

REACTION WHEELS



PRODUCT DESCRIPTION

Our ultra-low disturbance reaction wheels feature an advanced lubrication system for long life and vibration isolation. With more than 2,600 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

Nearly 1,000 Blue Canyon reaction wheels have launched, supporting numerous successful customer missions in dynamic environments. Thorough testing in vibration, thermal and radiation hardening have made the Blue Canyon reaction wheel a highly dependable product for satellite systems with demonstrated lifespans of five to ten years, depending on wheel size. In addition, our suite of reaction wheels recently surpassed 18 million hours of on-orbit operations.

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.

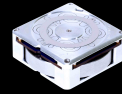
KEY ADVANTAGES

- 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 and Telemetry Handbook
- Functional, performance and environmental test results
- Certificate of Conformance (flight units only)
- Static and Dynamic Unbalance values per wheel



**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 ²	< 1.2 g-mm / < 20 g-mm ²	< 1.5 g-mm / < 20 g-mm ²
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
CONNECTOR TYPE	A79617-001	A79617-001 or A79618-001	A79617-001 or A79618-001
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		
LONGEST UNIT ON-ORBIT (YEARS)	8	6.1	6.1
TOTAL CONFIRMED UNITS LAUNCHED	521	107	30
CUMULATIVE TIME ON-ORBIT (YEARS)	1,582	192	62

Note: This data is for information only and subject to change. Please contact Blue Canyon Technologies for current design data.



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PERFORMANCE

	RWp500	RW1	RW4	RW8	RW16
MAX MOMENTUM	0.500 Nms	1.0 Nms	4.0 Nms	8.0 Nms	16.0 Nms
MAX TORQUE	0.025 Nm	0.06 Nm	0.25 Nm	0.25 Nm	0.25 Nm
STATIC/DYNAMIC UNBALANCE (STANDARD)	< 6 g-mm / < 180 g-mm ²	< 3 g-mm / < 90 g-mm ²	< 6 g-mm / < 300 g-mm ²	< 8 g-mm / < 500 g-mm ²	< 10 g-mm / < 1000 g-mm ²
CONTROL ACCURACY AT MAX TORQUE	2.0 rad				

MECHANICAL INTERFACE

	RWp500	RW1	RW4	RW8	RW16
MASS	0.86 kg	1.1 kg	3.2 kg	4.4 kg	7.5 kg
DIMENSIONS	112 x 124 x 38 mm	112 x 112 x 55 mm	175 x 175 x 72 mm	193 x 193 x 84 mm	242 x 242 x 120 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	< 30 W
PEAK POWER	25 W	100 W	204 W	204 W	204 W
POWER AT ZERO MOMENTUM	1.1 W	4.0 W	5.6 W	5.6 W	5.6 W
PEAK REGENERATED POWER	2.8 W	42 W	134 W	134 W	134 W
CONTROL RATE	200 Hz				
CONNECTOR TYPE	15 pin: M83513/13-B01NW	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				
LONGEST UNIT ON-ORBIT (YEARS)	7	3	4.4	4.4	
TOTAL CONFIRMED UNITS LAUNCHED	115	78	75	14	
CUMULATIVE TIME ON-ORBIT (YEARS)	315	127	138	38	

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