

File Number	Piece Number



File Number	TYS-PST3S-L3-IDS
Stage Mark	FM
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PST3S-L3 Star Tracker IDS

Signature

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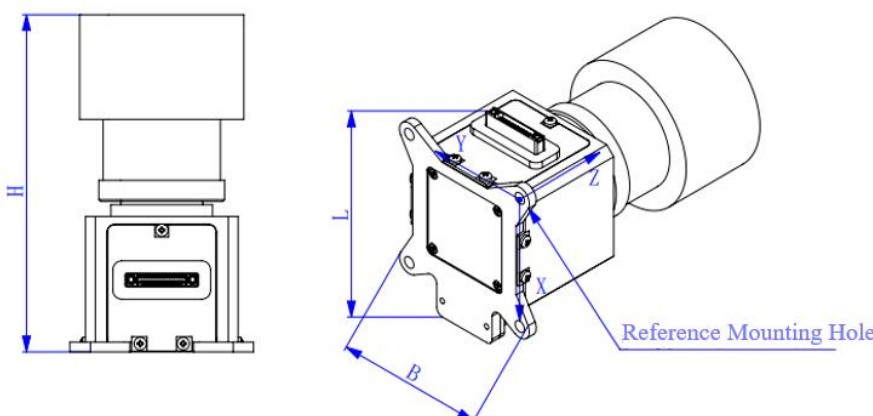
Standardization
Checked by: Lin Bayi

Approved by: Wang Haijun

IDS 1: Performance Index

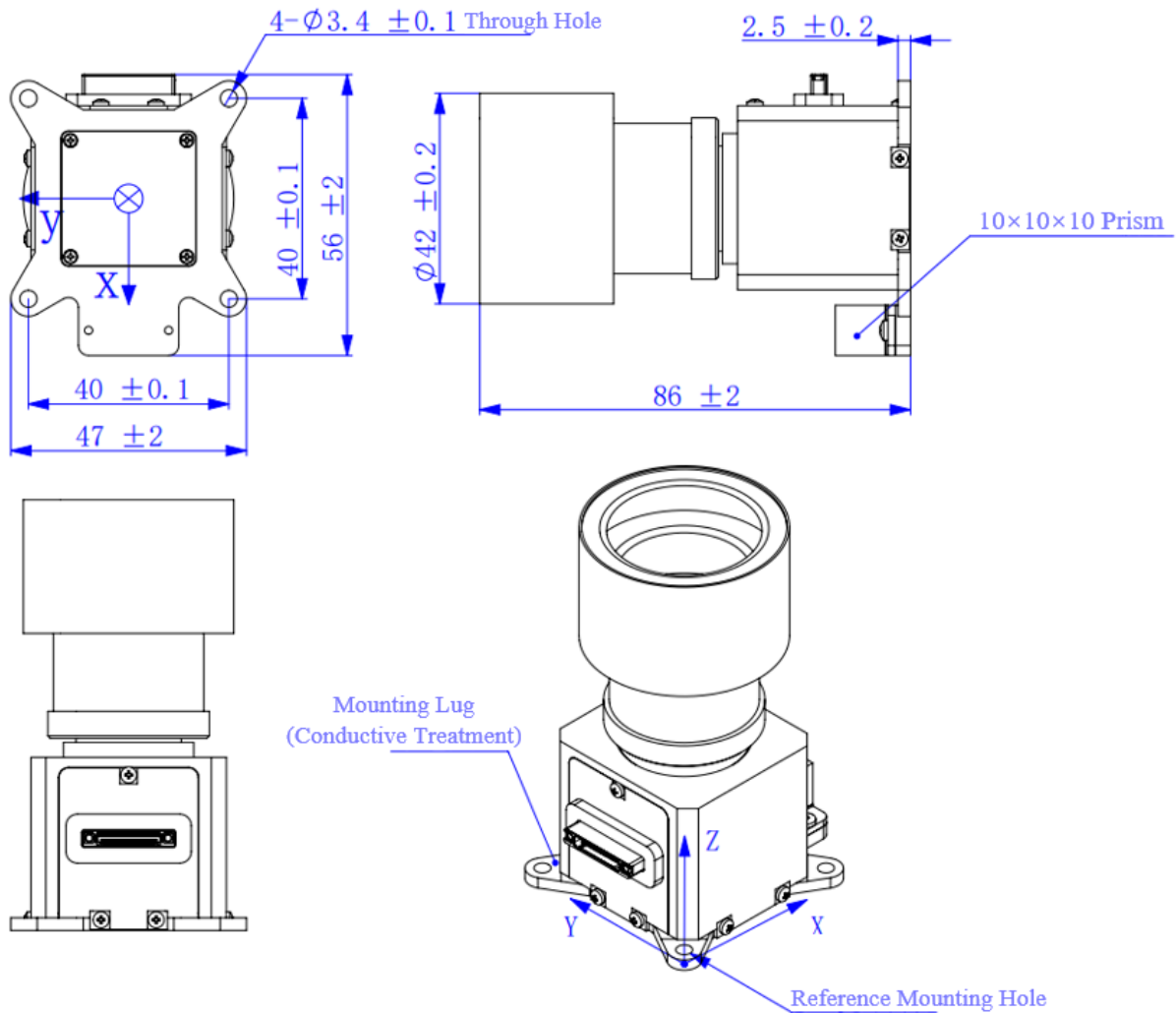
	File Number	TYS-PST3S-L3-IDS	Page 1 of 14			
	Sub-System Name					
	Device Name	PST3S-L3 Star Tracker	Stage Mark			
	Device Code				F M	
Parameters	Specifications					
Bias Instability (MEMS Gyroscope)	$< 0.5^\circ/h$ Allan Variance @25°C					
Angular Random Walk (MEMS Gyroscope)	$< 0.025^\circ/\sqrt{h}$					
Attitude Accuracy	Pointing: 3" (3σ) Roll: 15" (3σ)					
Dynamic Performance	@0.1°/s: 5" (Pointing, 3σ); 20" (Roll, 3σ); @0.5°/s: 8" (Pointing, 3σ); 40" (Roll, 3σ); @1.0°/s: 15" (Pointing, 3σ); 60" (Roll, 3σ); @3°/s: Trackable					
Data Validity Rate	$>98\%$ @ 0.5°/s; $>96\%$ @0.5°/s ~1.5°/s;					
Update Rate	$\geq 10\text{Hz}$					
Acquisition Rate	Max. $\leq 2\text{s}$					
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	3 years @500km Orbit					
Reliability	≥ 0.98 @ the end of 3-year running					
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IDS 2: Mechanical Characteristics

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		Sub-System Name					
		Device Name		PST3S-L3 Star Tracker		Stage Mark	
		Device Code					FM
Device Weight: 90±10g		Device Count: 1				√	
Mechanical Characteristics	Envelope Size (mm)	56±2×47±2		Height: 86±2		√	
	CM Position (mm)	X: 21.46±1	Y: 19.93±1	Z: 25.85±1	√		
	Inertia at CM (kg.mm ²)	P _X = 52.24±2	P _Y = 55.57±2	P _Z = 24.17±2	√		
					MEAS	CALC	EST
Mounting Characteristics	Mounting Hole Count: 4	Mounting Hole Dimensions (Tolerance) (mm): Φ3.4±0.1		Material: 2A12-T4		Determination Method (√)	
	Mounting Contact Area (mm ²): 1079.2			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 (see <i>IDS 3: Instrument Diagram</i>).							
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IDS 3: Instrument Diagram

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	Sub-System Name					
	Device Name	PST3S-L3 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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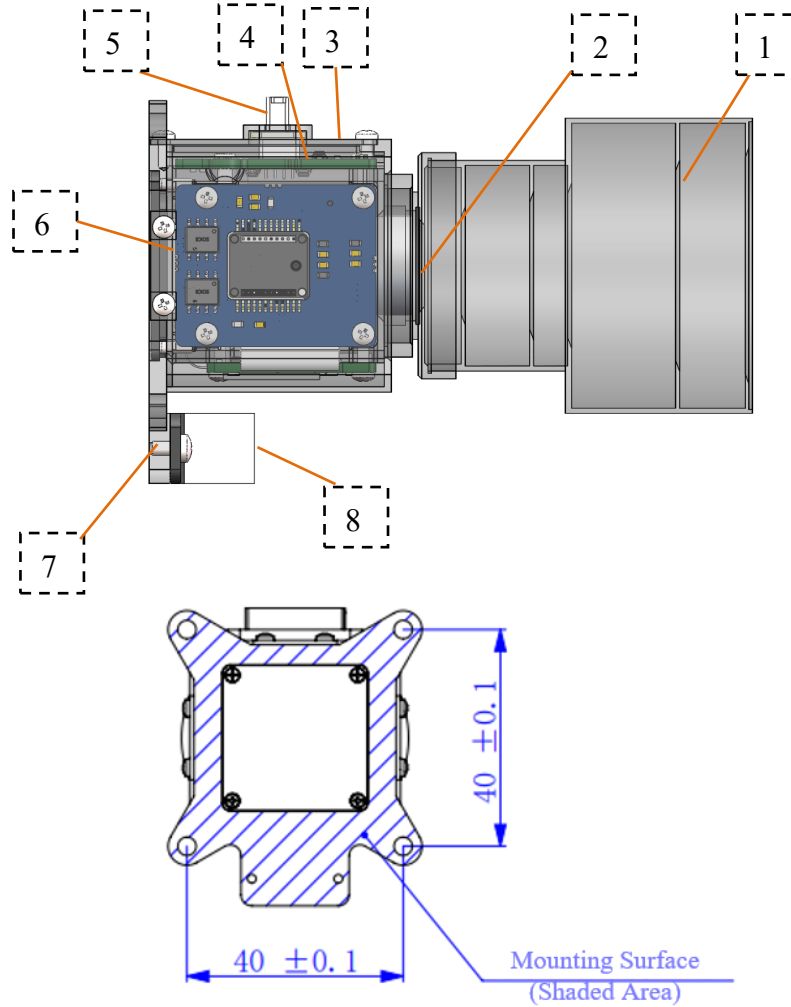
IDS 4: Thermal Characteristics

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		Sub-System Name				
		Device Name	PST3S-L3 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. $\varepsilon_H \geq 0.85$, $\alpha_S \geq 0.96$			
	Outer Surface Treatment: Aluminum Color					
	Outer Surface Emissivity: $\varepsilon_H \geq 0.6$					
Start Temperature °C: -30~+40			Heat Capacity J/K: 85			
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: 1.2 ± 0.2 (Per Device) Power Consumption @Preparing State W: 0 (Per Device)			
Description:						

IDS 5: Thermal Diagram

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	Sub-System Name					
	Device Name	PST3S-L3 Star Tracker	Stage Mark			
	Device Code				FM	

Diagram:



- | | |
|----------------|---|
| 1—Baffle | 2—Lens |
| 3—Circuit Box | 4—Power Supply & Image Processing Circuit Board |
| 5—Connector | 6—Image Sensor Circuit Board |
| 7—Mounting Lug | 8—Optical Prism |

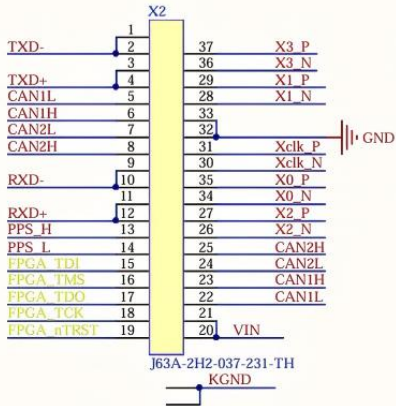
Note: Thermal conductive mounting of Star Tracker Circuit Box and Baffle.

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IDS 6: Power

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		Sub-System Name						
		Device Name		PST3S-L3 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	/	100mV (p-p)		2A/5ms		1.2±0.2W		
Notes: Safe Operating Voltage: 4.8V~5.4V.								
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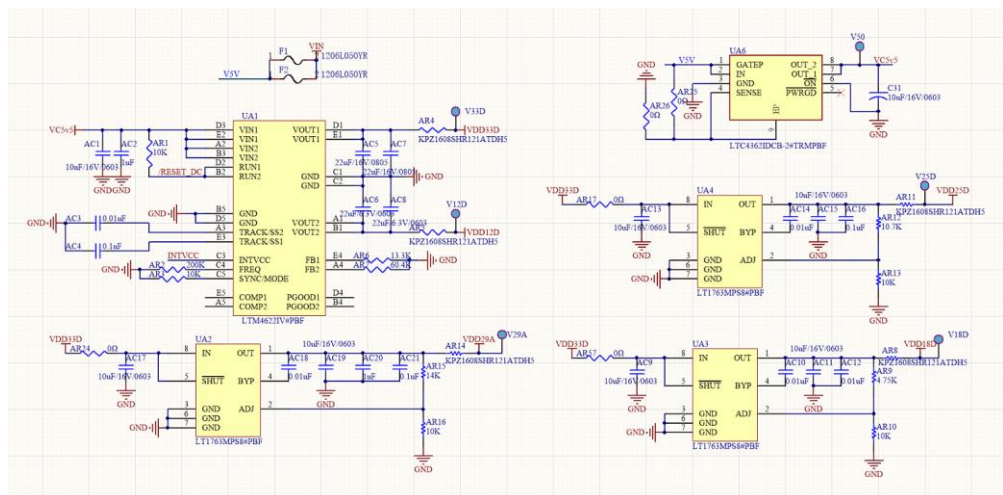
IDS 7: Electrical Connector Contact Assignment – Differential PPS

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		Sub-System Name							
		Device Name		PST3S-L3 Star Tracker		Stage Mark			
		Device Code						FM	
Name (by Function): X2		Electrical Connector P/N: J63A-2H2-037-231-TH				Pin / Hole: Hole			
Contact Number	Signal (Function) Description	Voltage/V	Current/A	Polarity		Remarks (Shielded / Twisted)			
13	PPS_H	RS422 Standard	RS422 Standard	PPS Receive+		13,14 Twisted			
14	PPS_L			PPS Receive-					
20,21	VCC5	5V		Power		Two-Point Two-Wire			
32,33	GND	0V		Power Ground					
3,4	TXD+	RS422 Standard	RS422 Standard	422 Transmit+		1,3 Twisted, 2,4 Twisted			
1,2	TXD-			422 Transmit-					
11,12	RXD+	RS422 Standard	RS422 Standard	422 Receive+		9,11 Twisted, 10,12 Twisted			
9,10	RXD-			422 Receive-					
5,6,7,8,15,16, 17,18,19,22,23, 24,25,26,27,28, 29,30,31,34,35, 36,37						Internal Use			
									
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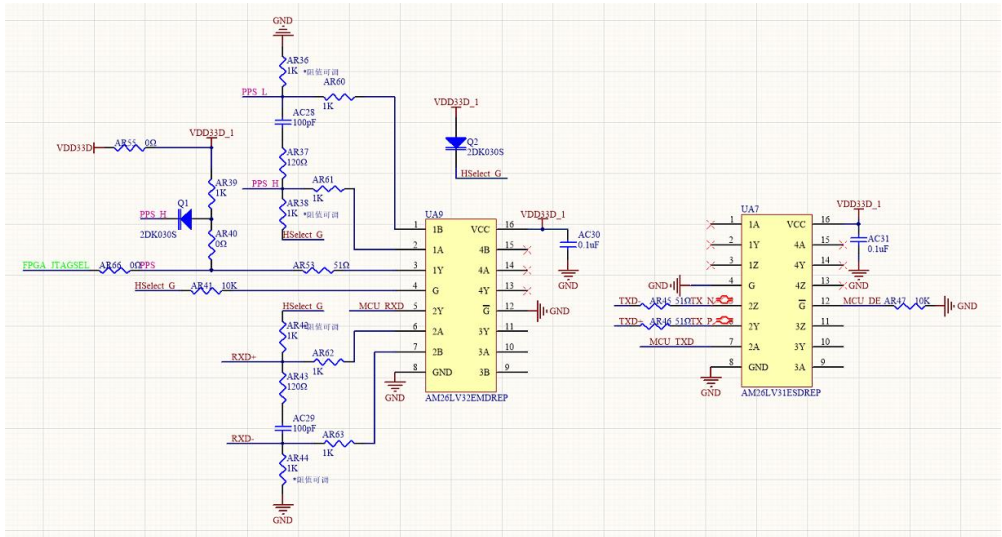
IDS 8: Electrical Interface Features - Power

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		Sub-System Name				
		Device Name	PST3S-L3 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 Input[5V Input] --> USF1206_1[USF1206] Input --> USF1206_2[USF1206] USF1206_1 --> Surge[Surge Suppressor] USF1206_2 --> Surge Surge --> DCDC[DCDC] DCDC --> V33D[V3.3D] V33D --> V12D[V1.2D] V33D --> V33D[V3.3D] V33D -- VLDO --> V18D[V1.8D] V33D -- VLDO --> V25D[V2.5D] V33D -- VLDO --> V29A[V2.9A] </pre>					
Notes						
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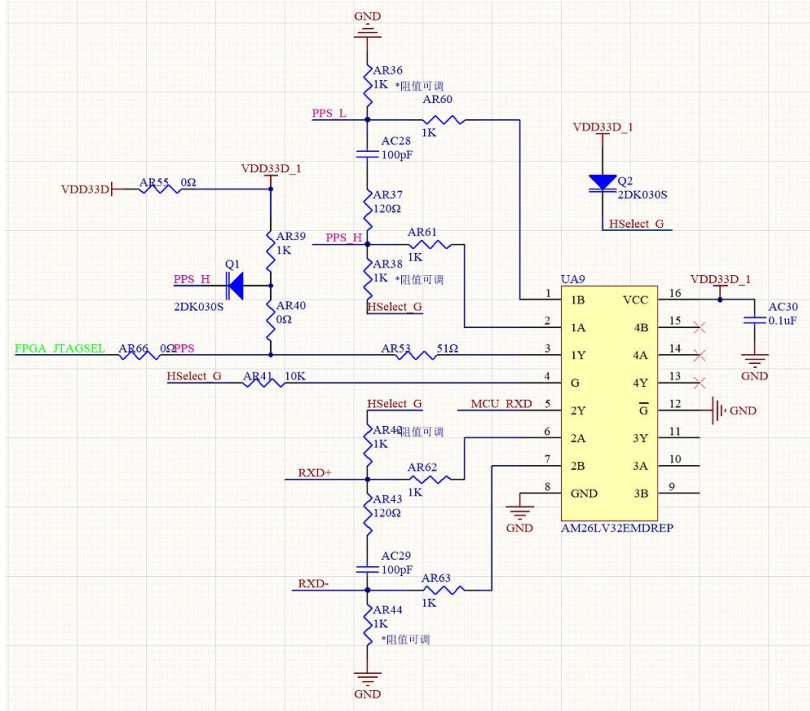
IDS 9: Electrical Interface Features - Power

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		Sub-System Name					
		Device Name	PST3S-L3 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	AR26: not soldered.						
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IDS 10: Electrical Interface Features - RS422

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		Sub-System Name					
		Device Name	PST3S-L3 Star Tracker	Stage Mark			
		Device Code				FM	
Interface Signal	Digital Signal: RS422						
Signal Characteristics	RS422 Communication Baud Rate: 115200bps; Communication Method: Two-point Two-wire						
Interface Circuit							
Notes	AR36, AR60, AC28, AR37, AR61, AR38, AR53: not soldered @Single-Ended PPS; AR39, Q1, AR40: not soldered @Differential PPS						
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IDS 11: Electrical Interface Features - Differential PPS

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		Sub-System Name					
		Device Name	PST3S-L3 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	AR39, AR40 and 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-L3 Star Tracker	Stage Mark		
	Device Code				FM

Schematic Diagram:

J70A-2F2-037-431-TH

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IDS 13: Mounting Requirements

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	Device Name	PST3S-L3 Star Tracker	Stage Mark			
	Device Code				FM	

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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	Sub-System Name				
	Device Name	PST3S-L3 Star Tracker	Stage Mark		
	Device Code				FM
None.					
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