SENSSET
SENSOR SEQUENCE

SSG-DFM3000

High performance single axis fiber optic gyroscope

PRODUCTS FEATURES

- Higher Accuracy, Lower Noise and Greater Efficiency
- Measuring Range: -600°/s~+600°/s
- Bias Stability at Full Temperature ≤ 0.3°/h
- Bias Repeatability at Full Temperature ≤ 0.3°/h
- Scale Factor Non-linearity ≤ 50ppm
- Bandwidth ≥ 200Hz
- Working Temperature: -40~+70 ºC

1. Product performance indicators

Table 1.Characteristics

Name	Value
Measuring Range	-600°/s~+600°/s
Zero Bias Stability	<=0.1°/h (2h continous test, 10s (1σ) smoothing result)
Zero Bias Repeatability	<=0.1°/h (6 test data calculation (1σ) result)
Zero Bias Stability at Full Temperature	<=0.3°/h (-40~+70°C, 10s (1σ) smoothing result)
Zero Bias Repeatability at Full Temperature	<=0.3°/h (-40~+70°C, 10s (1σ) smoothing result)
Scale Factor Non-linearity	<=50ppm, room temperature (1σ)
Scale Factor Unsymmetry	<=50ppm, room temperature (1σ)
Scale Factor Repeatability	<=50ppm, room temperature (1σ)
Random Walk Coefficient	<=0.01°/√h
Start Time	<=3minutes, the time from power-on output to reach accuracy
Bandwidth	≥200Hz
Communication Mode	RS422
Working Temperature	-40~+70°C
Storage Temperature	-55~+85°C
Power Supply	±5VDC±5% (maximum shock current close to 2A)
Power Ripple	20mV
Power Consumption	<=3W (Room Temperture)
Power Consumption	<=5W (Full Temperture -40~+70°C)
Physical Characteristics	
Demension	70mm * 70mm * 32mm
Weight	<=180g±20g
Installation Hole Distance	62mm*62mm
Mounting Screws	M4
Mounting Surface Accuracy	Flatness<=0.01mm

2. Mechanical dimension

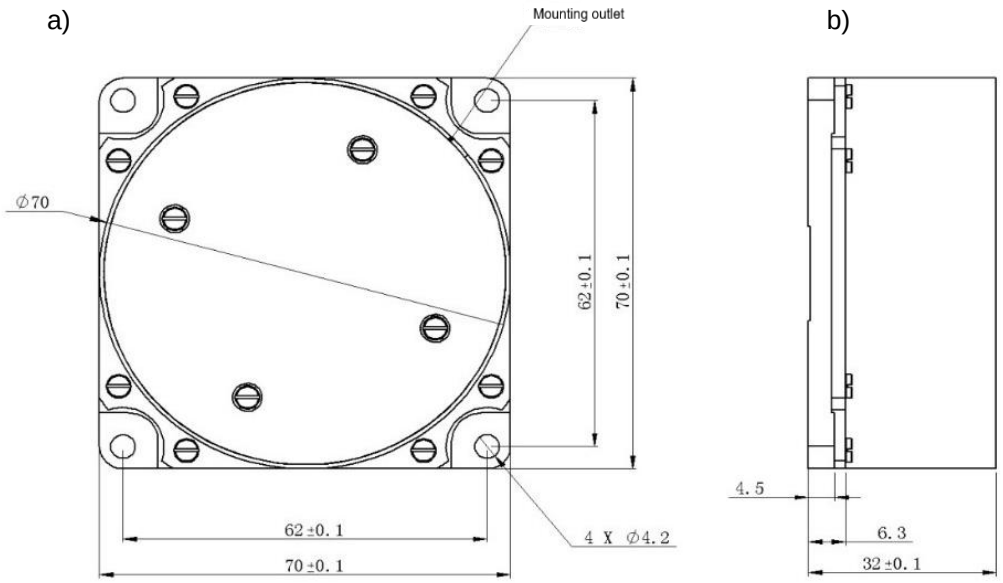

Figure 2.1. All sizes in mm a) top view; b) side view

3. Pin definition

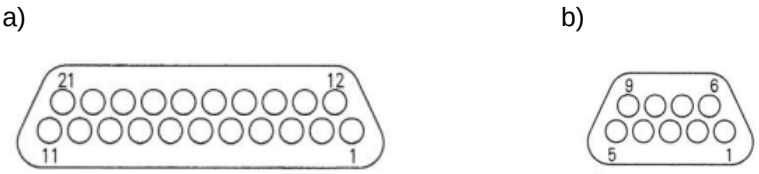

Figure 3.1. Plug type - pin a) J30-21ZK; b) J30-9ZK (optional)

Table 2. Pin definition for J30-21ZK

Pins No. of J30-21ZK	Collection Cable Description
8,10	＋5V
6,7	GND (power gournd)
13,14	-5V
17	R+ (valid when triggered)
18	R- (valid when triggered)
16	T＋
19	T－

4. Communication protocol – RS422

- The electronic parameters of RS422 communication protocol are as follows:
- Serial port communication, confirms to RS-422 interface standards
- Output data format: two's complement format
- Gyroscope valid data bits: 32
- Temperature valid data bits: 14
- Data refreshing frequency: 400Hz
- Data transmission baud rate: 115.2kbps (ODM supported)

Data Format

Data transmission format: the serial port communication format is 11bit per frame, it includes 1 start bit (0, the first bit), 8 data bits (from 2 to 9 bit), 1 check bit (the 10th bit), 1 stop bit (the 11st bit).

Checksum mode: even parity check

Gyroscope valid data bits: 32bits (the highest bit is symbol bit, 0 is positive “+”, 1 is negative “-”); temperature valid data bits: 14bit (the highest bit is symbol bit, 0 is positive “+”, 1 is negative “-”)

Data package format: each data package has 10 bytes: the 1st byte is frame head 80H; the 2nd byte is the gyro's first byte data (low byte), the 4th byte is the gyro's third byte data, the 5th byte is the gyro's fourth byte data, the 6th byte is the gyro's fifth byte data (high byte); the 7th byte is checksum bit, it is the XOR value of 2nd to 6th byte data of the data package; the 8th byte is the temperature data low byte, the 9th byte is the temperature data high byte; the 10th byte is the checksum bit, it is the XOR value of 8th to 9th byte data of the data package.

Table 3. Data format

Byte	Description	D7	D6	D5	D4	D3	D2	D1	D0
1	Frame head	1	0	0	0	0	0	0	0
2	Gyro data	0	D6	D5	D4	D3	D2	D1	D0
3		0	D13	D12	D11	D10	D9	D8	D7
4		0	D20	D19	D18	D17	D16	D15	D14
5		0	D27	D26	D25	D24	D23	D22	D21
6		0	0	0	0	D31	D30	D29	D28
7	Check sum 1	0	X	X	X	X	X	X	X
8	Temperature	0	T6	T5	T4	T3	T2	T1	T0
9		0	T13	T12	T11	T10	T9	T8	T7
10	Check sum 2	0	X	X	X	X	X	X	X

5. Installation

1) Installation requirements

The user is responsible for installing and disassembling the product. During this process, the product cannot be hit, and the outer surface of the product cannot be mechanically processed.

2) Inspection before installation

Check the appearance of the product for physical damage such as collisions;

At room temperature, use an insulation resistance meter to test the insulation resistance between all pins of output interfaces and the shell, and they should be ≥60MΩ;

If necessary, power on and check the electrical parameters of the product;

The surface flatness used to fix the product should be better than 0.05mm;

When the product is installed, it is required to evenly coat a layer of 0.2~0.5mm thermal grease on the bottom of the product;

During the product acceptance test, an aluminum plate (bigger than 60mm×60mm×5 mm) should be placed under the product installation surface.

3) Check after installation

Check whether the mounting screws are fixed well.

6. Maintenance

1) Before the product is installed into the carrier, it is required to power on the product at least once a year, and the power-on time is 3600s, and the electrical parameters of the product are not required to be tested when the power is turned on;

2) After the product is installed into the carrier, the product is required to be energized at least once a year, and the power-on time is 3600s, and the electrical parameters of the product are not required to be tested when the product is energized;

3) The product should be re-calibrated every 8 years (by Sensset).

7. Common Failure 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 product manufacturer for reparation.

The following only lists some possible failure phenomena that are not the product itself. If there are other technical problems during the use of the product, please contact the manufacturer of the product.

Table 4.

No.	Failure Phenomena	Reason Analysis	Solution
1	Turn on the product, the current indication of +5V, -5V ammeter is basically 0	The product is not powered or the power supply current is too small	Check the power supply and power supply circuit, restore the power supply of the product
2	Turn on the product, the current indication of +5V, -5V ammeter is normal, but the computer collection program does not work	The collection system of the test equipment is abnormal	Check the connection cable and the power supply of the equipment
		Software program conflict	Restart the test computer
3	Turn on the product, and the current indication of +5V, -5V ammeter is abnormal	There may be a short circuit inside the test equipment	Check test equipment

8. Transportation and Storage

1) Precautions for transportation

a) Place the product in the direction shown in the packaging box;

b) When the temperature range is -40℃ ~ +70℃, transportation by road, railway, air and water is allowed;

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

2) Precautions for storage

a) The products placed in the packaging box should be stored in an air-conditioned warehouse under standard atmospheric pressure, with an ambient temperature of 15℃ ~ 35℃, and a relative humidity of 20% ~ 80%;

b) The storage life of the product is 20 years.

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