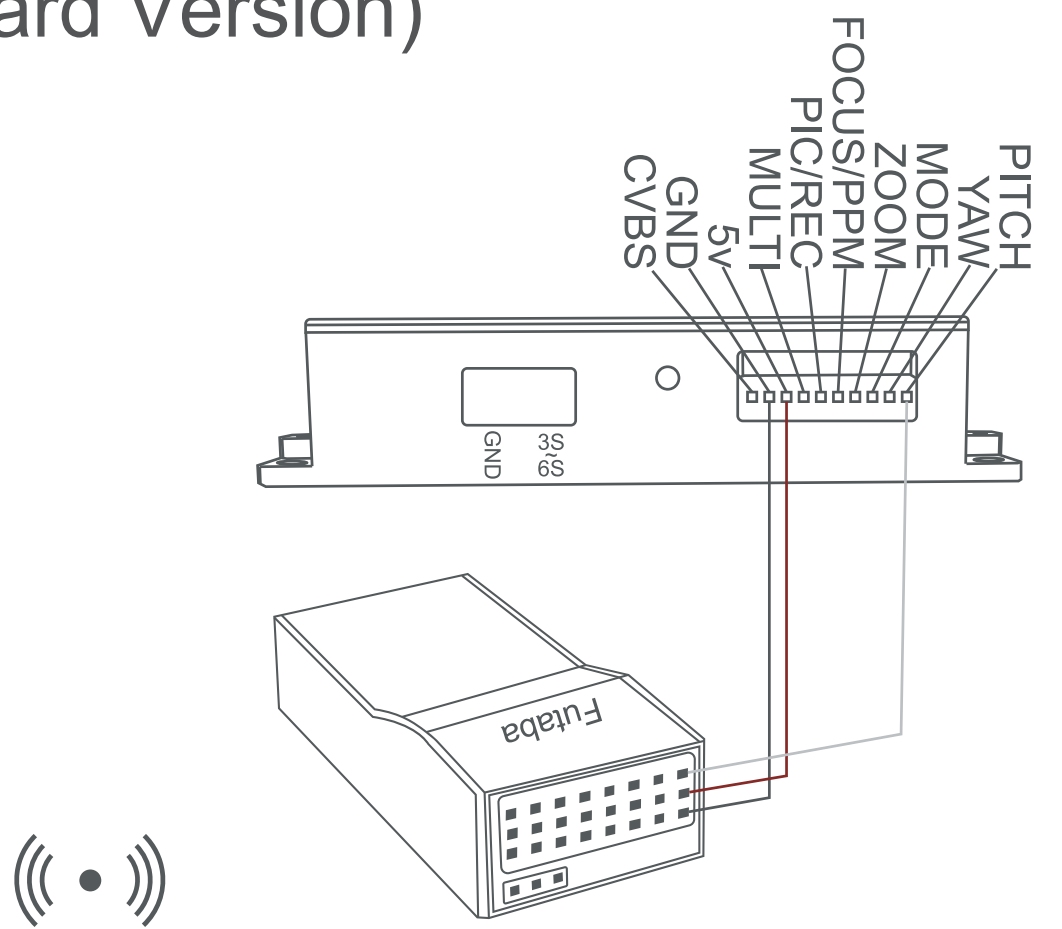
3.1.2 PWM Control Operation Instruction

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.)
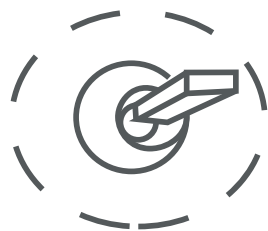
Position 1

Low Gear
Pitch Up
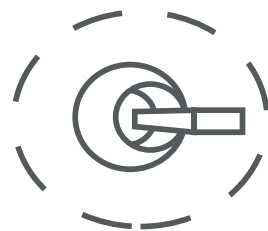
Position 2

Middle Gear
Pitch Stop
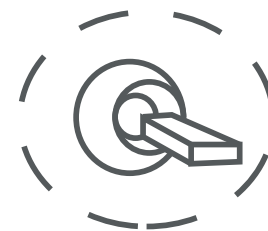
Position 3

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
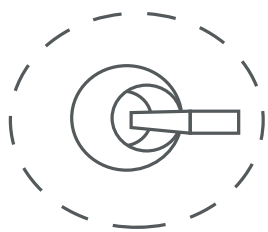
Position 2

Middle Gear
Yaw Stop
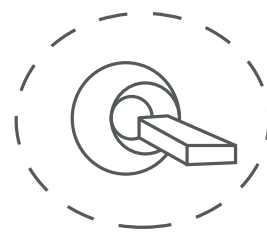
Position 3

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.)
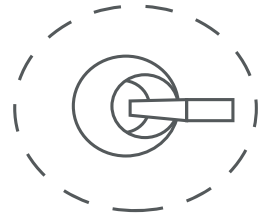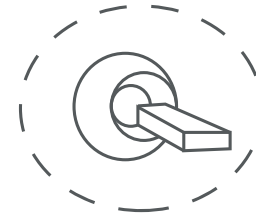
Position 1	Position 2	Position 3
Low Gear	Middle Gear	High Gear

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:

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

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

3.3) Operate 3 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3, to disable Follow Yaw Mode (gimbal yaw not follows by frame)

3.4) Operate 4 times continuously and quickly, from position 2 - 3 - 2 - 3 - 2 - 3 - 2 - 3, to enable Follow Yaw Mode (gimbal yaw follows by frame)

3.5) Zoom (PWM Focus channel is to control PIP, IR color palette switch, 3-gear switch as example.)
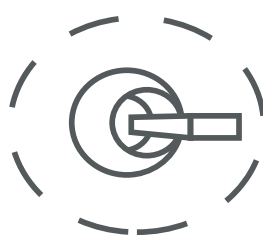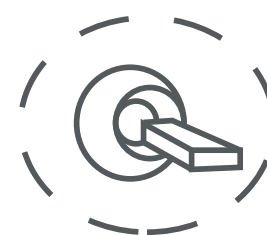
Position 1	Position 2	Position 3
Low Gear	Middle Gear	High Gear
PIP switch	Gear	IR color palette switch

Switch from Position 2 to 1: Picture in Picture. EO+IR , IR+EO, EO only, IR only.
Switch from Position 2 to 3: IR color switching: white hot, black hot, pseudo color

3.6) Focus (PWM Focus channel is to control PIP, IR color palette switch, 3-gear switch as example.)
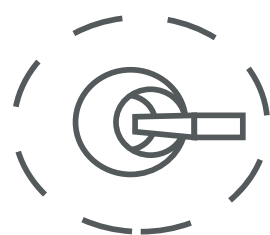
Position 1	Position 2	Position 3
Low Gear	Middle Gear	High Gear
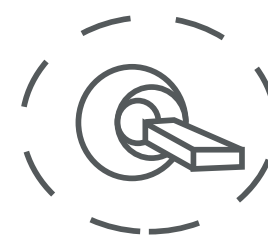
Switch from Position 2 to 1: Take a picture
OSD display 'REC IMG' a second.
Switch from Position 2 to 3: Start record / repeat operation to stop record
Start record, the OSD display rec hh:mm:ss.
Stop record, the OSD display STBY

3.7) Pic/Rec (IR digital zoom / tracking control, rotary knob or 3-gear switch on remote control are optional. 3-gear switch as example)
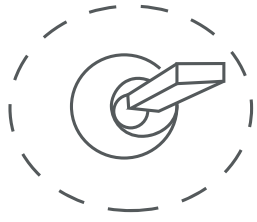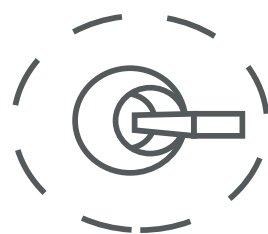
Position 1	Position 2	Position 3
Low Gear	Middle Gear	High Gear
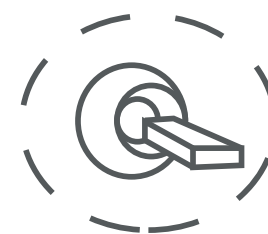
Switch from Position 2 to 1: IR digital zoom, 1x~4x
Switch from Position 2 to 3: Exit the tracking, display the cross cursor.
Adjust the cross cursor to lock target object and start tracking
Switch from Position 3 to 2:Cancel tracking

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)
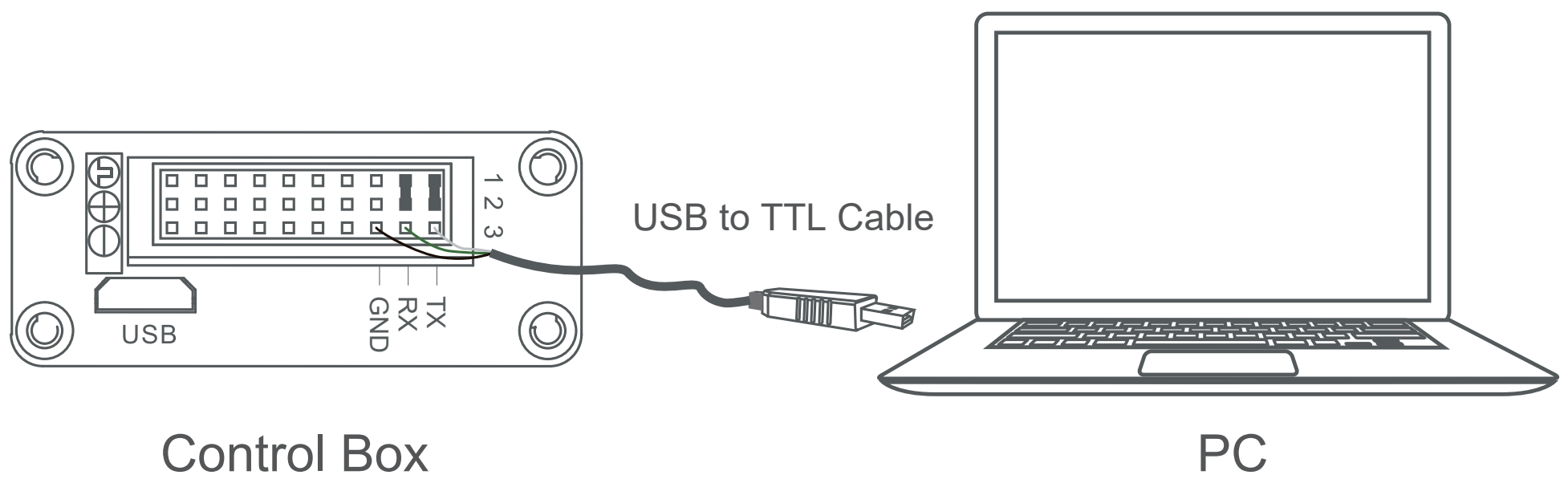
Connection Diagram Standard Version
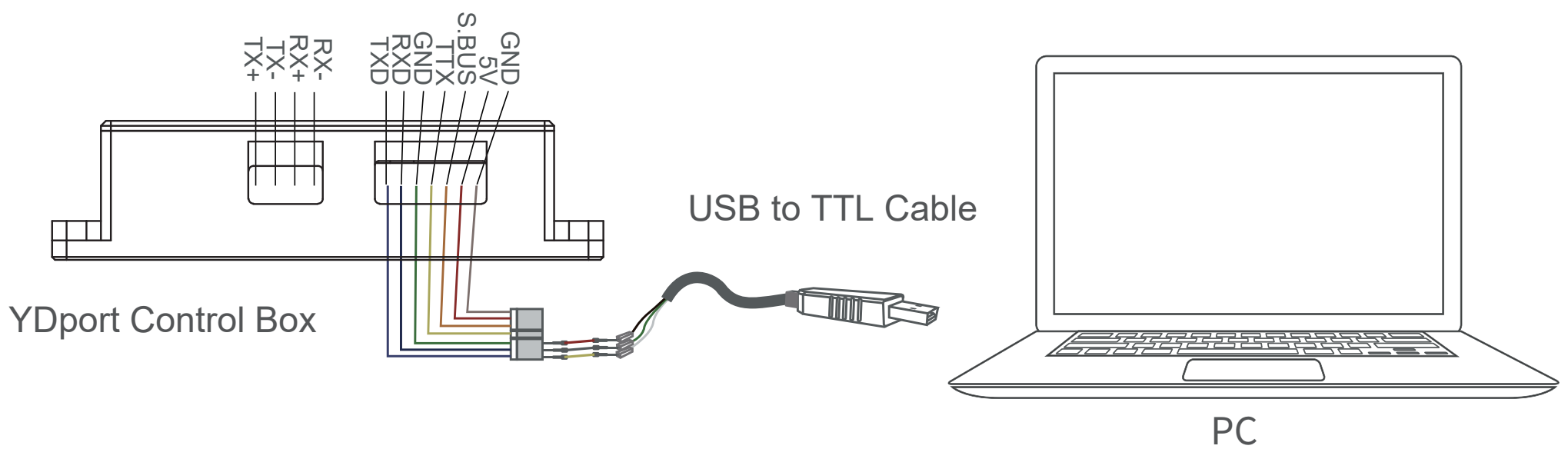
Connection Diagram YDport Version

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 YDlink control software to test the functions directly. Users may choose to develop their own software, please contact technical support for TTL control protocol file.

YDlink is a user interface developed by YDpro for YDpro gimbal cameras, you can download it from YDpro website (https://www.yangdaonline.com) or ask distributors for installation package.

- 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):

S.BUS

5V OUTPUT
GND

1 2 3

USB
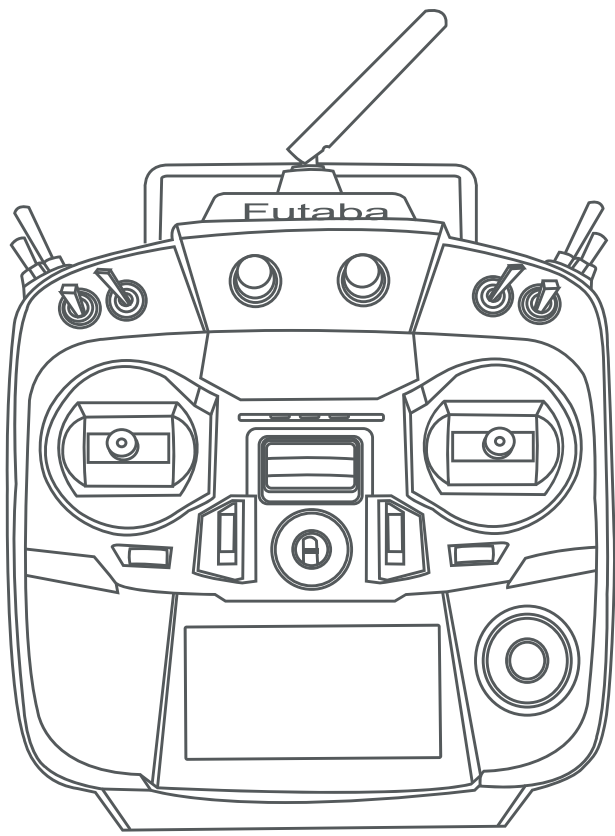
S.bus
5V
GND
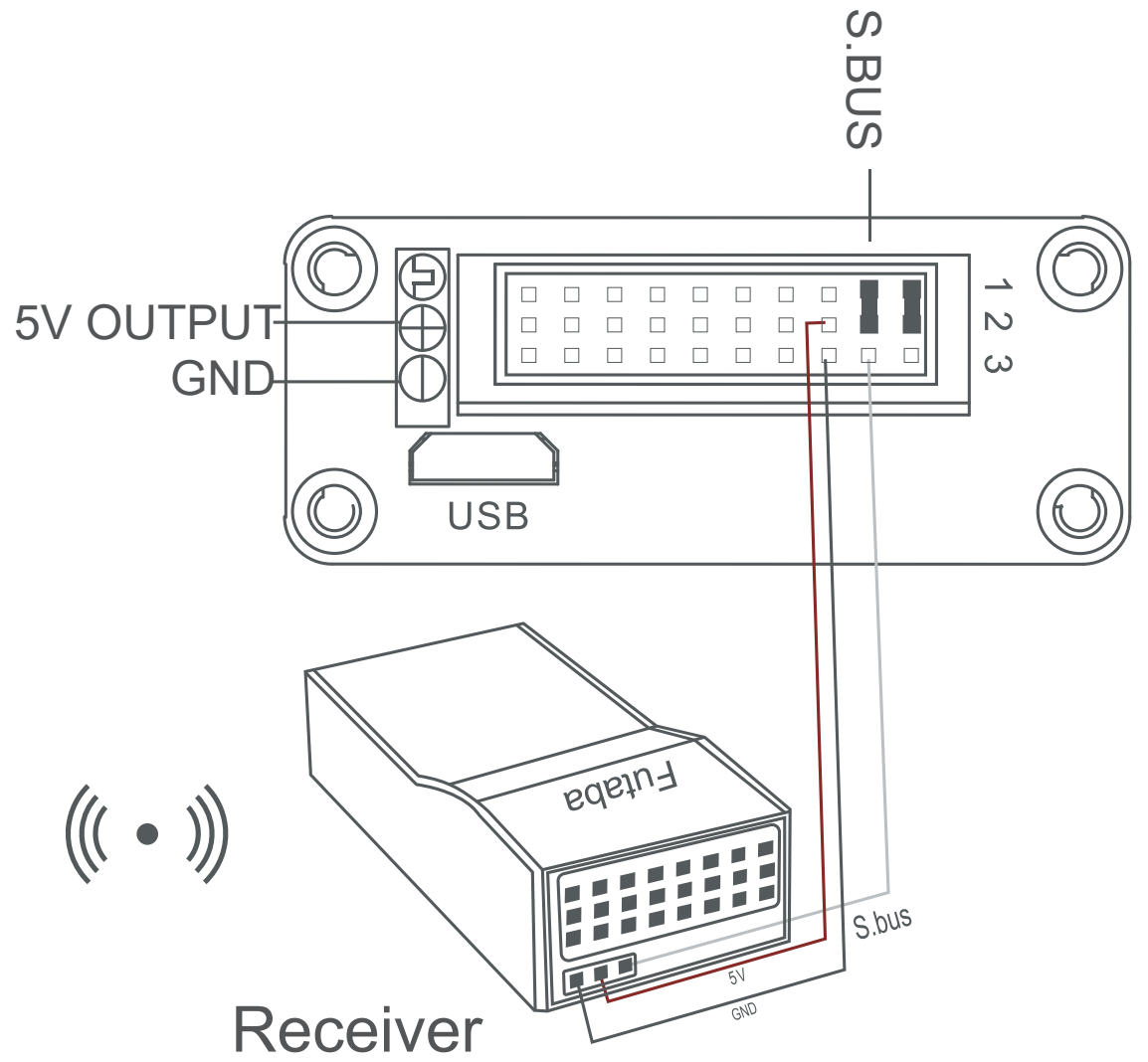
Remote Control   Receiver

Wiring Diagram Standard Version

TX+
TX-
RX+
RX-

TXD
RXD
GND
TTX
S.BUS
5V
GND
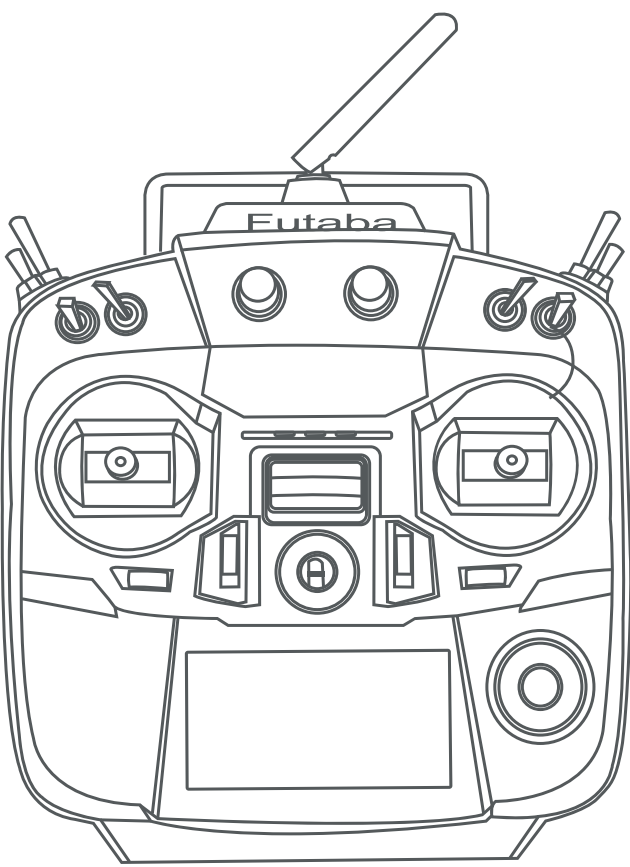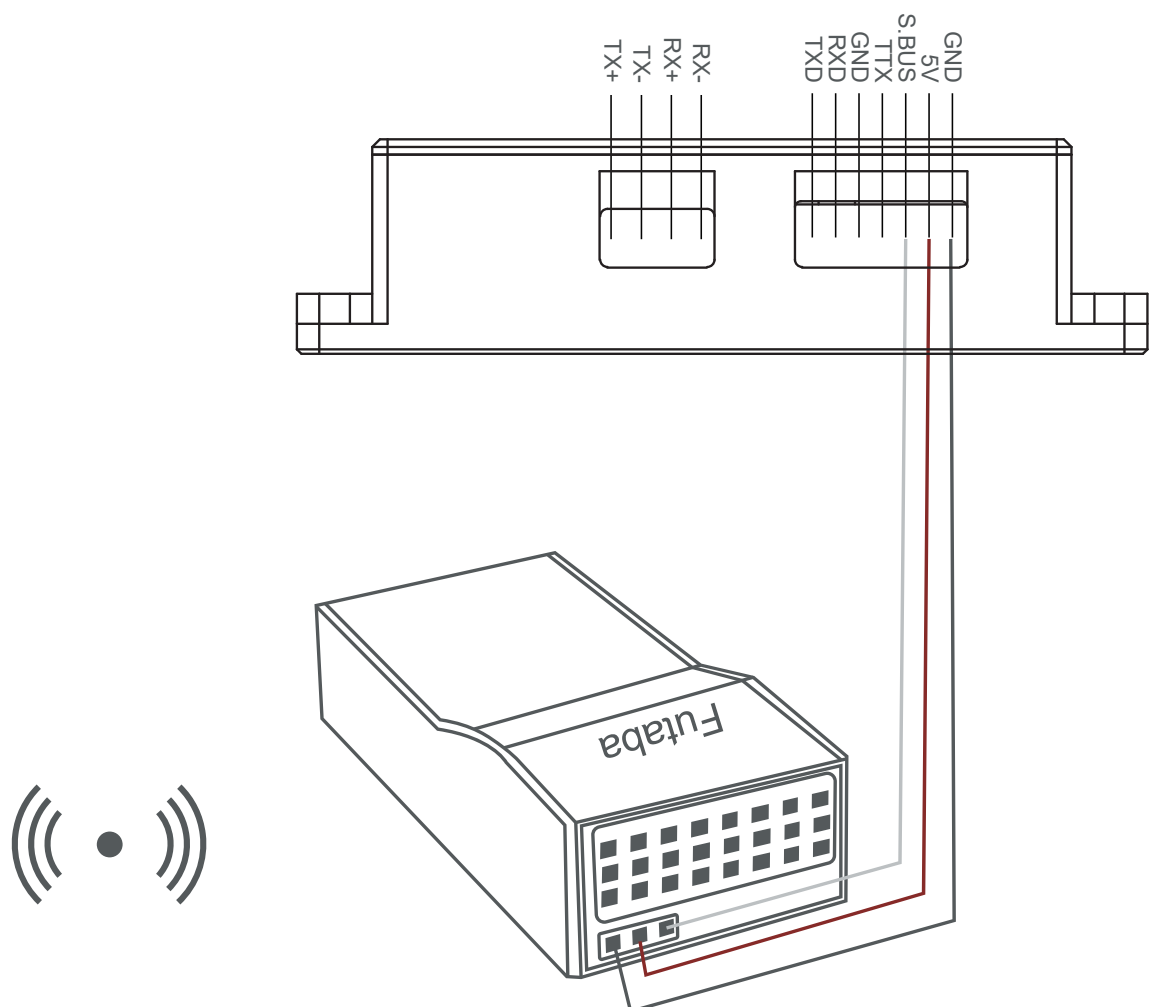
Remote Control   Receiver

Wiring Diagram YDport Version

21.

S.Bus control mode: default S.Bus signal channel 7-13 to control gimbal camera functions (the function of channel is consistent with corresponding channel in PWM function description)

Channel 7: Yaw Control

 Channel 8: Pitch Control

 Channel 9: Mode Control

Channel 10: Zoom Control

Channel 11: Focus Control

Channel 12: Pic/Rec Control

Channel 13: 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 defualt 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 YDpro gimbal cameras with Ethernet output, the default IP address is: 192.168.2.119, control port: 2000. You can send the corre-sponding 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 YDlink to control after TCP connection.

3.5 Laser Rangefinder

H30T build-in infrared (IR) laser rangefinder, can resolve the geo
graphic position and distance of the object automatically after GPS
signal is synced from the UAV. The target is the object in the middle
point of the screen.

⚠ 1.H30T default boot turn off laser range finder, can open it
in YDlink Manually.

2.If you don't use YDlink, pls send below serial port
commands to set the laser rangefinder:
Continuous ranging: AA 55 0D 01 FF
Single Use: 55 AA DC 05 1C 20 00 39
Turn off again: AA 55 0D 00 FF

3.Some points might cause the distance show 0:

A. The distance is out of range (5 to 1000 meters).

B. The IR laser rangefinder can't get distance information
from reflective object (glass, water, rain) or over-inclined
object.

4. Specification

Hardware Parameter	
Working voltage	12V
Input voltage	12 ~ 24V
Output voltage	5V (connect with PWM)
Dynamic current	1400~2000mA @ 12V
Idle current	1400mA @ 12V
Working environment temp	-20℃ ~ +60℃
Output	micro HDMI(1080P 30/60fps) / IP (1080p/720p 30/60fps)
Local-storage	TF card (Up to 128G, class 10, FAT32 or ex FAT format)
Photo storage format	JPG(1920*1080)
Video storage format	MP4 (1080P 30fps/60fps)
Control method	PWM / TTL / S.BUS / TCP(IP output)
Gimbal Spec	
Angle range of structure design	Pitch/Tilt: -45°～100°, Roll: ±75° Yaw/Pan: ±300° / ±360°*N (IP output version)

Angle range of software design	Pitch/Tilt: -40°～90°,　Yaw/Pan: ±290° / ±360°*N (IP output version)
Vibration angle	Pitch/Roll: ±0.02°, Yaw：±0.02°
One-key to center	√
EO Camera spec	
Imager Sensor	1/1.8 Type STARVIS CMOS Sensor
Picture quality	4.17MP
Lens optical zoom	30x, f=6.5~162.5mm, F1.6 to F4.8
Digital zoom	12x (max. 432x with StableZoom)
Min object distance	100 mm (Wide end), 1200 mm (Tele end)
Horizontal viewing angle	58.1°(wide end) ~ 2.3°(tele end)
Sync system	Internal
Image S/N	50 dB (Weight On)
Min illumination	"In the case of ICR-Off (Typical value) 0.009 lx (1/30 sec, 50%, High Sensitivity mode On) 0.09 lx (1/30 sec, 50%, High Sensitivity mode Off) 0.0012 lx (1/4 sec, 1/3 sec, 50%, High Sensitivity mode On) 0.012 lx (1/4 sec, 1/3 sec, 50%, High Sensitivity mode Off) In the case of ICR-On 0.00008 lx (1/30 sec, 50%, High Sensitivity mode On) 0.00063 lx (1/30 sec, 50%, High Sensitivity mode Off)

Min illumination	0.000005 lx (1/4 sec, 1/3 sec, 30%, High Sensitivity mode On)"
High Sensitivity mode On/Off	Off
Recommended illumination	100 lx to 100,000 lx
Gain	"Auto/Manual (0 to 50.0 dB (0 to 28 step)) Max. Gain Limit (10.7 to 50.0 dB (6 to 28 step))"
White balance	Auto, ATW, Indoor, Outdoor, One Push WB, Manual WB, Outdoor Auto, Sodium Vapor Lamp (Fix/Auto/Outdoor Auto)
Wide Dynamic Range Mode	Yes(On/Off)
Shutter speed	1/1 sec to 1/10000 sec (22 steps)
Backlight compensation On/Off	Off
Image Stabilizer On/Off/Hold	Off
ICR On/Off	Off
Aperture control	16 steps
Noise Reduction	On/Off (level 5 to 1 / Off, 6 steps)
Defog	On/Off (low, mid, high)
OSD	Yes

IR Thermal Imager Spec	
Focus Length	19mm
Coating Film	DLC
Horizontal FOV	22.9°
Vertical FOV	18.4°
Diagonal FOV	29.0°
Detective Distance (Man: 1.8x0.5m)	792 meters
Recognize Distance (Man: 1.8x0.5m)	198 meters
Verified Distance (Man: 1.8x0.5m)	99 meters
Detective Distance (Car: 4.2x1.8m)	2428 meters
Recognize Distance (Car: 4.2x1.8m)	607 meters
Verified Distance (Car: 4.2x1.8m)	303 meters
Working mode	Uncooled long wave (8μm~14μm) thermal imager
Detector pixel	640*512
Pixel size	12μm
Focusing method	Athermal prime lens
NETD	≤50mK@F.0 @25℃
Color palette	White hot, black hot, pseudo color

Digital zoom	1x ~ 8x
Sync correct time	Yes
EO / IR Camera Object Tracking	
Update rate of deviation pixel	30Hz
Output delay of deviation pixel	<30ms
Minimum object contrast	5%
SNR	4
Minimum object size	16*16 pixel
Maximum object size	256*256 pixel
Tracking speed	<32 pixel/frame
Object memory time	100 frames
IR Laser Rangefinder	
Range	5~1000 meters
Accuracy	1m: <400±1 2m: >400±0.4%
Light Beam	905nm pulse laser
Divergent Angle	12 mrad
Laser pulse frequency	0.1-1HZ
Location Resolving	Latitude and longitude of target
Ranefinder	Target distance measuring

EO Camera AI Performance	
Targets type	Car and human
Simultaneous detection quantity	≥ 10 targets
Min contrast ratio	5%
Min target size	5×5 pixel
Car detection rate	≥85%
False alarm rate	≤10%
Packing Information	
N.W.	About 1084g(Standard version) 1134g (YDport version)
Product meas.	173.5*128.7*198.9mm(Standard version) 173.5*128.7*204.6mm(YDport version)
Accessories	1pc gimbal camera device, screws, copper cylinders, damping balls, damping boards, 1pc USB to TTL cable / Hight quality plastic box with foam cushion

5. FAQ

1. What outputs does HDMI have？
A: HDMI 1080P 60fps(default)/HDMI 1080P 30fps

2. Does H30T support taking photos during recording?
A: Yes

3. How does the H30T store photos and videos?
A: The resolution of the photos saved in the TF card is 1920*1080, and the video is 1080P 30fps;

This user manual is subject to update without notice. For details, please visit https://www.iVcan.com to get the latest product information.
Technical support : info@iVcan.com