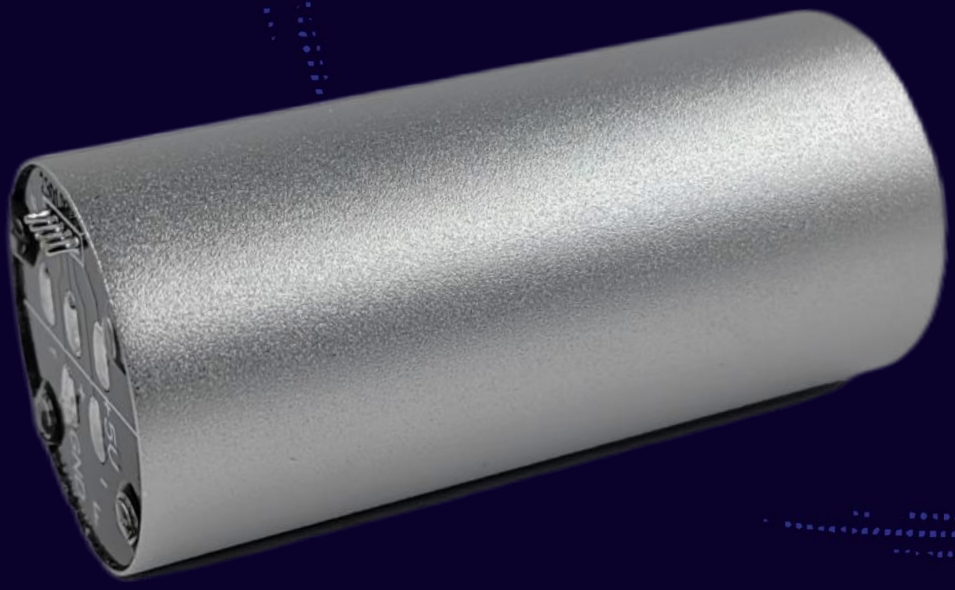

Version No. V3.2

BS-FU091T-300-A1ES

Operation Manual of Micro-nano Fiber Optic Gyroscope

1 Overview

This document specifies the requirements and methods for use and maintenance of BS-FU091T-300-A1ES micro-nano fiber optic gyroscope (product for short).

2 Reference and Standard

GJB1649-1993 ESD Control Program for Electronic Products

3 Definition

Null.

4 Product introduction

4.1 Product Overview

BS-FU091T-300-A1ES micro-nano fiber optic gyroscope (hereinafter referred to as the product) is an angular rate sensor integrating optics, mechanics and electronics. It is based on the Sagnac effect, integrates a variety of micro-nano fiber devices, and realizes the detection process by detecting, processing and feeding back the phase difference generated by two beams of light propagating in opposite directions.

This product is mainly composed of optical path components, circuit components and structural components. It has the characteristics of simple structure, no moving parts, no wear parts, fast start, small size, light weight and so on. And can be apply to that attitude control and measurement of the carrier.

4.2 Composition

The product is mainly composed of the following components:

A) an optical path assembly;

B) Detection and control signal circuit board;

C) Optical fiber coil skeleton, shell and other structural parts;

4.3 Appearance and dimension

The product is cylindrical, with overall dimensions of φ24mm × 51.6mm.

Figure 1 Outline drawing of BS-FU091T-300-A1ES micro-nano fiber optic gyroscope

4.4 Weight

≤30g.

4.5 Operating temperature

-40℃~+70℃.

4.6 Storage temperature

-55℃~+85℃.

4.7 Random vibration

Random vibration magnitude: 12g, frequency range: 20Hz ~ 2000Hz.

4.8 Main performance parameters

Table 1 Main Performance Parameters

Serial number	Project	Performance indicators
1	Range (°/s)	±300
2	Scale factor	7±0.7mv/°/s
3	Zero-bias stability (10s, 1σ, °/H)	≤2
4	Zero-bias repeatability (1σ, °/H)	≤2
5	Angular random walk (°/H $^{1/2}$)	≤0.04
6	Zero bias (°/s)	≤0.05
7	Bandwidth 3dB Band Width (Hz)	≥1000
8	Power supply (V)	5±0.15
9	Power Consumption (W)	≤0.7

10	MTBF (Calculated Assessment)	60000h @ 20℃

4.9 Mechanical and electrical interfaces

4.9.1 Mechanical interface

The cylindrical surface of the product is the installation surface, which is installed with clamps.

4.9.2 Power Requirements

The external power supply to the product has one circuit, and the requirements are shown in Table 2:

Table 2 External Power Supply Requirements

	+5V
Voltage	4.85V~5.15V
Ripple	20mV
Electric current	0.2A

4.9.3 Electrical interface

The BS-FU091T-300-A1ES micro-nano fiber optic gyroscope is electrically connected to the outside by a bonding pad.

It is defined as follows:

Table 3 BS-FU091T-300-A1ES Node Definition

Number	Definition	Remark
1	GND	Power ground
2	5V	
3	TS T=(TS-750)/10+25	TMP temperature sensor signal conversion relation T= (TS-750) /10+25 The unit is mV, and T is the Celsius temperature.
4	NC	
5	Out+	Differential Output
6	Out-	

Output impedance 1 kΩ, differential analog voltage output.

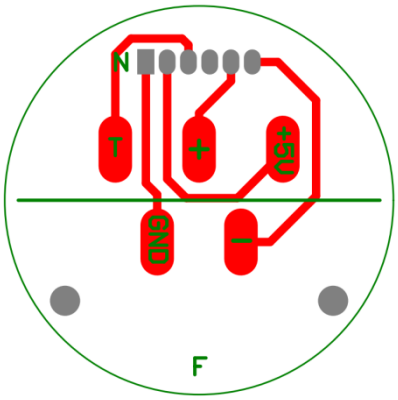

Figure 2 Node Definition

5 Installation of the product

5.1 Installation requirements

The user shall be responsible for the installation and disassembly of the product. During this process, the product shall not be impacted, and the outer surface of the product shall not be machined.

5.2 Inspection before installation

A) Check the appearance of the product for physical damage such as collision;

5.3 Inspection after installation

Check whether each mounting screw is secure.

6. Product maintenance

A) Before the product is loaded into the carrier, it is required to electrify the product at least once a year, for 3600s, and it is not required to detect the electrical parameters of the product when electrifying;

B) After the product is loaded into the carrier, the product is required to be powered on at least once a year, and the power on time is 3600s. It is not required to detect the electrical parameters of the product when it is powered on;

7 Common fault phenomena and troubleshooting methods

This product is in a fully sealed state, and cannot be repaired on site after any failure of the user, and needs to be returned to the production unit for maintenance. The following is a list of possible non-product fault phenomena, as shown in Table 4. If other technical problems occur during the use of the product, please contact the product manufacturer.

Table 4 Common Faults and Troubleshooting

Serial number	Fault symptom	Cause analysis	Exclusion method

1	When the product is powered on, the current indication of the + 5V ammeter is basically 0	The product is not supplied with power or the power supply current is too small	Check the power supply and power supply circuit, and restore the power supply of the product
2	When the product is powered on, the current indication of the + 5V ammeter is normal, but the computer acquisition program does not work.	Abnormal acquisition system of test equipment	Check the connection cable and equipment power supply
3	The product is powered on, and the current indication of the + 5V ammeter is abnormal	There may be a short circuit inside the test equipment	Check the test equipment

8 Transportation and storage requirements of products

8.1 Transportation precautions

A) Place the product in the direction shown in the packing box;

B) When the temperature range is -40 ℃ ~ + 65 ℃, it is allowed to transport by road, railway, air and water;

C) Ensure that the packing case is fastened to the carrier and will not move during transportation.

8.2 Storage precautions

A) The products placed in the packing box shall be stored in the air-conditioned warehouse under the standard atmospheric pressure, and the ambient temperature is 15 ℃ ~ 35 ℃;

B) The storage life of the product is 15 years.

9 Unpacking and inspection

9.1 Unpacking inspection

A) Check the appearance of the packing case for physical damage such as collision;

B) Electrostatic protection shall be carried out when the product is taken out.

9.2 Inspection of supporting delivery documents

A) Product certificate;

B) Acceptance report of BS-FU091T-300-A1ES micro-nano fiber optic gyroscope;

C) Operation and maintenance instructions for BS-FU091T-300-A1ES micro-nano fiber optic gyroscope (one copy for each batch).