

Reaction Wheel

Abstract:

This instruction describes the appearance features, technical specifications, interface definitions and communication protocols of Reaction Wheel.

Key Words: Satellite, Reaction Wheel, Specification, Protocol

1. Appearance

The appearance of Reaction Wheel is shown as figure1.

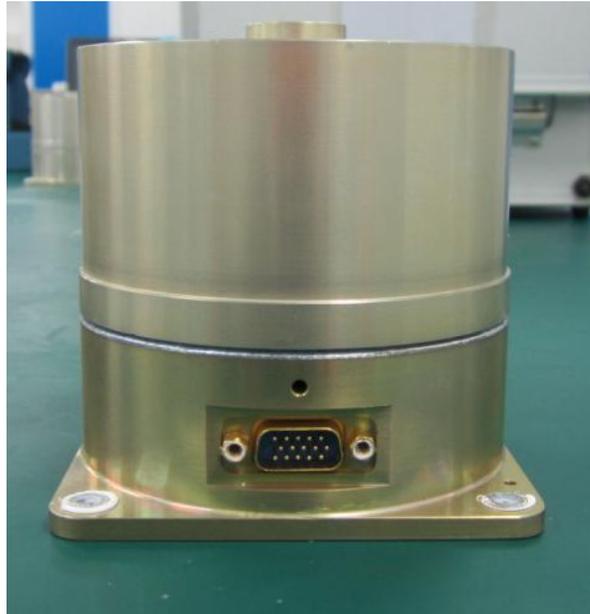


Fig.1 Reaction Wheel

2. Specifications

Table1 Specifications

Item	Parameter	Remark
Maximum angular momentum	0.65Nms	
Maximum control torque	20mNm	
Rotating speed range	-6000 to +6000 rpm@16V	
Rotating speed control accuracy	N/A (0 to 30 rpm) better than ± 5 rpm (30 to 100 rpm) better than ± 1 rpm (100+ rpm)	
Torque control resolution	0.003mNm	
Angular speed control accuracy	better than $0.1^\circ /s$	

3. Mechanical Interfaces

Table2 Specifications

Item	Parameter	Remark
Outline size	112mm×112mm×66mm	
Weight	≤ 1.2 Kg	
Mounting size	90mm×90mm	
Mounting aperture	4- $\Phi 5.5$ mm	

4. Power Requirements

+14 to +30V DC power supply.

Table3 Power Requirements

Items	Parameter	Remark
Power supply	+14 to +30V	

Inrush current	2A/5ms	
Steady power consumption	<1.5W	
Peak power consumption	<20W	

5. Interface Definitions and Communication Protocols

5.1 communication interface

Reaction Wheel provides CAN data bus and RS422 data bus. Reaction wheel and connectors used for satellite adopts J30J-25ZK8 manufactured by GuiHang Company.

1) CAN data bus interface

CAN communication rate 500Kbps, receiver input impedance: 5 to 10KΩ, differential input impedance: 20 to 100KΩ. The circuit interface is shown as figure2.

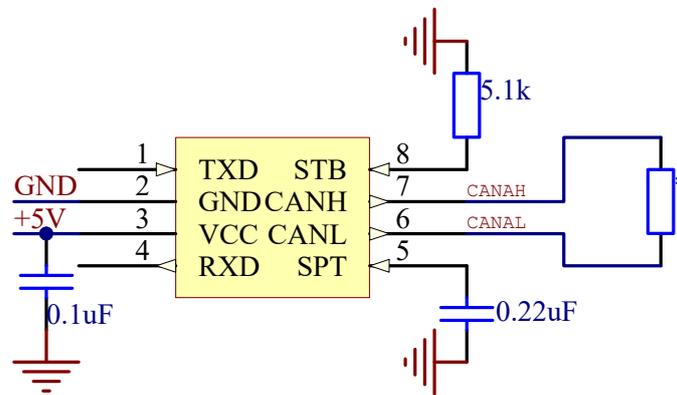


Figure2 CAN data bus interface

2) RS422 input interface

Asynchronous Serial Interface, pulse per second signal receiving logic signal. The interface chip adopts AM26C32. The circuit interface is shown as figure3.

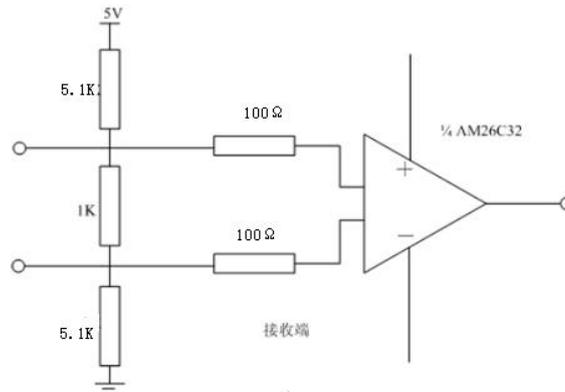


Figure3 RS422 input interface

3) RS422 output interface

Asynchronous Serial Interface, pulse per second signal output logic signal. The interface chip adopts AM26C31. The circuit interface is shown as figure4.

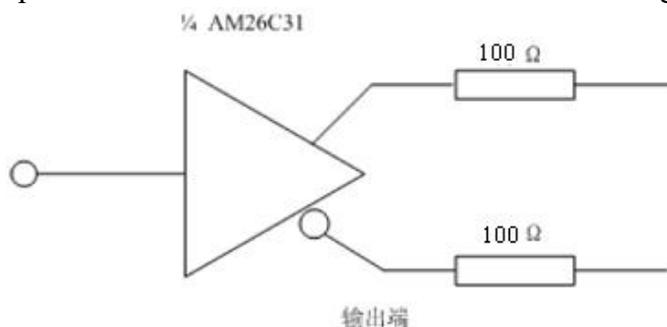


Figure4 RS422 output interface

5.2 communication protocols

RS422 adopts standard asynchronous serial interface communication protocol, with 1 start bit, 8 data bits, 1 stop bit, and the data content is determined by users.

CAN data bus comply with CAN2.0A protocol. The data content is determined by users.

6. Fault Identification

If the following phenomena happen in the process of installation testing, it indicates that Reaction Wheel has faults. Please contact supplier to solve the problems:

- There are obvious damage signs on the appearance, including serious scratch, knock mark, component loss, etc.
- There are damages to electrical interface. The impedance is less than 1KΩ when measuring power supply and ground return lines with multimeter.
- The static operating current is greater than 2A after power-on under normal temperature and pressure.
- Data bus can't receive (send) data or receive (send) error data.

7. Maintenance

Dedicated person should be designated for routine maintenance of Reaction Wheel.

- The input power supply of Reaction Wheel is +14 to +30V DC. No one shall be allowed to change that.

- The type, specification, and parameter of components in circuits shall not be changed in the process of usage or maintenance. If faults happen, please contact supplier.
- Installations must be firm without breaking off.
- Transportation shall comply with waterway, land route transportation and loading requirements, avoiding collision, water, and corrosion.