U s e r   m a n u a l

Seeker-30 TIRM

Content

Seeker-30 TIRM 3-axis Gimbal

30X Optical Zoom

640 35mm thermal camera

Laser   Rangefinder

TTL 、 S.BUS 、 TCP   control   Wiring

Introduction

Seeker-30 TIRM is a dual-sensor gimbal camera with laser rangefinder, which integrates a 30x optical zoom camera, a 640*480 thermal camera and a 3000m laser rangefinder.

The 3-axis gimbal developed based on FOC technology features high stability, accuracy and sensitivity. The image is very stable even at 30 times optical zoom. The gimbal control speed is adjustable, fast speed mode is used for small zooming range, which makes the gimbal control sensitive and quick; low speed mode is used for large zooming range, which will enable you to target the object more accurately. The high-precision laser rangefinder can accurately analyze the GPS location and distance of the object within 3000 meters, the information will display on screen automatically.SEEKER-30 TIRM supports dual sensors object tracking. The tracking speed is up to 32 pixels/frame, the object size range is from 32*32 pixels to 128*128 pixels.Seeker-30 TIRM 3-axis gimbal can be controlled via PWM,Sbus,TCP and serial port.

Target Tracking

1、The built-in normalized cross-correlation tracking algorithm, combined with the target lost recapture algorithm, realizes the stable tracking of the target;

Support user to display custom characters, adaptive gate, cross wire and tracking information display.

2、Tracking Performance

1) Data refresh rate: 50Hz
2) output lag＜5ms
3) min. target contrast 5%
4) Signal-to-noise ratio 4
5)Target Size: 32x32 to128*128 pixels
6) Tracking Velocity: ±32 pix/frame
7) The root mean square value of noise at the target position ＜0.5 pixel
8) Target memory time: 100 sessions

[1] Yaw axis motor

[2] TF slot
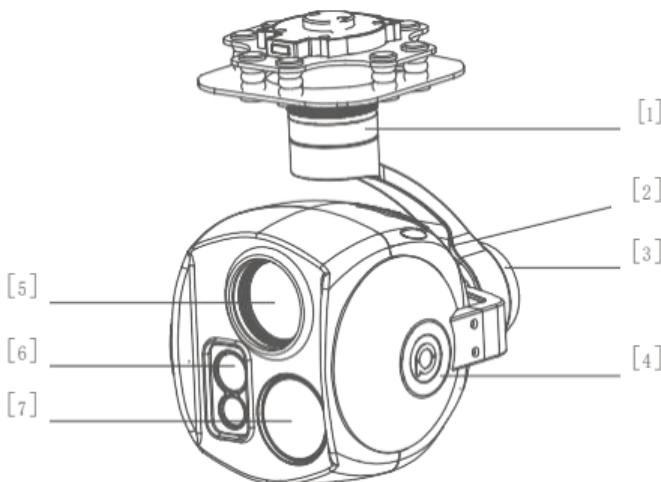
[3] roll axis motor

[4] pitch axis motor

[5] thermal camera

[6] rangefinder

[7] 30X optical camera

⚠ Please ensure that the motor is not blocked by anything during rotation. If the gimbal is blocked during rotation, please clear the obstruction immediately.

Packing List

Gimbal x1
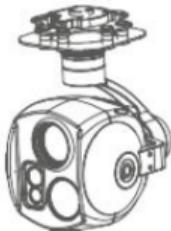
Pack of Screw x1

M3*5mm半圆头内六角螺丝*16
（固定铜柱及减震板）

Copper Cylinder x4

Damper x8

Dimensional Drawing

208.9
28.5
16
130.6

165.1
124
152.5

78
41.6
单位：mm
4-φ3.1
4-φ3.1
78
41.6
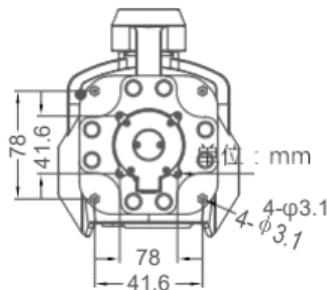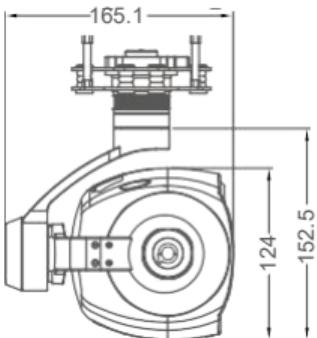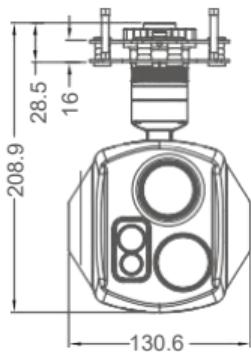
Installation
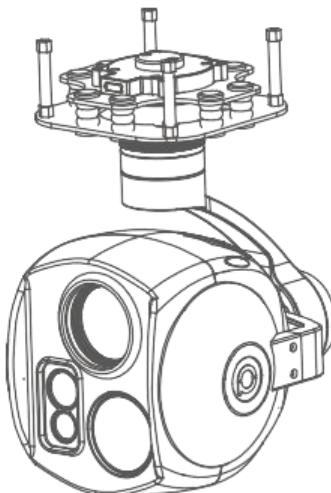
Mechanical&electronic characteristics

Voltage	3S~6S	IDDQ	750mA@12V
IDDT	850mA@12V	temperature	-20℃~+60℃
size	L130.6*W165.1*H208.9mm	Weight	1031g

Performance

Pitch: -45'~+90' Roll: -60'`+60'
Yaw: -290°~+290°
Control precision:Pitch & Roll: ±0.02° Yaw: ±0.03°

Tracking Gimbal Signal Wiring Diagram
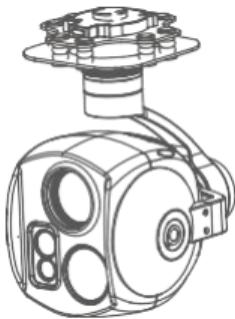
HDMI : HDMI output, micro HDMI
interface
1080P 60fps output
SD card: Max. 128G , class10
         FAT32 or exFAT
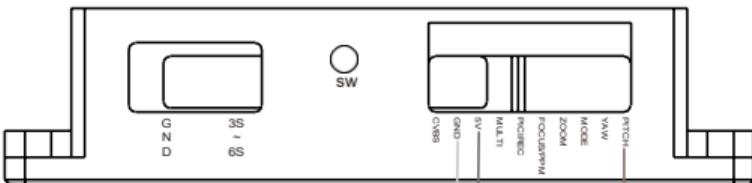
left side of the control box
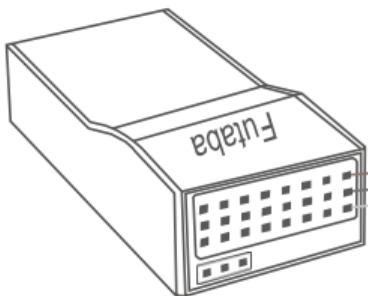
Pitch:PWM in, pitch control（俯仰控制，PWM 输入）

	1 pitch up 俯仰向上
	2 pitch stop 俯仰停止
	3 pitch down 俯仰向下
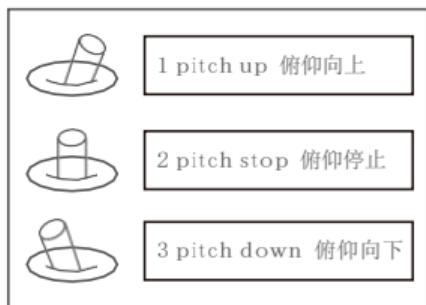
Yaw:PWM in, Yaw control(指向控制，PWM 输入）

	1 Yaw right 指向右转
	2 Yaw stop 指向停止
	3 Yaw left 指向左转

Mode:change the speed / home position（调整云台控制速度/一键回中）

1高位　2　3低位
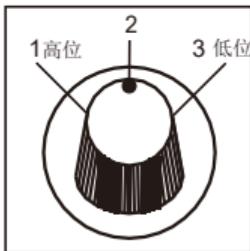
Position 3: Low speed mode, control Yaw and Pitch in this mode and then the gimbal willmove at the lowest speed;
Turn the knob to any position above position 3: change speed; at this time control Yaw and Pitch, gimbal control speed will be increased (The speed will change depending on the position of the switch)
Turn the knob to position 2-1-2: gimbal returns to the middle position.
Switch from 2 to 1 and back to 2 continuously and quickly, gimbal back to home;
Switch from 2-1-2-1-2 continuously and quickly, start follow mode;
Switch from 2-1-2-1-2-1-2, start head-locking mode.
Switch from 2-1-2-1-2-1-2-1-2 continuously and quickly, start follow mode;
Switch from 2-1-2-1-2-1-2-1-2-1-2 continuously and quickly, restored to factory Settings.

ZOOM: zoom the camera
（放大，缩小）

focus : focus the camera（画中画切换，色板切换）

	1 zoom tele 放大
	2 stop zoom 停止
	3 zoom wide 缩小

|	
1	Switch 2 to 1: IR color,white hot, black hot, pseudo color . （连续从2切到1，热像仪色板 白热，黑热，铁红三种模式循环）
2	Switch 2 to 3: picture in Picture. EO+IR, IR+EO, EO only, IR only. （连续从 2 切到 3,画中画循环显示，可见光+热红外，热红外+可见光， 单可见光，单热红外）
3	

Pic/Rec:picture / start record，stop record（拍照，开始录像，停止录像）

	Switch 2 to 1: start record / stop record.(从2 切到 1 ,开始录像，再切一次，停止录像) start record, the OSD display rec hh:mm:ss ；(录像开始后，会显示录像时间) stop record, the OSD display STBY. (录像停止后，显示STBY) Switch 2 to 3: take a picture . (从2 切到 3,拍一张照片) OSD display' REC　IMG' a second. (拍照会显示 REC IMG几秒钟）

Multi: tracking control (跟踪控制)

	Switch 2 to 3: Digital zoom is 1x~4x. Switch one time, the zooming will be 1x, the max zooming is 4x. repetitive switching 1x 2x 3x 4x for recycle. (热像电子放大，切换一次倍数，重复操作，1X 2X 3X 4X循环切换) Switch 2 to 1: start tracking. (开始跟踪，右下角显示偏移量) Switch 1 to 2: exit the tracking (退出跟踪模式)

AV: NO AV output this model。 （本型号没有AV 输出）

	Seeker-30 TIRM
PICS	

Hardware Parameter	
Working voltage	12V
Input voltage	3S ~ 6S
Output voltage	5V (connect with PWM)
Dynamic current	750mA @ 12V
Idle current	650mA @ 12V
Working environment temp.	-20℃ ~ +60℃
Output	micro HDMI(1080P 60fps) / IP (720p) / SDI (1080P 30fps)
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/720P 25fps/30fps)
Control method	PWM / TTL / S.BUS / TCP(IP output)

| Gimbal Spec	
Mechanical Range	Pitch/Tilt: -100°~120°, Roll: ±70°, Yaw/Pan: ±300° / ±360°*N (IP output version)
Controllable Range	Pitch/Tilt: -45°~90°, Yaw/Pan: ±290° / ±360°*N (IP output version)
Vibration angle	Pitch/Roll: ±0.02°, Yaw: ±0.02°
One-key to center	√

Camera spec	
Imager Sensor	SONY 1/2.8" "Exmor R" CMOS
Picture quality	Full HD 1080 (1920*1080)
Effective pixel	2.13MP
Lens optical zoom	30x, F=4.3~129mm
Digital zoom	12x (360x with optical zoom)
Min object distance	10mm(wide end) to 1200mm(tele end). Default 300mm
Horizontal viewing angle	1080p mode: 63.7°(wide end) ~ 2.3°(tele end)
	720p mode: 63.7°(wide end) ~ 2.3°(tele end)
	SD: 47.8°(wide end) ~ 1.7°(tele end)
Sync system	Internal
S/N ratio	more than 50dB
Min illumination	Color 0.01lux@F1.6
Exposure control	Auto, Manual, Priority mode(shutter priority & iris priority), Bright, EV compensation, Slow AE
Gain	Auto/Manual 0dB to 50.0dB(0 to 28 steps + 2 setep)/ total 15 steps) Max.Gain Limit 10.7 dB to 50.0dB (6 to 28 steps + 2 step/ total 12 steps)
White balance	Auto, ATW, Indoor, Outdoor, One Push WB, Manual WB, Outdoor Auto, Sodium Vapor Lamp (Fix/Auto/Outdoor Auto)
Shutter speed	1/1s to 1/10,000s, 22 steps
Backlight compensation	Yes
Aperture control	16 steps

Camera Object Tracking	
Update rate of deviation pixel	50Hz
Output delay of deviation pixel	5ms
Minimum object contrast	5%
SNR	4
Minimum object size	32*32 pixel
Maximum object size	128*128 pixel
Tracking speed	32 pixel/frame
Object memory time	100 frames (4s)
The mean square root values of pulse noise in the object position	< 0.5 pixel

Thermal Imager Spec	
Lens size	35mm
Horizontal FOV(°)	17.7°
Vertical FOV(°)	13.3°
Diagonal FOV(°)	22°
Detective Distance (Man: 1.8x0.5m)	1029 meters
Recognize Distance (Man: 1.8x0.5m)	257 meters
Verified Distance (Man: 1.8x0.5m)	129 meters
Detective Distance (Car: 4.2x1.8m)	3157 meters
Recognize Distance (Car: 4.2x1.8m)	789 meters
Verified Distance (Car: 4.2x1.8m)	395 meters
Working mode	Uncooled long wave (8μm~14μm) thermal imager
Detector pixel	640*480
Pixel size	17μm
Focusing method	Athermal prime lens
Emissivity correction	0.01~1
NETD	≤50mK (@25℃)
MRTD	≤650mK (@characteristic frequency)
Image enhancement	Auto adjust image brightness and contrast ratio
Color palette	White, iron red, pseudo color
Auto Non-uniform correction	Yes (no shutter)
Digital zoom	1x ~ 4x
Sync correct time	Yes
Thermometry type	Temperature bar (psudo color display) max temp, min temp, FOV center temp (Optional)
Temperature warning	0℃~120℃ (For thermometry version only)

Thermal Imager Object Tracking	
Update rate of deviation pixel	50Hz
Output delay of deviation pixel	5ms
Minimum object size	32*32 pixel
Maximum object size	128*128 pixel
Tracking speed	32 pixel/frame
Object memory time	100 frames (4s)

IR Laser Rangefinder	
Laser Wavelengths	1550nm
Optical aperture	Transmit 13mm / Receive17 mm
Resolution	0.75m
Measure ability	3000m (Typical value 1: · Object size: the target surface is larger than the laser spot area · Reflectivity: 60% · Accuracy rate: 90% · Visibility: 10 km · Environment temperature: 20℃ · Atmospheric pressure: 1013 mbar)
Vehicle target measuring	2300m (Typical value 2: · Object size: 2.3*2.3 m · Emissivity: 30% · Others same as Typcial value 1)
Eye-safe	Class 1【Standard IEC 60825-1, Second Edition (2007-03)】
Laser beam angle (Typical value)	1.0 mrad
Accuracy (Typical value)	± 0.75m
Accuracy (In harsh condition)	± 2m
Measurement frequency	2Hz
Multi-target measuring	Max.3 targets distance values returning
Object resolution (Typical value)	30m
Packing Information	
N.W.	1110g / 1180g (Viewport version)
Product meas.	203*131*165mm / 209*131*165mm (Viewport version)
Accessories	1pc gimbal camera device, 8pcs screws, 4pcs copper cylinders, 12pcs damping balls,1pc USB to TTL cable / Hight quality plastic box with foam cushion
G.W.	3521g
Package meas.	360*300*250mm
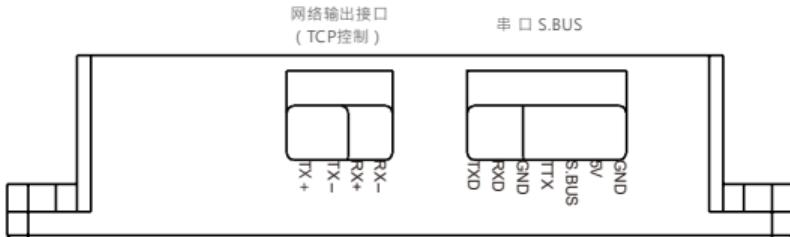
method 1: TXD RXD GND   TTX S.BUS 5V GND by default

（TX1 RX1 GND）

串口1（固定115200）   S.BUS

Method 2: TXD RXD GND   TTX S. BUS 5V GND

（TX1 RX1 GND） （TX2 RX2   GND）

串口 1（固定115200） TTL 2（Baud rate adjustable）

从串口1发送指令可以更改方式：

指令：AA 55 08 06 FF（   0--6 serial port 2 is on，set baud rate to 115200）

AA 55 08 07 FF （ 7 S.BUS is on ）

Baud rate setting

0: 2400

1: 4800

2: 9600

3: 19200

4: 38400

5: 57600

6: 115200

7: S.BUS mode

Note: Red words are editable parameters

RXIS connected to TXD. External serial port GND is connected to control box GND.

The 1-way serial port (TTL 3.3V) output of the digital transmission station directly controls the gimbal and camera. The movements of the gimbal include:

1. Yaw control and angle output, pitch control and angle output, speed setting, angle setting, stop, return to center, etc. ;

2. Camera actions include: zoom, focus, record, stop recording, take photo, recording/shooting switch , multiple query output, etc.

3. The control box does not respond when receiving commands, and you need to enter the command to query gimbal camera , and automatically focus whe taking pictures or videos.

4. Serial port 115200 baud rate, 8 data bits, 1 stop bit, no parity, HEX