

SYK-30 AI-TIR EO/IR Dual Sensor Camera With 3-axis Gimbal



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Warning and disclaimer

⚠️ In any cases (not matter power on or not) avoid aiming the camera at extremely high-temperature radiation source (e.g. the sun), or else the sensor is likely to be damaged.

Be sure not to adjust the pod or change its mechanical structure, installing the pod on the aircraft before power on.

Please do not add other peripherals (filters, hoods, etc.) to the camera, please use the original camera to avoid pod performance degradation or load imbalance which may cause the damage to pod.

Ensure that your aircraft flight control system master works in the safest state when powered. We strongly recommend that you remove the propeller from the aircraft while setting the pod parameters, use a non-powered battery to power the pod, and keep the child away from the preset flight area.

In view of our company can't control the specific use of the user, installation, assembly, modification (including the use of non-designated spare parts) and improper use of the above caused by direct or indirect damage, Our company will not bear the corresponding loss and free of liability.

This manual subjects to any change without notice.

Brief Introduction

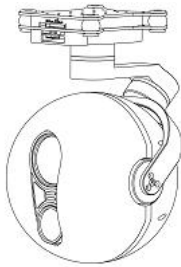
Thermal gimbal camera can be widely used in public security, firefighting, electricity and other UAV applications, equipped with infrared thermal imaging camera with extended feature for temperature measurement function, also can save thermal imaging video and pictures on the front end.

This equipment is used for mounting on the aircraft, which can achieve stabilization in three directions of yaw, roll and pitch direction, and adopt the integrated design of shock absorption and pod, which can greatly reduce mechanical vibration and ensure the stability of the image of the equipment during the flight.

This pod supports lock and follow mode switch, one key to middle position; S.BUS control and serial command control; Ethernet output.

Packing List

Pod ×1



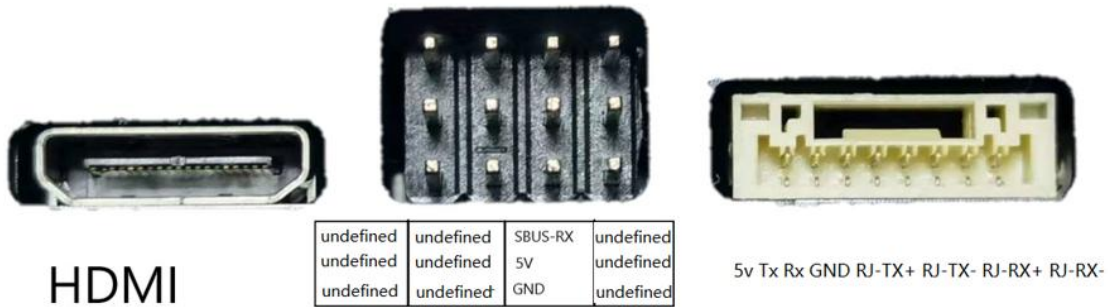
TFcard ×1



8pin cable



Connection Pin Description



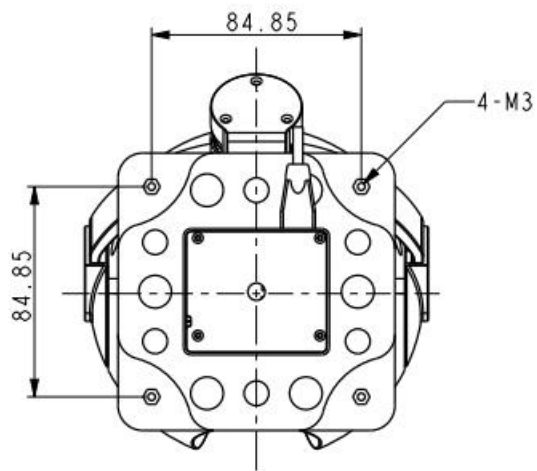
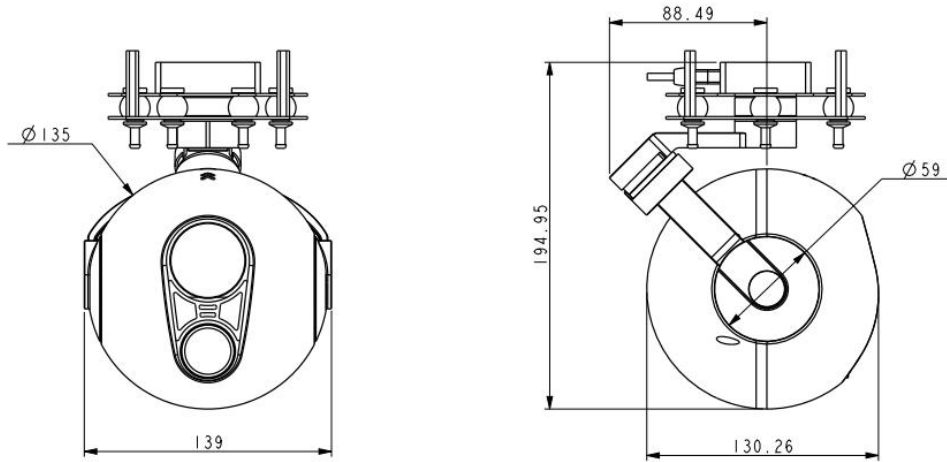
HDMI

undefined	undefined	SBUS-RX	undefined
undefined	undefined	5V	undefined
undefined	undefined	GND	undefined

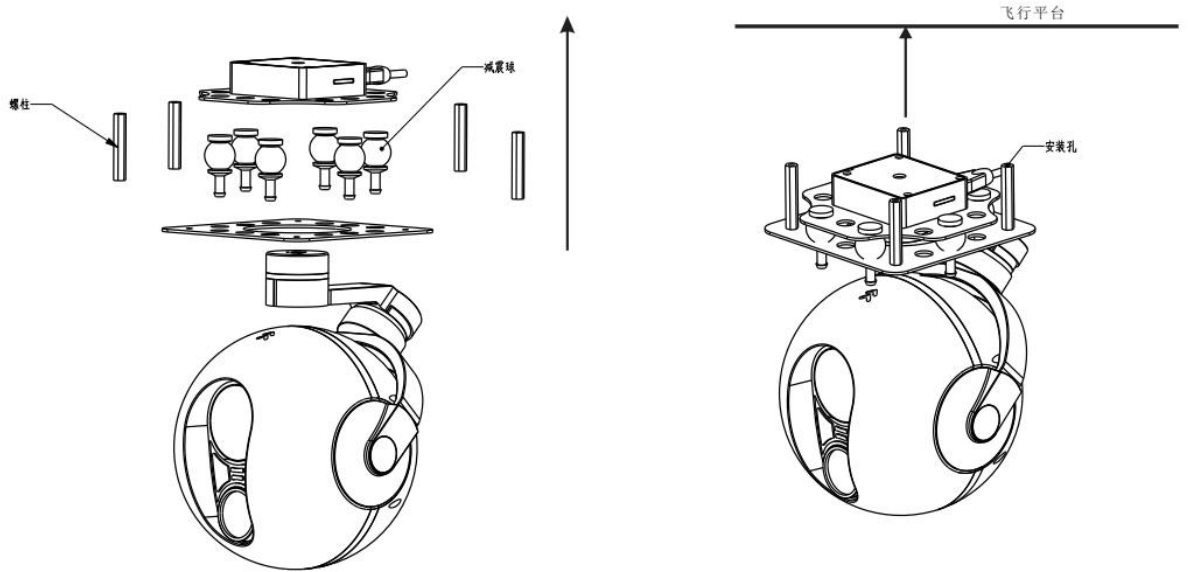
5v Tx Rx GND RJ-TX+ RJ-TX- RJ-RX+ RJ-RX-

- 1) RJ-TX+, RJ-TX- , RJ-RX+ , RJ-RX- for Ethernet , RJ-TX+ and RJ-TX- are pairs , RJ-RX and RJ-RX- are pairs.
- 2) undefined for undefined pin.
- 3) GND for ground.
- 4) TX and RX for Serial command control.
- 5) SBUS for connection with SBUS signal receiver.
- 6) 5V for out DC5v signal, use together with GND , for SUBUS receiver power.
- 7) Mini HDMI interface for output video.

Drawing and mounting hole diagram



Connection with flying platform



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Installation and network

1 Preparation

1.1 HDMI HD image transmission (1080P) or Network port HD image transmission is a must

1.2 Choose the communication mode of the control pod, the pod can be controlled by S.BUS, serial port and network, serial port and network need to develop the corresponding software through the protocol by user.

1.3 Supported TF card types (this pod TF memory card does not support hot swapping). Use a Class10 or UHS-1 and above TF card to ensure proper video recording.

1.4 Power supply, the pod uses a power supply voltage of DC12v ~ 24v (3S ~ 6S), in order to ensure the stability of the pod, it is necessary to ensure more than 30w power supply power, transient power to meet more than 60w.

2 Installation

2.1 The fixing kit, damping ball and pod main body are assembled together, and different types of damping balls and quantities are selected according to the size of the aircraft rotor etc.

2.2 After assembling the pod, then mounting it to the flight platform through the fixing hole.

2.3 Insert TF card.

2.4 Video connection through network.

2.5 Connect the control interface, S.BUS or TTL serial port or network.

3. IP connection

The default IP address is 192.168.1.100, network video surveillance and IP address modification can use IE; in addition, it also supports rtsp stream access, and can use video software such as vlc media player (VLC) to monitor video.

RTSP stream address :

Main stream: rtsp : // camera IP : 554/majorAV (e.g. :
rtsp://192.168.1.100:554/majorAV)

Sub stream : rtsp : // camera IP : 554/minorAV (e.g. :
rtsp://192.168.1.100:554/minorAV)

Technical specification

SYK-30 AI-TIR EO/IR		
Weight	1100g	
Dimension	144mm×135mm×205mm (L×W×H)	
Operating voltage	3s ~ 6s	
Operating current	Static : 600mA(@12V) ; Dynamic : 3000mA(@12V)	
Pitch	Upward 15° , downward 90°	
Roll	±40°	
Yaw	±155° (360°Ethernet Version Only)	
Angle Jitter	±0.01°	
Control interface	S.BUS or TTL	
Camera (Thermal+Visible)		
Camera	Thermal	Visible
Sensor	Uncooled FPA(ASI)	1/2.8" CMOS Sensor
Rsolution	640X480	1920X1080
Pixel pitch	17µm	/
Lens	25mm	30X optical zoom (4.3mm ~ 129mm)
Wavelength	8 ~ 14µm	/
(NETD) /illuminance	≤50mk@30°C	Colour : 0.05Lux@(F1.6 , AGC NO) Black&white : 0.01Lux@(F1.6 , AGC NO)
Video output	Network or HDMI (1080P)	
Storage	Maximum 128G TF card ; save avi video、JPG piture	
Format	1080P (30fps)	
Control	EO/IR Switch,Pseudo color switch, Pic-in-Pic Switch; Recording; Snapshot	
Extended feature	Temperature measurement, H/L/C/A/P Temperature Display, -20°C to +150°C Range, ±2°C/2% Accuracy	

Serial Command Protocol

1. Send within 15 seconds after power on: EF 05 00 04 02 A0 4D 4D 4D 12 22, Need to send more than 20 times, 1-10hz, baud rate 115200, 8 bit data, 1 bit stop, no parity. Feedback: 4D 01 4D 04 FB FF 00 00 04 00 04 00 C8 FF 94 02 00 00 22 01 C8 00 08 00 00 26 00 5A 19 00 0A 08 00 00 12 00 00 28 64 2C 00 00 00 00 00 4D, some camera may be different, this used for SBUS mode switch to serial command control.

2. Control information

Message meaning	Message head	Message length	Equipment number			Message type	Pod mode		Pitch speed		Yaw speed		Take the fixed value		Take the fixed value		Camera control		Checksum	
							I1	I2	J1	J2	K1	K2	L1	L2	M1	M2	N1	N2	O1	O2
Message bytes	0xEF	0xf	0x4	0x2	0xa3	0x11	I1	I2	J1	J2	K1	K2	0x5	0xdc	0x5	0xdc	0x05	0xdc	O1	O2

I1 & I2 : pod mode, The data type is a 16-bit integer, with the high bit in front and the low bit in the back, value 1500 for yaw follow mode , 1024 for turn to middle mode (Pitch and yaw return to their original position at boot time) , value range 600~2400.

J1 & J2 :pitch speed ,The data type is 16-bit integer, the high position is in the front, the low bit is in the back, and 1500 is the median position, indicating that the speed is zero, and the value range is 600 to 2400.

K1 & K2 :YAW speed ,The data type is 16-bit integer, the high position is in the front, the low bit is in the back, and 1500 is the median position, indicating that the speed is zero, and the value range is 600 to 2400.

O1& O2; Checksum, the sum of all bytes from H1 to N2, the data type is 16-bit integer, with the high bit before and the low bit after.

e.g. :

A) gimbal control

Down rotation : EF 0F 00 04 02 A3 11 05 DC 06 40 05 DC 05 DC 05 DC 05 DC 04 BC

Up rotation : EF 0F 00 04 02 A3 11 05 DC 05 70 05 DC 05 DC 05 DC 05 DC 04 EB

Right rotation : EF 0F 00 04 02 A3 11 05 DC 05 DC 05 70 05 DC 05 DC 05 DC 04 EB

Left rotation : EF 0F 00 04 02 A3 11 05 DC 05 DC 06 40 05 DC 05 DC 05 DC 04 BC

Stop rotation : EF 0F 00 04 02 A3 11 00 00 05 DC 05 DC 05 DC 05 DC 05 DC 04 76

(The schema data for this message is 0, not in the range of values, the schema data is not updated, or the original schema)

Turn to middle : EF 0F 00 04 02 A3 11 04 00 05 DC 05 DC 05 DC 05 DC 05 DC 04 7A

downward : EF 0F 00 04 02 A3 11 03 F0 00 00 00 00 00 00 00 00 01 04

Follow mode : EF 0F 00 04 02 A3 11 05 70 00 00 00 00 00 00 00 00 00 86

Lock mode : EF 0F 00 04 02 A3 11 07 40 00 00 00 00 00 00 00 00 00 58

(The schema data for this message is 0, not in the range of values, the schema data is not updated, or the original schema)

B) Camera control

Zoom in : EF 0F 00 04 02 A3 11 00 00 00 00 00 00 00 00 00 04 60 00 75

Zoom out : EF 0F 00 04 02 A3 11 00 00 00 00 00 00 00 00 00 07 40 00 58

Recording/stop : EF 0F 00 04 02 A3 11 00 00 00 00 00 00 00 00 00 06 70 00 87

Snapshot : EF 0F 00 04 02 A3 11 00 00 00 00 00 00 00 00 00 06 D0 00 E7

Pseudo : EF 0F 00 04 02 A3 11 00 00 00 00 00 00 00 00 00 06 A5 00 BC

3. The underlying status query instruction

hexadecimal : EF 05 00 04 02 A0 4D 4D 0D 12 22

Feedback examples : 4D 0A 08 01 00 00 8B EC 14 00 00 8C 01

Status feedback bytes

4D 0A 08 G1 A1 A2 B1 B2 C1 C2 Q1

Message head/ The number of bytes /device number/ Firmware version number /ROLL angle/PITCH angle/YAW encoder angle/ Gimbal working status /

D1 02

Checksums from bytes 4 to 11

Note :

1、 Angle information :A1 A2 、 B1 B2、 D1 02 ,Double-byte signed integer data, with the low bit in front of the high bit after ;

ROLL angle、 PITCH angle unit is 0.01 degrees ,eg. A1=0x10 ,A2=0x0 ,Indicates that the ROLL attitude angle is 0.16 degrees ;

YAWThe encoder angle unit is 0.1 degrees ,eg.C1=0x10 ,C2=0x0 ,Indicates that the YAW encoder angle is 1.6 degrees;

4.Pass-Through protocol

The pass-through transmission protocol is a one-way serial port " pass-through protocol" that is input from the external serial port of the YAW board, and the external output of the PITCH board, which is generally used for the customer's custom control of the camera core. It requires the customer to package the messages that need to be transmitted to the camera core before they are sent. The format of a packet is as follow.

(The following numbers are hexadecimal)

EF	XX	00	04	02	D0	XX	XX	XX	O1	O2
Frame head	bytes to be transmitted, maximum 62 bytes	Fixed value	Fixed value	Fixed value	Fixed value	bytes to be transmitted 1	bytes to be transmitted 1	bytes to be transmitted n	Checksum high position	Checksum low position

examples :

1、 Need to pass-through : 81 01 04 07 26 ff , daylight zoom , then :

EF 06 00 04 02 d0 81 01 04 07 26 ff 01 b2 , Bytes 6 , Checksum :

$0x81+0x01+0x04+0x07+0x26+0xff = 0x1b2$.

2、 Need to pass-through : f8 00 12 02 08 00 00 1c , IR pseudo color , then :

EF 08 00 04 02 d0 f8 00 12 02 08 00 00 1c 01 30 Bytes 8 , Checksum :

$0xf8+0x12+0x02+0x08+0x1c = 0x1b2$.

3、 Zoom pass-through query : EF 05 00 04 02 d0 81 09 04 47 FF 01 d4 feedback

example : 90 50 03 0D 0F 01 FF

4、 focus pass-through query : EF 05 00 04 02 d0 81 09 04 48 FF 01 d5 feedback

example : 90 50 07 0C 01 0C FF

Dual vision camera core serial port function

Note : The following functions need to be implemented through the pass-through transmission protocol, and some functions are already available on the gimbal protocol

Pseudo color :

Iron red : f8 00 12 02 00 00 00 14

amber : f8 00 12 02 01 00 00 15

White-hot : f8 00 12 02 08 00 00 1c

Red alarm : f8 00 12 02 09 00 00 1d
 Black hot : f8 00 12 02 0b 00 00 1f

Snapshot/recording :

JPEG snapshot : f8 00 80 01 00 00 00 81
 Recording : f8 00 82 01 00 01 00 84
 Stop recording: f8 00 84 01 00 01 00 86
 Temperature data snapshot : f8 00 80 02 00 00 00 82

IR image zoom :

Frame head	Type	Command	Data1	Data2	Data3	Data4	CRC
0xF8	0x00	0x30	AA	BB	00	00	XX

AA : Integer part (1 ~ 16) Recommended 4X

BB : Fractional part (0 ~ 99)

e.g. : F8 00 30 01 00 00 00 31 //1X

F8 00 30 02 00 00 00 32 //2X

F8 00 30 02 03 00 00 35 //2.3X

OSD related control (Time、Yaw、 Pitch) :

f8 00 12 04 01 02 00 19 (PITCH angle shown)

f8 00 12 04 01 1d 00 34 (PITCH angle hidden)

f8 00 12 04 01 10 00 27 (Time shown)

f8 00 12 04 01 0f 00 26 (Time hidden)

Visible camera control :

Sony camera visca aprotocol control , our main board only for pass-through command

Visa related protocol

Stop : 8x 01 04 07 00 FF

Tele (Standard) : 8x 01 04 07 02 FF

Wide (Standard) : 8x 01 04 07 03 FF

Tele (Variable) : 8x 01 04 07 2p FF p=0 (Low) to 7 (High)

Wide (Variable) : 8x 01 04 07 3p FF p=0 (Low) to 7 (High)

Sony camera set to 1080P 25Hz : 81 01 04 24 72 00 08 FF