

File Number	Piece Number



File Number	TYS-NST4S-A2-IDS
Stage Mark	FM
Page	14

NST4S-A2 Star Tracker IDS

Signature

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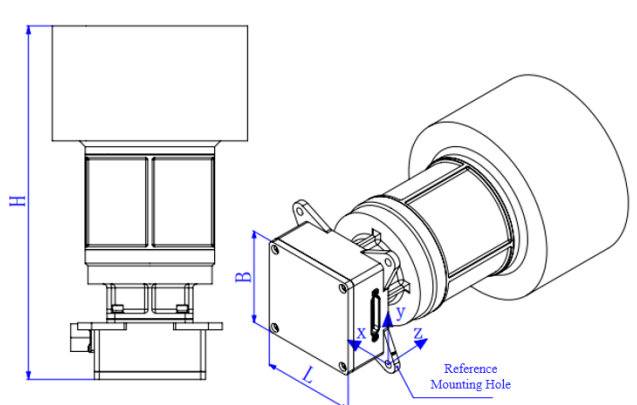
Standardization
Checked by: Dong Pengfei

Approved by: Wang Haijun

IDS 1: Performance Index

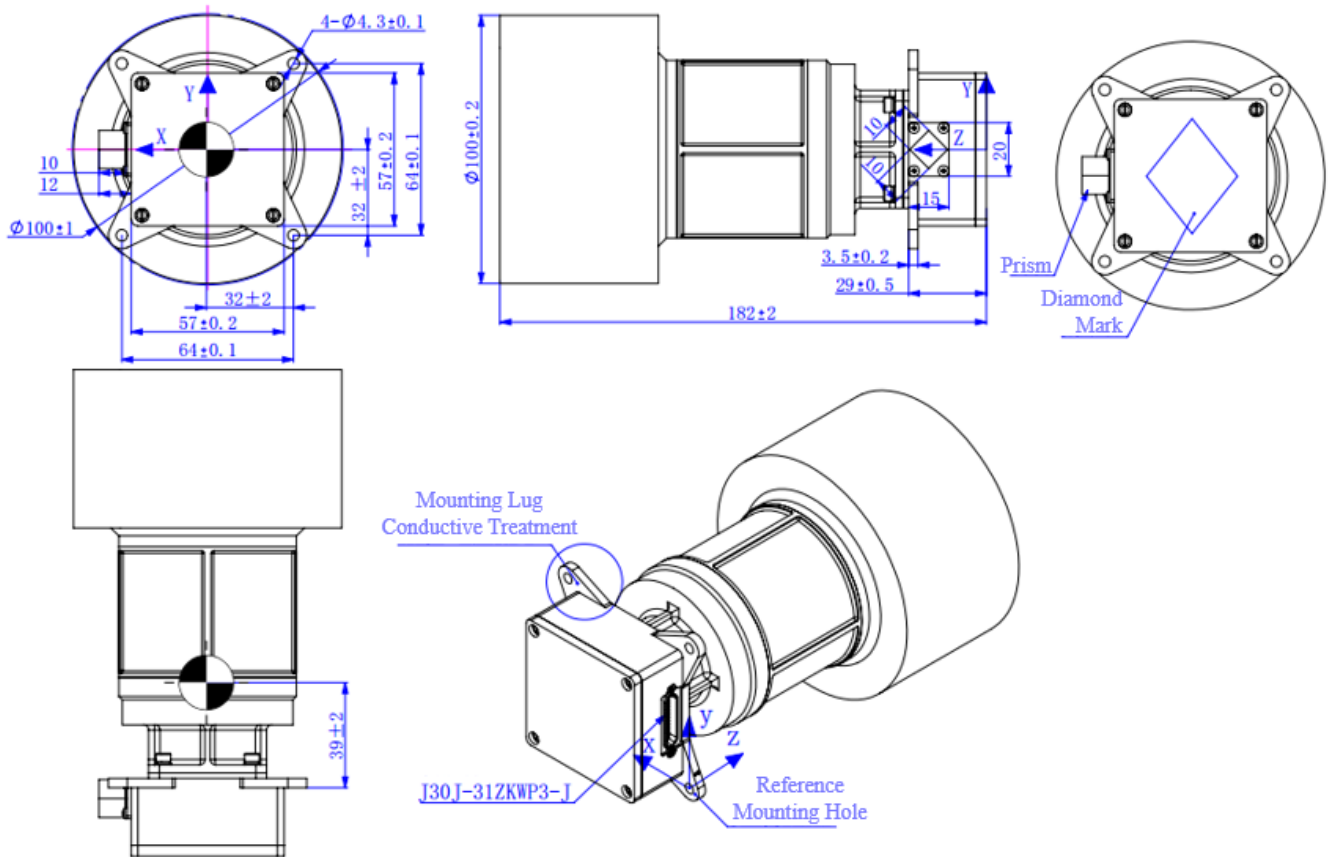
		File Number	TYS-NST4S-A2-IDS		Page 1 of 14		
		Sub-System Name					
		Device Name	NST4S-A2 Star Tracker		Stage Mark		
		Device Code					FM
Parameters	Specifications						
Attitude Accuracy	Pointing: 3" (3σ) Roll: 30" (3σ)						
Dynamic Performance	@0.1°/s: 3" (Pointing, 3σ); 30" (Roll, 3σ); @0.5°/s: 5" (Pointing, 3σ); 50" (Roll, 3σ); @1.0°/s: 10" (Pointing, 3σ); 100" (Roll, 3σ); @3°/s: Trackable						
Data Validity Rate	>98%@ 0.5°/s; >96%@0.5°/s ~1.5°/s; >90%@1.5°/s ~2°/s						
Update Rate	≥10Hz						
Acquisition Rate	Max. ≤2s						
Start-up Time	Better than 5s						
Exclusion Angle	Sun: better than 25°; Earth: better than 20°						
Time Scale Accuracy	Better than 0.1ms @ synchronization pulse (SYNC pulse)						
Communication	RS422						
Quaternions Continuity	The scalar of quaternion: non-negative						
Life Time	7 years @1200km Orbit						
Reliability	≥0.98 @ the end of 7-year running						
Edited (Date):							
Signed (Date):		Mark				Signature, Date	

IDS 2: Mechanical Characteristics

		File Number		TYS-NST4S-A2-IDS		Page 2 of 14	
		Sub-System Name					
		Device Name		NST4S-A2 Star Tracker		Stage Mark	
		Device Code					FM
Device Weight: 370±20g		Device Count: 1					√
Mechanical Characteristics	Envelope Size (mm)	Φ100±1		Height: 182±2			√
	CM Position (mm)	X: 32±2		Y: 32±2	Z: 39±2		√
	Inertia at CM (kg.mm ²)	P _X = 1351±3		P _Y = 1357±3	P _Z = 383±3		√
						MEAS	CALC
Mounting Characteristics	Mounting Hole Count: 4	Mounting Hole Dimensions (Tolerance) (mm): Φ4.3±0.1			Material: 2A12-T4	Determination Method (√)	
	Mounting Contact Area (mm ²): 500			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>).							
Edited (Date):							
Signed (Date):		Mark				Signature, Date	

IDS 3: Instrument Diagram

	File Number	TYS-NST4S-A2-IDS	Page 3 of 14			
	Sub-System Name					
	Device Name	NST4S-A2 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.

Edited (Date):			
Signed (Date):	Mark		Signature, Date

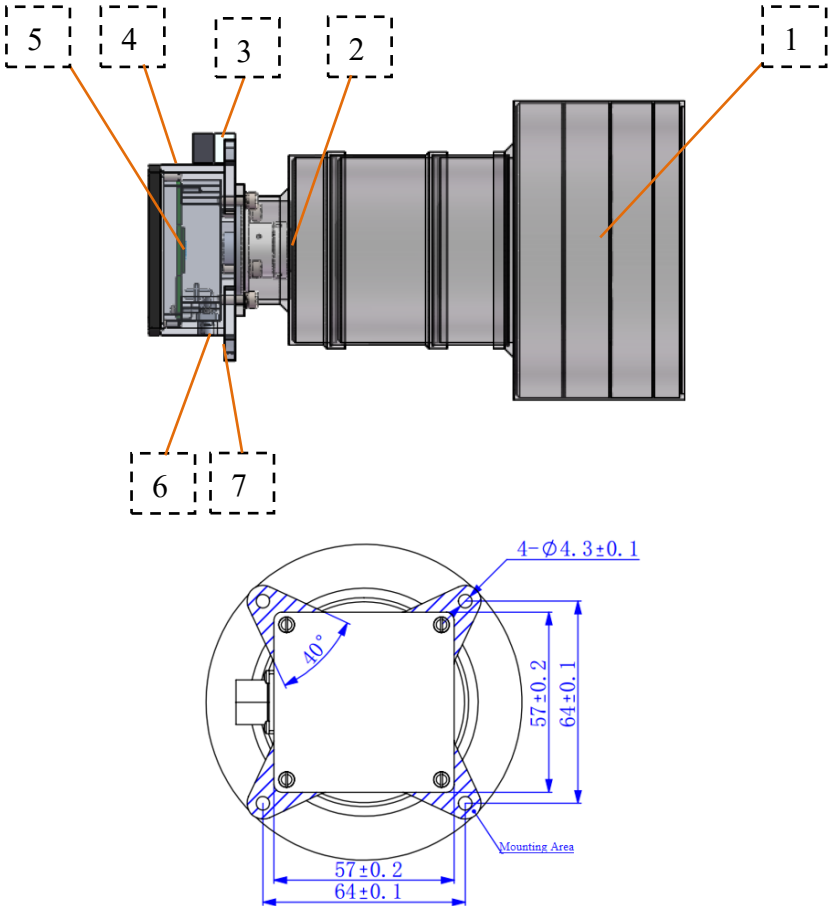
IDS 4: Thermal Characteristics

		File Number	TYS-NST4S-A2-IDS		Page 4 of 14	
		Sub-System Name				
		Device Name	NST4S-A2 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. $\epsilon_H \geq 0.85$, $\alpha_S \geq 0.96$			
	Outer Surface Treatment: Aluminum Nature Color					
	Outer Surface Emissivity: $\epsilon_H \geq 0.6$					
Start Temperature °C: -30~+40			Heat Capacity J/K: 350			
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: 0.9 ± 0.1 (Per Device)			
Description:						
Edited (Date):						
Signed (Date):		Mark			Signature, Date	

IDS 5: Thermal Diagram

	File Number	TYS-NST4S-A2-IDS	Page 5 of 14			
	Sub-System Name					
	Device Name	NST4S-A2 Star Tracker	Stage Mark			
	Device Code				FM	

Diagram:



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

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.

Edited (Date):			
Signed (Date):	Mark		Signature, Date

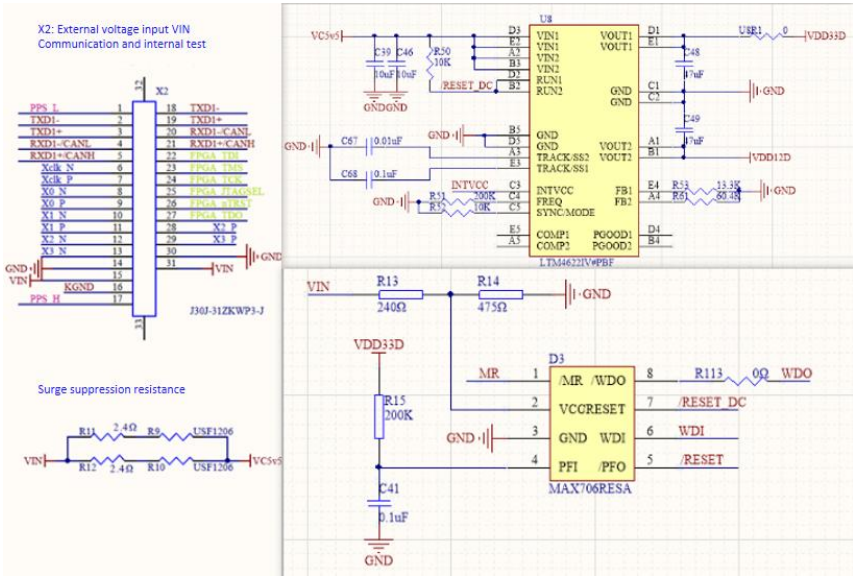
IDS 6: Power

		File Number		TYS-NST4S-A2-IDS		Page 6 of 14		
		Sub-System Name						
		Device Name		NST4S-A2 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		0.9±0.1W		
Notes: Safe Operating Voltage: 4.8V~5.4V.								
Edited (Date):								
Signed (Date):		Mark			Signature, Date			

IDS 7: Electrical Connector Contact Assignment – Differential PPS

		File Number		TYS-NST4S-A2-IDS		Page 7 of 14	
		Sub-System Name					
		Device Name		NST4S-A2 Star Tracker		Stage Mark	
		Device Code					
Name (by Function): Ground, Signal Test		Electrical Connector P/N: J30J-31ZKWP3-J				Pin / Hole: Hole	
Contact Number	Signal (Function) Description	Voltage/V	Current/A	Polarity	Remarks (Shielded / Twisted)		
2,18	TXD1-	RS422 Standard	RS422 Standard	Asynchronously Transmit-	2,3 Twisted, 18,19 Twisted		
3,19	TXD1+			Asynchronously Transmit+			
4,20	RXD1-	RS422 Standard	RS422 Standard	Asynchronously Receive-	4,5 Twisted, 20,21 Twisted		
5,21	RXD1+			Asynchronously Receive+			
17	PPS H	RS422 Standard	RS422 Standard	Synchronize Signal+	1,17 Twisted		
1	PPS L			Synchronize Signal-			
15,31	VIN	/	/	Power			
14,30	GND	/	/	Power Ground			
16	KGND	/	/	Case Ground	Case Ground		
6,7,8,9,10, 11,12,13,22, 23,24,25,26, 27,28,29					Internal Use		
Edited (Date):							
Signed (Date):		Mark			Signature, Date		

IDS 8: Electrical Interface Features - Power

	File Number	TYS-NST4S-A2-IDS	Page 8 of 14			
	Sub-System Name					
	Device Name	NST4S-A2 Star Tracker	Stage Mark			
	Device Code				FM	
Interface Signal	Power Supply					
Signal Characteristics	Operating Voltage: 4.8V~5.4V					
Interface Circuit						
Notes	GND: Power Ground KGND: Case Ground GND is complete isolation with KGND Fuse Model:1206L020YR, Single Channel: 0.2A, Total: 0.4A					
Edited (Date):						
Signed (Date):		Mark			Signature, Date	

IDS 9: Electrical Interface Features - RS422 (Transmit)

		File Number	TYS-NST4S-A2-IDS	Page 9 of 14			
		Sub-System Name					
		Device Name	NST4S-A2 Star Tracker	Stage Mark			
		Device Code				FM	
Interface Signal	Digital Signal: RS422 (Transmit)						
Signal Characteristics	RS422 Communication Baud Rate: 115200bps; Comply with EIA-422-B Standard; Interface Chip: AM26LV31ESDREP, 3.3V						
Interface Circuit							
Notes	TXD1+ and TXD1- are signals interfacing to the satellite bus; TXD2+ and TXD2- are not used for on-board applications. R71: not soldered.						
Edited (Date):							
Signed (Date):		Mark			Signature, Date		

IDS 10: Electrical Interface Features - RS422 (Receive)

		File Number	TYS-NST4S-A2-IDS		Page 10 of 14			
		Sub-System Name						
		Device Name	NST4S-A2 Star Tracker		Stage Mark			
		Device Code					FM	
Interface Signal		Digital Signal: RS422 (Receive)						
Signal Characteristics		RS422 Communication Baud Rate: 115200bps; Comply with EIA-422-B Standard; Interface Chip: AM26LV31ESDREP, 3.3V						
Interface Circuit								

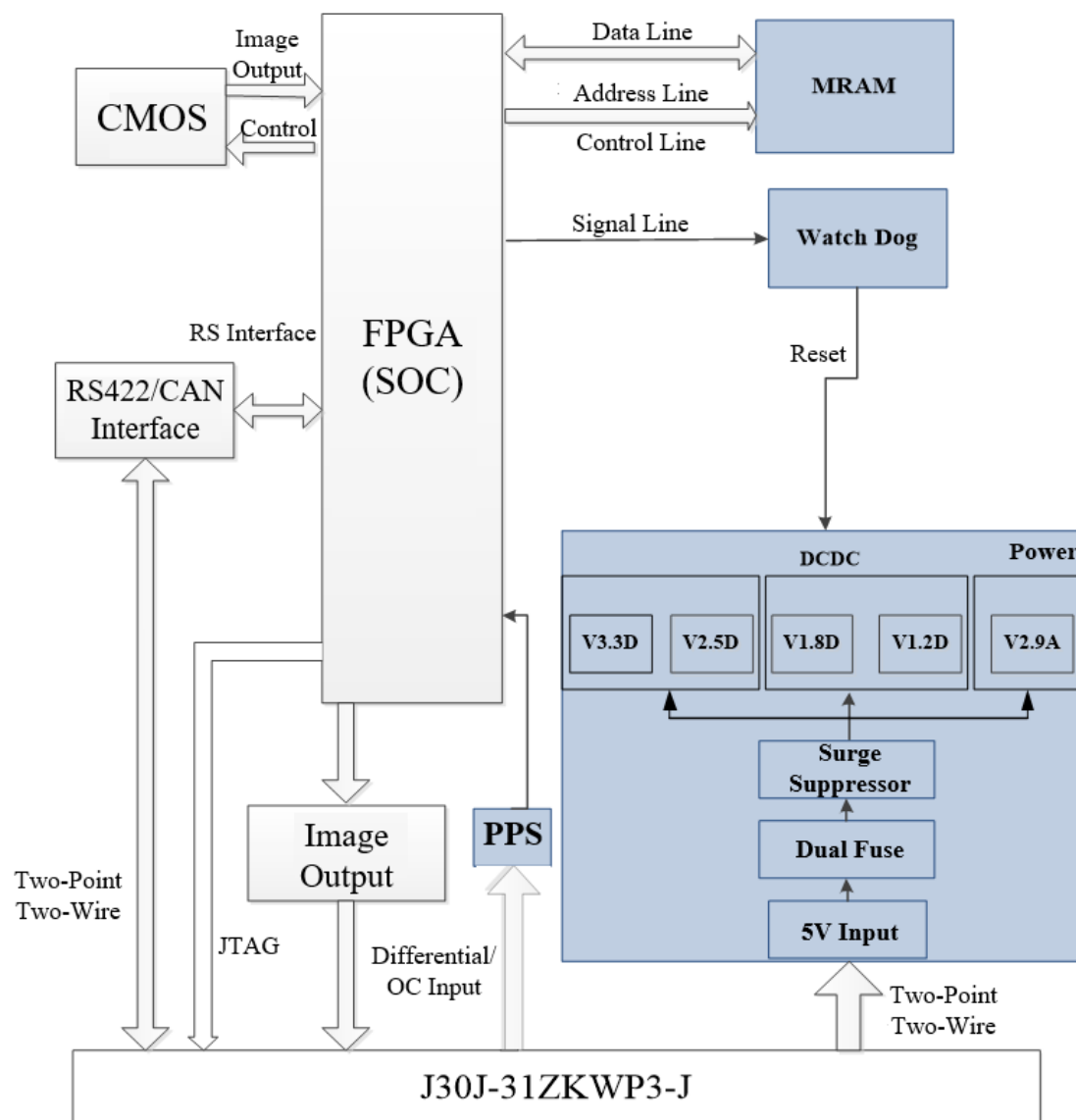
IDS 11: Electrical Interface Features - Differential PPS

	File Number	TYS-NST4S-A2-IDS	Page 11 of 14		
	Sub-System Name				
	Device Name	NST4S-A2 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 1~2ms; Meet the Standard: EIA-422-B.				
Interface Circuit					
Notes	R37, R62, R62, Q1, R74, R75: not soldered @Differential PPS				
Edited (Date):					
Signed (Date):		Mark		Signature, Date	

IDS 12: Circuit and Interface Schematics

	File Number	TYS-NST4S-A2-IDS	Page 12 of 14			
	Sub-System Name					
	Device Name	NST4S-A2 Star Tracker	Stage Mark			
	Device Code				FM	

Schematic Diagram:



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IDS 13: Mounting Requirements

	File Number	TYS-NST4S-A2-IDS	Page 13 of 14			
	Sub-System Name					
	Device Name	NST4S-A2 Star Tracker	Stage Mark			
	Device Code				FM	

non-sheltered area non-sheltered area

$>40^\circ$ $>40^\circ$

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

	File Number	TYS-NST4S-A2-IDS	Page 14 of 14		
	Sub-System Name				
	Device Name	NST4S-A2 Star Tracker	Stage Mark		
	Device Code				FM
None.					
Edited (Date):					
Signed (Date):	Mark		Signature, Date		