WHL-1000S

1000 mNms Reaction Wheel

For Micro Satellites

Features

- Performance
  - Max nominal RPM: 10.000
  - Momentum: 1000 mNms @ 10.000 RPM
  - Max Torque > 40 mNm
  - Control: Speed, torque
- Physical
  - 120 x 120 x 45 mm
  - Mass: 900 gram
  - Rotor inertia: 1 x 10-3 kg m2
  - Operating temperature range -40°C to 70°C
  - Stainless steel rotor
  - Aluminium motor housing
- Electrical
  - Bus interface: CAN
  - Voltage: 28V
  - Power: 50W max, 15W at 1000 mNms
- Reliability
  - Long life brushless motor design
  - Redundant windings and drive stage
  - Hybrid ball bearings
  - Radiation total dose tested EEE parts
  - Vibration rated for all launch vehicles
  - 5 years design lifetime

Description

Fully integrated reaction wheel unit for high performance satellite attitude control for Micro satellite missions with mission lifetime up to 5 years (minimum).

The WHL-1000 wheel is an integrated 3-phase outrunner BLDC with fully integrated motor control electronics and software. Material for the body is Al-7075-T6, and the rotor is made of ferritic stainless steel while the magnetsare Neodymium. The rotor is axially suspended between two hybrid ceramic high precision bearings chosen for long life and low friction in vacuum conditions. The wheel is commutated by its own internal microcontroller, which runs the control loop to control speed and acceleration upon commands from the ADCS computer.

Each wheel has a CAN bus interface with CSP making them accessible to the satellite communication bus. The wheels are fitted with basic telemetry sensors: Temperature, current, speed, vibration. Software can be updated runtime with only a few seconds idle spinning.

For reliability, the stator incorporates redundant wiring which are complemented by redundant drive stage electronics. The internal power supplies add latch-up protection as well as over-current protection to all the circuits.