



Autonomous Star Sensor ASTRO 10

The ASTRO 10 is an Autonomous Star Sensor for a wide range of LEO and GEO applications. Its Electronic Box is separated from the Optical Head for a flexible accommodation on the spacecraft, giving minimum thermal impact on the S/C structure and maximum pointing capability.

- Lifetime > 10 years
- Low mass Optical Head
- ITAR Parts free design



Technology for Star Sensors

The requirements for the sensors are very demanding. In addition to measurement accuracy and efficiency, reliability and durability play a decisive role. All of our developments have proven this value under the conditions in space.



ASTRO 10 Star Sensor Performance

Dimensions [mm]			
Optical Head + 30 °Baffle	140 Ø x 242		
Optical Head + 40 °Baffle	130 Ø x 205		
Electronic Box	150 x 145 x 75		
Mass [g], e.g. LEO application			
Head	980	+ 510 for 30° Baffle	+340 for 40° Baffle
E-Box	1360		
Harness [2 cables]	320 for 1m length		
Optical Design			
Lens	refractive	focal length 28 mm	aperture 25 mm Ø
CCD Detector	resolution 668 x 520 pixels	pixel size 12.9 µm x 12.9 µm	
Temperature Range [°C]			
Operational Optical Head	-40...+35		
Operational E-Box	-40...+50		
Non-operational Sensor	-50...+70		
Performance			
Field of View	18.4° x 13.7° [physical]	17.6° x 13.5° [effective]	
Single Star Accuracy	3 arcsec [1σ] for 4.0 m _i G ₀ -ref. star		
LOS accuracy [NEA]	< 2 arcsec [1σ] pitch/yaw	< 15 arcsec [1σ] roll	
LOS re-acquisition	< 20 s [without a priori information]	< 5 s [with a priori information]	< 25 s after switch-on
Slew rate	0.6°s ⁻¹ [full performance]	3°s ⁻¹ [reduced performance]	
Sampling time	125 ms		
Sensitivity	SNR = 10 for 6.0 m _i G ₀ -ref. star		
Power Consumption [W]			
Total, Peltier Cooling off	< 8.2 [at 20°C I/F temp., at 28 V]		
Total, Peltier Cooling max	< 14.9 [at 28 V]		
Optical Head, Peltier Cooling off	< 2 [at 20°C I/F temp.]		
Optical Head, Peltier Cooling max	< 5.5		
Operating Modes			
In-Orbit	acquisition mode A SW upload	tracking modes B and C photo	simulation
On-Ground	teach-in	testing	calibration
Data Interface			
	redundant	RS-422 [or customer specified, e.g. MIL-STD-1553B]	
Input Voltage Range			
	nominal 28 V DC	range 22 V – 35 V DC	



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