CubeWheel

Momentum/Reaction Wheel

Feature List

Motor:

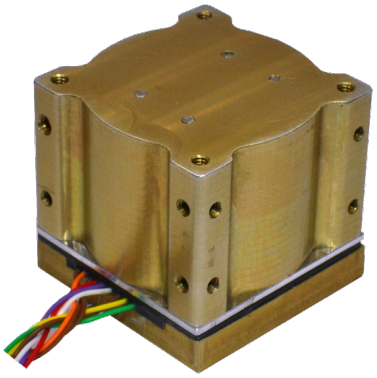
- Brushless DC motor to minimise friction
- Vacuum-rated bearings

Electronics:

- 12-bit angular rate feedback
- Integrated electronics which includes drive circuitry and speed control algorithms
- I2C, UART, and CAN interfaces

Mechanical:

- Various sizes: Small, Medium, and Large
- Mountable in 3 axes
- Magnetically shielded using Mu-Metal



Application

- Can be used to exchange angular momentum with satellite body
- Easily integrates with CubeADCS bundles

Testing & Heritage

- Successful heated vacuum test
- Wheel design based on momentum wheels used for QB50 precursor satellites

Specifications

CubeWheel	Small	Medium	Large
Operating voltage ($V_{battery}$ = 6.5 V - 16 V)	3.3 V / $V_{battery}$	3.3 V / $V_{battery}$	3.3 V / $V_{battery}$
Speed range	±8000 rpm	±6000 rpm	±6000 rpm
Speed control accuracy	< 5 rpm	< 5 rpm	< 5 rpm
Max torque ($V_{battery}$ = 8 V)	0.23 mNm	1.0 mNm	2.3 mNm
Momentum storage (@ max rpm)	1.7 mNms	10 mNms	30 mNms
Peak power (@ max torque, $V_{battery}$ = 8 V)	< 0.6 W	< 1.0 W	< 2.2 W
Average power (@ 2000 rpm, $V_{battery}$ = 8 V)	< 0.18 W	< 0.24 W	< 0.27 W
Dimensions	28 x 31 x 26 mm	46 x 46 x 31.5 mm	57 x 57 x 31.5 mm
Mass	55 g	130 g	200 g

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