

# REACTION WHEELS



## PRODUCT DESCRIPTION

Our ultra-low disturbance reaction wheels feature an advanced lubrication system for long life and vibration isolation. With more than 2,000 wheels manufactured and hundreds on-orbit, our reaction wheels have supported missions ranging from very low Earth orbit to cislunar and interplanetary journeys.

Made in the U.S. and applicable for DOD applications.

## HERITAGE

Our reaction wheels are operating on-orbit, supporting numerous successful customer missions. To date, we have more than 500 BCT Reaction Wheels on orbit. Thorough testing in vibration, thermal, and radiation hardening have made the Blue Canyon Reaction Wheel a highly dependable product for satellite systems at our minimum lifespan of five to ten years, depending on wheel size.

## DESIGN

Brushless DC motors, ultra-smooth bearings, and an advanced lubrication system ensures low jitter performance, and long life for your mission.

## WATERFALL PLOT

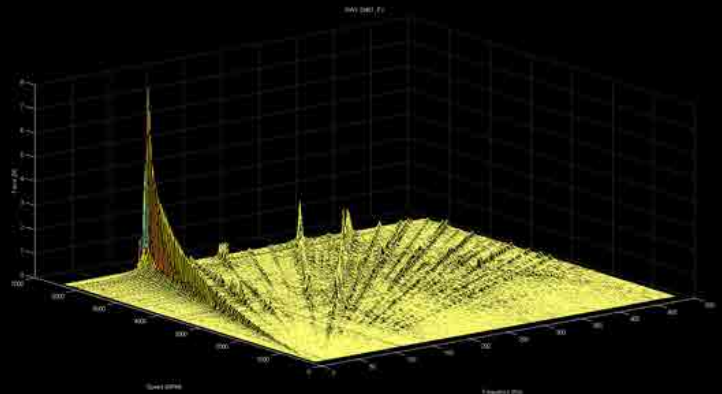
Waterfall plots (radial, axial, and moment) are generated for each reaction wheel characterizing the micro-vibration produced by the wheel and available as an option to customers upon delivery.

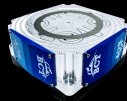
## KEY ADVANTAGES

- High-accuracy observer-based control design
- Low jitter with fine balance available
- Wheel Life Test ongoing
- High torque-to-speed ratio

## BASELINE DELIVERABLES

- User Manual
- Interface Control Documentation
- Command & Telemetry Handbook
- Functional and Performance Test Results
- Certificate of Conformance (Flight Units Only)
- Static and Dynamic Unbalance values per wheel
- Environmental Testing Results (Flight Units Only)



**RWp500****RW1****RW4****RW8****PERFORMANCE**

MAX MOMENTUM	0.500 Nms	1.0 Nms	4.0 Nms	8.0 Nms
MAX TORQUE	0.025 Nm	0.06 Nm	0.25 Nm	0.25 Nm
STATIC/DYNAMIC UNBALANCE (STANDARD)	< 6 g-mm / < 180 g-mm <sup>2</sup>	< 3 g-mm / < 90 g-mm <sup>2</sup>	< 6 g-mm / < 300 g-mm <sup>2</sup>	< 8 g-mm / < 500 g-mm <sup>2</sup>
CONTROL ACCURACY AT MAX TORQUE	2.0 rad			

**MECHANICAL INTERFACE**

MASS	0.86 kg	1.1 kg	3.2 kg	4.4 kg
DIMENSIONS	110 x 110 x 38 mm	110 x 110 x 54 mm	170 x 170 x 70 mm	190 x 190 x 90 mm

**ELECTRICAL INTERFACE**

SUPPLY VOLTAGE	22 - 34 VDC 28 - 34 VDC (full performance)		22 - 34 VDC	
POWER AT MAX MOMENTUM	< 6 W	< 14 W	< 10 W	< 10 W
PEAK POWER	21.3 W	81.1 W	168 W	168 W
POWER AT ZERO MOMENTUM	1.1 W	4.0 W	5.6 W	5.6 W
PEAK REGENERATED POWER	2.8 W	32.7 W	110 W	110 W
CONTROL RATE	200 Hz			
CONNECTOR TYPE	12POS (sockets) Micro-D 21 pin: M83513/13-C01NW			
PROTOCOL	RS-422			
ELECTRONICS	Integrated			

**ENVIRONMENTAL CONDITIONS**

VIBRATION QUALIFICATION	GEVS Qualification Profile
OPERATING TEMPERATURE	-20°C to +60°C
SURVIVAL TEMPERATURE	-30°C to +70°C
SYSTEM RADIATION HARDNESS (Si)	> 40 Krad
DESIGN LIFE	> 10 years



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Lafayette, CO 80026

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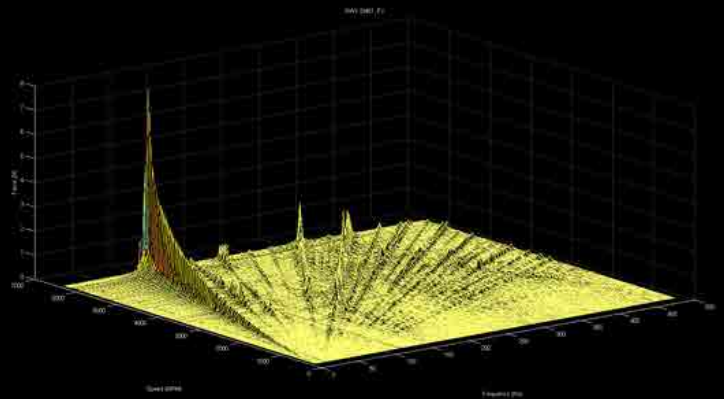
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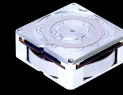
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- Certificate of Conformance (flight units only)
- Static and Dynamic Unbalance values per wheel
- Environmental testing results (flight units only)



**RWp015****RWp050****RWp100****PERFORMANCE**

MAX MOMENTUM	0.015 Nms	0.050 Nms	0.100 Nms
MAX TORQUE	0.004 Nm	0.007 Nm	0.007 Nm
STATIC/DYNAMIC UNBALANCE (STANDARD)	< 1.2 g-mm / < 20 g-mm <sup>2</sup>	< 1.2 g-mm / < 20 g-mm <sup>2</sup>	< 1.5 g-mm / < 20 g-mm <sup>2</sup>
CONTROL ACCURACY AT MAX TORQUE		2.0 rad	

**MECHANICAL INTERFACE**

MASS	0.13 kg	0.24 kg	0.33 kg
DIMENSIONS	42 x 42 x 19 mm	58 x 58 x 25 mm	70 x 70 x 25 mm

**ELECTRICAL INTERFACE**

SUPPLY VOLTAGE		10 - 14 VDC	
POWER AT MAX MOMENTUM	< 1 W	< 1 W	< 1 W
PEAK POWER	5.5 W	9 W	9 W
POWER AT ZERO MOMENTUM	0 W	0 W	0 W
PEAK REGENERATED POWER	0.88 W	0.82 W	0.9 W
CONTROL RATE			
CONNECTOR TYPE		Nano receptacle A29400-031	
PROTOCOL		RS-422	
ELECTRONICS		DCE	

**ENVIRONMENTAL CONDITIONS**

VIBRATION QUALIFICATION		GEVS Qualification Profile	
OPERATING TEMPERATURE		-20°C to +60°C	
SURVIVAL TEMPERATURE		-30°C to +70°C	
SYSTEM RADIATION HARDNESS (Si)		> 40 Krad	
DESIGN LIFE		> 5 years	



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