TY-SPACE

File Number_____TYS-PST3SH4-IDS_____

Stage mark_____FM_____

Page _____14_____

PST3S-H4 Star Tracker IDS

Edit ： FUSHUXIN

Proofreading ： WANG HONGQIANG

Check ： XIAO MINGGUO
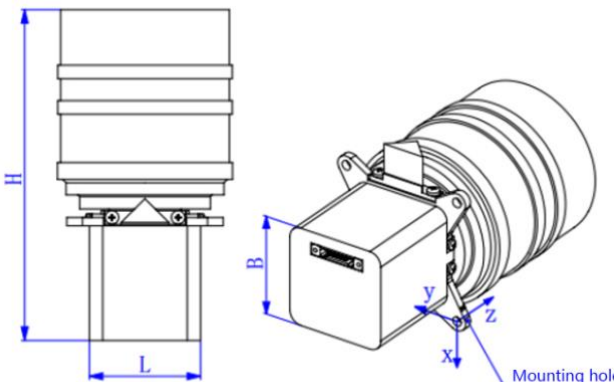
Standard check：CHAIYIN

Approval ： WANGHAIJUN

Signature

TY-Space Technology (Beijing) Ltd.

IDS 1：Performance Index

	File number	TYS-PST3SH4-IDS		
	Sub-system name			
	Device name	PST3S-H4 Star Tracker	Stage mark	
	Device code			FM

Attitude Accuracy	Pointing: 5″ (3σ) Rolling: 50″ (3σ)
Dynamic Range	@ 0.1°/s: 5″ (Pointing, 3σ); 50″ (Rolling, 3σ); @0.5°/s: 8″ (Pointing, 3σ); 60″ (Rolling, 3σ); @1.0°/s: 15″ (Pointing, 3σ); 120″ (Rolling, 3σ); @ 3°/s: follow up
Update Rate	≥10Hz
Acquisition Rate	Max. ≤2s
Start-up Time	Better than 5s
Exclusive Angle	Sun:better than 35°；Earth: better than 25°
Timing Accuracy	0.5ms @ synchronization pulse（SYNC pulse）
Quaternion Continuity	the scalar of quaternion: non-negative
Life Time	3years @500Km Orbit
Reliability	≥0.98 @ the end of 3years running

Edited（Date）：				WangHaijun2022-04-13
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IDS 2：Mechanical Characteristics

		File number	TYS-PST3SH4-IDS				
		Sub-system name					
		Device name	PST3S-H4 Star Tracker	Stage mark			
		Device code				FM	

Device weight^note) 95±10g			Device number：1			√	
Weight characteristics	Envelope size mm	Envelope diameter：Φ64		Height：98±2		√	
	Centroid position mm	X：-21±1	Y：20±1	Z：4±1		√	
	Inertia of centroid kg.mm²	$P_X = 79\pm2$	$P_Y =80\pm2$	$P_Z =33\pm2$		√	
					Mea-sure-ment	Calc-ulatio-n	Esti-mate

Installation characteristics	Installed holes number：4	Size of installed holes （tolerance）mm：Φ3.1±0.1		Material:2A12-T4	Determination method（√）	
	Installation contacting area mm²：200	Note：				
	Installation surface flatness：0.1mm/100mm²					
	Installation surface roughness Ra μm: 3.2					
	Installation surface state：the installation area is oxidized by conduction, and the remaining area is oxidized black.					

Parameter relationship diagram (the relative relationship between the coordinate frames, position of centroid, size of device body, location of installation surface, etc.):
Note: the determination method refers to the way to determine the weight of device.

Note：The origin of the coordinates is located at the geometric center of the outer surface of the lower shell (see "Instrument diagram");

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IDS 3：Instrument Diagram
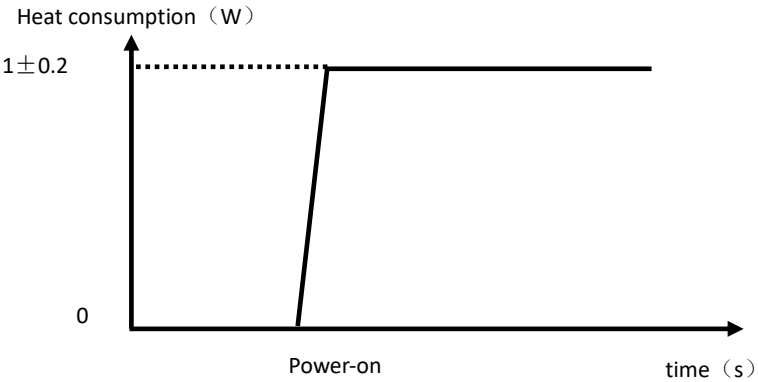
	File number	TYS-PST3SH4-IDS	
	Sub-system name		
	Device name	PST3S-H4 Star Tracker	Stage mark
	Device code		FM
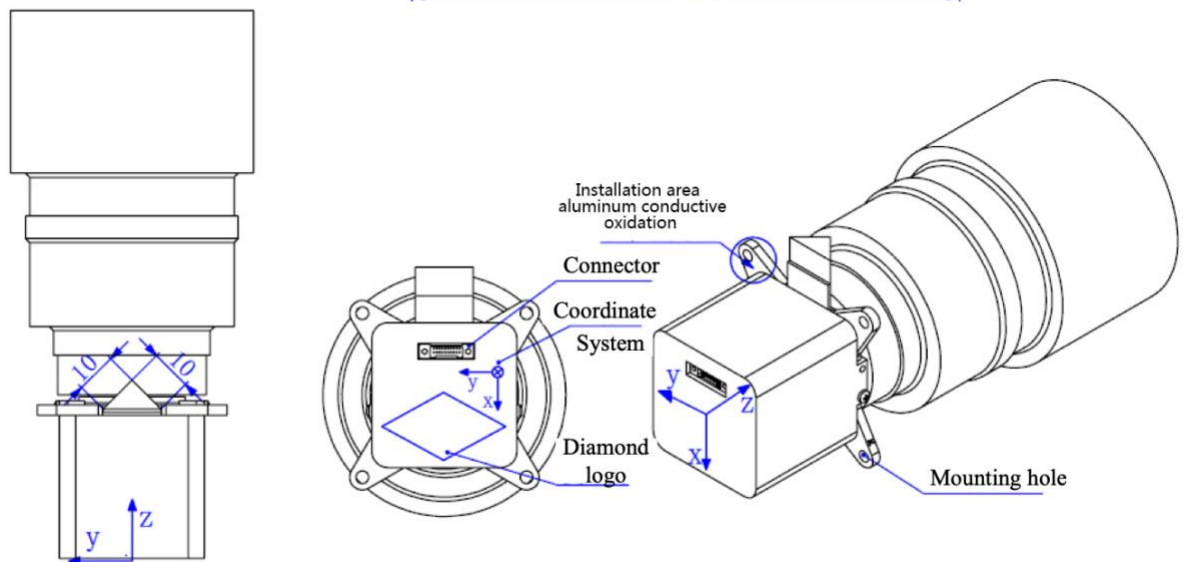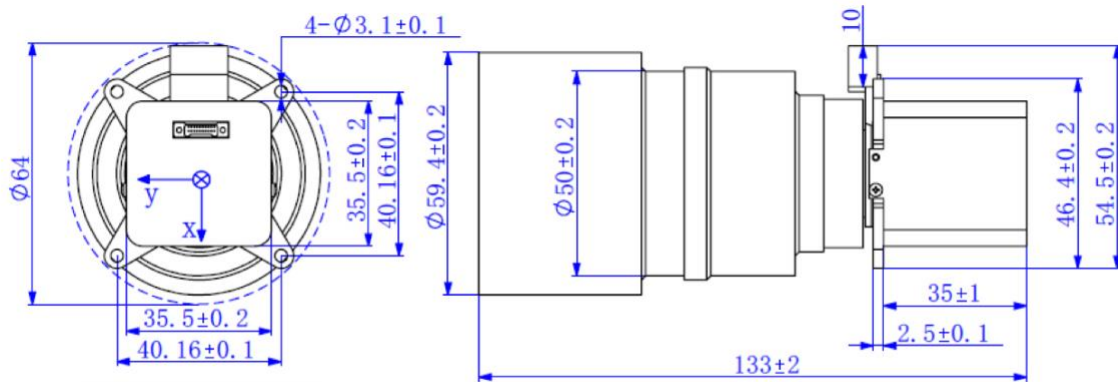
Note: This sketch should include body size, mounting size, mounting plane, mounting point (aperture and its tolerances, center distance and its tolerances), position tolerances for guide pins and holes, direction, location, type and number of electrical connectors , the operating hole, the lap (position and length), the registration measurement reference for calibration and testing.

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IDS 4：Thermal characteristics

		File number	TYS-PST3SH4-IDS			
		Sub-system name				
		Device name	PST3S-H4 Star Tracker		Stage mark	
		Device code				FM
Surface (except for mounting surface)	Aluminum alloy（2A12-T4）	Note: The inner surface of the baffle is treated with ultra black coating，ε_H：≥0.85，α_S：≥0.96				
	Outside surface treatment: Black anodized					
	ε_H：≥0.85					
	α_S：≥0.96					

Start temperature ℃：-40~+45	The best operating temperature range ℃：-0~+10	Heat capacity J/K：100

Operating temperature range ℃：-40~+45	Operating relative humidity range： ≤60％
Storage temperature range ℃：-40~+45	Storage relative humidity range：≤70％
Operating state heat consumption W：1±0.2（per device）	Preparing state heat consumption W：0（per device）

Description:

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IDS 5：Thermal Diagram

	File number	TYS-PST3SH4-IDS			
	Sub-system name				
	Device name	PST3S-H4 Star Tracker	Stage mark		
	Device code				FM

Diagram：
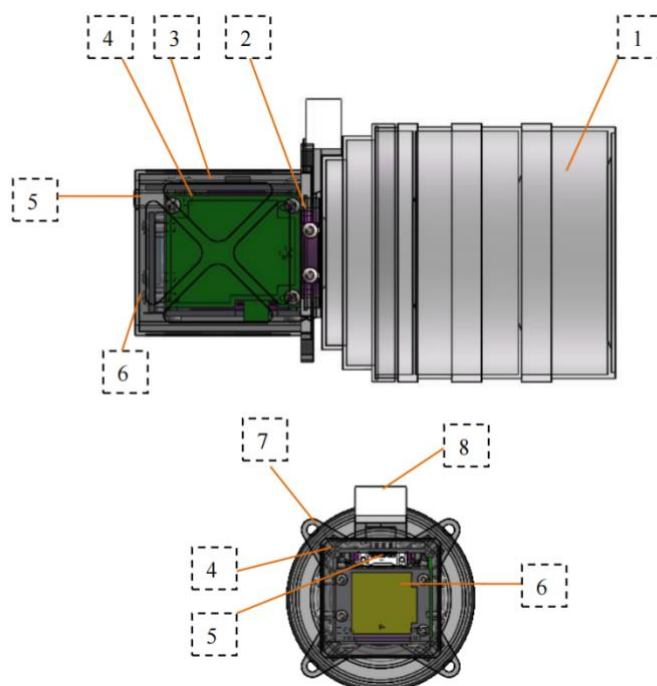
1－Baffle　　　　　2－Lens
3－Circuit box　　　4－Circuit board of power and image processing
5－Connector　　　6－Circuit board of image sensor
7－Installing lugs（Contact surfaces）　　8－optical prism

The power distribution is:
1,circuit board of image sensor : ＜0.5±0.1W;
2, circuit board of power and image processing: ＜0.5±0.1W.

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IDS 6：Power

		File number	TYS-PST3SH4-IDS		
		Sub-system name			
		Device name	PST3S-H4 Star Tracker	Stage mark	
		Device code			FM

Working mode (long term/short term/others）		Long term	Single non-long-term power-up working hours S		Device number	1
Voltage V	Voltage stability %	Ripple voltage mV （P-P）	Device starting current characteristics （peak/duration）		Power W	
5	5%	100		2A/5ms	1±0.2	

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IDS 7: Electrical Connector Contact Assignment-Different PPS
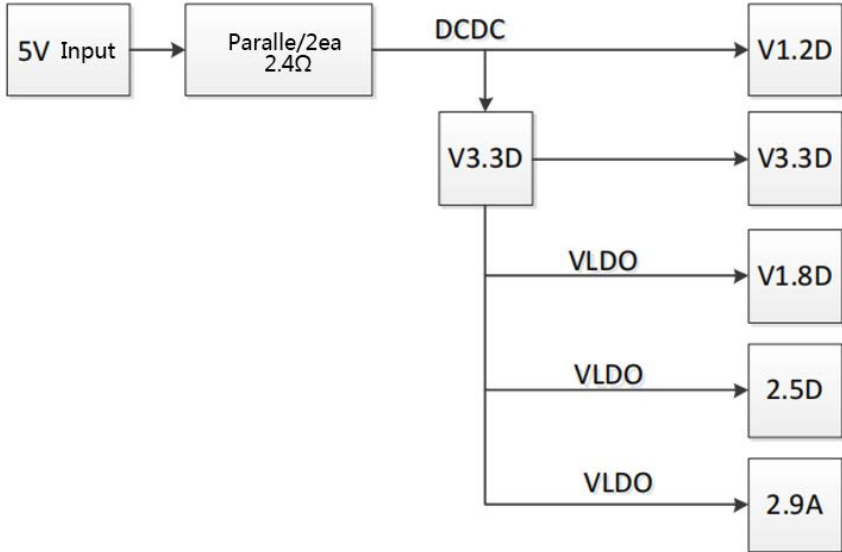
		File number	TYS-PST3SH4-IDS		
		Sub-system name			
		Device name	PST3S-H4 Star Tracker	Stage mark	
		Device code			FM
Name (by function)	XK-01	Electrical connector P/N	J70A-2F2-037-431-TH	Needle / Hole	Hole
Contact number	Signal (function) description	Voltage/V	Current/A	Polar	Remarks (shielded / twisted)
13	PPS_H	RS-422 standard	RS-422 standard	PPS Receive +	13、14twisted
14	PPS_L			PPS Receive -	13、14twisted
20，21	VCC5	5V		Power	two-point two-wire
32，33	GND	0v		power Ground	two-point two-wire
3，4	TXD+	RS-422 standard	RS-422 standard	422 Transmit+	1、3twisted
1，2	TXD-			422 Transmit-	2、4twisted
11，12	RXD+	RS-422 standard	RS-422 standard	422 Receive +	9、11twisted
9，10	RXD-			422 Receive -	10、12twisted
5，22	CAN1L	CAN2.0 B standard	CAN2.0 B standard	CAN1L	5、6twisted
6，23	CAN1H			CAN1H	22、23twisted
7，24	CAN2L	CAN2.0 B standard	CAN2.0 B standard	CAN2L	7、8twisted
8，25	CAN2H			CAN2H	24、25twisted
26	X2_N	LVDS Standard	LVDS Standard	CameraLink X2-	26、27shielded twisted
27	X2_P			CameraLink X2+	
28	X1_N	LVDS Standard	LVDS Standard	CameraLink X1-	28、29shielded twisted
29	X1_P			CameraLink X1+	
30	Xclk_N	LVDS Standard	LVDS Standard	Cameralink Xclk-	30、31shielded twisted
31	Xclk_P			Cameralink Xclk+	
34	X0_N	LVDS Standard	LVDS Standard	CameraLink X0-	34、35shielded twisted
35	X0_P			CameraLink X0+	
36	X3_N	LVDS Standard	LVDS Standard	CameraLink X3-	36、37shielded twisted
37	X3_P			CameraLink X3+	
15,16,17,18,19	Internal debug				Internal use, prohibit external use
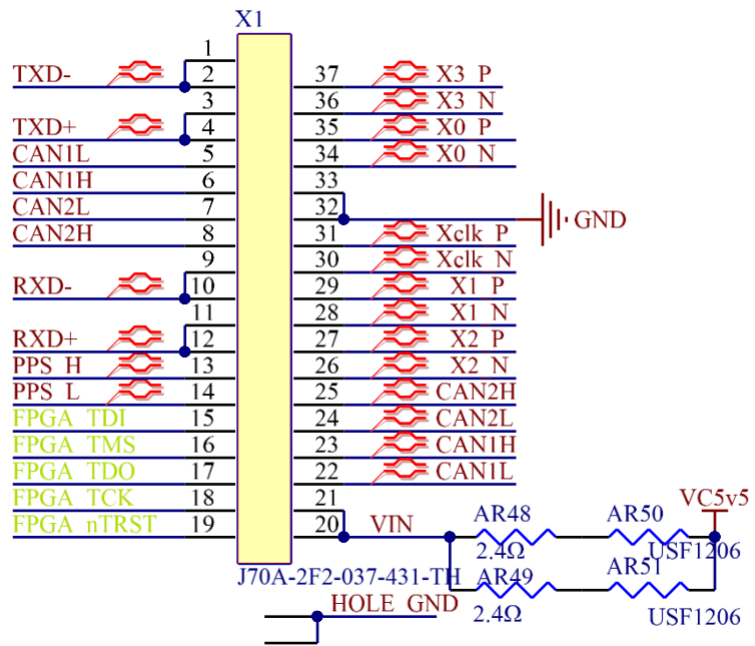
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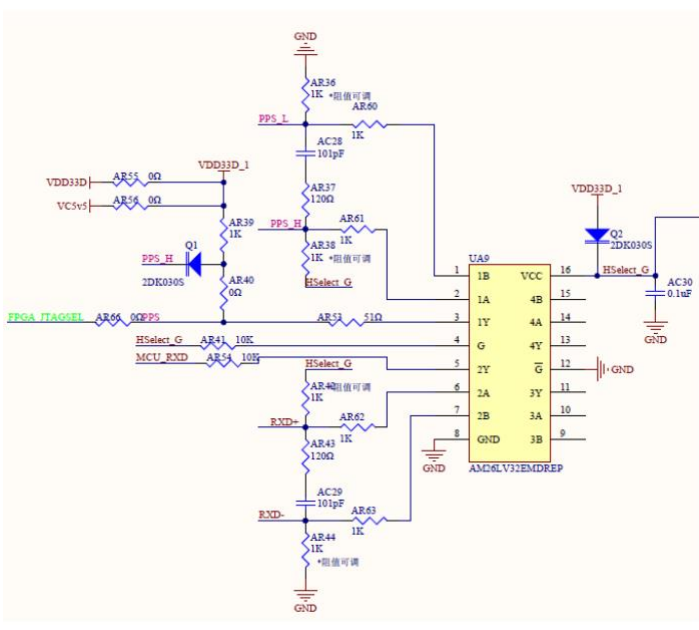
IDS 8: Electrical Interface Features-Power

	File number	TYS-PST3SH4-IDS				
	Sub-system name					
	Device name	PST3S-H4 Star Tracker	Stage mark			
	Device code			FM		

Interface signal	Power supply
Signal characteristics	5V power and the ground are two-point two-wire.
Interface Circuit	
Explanation	

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IDS 9：Electrical Interface Features-RS422

		File number	TYS-PST3SH4-IDS			
		Sub-system name				
		Device name	PST3S-H4 Star Tracker	Stage mark		
		Device code			FM	
Interface signal		Digital signal, RS422.				
Signal characteristics		422 communication baud rate: 115200bps; two-point two-wire				
Interface circuit						
Explanation						
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IDS 10：Electrical Interface Features-Second pulse (different)

	File number	TYS-PST3SH4-IDS		
	Sub-system name			
	Device name	PST3S-H4 Star Tracker	Stage mark	
	Device code			FM
Interface signal	Second pulse			
Signal characteristics	@ Differential second pulse, the second integer is aligned by the lower edge, and the negative pulse width is 1ms.			
Interface circuit	Seconds pulse circuit 			
Explanation	AR40、AR39、AR56 and Q1.are not weld @Differential PPS			
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IDS 11：Circuit and Interface Schematics

	File number	TYS-PST3SH4-IDS			
	Sub-system name				
	Device name	PST3S-H4 Star Tracker	Stage mark		
	Device code			FM	

Simplified diagram：
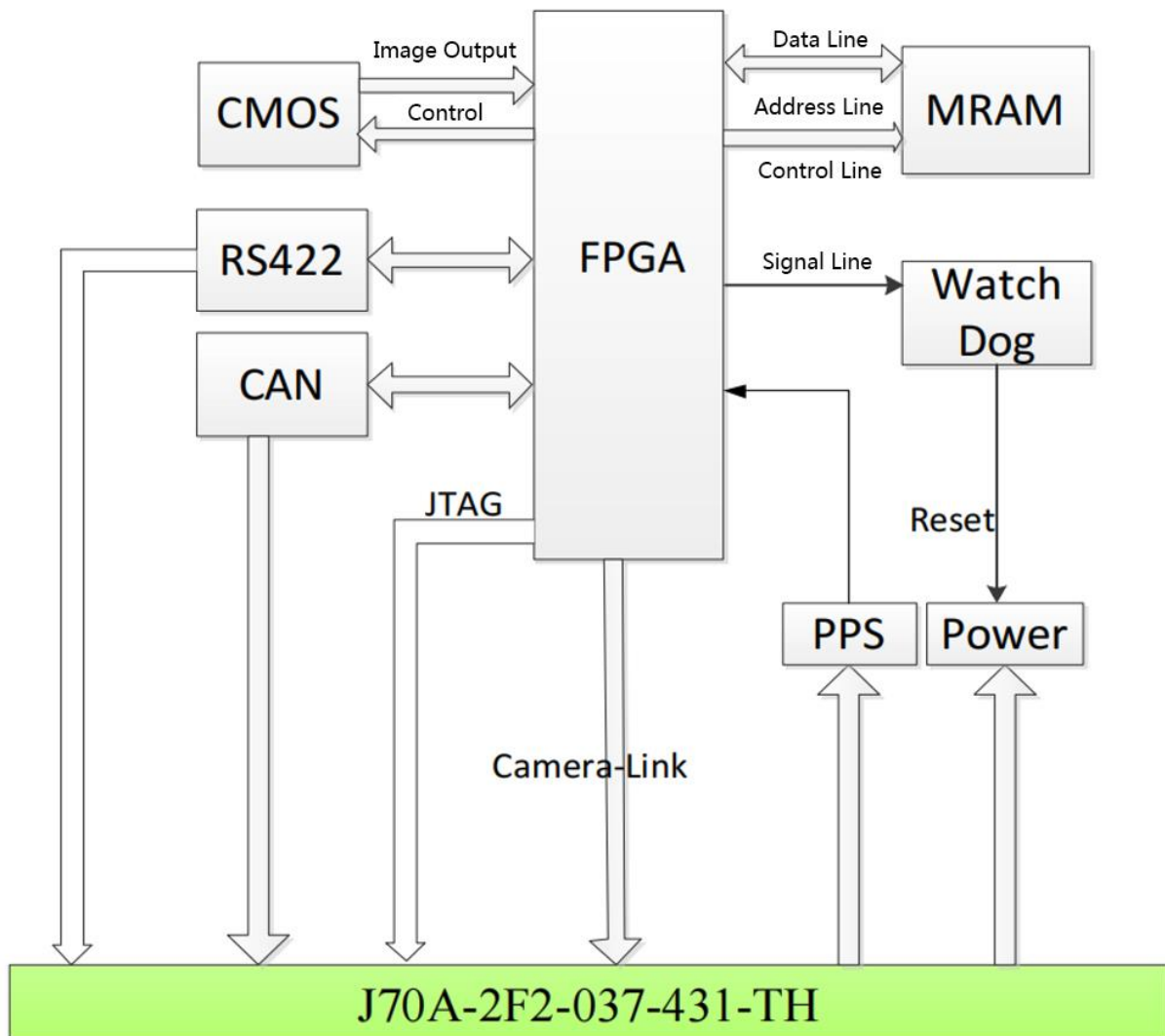
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IDS 12：Installation requirements

	File number	TYS-PST3SH4-IDS			
	Sub-system name				
	Device name	PST3S-H4 Star Tracker	Stage mark		
	Device code			FM	
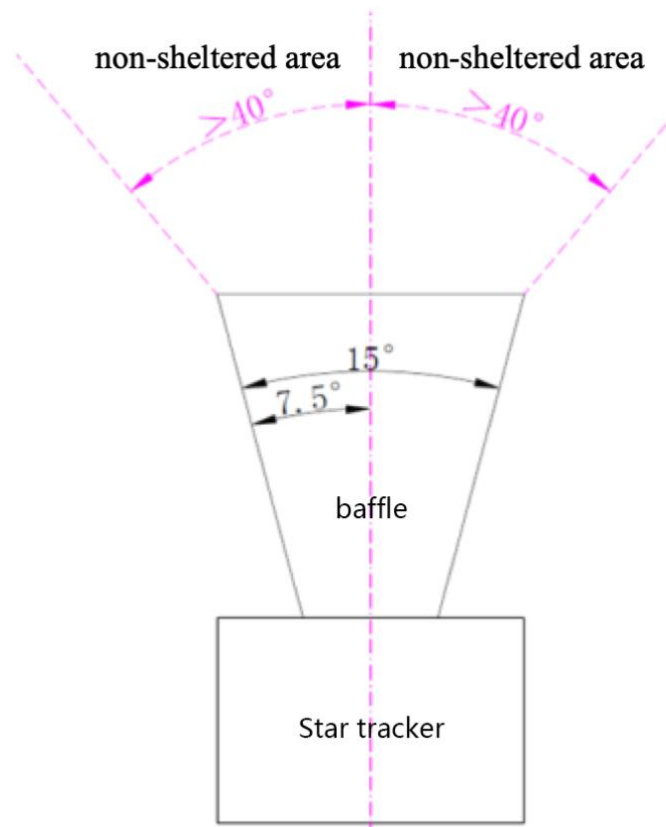
Be sure: Nothing sheltered in the field of view: the circular cone of 80° around the top of the Baffle.

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