CubeWheel

Reaction/Momentum Wheel

Feature List

Motor:

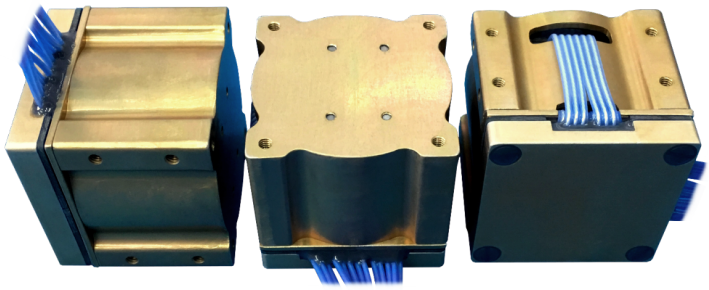
- Brushless DC motor to minimise friction
- Vacuum-rated bearings

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
- Mounting holes strengthened with heli-coils
- 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)	0.72 W	< 1.5W	< 2.2 W
Average power (@ 2000 rpm, $V_{battery}$ = 8 V)	0.12 W	< 0.24 W	< 0.27 W
Dimensions	28 x 28 x 26.1 mm	46 x 46 x 31.5 mm	57 x 57 x 31.5 mm
Mass	60 g	140 g	220 g

ESL
Electronic Systems Laboratory

Contact Us

Phone : +27 21 808 9499
E-mail : info@cubespace.co.za
Web : www.cubespace.co.za
Facebook : /CubeSpaceADCS
Twitter : @CubeSpace_ADCS

Physical Address

CubeSpace
The LaunchLab
Hammanshand Road
Stellenbosch, 7600
South Africa

UNIVERSITEIT STELLENBOSCH UNIVERSITY