

2.09. REACTIVE FLYWHEEL FOR MICROSATELLITE ORIENTATION



Controlled reactive flywheel is a miniaturized digitally controlled drive system, which is designed to orient microsattellites relative to the selected axis. The flywheel drive motor is developed on the basis of a contactless magnetoelectric circuit with an external rotor. An external magnetic circuit of the motor simultaneously performs the functions of inertial mass. The rotor rotation control is carried out by an electronic circuit integrated into motor that allows to reduce a number of power and signal wires fed to the motor, and to develop flywheel together with a control system in a pressure hull.

The flywheel control system provides:

- control of motor rotor position;
- monitoring of motor current;
- monitoring of the temperature inside the drive;
- data exchange with microcontroller;
- speed control of the motor by microcontroller command;
- limitation of the motor current at a level corresponding to a maximum power consumption of 1 W.

Technical specifications:

Rotor inertia moment, kg·m ²	0,0000215
Rotation velocity range, rpm	6000
Step of rotation velocity correction, rpm	0,2
Control moment, Nm	0,0012
Supply voltage, V	3...3,5
Frequency of control commands, s	1/16 ...3
Weight with control system, kg	0,2
Dimensions with control system, mm	∅ 58 x 42
Energy consumption (Constant speed/max moment), W	0,16 / 0,9