



Reaction Wheels

| Single Axis Micro Wheel 500mNms

The flywheel adopts electromechanical structure which realizes the light weight design. Military components are used in this micro flywheel which consists of digital controlling electronic, ball bearing, driving motor and connecting cable.

■ Key features

- Wide power voltage range which could connect to power supply system of satellite directly
- Adapting Hall measurement method without photoelectric encode
- Small size and light weight
- High accuracy of speed controlling
- Low power consumption

■ Application

It could be applied in Nanosats (50~100kg) of high attitude controlling accuracy. It has been applied in “zhuhai-1” series satellites.



Item	Unit	Specified Value
Maximum angular momentum	mNms	500@6000rpm
Maximum speed	rpm	$\geq \pm 6500$
Error of speed (3σ)	rpm	$\leq \pm 2$
Maximum output torque	mNm	≥ 18
Time constant	s	≤ 0.3
Operational mode	-	Speed mode/Torque mode
Power consumption at steady state	W	≤ 6.5
Maximum power consumption	W	≤ 27 (while the absolute value of reaction torque is 18mNm)
Power voltage	V	24~32
Communication interface	-	CAN2.0B
Dimension	mm	110×110×97
Mass	kg	≤ 1.3
Lifetime	a	≥ 3
Lead time	month	T0+8

Reaction Wheel 4Nms

This production consists of motor, housing and controlling electronic subassembly including software. It could work at speed mode or torque mode. It has been applied in “Innovation” series and rapid respond series satellites.

■ Key features

- Small size and light weight
- Multi-function, it could be reaction wheel or momentum wheel
- Low cost by adapting Hall measurement method
- Low power consumption
- Small torque resolution

■ Application

It could be applied in small satellites of high attitude controlling accuracy.



Item	Unit	Specified Value
Maximum angular momentum	Nms	≥ 4
Maximum output torque	Nm	≥ 0.1
Maximum speed	rpm	≥ 6000
Torque resolution	mNm	≤ 0.2
Loss torque	mNm	≤ 15
Operational mode	-	Speed mode/Torque mode
Power consumption at steady state	W	≤ 7.5
Maximum power consumption	W	≤ 100
Power voltage	V	28
Communication interface	-	CAN2.0B
Dimension	mm	$\Phi 178 \times 72$
Mass	kg	≤ 2.9
Lifetime (LEO)	a	≥ 1
Lead time	month	T0+8

Reaction Wheel 15Nms

This production is speed-mode flywheel which consists of ball bearing unit, rotating mass, housing, controlling electronic subassembly including software, photoelectric encode subassembly, motor and connectors. It has been applied in “Practice” series and many remote sensing satellites.

Key features

- Light weight
- Control electronic based on FPGA and RS422 digital interface
- Highest control accuracy in China ($\leq 0.2\text{rpm}$)
- Inertial air exhaust valve, bracket less mounting
- Assemble rotating mass

Application

It could be applied in middle and small size satellites of high attitude control accuracy.



Item	Unit	Specified Value
Maximum angular momentum	Nms	15±1
Maximum output torque	Nm	≥0.15
Maximum speed	rpm	≥3500
Tolerance of angular momentum controlling constant	Nms	≤0.005
Controlling error of angular momentum	Nms	≤0.002
Power voltage	V	28±3
Operational mode	-	Speed mode
Power consumption at steady state	W	8
Maximum power consumption	W	75
Communication interface	-	RS 422
Dimension	mm	Φ290×113
Mass	kg	≤7
Lifetime	a	≥8
Lead time	month	T0+12

Reaction Wheel 25Nms

Flywheel is the important actuator part of the satellite attitude controlling system. This electromechanical production is the first digital reaction flywheel based on FPGA control electronic in China. And the speed measure accuracy is the highest in China. It has been applied in many communication satellites.

Key features

- Long lifetime
- Control electronic based on FPGA and RS422 digital interface
- Highest control accuracy in China ($\leq 0.2\text{rpm}$)
- Inertial air exhaust valve

Application

It could be applied in small satellites of high attitude control accuracy in MEO and LEO.



Item	Unit	Specified Value
Maximum angular momentum	Nms	25
Maximum output torque	Nm	0.2
Maximum speed	rpm	≥ 3500
Tolerance of angular momentum controlling constant	Nms	≤ 0.005
Controlling error of angular momentum	Nms	≤ 0.002
Power voltage	V	42 ± 3
Operational mode	-	Speed mode
Power consumption at steady state	W	≤ 10
Maximum power consumption	W	≤ 120
Communication interface	-	RS 422
Dimension	mm	$\Phi 312 \times 121$
Mass	kg	≤ 10
Lifetime	a	≥ 8
Lead time	month	T0+12

Momentum Wheel 25Nms B

This production is an electromechanical production with internal wheel drive electronic, which could work as momentum flywheel or reaction flywheel. Its operational mode is torque-mode. It has been successfully applied in many meteorological satellites.

Key features

- Small size and welding sealed
- Excellent environmental adaptability by adopting analog electronic
- Internal step-up electronic
- Long lifetime

Application

It could be applied in meteorological satellites MEO and HEO.



Item	Unit	Specified Value
Maximum angular momentum	Nms	25
Maximum output torque	mNm	≥75
Maximum speed	rpm	±6000
Power voltage	V	28±3/42±3
Operational mode	-	Torque mode
Power consumption at steady state	W	≤25
Maximum power consumption	W	≤90
Communication interface	-	RS 422
Dimension	mm	Φ260×106
Mass	kg	8.5±0.2
Lifetime	a	≥8
Lead time	month	T0+12

Large Torque Reaction Wheel 1Nm

The production is a speed mode reaction flywheel which consists of ball bearing unit, rotating mass, housing, controlling electronic subassembly including software and photoelectric encode subassembly. It has been applied in rapid respond series satellites which require a large output torque.

Key features

- Large output torque
- Light weight
- High accuracy speed feedback electronic based on FPGA
- Inertial Hall & photoelectric encode speed measurement method
- Low cost

Application

It could be applied in small satellites of high attitude control accuracy .



Item	Unit	Specified Value
Maximum angular momentum	Nms	11
Maximum output torque	Nm	≥ 1
Maximum speed	rpm	± 1200
Power voltage	V	28 ± 3
Operational mode	-	Speed Model
Power consumption at steady state	W	≤ 15
Maximum power consumption	W	≤ 160
Communication interface	-	CAN2.0B/RS 422
Dimension	mm	$\Phi 337 \times 121$
Mass	kg	≤ 10
Lifetime	a	≥ 1
Lead time	month	T0+8

| SGCMG-50Nms

It consists of wheel, slip ring, photoelectric encoder and PMSM motor. By changing the angular momentum direction of the wheel, CMG realizes the rapid exchange of angular momentum of the aerospace craft for elevating the maneuverability. It has been successfully applied in many midsize agile satellites.

■ Key features

- Large output torque
- Low power consumption
- High accuracy
- Light weight

■ Application

It could be applied in agile satellites in HEO, MEO and LEO.



Item	Unit	Specified Value
Angular momentum	Nms	50
Range of angular momentum	Nms	30~70
Maximum output torque	Nm	12
Speed of gimbal rotates	°/s	0.005
Power consumption at steady state	W	≤30
Maximum power consumption	W	≤80
Communication interface	-	RS 422
Dimension	mm	506.8×334×295
Mass	kg	21.8±0.2
Lifetime	a	5
Lead time	month	T0+18