

File Number	Piece Number



File Number	TYS-PST3S-K4G-IDS
Stage Mark	FM
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PST3S-K4G Star Tracker IDS

Signature

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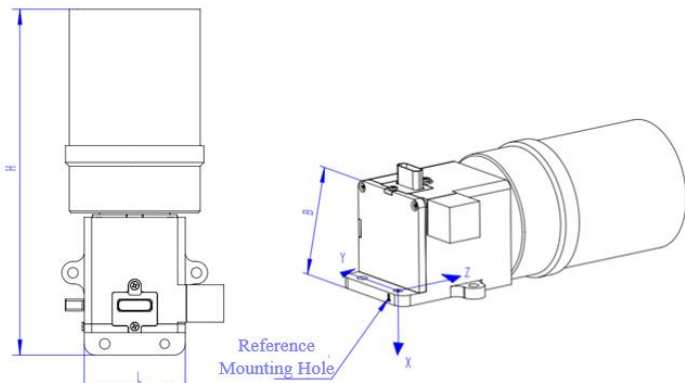
Standardization
Checked by: Li Ya'nan

Approved by: Wang Haijun

IDS 1: Performance Index

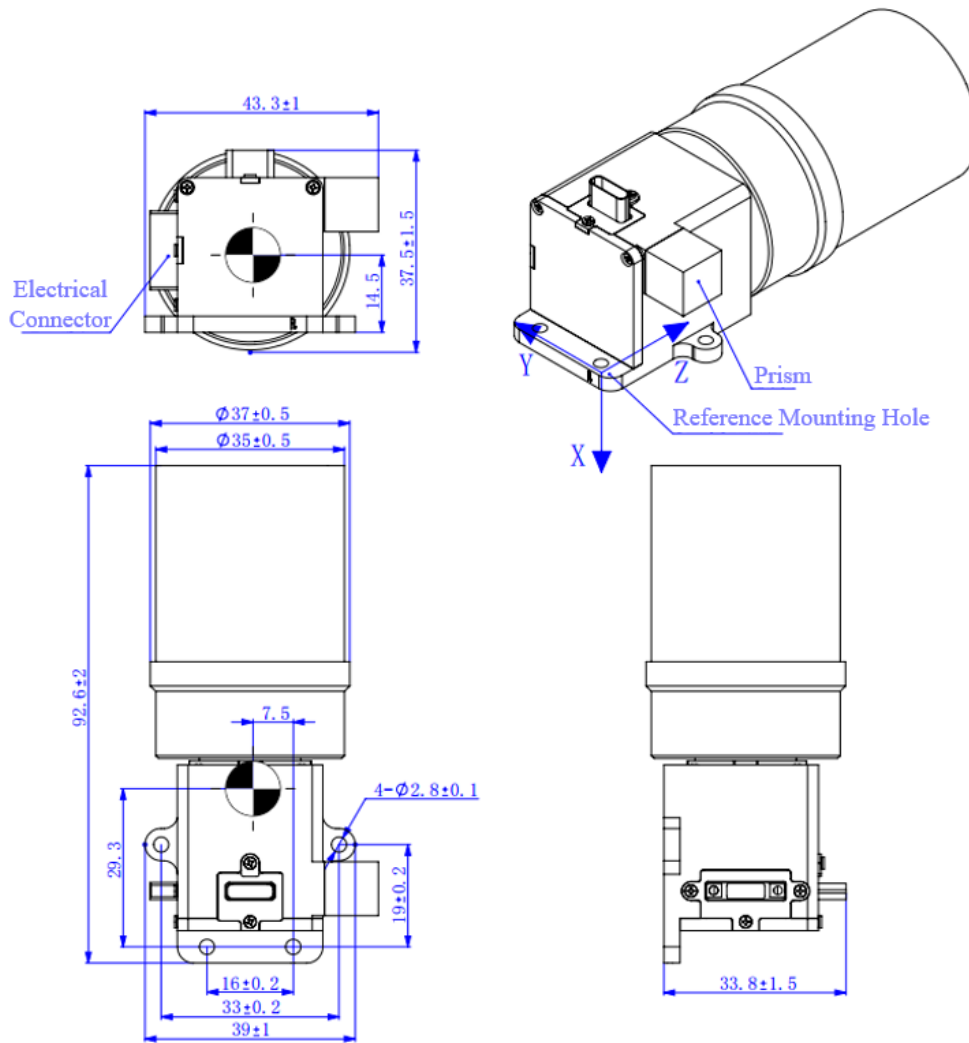
		File Number	TYS-PST3S-K4G-IDS		Page 1 of 14	
		Sub-System Name				
		Device Name	PST3S-K4G Star Tracker		Stage Mark	
		Device Code				
Parameters	Specifications					
Attitude Accuracy	Pointing: 5" (3σ) Roll: 50" (3σ)					
Dynamic Performance	@0.1°/s: 5" (Pointing, 3σ); 50" (Roll, 3σ); @0.5°/s: 8" (Pointing, 3σ); 80" (Roll, 3σ); @1.0°/s: 10" (Pointing, 3σ); 100" (Roll, 3σ); @2°/s: Trackable					
Data Validity Rate	>98%@ 0.5°/s; >96%@0.5°/s ~1.5°/s;					
Update Rate	≥10Hz					
Acquisition Rate	Max. ≤2s					
Start-up Time	Better than 5s					
Exclusion Angle	Sun: better than 35°; Earth: better than 25°					
Time Scale Accuracy	Better than 0.5ms @ synchronization pulse (SYNC pulse)					
Communication	RS422					
Quaternions Continuity	The scalar of quaternion: non-negative					
Life Time	7 years @500km Orbit					
Reliability	≥0.98 @ the end of 7-year running					
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IDS 2: Mechanical Characteristics

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		Sub-System Name					
		Device Name		PST3S-K4G Star Tracker		Stage Mark	
		Device Code					FM
Device Weight: 70±10g		Device Count: 1					√
Mechanical Characteristics	Envelope Size (mm)	(43.3±1)×(37.5±1.5)×(92.6±2)					√
	CM Position (mm)	X: -14.5±1	Y: 7.5±1	Z: 29.3±1		√	
	Inertia at CM (kg.mm ²)	P _X = 38.5±1	P _Y = 38.1±1	P _Z = 13.5±1		√	
					MEAS	CALC	EST
Mounting Characteristics	Mounting Hole Count: 4	Mounting Hole Dimensions (Tolerance) (mm): Φ2.8±0.1		Material: 2A12-T4		Determination Method (√)	
	Mounting Contact Area (mm ²): 771			Note: The determination method refers to the way to determine the mechanical characteristics of the device. MEAS: Measurement CALC: Calculation EST: Estimation			
	Mounting Surface Flatness: 0.1mm/(100mm×100mm)						
	Mounting Surface Roughness Ra (μm): 3.2						
	Mounting Surface Treatment: Conductive Treatment						
Parameter relationship diagram (should indicate coordinate system relative orientation, CM position, device body dimensions, mounting surface location, etc.):							
							
Note: The coordinate origin is located at the center of the reference mounting hole on the mounting surface. The black-and-white circle marks the CM position (see IDS 3: Instrument Diagram).							
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IDS 3: Instrument Diagram

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	Sub-System Name				
	Device Name	PST3S-K4G Star Tracker	Stage Mark		
	Device Code			FM	



Note: This schematic diagram should include overall dimensions, mounting dimensions, mounting surface, mounting points (hole diameters and their tolerances, center-to-center distance and their tolerances), positional tolerances of guide pins and holes, orientation, position, type and designation of electrical connectors, operation holes required for calibration and testing, bonding jumpers/straps (position and length), and registration measurement datum.

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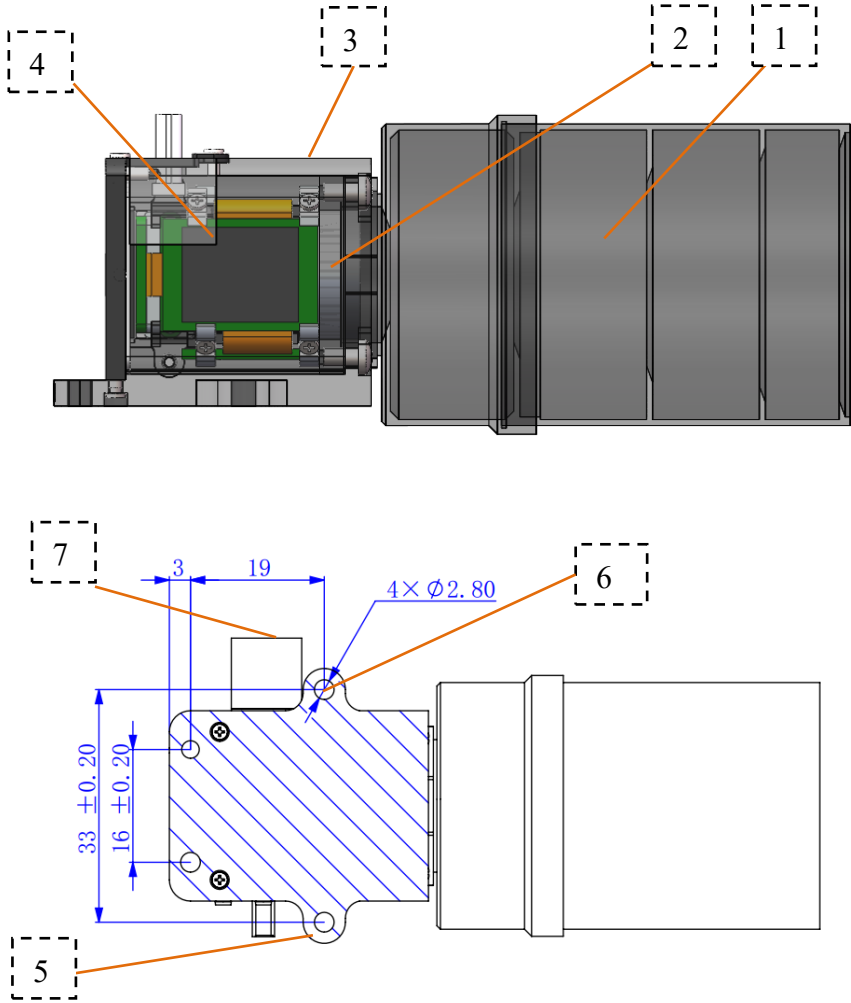
IDS 4: Thermal Characteristics

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		Sub-System Name				
		Device Name	PST3S-K4G Star Tracker		Stage Mark	
		Device Code				
Surface (Excluding Mounting Surface)	Material: Aluminum Alloy (2A12-T4)		Note: The inner surface of the baffle is ultra black coating. $\varepsilon_H \geq 0.85$, $\alpha_S \geq 0.95$			
	Outer Surface Treatment: Aluminum Nature Color					
	Outer Surface Emissivity: $\varepsilon_H \geq 0.6$					
Start Temperature °C: -30~+40			Heat Capacity J/K: 67			
Operating Temperature Range °C: -30~+40			Operating Relative Humidity Range: $\leq 60\%$			
Best Operating Temperature Range °C: 20 ± 5			Storage Relative Humidity Range: $\leq 70\%$			
Storage Temperature Range °C: -30~+40			Power Consumption @Operating State W: 0.8 ± 0.1 (Per Device) Power Consumption @Preparing State W: 0 (Per Device)			
Description: 0 2s Time (s) Power-on						

IDS 5: Thermal Diagram

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	Sub-System Name					
	Device Name	PST3S-K4G Star Tracker	Stage Mark			
	Device Code				FM	

Diagram:



- 1—Baffle
- 2—Lens
- 3—Circuit Box
- 4—Circuit Board
- 5—Connector
- 6—Mounting Lug
- 7—Optical Prism

Note: Thermal conductive mounting of Star Tracker Circuit Box and Baffle.

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IDS 6: Power

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		Sub-System Name						
		Device Name		PST3S-K4G Star Tracker		Stage Mark		
		Device Code					FM	
Operating Mode (Long Term/Short Term / Other)		Long Term				Device Count		1
Voltage	Voltage Stability	Ripple Voltage		Inrush Current (Peak / Duration)		Power Consumption		
5V	5%	100mV (p-p)		2A/5ms		0.8±0.1W		
Notes: The internal grounding of the star tracker is designed as isolation, while the external structure contact grounding.								
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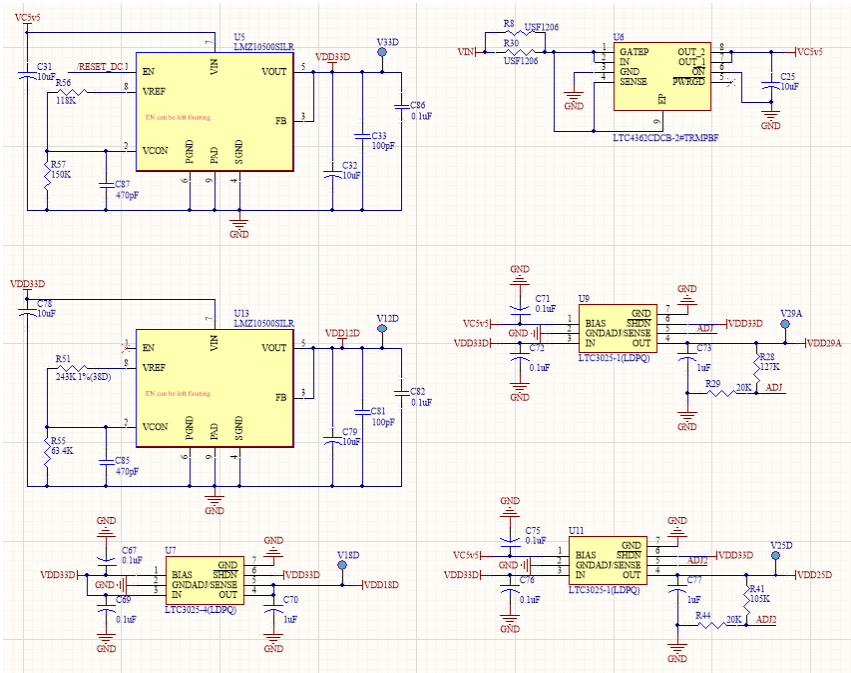
IDS 7: Electrical Connector Contact Assignment – Differential PPS

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		Sub-System Name					
		Device Name		PST3S-K4G Star Tracker		Stage Mark	
		Device Code				FM	
Name (by Function): X01		Electrical Connector P/N: J70A-2H2-025-231-TH				Pin / Hole: Hole	
Contact Number	Signal (Function) Description	Voltage/V	Current/A	Polarity		Remarks (Shielded / Twisted)	
16,19	TXD+	RS422 Standard	RS422 Standard	Asynchronously Transmit+		3,16 Twisted, 4,19 Twisted	
3,4	TXD-			Asynchronously Transmit-			
15,17	RXD+	RS422 Standard	RS422 Standard	Asynchronously Receive+		1,15 Twisted, 2,17 Twisted	
1,2	RXD-			Asynchronously Receive-			
7,8	VIN	5V	0.2A	Power		Two-Point Two-Wire	
5,6	GND	0V	0.2A	Power Ground			
14	KGND					Case Ground	
10	PPS_H	RS422 Standard	RS422 Standard	PPS Receive+		9,10 Twisted	
9	PPS_L			PPS Receive-			
11,12,13, 18,20,21 22,23,24, 25						Internal Use	
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IDS 8: Electrical Interface Features - Power

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		Sub-System Name				
		Device Name	PST3S-K4G Star Tracker		Stage Mark	
		Device Code				
Interface Signal	Power Supply					
Signal Characteristics	5V power and the ground are two-point two-wire.					
Interface Circuit	<pre> graph LR A[5V Input] --> B[Fuse] B --> C[Surge Suppressor] C --> D[V3.3D] D --> E[V1.2D] D --> F[V1.8D] D --> G[V2.5D] D --> H[V2.9A] </pre>					
Notes						
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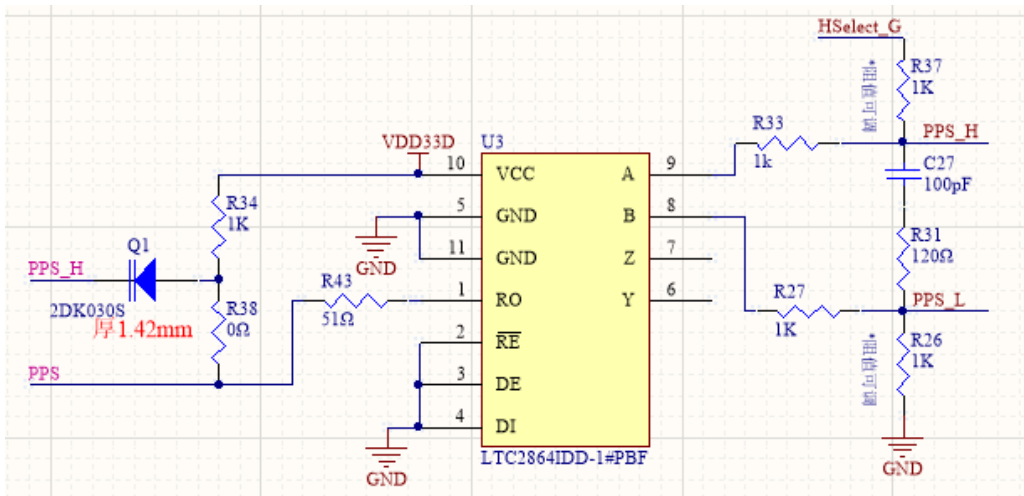
IDS 9: Electrical Interface Features - Power

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		Sub-System Name						
		Device Name	PST3S-K4G 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								
Notes								
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IDS 10: Electrical Interface Features - RS422

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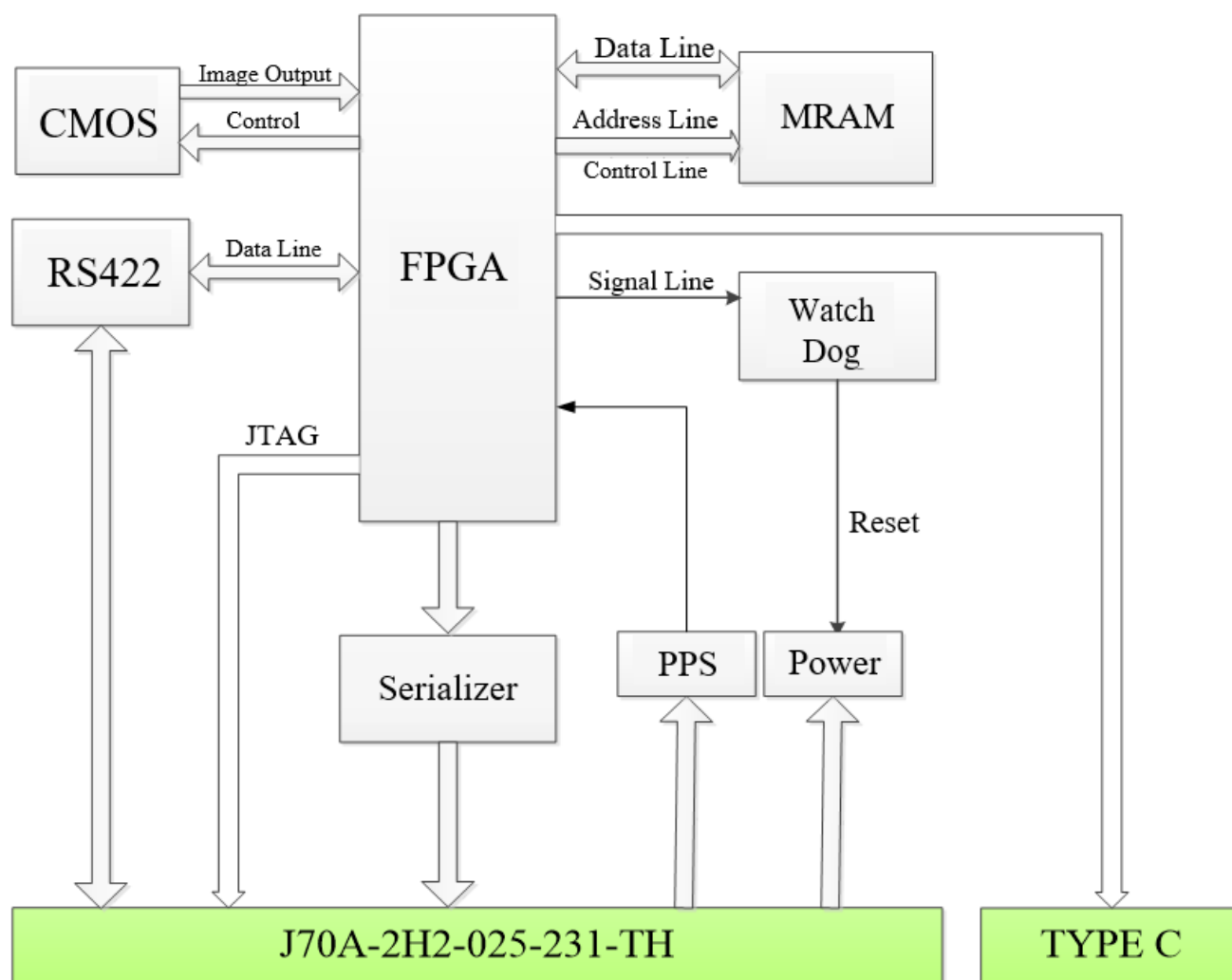
IDS 11: Electrical Interface Features - Differential PPS

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		Sub-System Name					
		Device Name	PST3S-K4G Star Tracker		Stage Mark		
		Device Code					FM
Interface Signal	Pulse Per Second (PPS)						
Signal Characteristics	Second Pulse Signal: Differential Input; Falling Edge Aligned to Integer Seconds; Negative Pulse Width 1ms.						
Interface Circuit	PPS circuit 						
Notes	R34, R38, Q1: not soldered @Differential PPS						
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IDS 12: Circuit and Interface Schematics

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	Sub-System Name					
	Device Name	PST3S-K4G Star Tracker	Stage Mark			
	Device Code				FM	

Schematic Diagram :



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IDS 13: Mounting Requirements

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	Device Name	PST3S-K4G Star Tracker	Stage Mark		
	Device Code			FM	

non-sheltered area

$>40^\circ$

non-sheltered area

$>40^\circ$

15°

7.5°

Baffle

Star Tracker

Mounting Requirements: Ensure that nothing sheltered in the field of view (no obstructions within the 80° cone from the top of the baffle).

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IDS 14: Device Description

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	Device Name	PST3S-K4G Star Tracker	Stage Mark		
	Device Code				FM
None.					
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