REACTION WHEELS

PRODUCT DESCRIPTION

Our ultra-low disturbance reaction wheels deliver long-life performance and vibration isolation features. With nearly 4,000 wheels manufactured and hundreds on-orbit, our reaction wheels have supported missions ranging from very low Earth orbit to cislunar and interplanetary journeys.

HERITAGE

More than 1,600 of our reaction wheels have launched, supporting numerous successful customer missions in dynamic environments. Thorough testing in vibration, thermal and radiation hardening have made our 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 has surpassed 34 million hours of on-orbit operations.

DESIGN

Brushless DC motors, ultra-smooth bearings and additional advanced features 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.

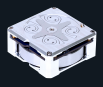
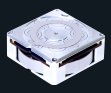
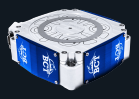
KEY ADVANTAGES

- 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



PERFORMANCE	RWp015	RWp050	RWp100	RWp500
MAX MOMENTUM	0.015 Nms	0.050 Nms	0.100 Nms	0.500 Nms
MAX TORQUE	0.004 Nm	0.007 Nm	0.007 Nm	0.025 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	< 6 g-mm / < 180 g-mm^2
CONTROL ACCURACY AT MAX TORQUE	2.0 rad			
MECHANICAL INTERFACE				
MASS	0.13 kg	0.24 kg	0.33 kg	0.86 kg
DIMENSIONS	42 x 42 x 19 mm	58 x 58 x 25 mm	70 x 70 x 25 mm	112 x 124 x 38 mm
ELECTRICAL INTERFACE				
SUPPLY VOLTAGE	10 - 14 VDC			22 - 34 VDC 28 - 34 VDC (full performance)
POWER AT MAX MOMENTUM	< 1 W	< 1 W	< 1 W	< 6 W
PEAK POWER	5.5 W	9 W	9 W	25 W
POWER AT ZERO MOMENTUM	0 W	0 W	0 W	1.1 W
PEAK REGENERATED POWER	0.88 W	0.82 W	0.9 W	2.8 W
CONNECTOR TYPE	A79617-001	A79617-001 or A79618-001	A79617-001 or A79618-001	15 pin: M83513/13-B01NW
PROTOCOL	RS-422			
ELECTRONICS	DCE			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)	8.8	6.8	6.8	7.8
TOTAL CONFIRMED UNITS LAUNCHED	525	188	46	119
CUMULATIVE TIME ON-ORBIT (YEARS)	1,849	283	83	389

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

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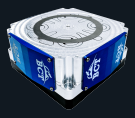
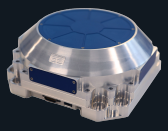
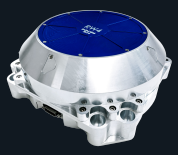

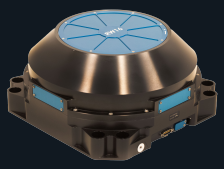

	RW1	RW2 | RW2-HT	RW4 | RW4-HT	RW8 | RW8-HT	RW16 | RW16-HT
PERFORMANCE					
MAX MOMENTUM	1.0 Nms	2.0 Nms | 1.2 Nms	4.0 Nms | 2.5 Nms	8.0 Nms | 5.0 Nms	16.0 Nms | 10.0 Nms
MAX TORQUE	0.06 Nm	0.12 Nm | 0.25 Nm	0.25 Nm | 0.50 Nm	0.25 Nm | 0.50 Nm	0.25 Nm | 0.50 Nm
STATIC/DYNAMIC UNBALANCE (STANDARD)	< 3 g-mm / < 90 g-mm^2	< 4 g-mm / < 250 g-mm^2	< 6 g-mm / < 300 g-mm^2	< 8 g-mm / < 500 g-mm^2	< 10 g-mm / < 1000 g-mm^2
STATIC/DYNAMIC FINE BALANCE	< 1 g-mm / < 10 g-mm^2	-	< 2.5 g-mm / < 150 g-mm^2	< 3 g-mm / < 350 g-mm^2	< 5 g-mm / < 500 g-mm^2
CONTROL ACCURACY AT MAX TORQUE	2.0 rad				
MECHANICAL INTERFACE					
MASS	1.1 kg	2.5 kg	3.2 kg	4.4 kg	7.5 kg
DIMENSIONS	112 x 112 x 55 mm	150 x 150 x 65 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				
POWER AT MAX MOMENTUM	< 14 W	< 14 W	< 10 W	< 10 W	< 30 W
PEAK POWER	100 W	100 W	176 W	176 W	204 W
POWER AT ZERO MOMENTUM	4.0 W	4.0 W	5.6 W	5.6 W	5.6 W
PEAK REGENERATED POWER	42 W	42 W	134 W	134 W	134 W
CONTROL RATE	200 Hz				
CONNECTOR TYPE	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)	3.4	-	6.0 | TRL8	4.1	-
TOTAL CONFIRMED UNITS LAUNCHED	331	TRL4	163 | TRL8	50	TRL8
CUMULATIVE TIME ON-ORBIT (YEARS)	407	-	232 | TRL8	92	-

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