CIRUS & CIRUS-EX

Compact Intertial Reference Unit (IRU) for Space

emcore®

DATASHEET | JANUARY 2024

A New Era in Navigation

Applications

- Spacecraft Attitude Control
- Platform Stabilization
- Pointing Applications
- Missile Guidance Systems
- Vehicle/Platform navigation
- Northfinder Applications

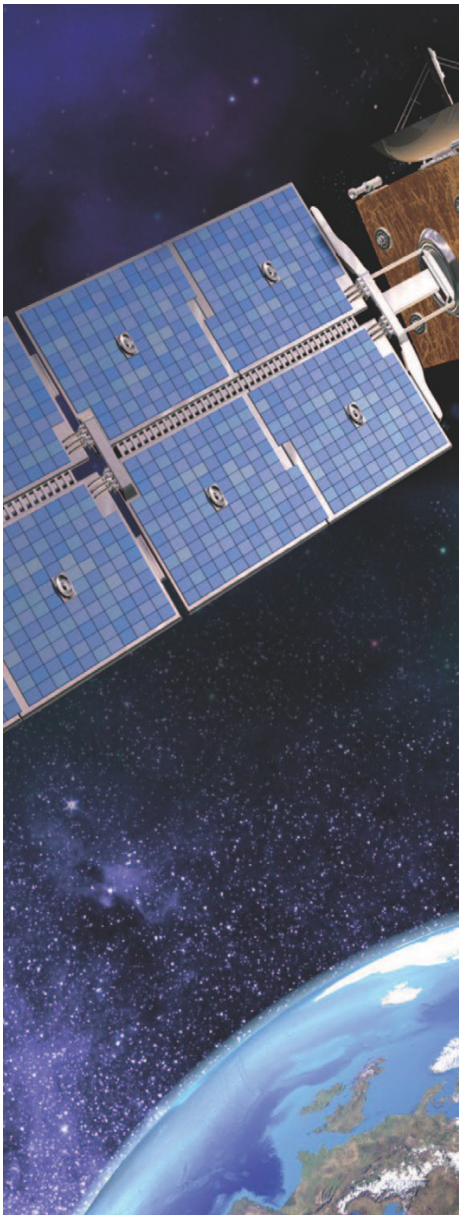
Key Performance Features

- Two Performance Grades with Lowest ARW <100 µ°/√hr
- Four Gyros and Dual A/B Electronics Provide Optimal Redundancy for Enhanced Mission Success
- Dual-Redundant Serial Interfaces (MIL-STD-1553 and RS-422) to permit Flexible I/O Rates
- High-Reliability Class S and Class K Rad-Hard Electronics
- Each Sensor is Individually Power-Select-able Providing Ultimate Flexibility for the End User
- User-Selectable Thermal Set Points Permit Optimal Operation over Changing Mission Environments
- User-Selectable Capability to Execute “On-Station” Commands for Optimal Situational Awareness
- Conductive or Radiative Vehicle-Mount Options
- Telemetry Format can be Customized for any Specific User Interface

Cost-Effective, Next-Generation, Strategic-Grade Fiber Optic Gyros

Leveraging over sixty years of experience and proven performance in systems deployed in space, EMCORE's Compact Inertial Reference Unit for Space (CIRUS) is designed and qualified as the next-generation product of our heritage system. The CIRUS and CIRUS-EX rate sensors deliver two different strategic grades of performance combined with the benefits of a compact, low-cost system in an integral chassis.

Both CIRUS and CIRUS-EX systems feature four Fiber Optic Gyro (FOG) sensors in a fully redundant configuration for spacecraft attitude control, supporting DoD, NASA and commercial missions. The CIRUS and CIRUS-EX are our next generation of IRUs that build on our legacy as the premier supplier of mission-critical precision pointing and navigation systems since the early days of the U.S. space program.



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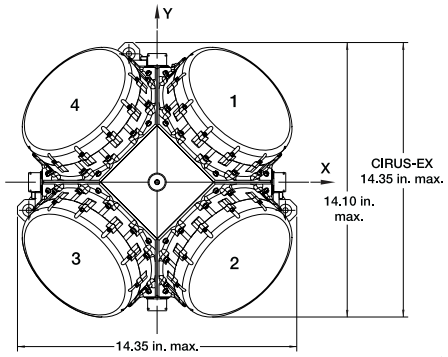
Specifications

Parameter	CIRUS	CIRUS-EX
System Performance		
Bias Stability (1σ)	0.0003 °/hr.	0.0003 °/hr.
Angle Random Walk (EOL)	0.000190 °/√hr. (0.000150 available)	0.000125 °/√hr (< 0.000100 available)
Angle White Noise	0.000025 arc-sec./√Hz (0.000006 typical)	0.000025 arc-sec./√Hz (0.000006 typical)
Angular Rate Range	> 30 °/sec.	> 22 °/sec.
SF Stability	±2 ppm	±2 ppm
SF Linearity (Maximum)	35 ppm (3 typical)	35 ppm (3 typical)
Alignment Stability	< 3.5 arc-sec. (long term) < 20 arc-sec. (life)	< 3.5 arc-sec. (long term) < 20 arc-sec. (life)
Characteristics		
Weight	34.0 lb., 15.4 kg	37.0 lb., 16.8 kg
Dimensions (Fits within cylinder)	Ø 14.10 in. (max) x 8.55 in. (max) Ø 400.1 mm x 217.2 mm	Ø 14.35 in. (max) x 8.75 in (max) Ø 421.6 mm x 223.5 mm
Power	28 VDC input, steady-state, 3 gyros operational ≤ 40 W	
Reliability (30 °C)	> 0.93 Probability of success (Ps) for 15-year life, continuous operation	
Telemetry	RS-422, MIL-STD-1553; FPGA-based interface can be modified without hardware change to meet customer-specific requirements	
Operational Temperature	-23 °C to +41 °C, with > 14 °C temperature variations	
Random Vibration	9.45 grms lateral and normal	
Radiation	> 100 krad total dose SEU-tolerant Latchup immune	

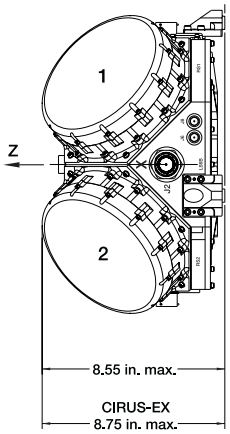
Notes

PUBLIC RELEASE. Cleared by DoD Office of Prepublication and Security Review for public release.

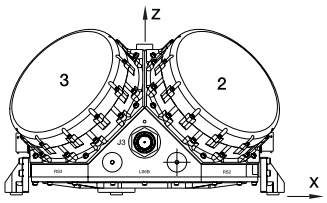
Top View



Right View



Front View



For More Information

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MADE IN USA

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