

File number	Piece number



File Number TYS-PST4SH1-IDS

Stage mark FM

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Signature

Edit : FUSHUXIN

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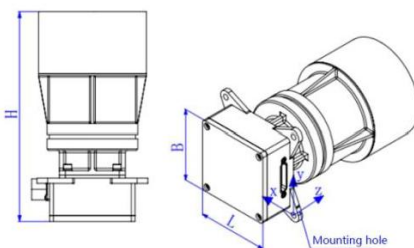
Standard check: CHAIYIN

Approval : WANGHAIJUN

IDS 1: Data Sheet

	File number	TYS-PST4SH1-IDS		
	Sub-system name			
	Device name	PST4SH1 Star Tracker		Stage mark
	Device code			FM
Attitude Accuracy	Pointing: 3" (3 σ) Rolling: 30" (3 σ)			
Dynamic Range	@ 0.1°/s: 3" (Pointing, 3 σ); 30" (Rolling, 3 σ); @0.5°/s: 5" (Pointing, 3 σ); 50" (Rolling, 3 σ); @1.0°/s: 10" (Pointing, 3 σ); 100" (Rolling, 3 σ); @ 3° /s: follow up			
Update Rate	≥ 10 Hz			
Acquisition Rate	Max. ≤ 2 s			
Start-up Time	Better than 5s			
Exclusive Angle	Sun: better than 35°; Earth: better than 25°			
Timing Accuracy	0.1ms @ synchronization pulse (SYNC pulse)			
Quaternion Continuity	the scalar of quaternion: non-negative			
Life Time	5years @1000Km Orbit			
Communication Method	422			
Reliability	≥ 0.98 @ the end of 5 years running			
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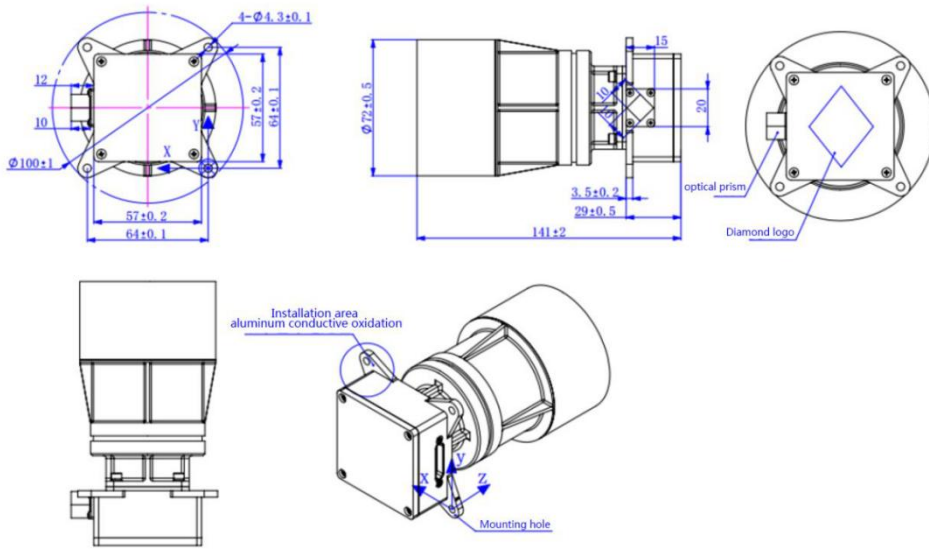
IDS 2: Mechanical Characteristics

		File number		TYS-PST4S H1-IDS			
		Sub-system name					
		Device name		PST4SH1 Star Tracker		Stage mark	
		Device code					
Device weight (W / Baffle) 310g ± 20g		Device number:				√	
Weight charact eristics	Envelope size mm	Envelope diameter: $\Phi 100 \pm 1$		Height: 141 ± 2		√	
	Centroid position mm	X: 32.4 ± 1	Y: 32 ± 1	Z: 18 ± 1		√	
	Inertia of centroid kg.mm ²	549.7 ± 3	555.0 ± 3	223.5 ± 3		√	
Install ation charact eristics	Installed holes number: 4	Size of installed holes (tolerance) mm: $4-\Phi 4.3 \pm 0.1$		Material: 2A12-T4		Determination method (√)	
	Installation contacting area mm ² : 500	Note:					
	Installation surface flatness : 0.1mm/100mm×100mm						
	Installation surface roughness Ra μm : 3.2 μm						
Installation surface state: the installation area is oxidized by conduction							
<p>Parameter relationship diagram (the relative relationship between the coordinate frames, position of centroid, size of device body, location of installation surface, etc.):</p> <p>Note: the determination method refers to the way to determine the weight of device.</p> <div style="text-align: center;">  </div>							
<p>Note: The origin of the coordinates lies in the geometric center of the outer surface of the lower shell (see "Instrument diagram");</p>							
Edited (Date) :							
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IDS 3: Instrument Diagram

IDS 4: Thermal characteristics

	File number	TYS-PST4SH1-I DS			
	Sub-system name				
	Device name	PST4SH1 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.

Note: The installation of baffle and star tracker circuit box should be heat-isolation, the baffle communicated with the shell of star tracker circuit box through screws, meet the requirement of connection between metal components.

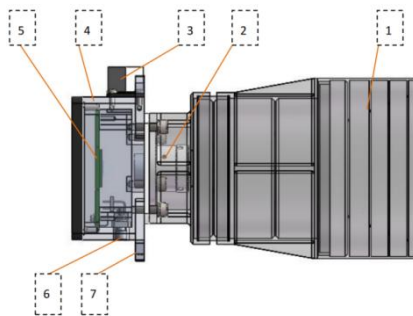
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	File number	TYS-PST4SH1-IDS	

		Sub-system name		
		Device name	PST4SH1 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, $\varepsilon_H: \geq 0.85, \alpha_S: \geq 0.96$		
	Outside surface treatment: aluminum anodization			
	$\varepsilon_H: \geq 0.6$			
	Preparing state heat consumption W: 0 (per device)			
Start temperature °C: -30~+40		Heat capacity J/K: 310		
Operating temperature range °C: -40~+40		The best operating temperature range °C: 0~+10		
Storage temperature range °C: -40~+40		Operating relative humidity range: $\leq 60\%$		
Operating state heat consumption W: 0.9 ± 0.1 (per device)		Storage relative humidity range: $\leq 70\%$		
Description:				
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IDS 5: Thermal Diagram

	File number	TYS-PST4SH1-IDS		
	Sub-system name			
	Device name	PST4SH1 Star Tracker	Stage mark	
	Device code			FM

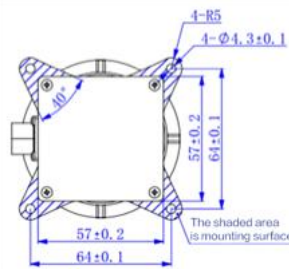
Diagram:



- 1—Baffle 2—Lens
- 3—Prism 4—Circuit box
- 5—Image sensor & Circuit board 6—Connector
- 7—Installing lugs (Contact surfaces)

The structure of NST4S-H1 Star Tracker is shown as above,

The power distribution: circuit board: about $0.9W \pm 1W$;



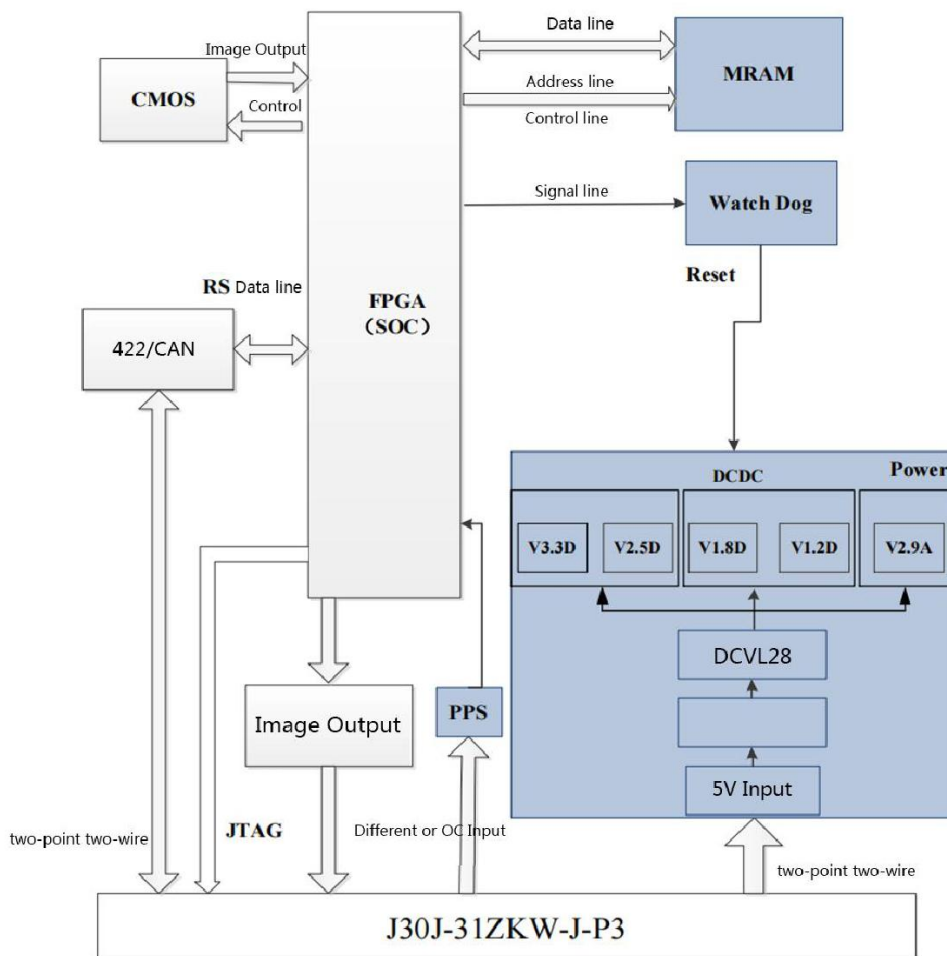
Note:The installation of baffle and star tracker circuit box should be heat-isolation,the baffle communicated with the shell of star trackercircuit box through screws,meet the requirment of connection between metal components.

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IDS6 : Circuit and Interface Schematics

	File number	TYS-PST4SH1-IDS		
	Sub-system name			
	Device name	PST4SH1 Star Tracker	Stage mark	
	Device code			FM

Diagram:



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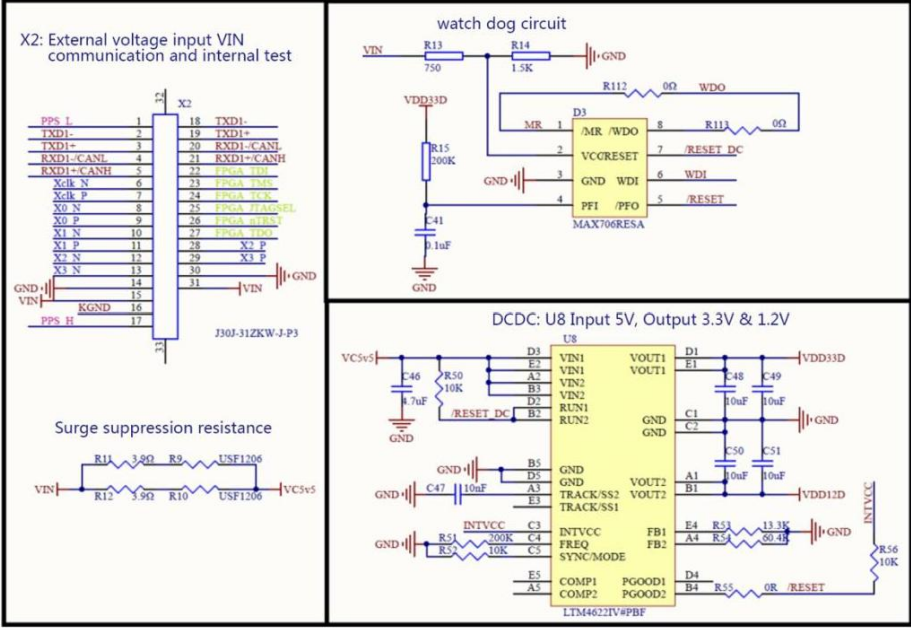
IDS 7: Power

		File number		TYS-PST4SH1-IDS			
		Sub-system name					
		Device name		PST4SH1 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			0.9±0.1	
<p>Safe Operating Voltage:4.75V-5.25V</p>							
Edited (Date) :							
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IDS 8: Electrical Connector Contact Assignment

Name (by function)		information and ground test		File number		TYS-PST4SH1-IDS		Stage mark					
				Sub-system name									
				Device name		PST4SH1 Star Tracker							
				Device code									
Electrical connector code		J30J-31ZKWP3-J		Needle / Hole		Hole							
Contact number	Signal (function) description	Voltage/V	Current/A	Polar		Remarks(shielded/twisted)							
2, 18	TXD1-	0/+3.3(±1)	≤0.075	422 Transmit-		2,3twisted, 18,19 twisted							
3, 19	TXD1+	0/+3.3(±1)	≤0.075	422 Receive +		2,3twisted, 18,19 twisted							
4, 20	RXD1-	0/+3.3(±1)	≤0.075	422 Transmit-		4,5twisted, 20,21twisted							
5, 21	RXD1+	0/+3.3(±1)	≤0.075	422 Receive +		4,5twisted, 20,21twisted							
17	PPSH	0/+3.3(±1)	≤0.075	Synchronize signal+		1,17twisted							
1	PPS L	0/+3.3(±1)	≤0.075	Synchronize signal-		1,17twisted							
15, 31	VIN	/	/	Power									
14, 30	GND	/	/	Power ground									
16	KGND	/	/	Structure ground		Structure ground							
22	FPGA_TDI	/	/	JTAG_TDI		Internal use, prohibit external use							
23	FPGA_TMS	/	/	JTAG_TMS									
24	FPGA_TCK	/	/	JTAG_TCK									
25	FPGA_JTAGSEL	/	/	JTAG_SEL									
26	FPGA_nTRST	/	/	JTAG_nTRST									
27	FPGA_TDO	/	/	JTAG_TDO									
6	Xclk_N	/	/	Cameralink Xclk-									
7	Xclk_P	/	/	Cameralink Xclk+									
8	X0_N	/	/	Cameralink X0-									
9	X0_P	/	/	Cameralink X0+									
10	X1_N	/	/	Cameralink X1-									
11	X1_P	/	/	Cameralink X1+									
12	X2_N	/	/	Cameralink X2-									
28	X2_P	/	/	Cameralink X2+									
13	X3_N	/	/	Cameralink X3-									
29	X3_P	/	/	Cameralink X3+									
Edited (Date):													
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IDS 9: Electrical Interface Features-Power

	File number	TYS-PST4SH1-ID S		
	Sub-system name			
	Device name	PST4SH1 Star Tracker	Stage mark	
	Device code			FM
Interface signal	Power supply			
Signal characteristics	Operating voltage:4.75V-5.25V Reflected ripple voltage $\leq 100\text{mV(p-p)}$; Starting current rising slope $< 10^6\text{A/s}$, peak value $< 2\text{A}$, length of time $< 5\text{ms}$.			
Interface Circuit	 <p>The interface circuit section contains four sub-diagrams:</p> <ul style="list-style-type: none"> X2: External voltage input VIN communication and internal test: A pinout diagram for connector X2 with 31 pins. Pins 1-17 are on the left, and pins 18-31 are on the right. Pins 18-21 are TXD1- and RXD1- related. Pins 22-25 are Xclk N and Xclk P. Pins 26-29 are X0 N and X0 P. Pins 30-31 are X1 N and X1 P. Pins 14, 15, and 16 are GND, KGND, and PPS_H respectively. Surge suppression resistance: A circuit diagram showing VIN connected to a network of resistors (R11, R12, R9, R10, R5) and capacitors (C4, C5) leading to VCSv5. watch dog circuit: A circuit diagram for a MAX706RESA watch dog timer. It shows VIN connected through resistors R13 and R14 to the MR pin. Other pins like VCGRESET, GND, WDI, PFI, and PFO are also shown. DCDC: U8 Input 5V, Output 3.3V & 1.2V: A detailed schematic of a DCDC converter (LTM4622IV#PBF). It shows the input side with VIN1, VIN2, and RUN1 pins, and the output side with VOUT1 and VOUT2 pins. Various resistors (R50, R51, R52, R53, R54, R55) and capacitors (C46, C47, C48, C49, C50, C51) are used for regulation and filtering. 			
Explanation	GND:power ground KGND:packaging ground GND is complete isolation with KGND			
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IDS 10: Electrical Interface Features- RS422(Transmit)

	File number	TYS-PST4SH1-ID S			
	Sub-system name				
	Device name	PST4SH1 Star Tracker	Stage mark		
	Device code				FM
Interface signal	Digital signal, RS422. (Sent)				
Signal characteristics	422 communication baud rate: 115200bps; Meet the standard: EIA-422-B Baud rate: 115200bps(±0.5%) Interface Chip:AM26LV31ESDREP,3.3v				
Interface Circuit	<p style="text-align: center;">Note: TXD1+, TXD1-are for connecting OBC. TXD2+, TXD2-are internal used.</p>				
Explanation	R71 is not weld@ RS422(transmit).				
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IDS 11: Electrical Interface Features- RS422(Receive)

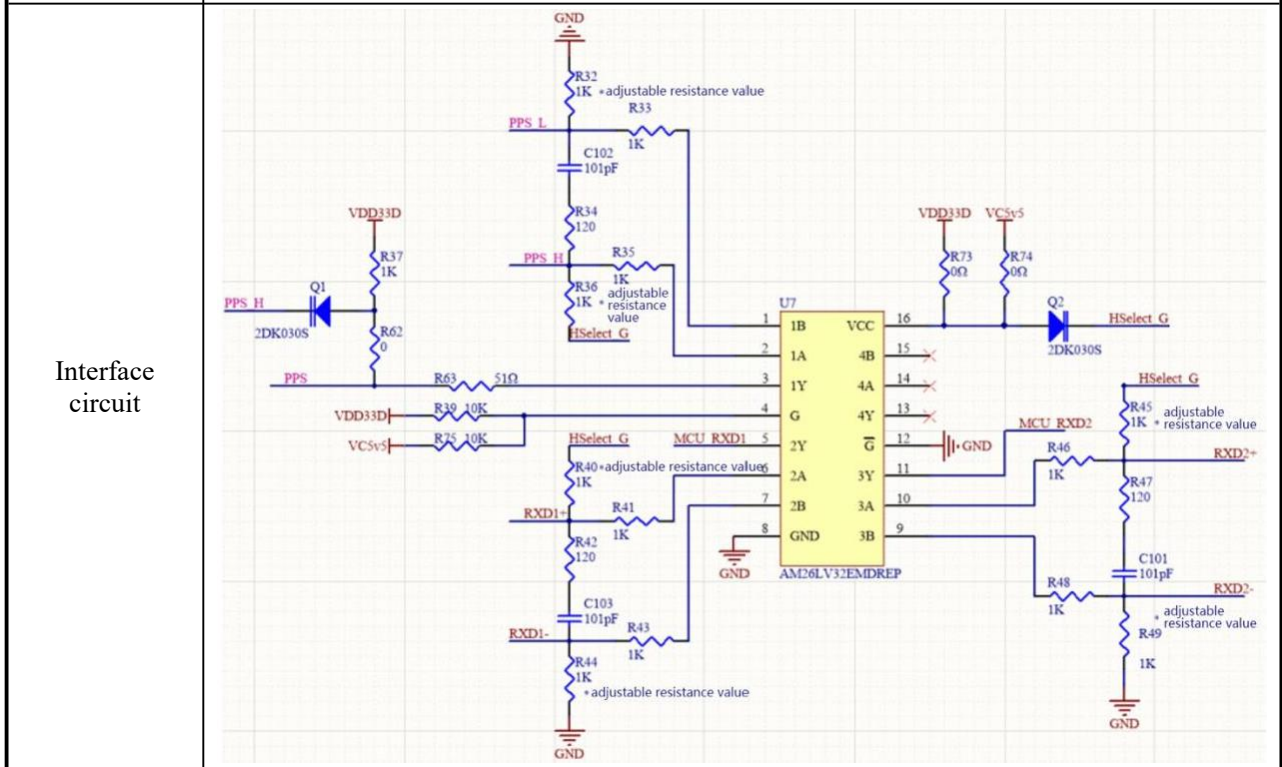
IDS 12: Electrical Interface Features-Second pulse (Different)

	File number	TYS-PST4SH1-ID S		
	Sub-system name			
	Device name	PST4SH1 Star Tracker	Stage mark	
	Device code			FM
Interface signal	Digital signal, RS422. (receive)			
Signal characteristics	422 communication baud rate: 115200bps; Meet the standard: EIA-422-B Baud rate: 115200bps(±3%) Interface Chip:AM26LV32ESDREP,3.3v			
Interface Circuit				
Explanation	Note: RXD1+, RXD1- are for connecting OBC. RXD2+, RXD2- are internal used. R74 is not weld@ RS422(receive).			
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	File number	TYS-PST4SH1-IDS		

	Sub-system name		
	Device name	PST4SH1 Star Tracker	Stage mark
	Device code		FM

Interface signal	Second pulse signal
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Signal characteristics	@ Differential second pulse, the second integer is aligned by the lower edge, and the negative pulse width is 1~2ms.
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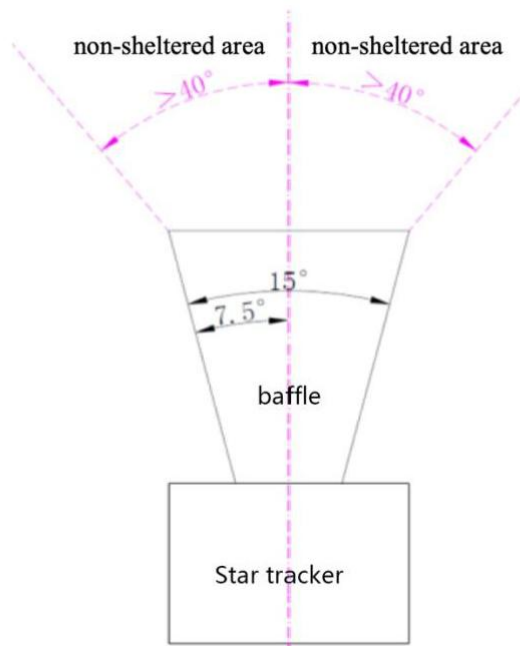
Explanation	R37, R62, Q1 and R71 are not weld@ different second pulse.
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IDS 13: Installation requirements

	File number	TYS-PST4SH1-IDS	
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Sub-system name			
Device name	PST4SH1 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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IDS 14: Device Description

	File number	TYS-PST4SH1-IDS	
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Sub-system name				
Device name	PST4SH1 Star Tracker	Stage mark		
Device code			FM	

Note: the special requirements for the interface and other inconvenient presentation are described in this section.

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