

BS-FU34-300-D1EC

Fiber Optical Gyro Specifications





Descriptions

This product is an inertial angular rate sensor based on the principle of Sagnac, which is used to measure the angular rate motion of the carrier around the sensitive axis of the product. This product with fiber ring for angular rate sensing unit, based on the closed-loop detection circuit, the phase difference caused by sensitive angular rate of optical fiber ring, change into intensity signal by interference, detecting circuit change the intensity signal into voltage signal, and the signal is detected through the modulation and demodulation, Then feedback signal back to the optical path, to realize the closed-loop control.

This product is an inertial sensor composed of optical system and corresponding power supply and data processing circuit, which can provide incremental information of single axis angle.

This product is mainly used in inertial measurement system of high precision inertial navigation system and positioning & orientation system.

Features

- All-fiber design -long lifespan, small package size, high stability and more resistance to interference.
- Integrated fiber polarizer -minimum insertion loss and high extinction ratio, offering more resistance to temperature and mechanical shock, as well as intense vibration.
- Reliable compact package -operationally robust for all kinds of environments, ideal for a wide of applications in both civilian and military areas.
- QuickLaunch technology -minium activation time with no external calibration required.
- Optimal wavelength -improves the sensibility by 50% with the same structure, size and cost.
- Noise isolation and compression -significantly reduces the angle random walk.
- SelfTrack technology -improves the gyro dynamic range

Applications

- UAV/AUV/Helicopter
- Tactical nuclear weapons
- Aeronautics and astronautics
- Integrated navigation system
- inertial platform stabilizing
- Vehicle navigation



Components inside

- a) Optical components: Fiber optic ring, Y waveguide, Coupler, ASE source of light, PIN-FET detector;
- b) The source of light drive circuit, Detection and signal control circuit board;
- c) Fiber optic ring frame, Outcover, Topcover, Bottom plate;

Performance Characteristics

No.	Content	Unit	Index
1	Measure range	° /s	±300
2	Zero bias stability (cold star, test for 90min, 1σ, 10s)	° /h	≤0.04
2	Zero bias stability (1σ, 10s, test for 90min, deduct first 5min)	° /h	≤0.02
3	Zero bias repeatability (1σ, 10s, after 5min)	° /h	≤0.02
4	Scale factor degree of asymmetry (1σ)	ppm	≤20
5	Scale factor repeatability (1σ)	ppm	≤20
6	threshold value	° /h	≤0.02
7	Random walk	(°)/h ^{1/2}	≤0.002
8	Power supply voltage	V	+5

9	Steady state consumption	W	≤ 5
10	Bandwidth	Hz	≥ 500
11	Working temperature	°C	-40~+60
12	Store temperature	°C	-50~+70
13	size	mm	98×98× 38.3
14	Weight	g	≤ 480

Environment requirement

Use +5 DC power supply, power supply requirements as table below:

No.	Name	requirement
1	Power supply accuracy	$\pm 5\%$
2	Power ripple (Vpp)	20mV
3	Power supply current	>1.8A

Interface definition

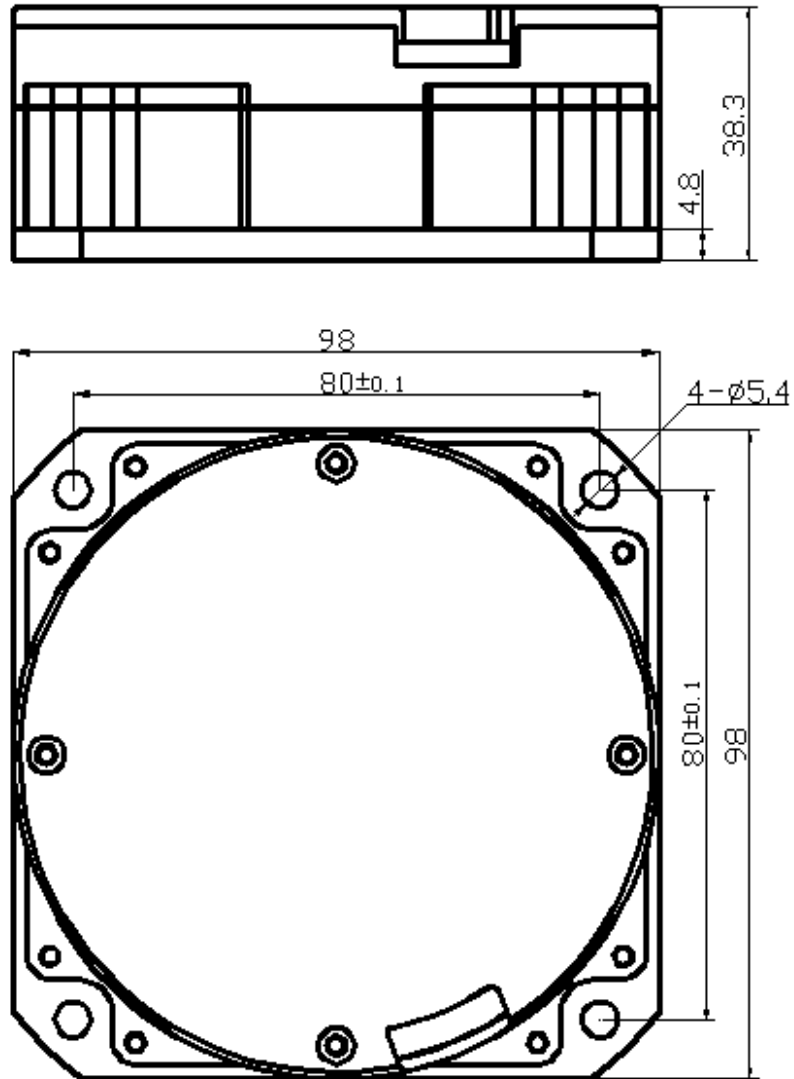
The connector for connecting the product to the outside is J30V2-9TJW, as defined in Table

Number of connector point	Connector identification	Connector point definition
1	D+	Gyro output +
2	D-	Gyro output -
3	---	retain
4	---	retain
5	SEL-	strobe signal
6	+5V	Power supply input
7	GND	Power supply input ground
8	GND	Power supply input ground
9	SEL+	TTL level power

Note: TTL level power is external +5v; strobe signal is TTL level

Note: when connecting or touching the product, anti-static measure should be taken according to GJB 1649-1993.

Dimensions



Gyro communication protocol

The signal output form of the product is RS485, and the fiber optic gyro communication is controlled by the gyro strobe signal. The signal is TTL level, it is active when level is low, the pulse width is not less than 10us, the drive current is not less than 10mA, and the gyro processing circuit should use the photocoupler to receive. The gyro processing circuit starts transmitting the gyro data in the period through the serial interface within 5 us after the falling edge of the gyro strobe signal arrives.

Communication protocol

The communication protocol is as follows: RS485 serial interface, baud rate is 921.6kbps, communication frame character format: 1 start bit, 8 data bits, 1 stop bit, no parity, communication period is 1ms~ 10ms.

The total data frame length of the gyroscope is 14 bytes. The data definition is shown in Table 4 below.

Byte number	Name	Content	Remark
1	Frame header	55H	
2	Frame header	AAH	
3	Data length	0A	
4~6	Gyro data	---	Byte from low to high
7~8	Temperature data 1	---	
9~10	Temperature data 2	---	retain
11~12	Frame serial number	---	
13	Status sign	---	
14	checksum	---	

Note 1: The status flag of the gyroscope normal output is FFH.

Note 2: The checksum is the lower 8 bits of the accumulated sum of 3 to 13 bytes.

Note 3: The temperature data is divided by 16 as the actual measured temperature value.

Note on installation

Please avoid impact during installation, and no machining work on its surface is allowed.

Check before installation:

- a) check if there is physical damage on the product
- b) Under ordinary temperature, use insulation resistance meter test the insulation resistance between all pins of output interface and its shell, should $\geq 60M\Omega$
- c) Test all technical parameters when necessary
- d) The flatness of installation surface against the product should be better than 0.05mm
- e) When installation, 0.2~0.5mm layer of heat conducting silica gel is required to be coated under the bottom of the product
- f) Check if all screws are fixed steadily after installation

Product maintenance

- a) Before loading into the carrier, it is required to electrify the product one time at least every year, and the power one time is 3600s, and the electrical parameters of the product are not required to be detected when the power is switched on;
- b) After the product is loaded into the carrier, it is required to electrify the product one time at least every year, and the power one time is 3600s, and the electrical parameters of the product are not required to be detected when the power is switched on;
- c) Products should be re calibrated every 8 years.

Common fault phenomena and troubleshooting methods

1.This product is in the state of full seal, and can not be repaired on the spot after any fault occurs at the user's sides, and needs to be returned to the product manufacturer for repair.

2.Here below are only a list of possible failures of the non - product itself, see table 5. If there are other technical problems occurs during using of products, please the user to contact the products manufacturer.

(Common fault and resolvent)

Item	Fault phenomena	Reason analysis	Resolvent
1	Product electrify, +5V、-5V ,the current indicator of the ammeter is basically 0	No power supply or current supply is too small for the product	Check the power supply and power supply circuit to restore the power supply
2	Product electrify, +5V、-5Vthe ammeter current is normal, but the computer acquisition program doesn't work	The acquisition system of test equipment unusual	Check the connection cable, equipment power supply situation
		Software program conflict	Restart the test computer
3	Product electrify, +5V、-5V the current indicator of the ammeter is abnormal	A short circuit may occur inside the test equipment	Inspection and test equipment

Requirements for transportation and storage of products

5.1 Transportation notice

- a) Place the product according to the direction shown in the packing box;

- b) When the temperature range is $-40^{\circ}\text{C}\sim+65^{\circ}\text{C}$, it is allowed to be transported by road, railway, air and water transportation;
- c) Ensure that the packing box is fastened to the carrier without moving during shipment.

5.2 Storage notice

- a) The products placed in the packing box should be stored in an air conditioned warehouse under standard atmospheric pressure, environmental temperature is $15^{\circ}\text{C}\sim35^{\circ}\text{C}$;
- b) The storage period of the product is 15 years .

Unpacking and inspection

6.1 Unpacking inspection

- a) Check the appearance of the packing box for collision and other physical damage;
- b) Static electricity protection should be carried out when taking out the product .

6.2 Inspection of supporting delivery documents

- a) Product qualification certificate;
- b) BS-FU34-300-D1EC Acceptance report of closed loop fiber optic gyroscope;
- c) BS-FU34-300-D1EC Maintenance instructions for closed-loop fiber optic gyroscope (1pcs per batch) .