



FORSENSE
原极科技

Ns15_datasheet_Product Manual

MEMS IMU Find North

- Up to 0.48 North finding accuracy (1σ)

Ultra high precision gyroscope - comparable to foreign high-end

- 0.4 °/h zero bias instability

Stable operation across all temperature ranges

- -40 ~ 85°C stable fine temperature compensation

Real-time and flexible digital interface

- Volume: 88x 88x57 mm
- Built-in motor for dual position north finding

Application areas

- Vehicle-mounted head
- drone



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1. Performance Parameter

1.1 Key indicators of gyroscope

Table 1 Key indicators of gyroscope

Parameter	Test conditions/Remarks	Minimum value	Typical value	Maximum value	Units
Measuring range			+ 500		°/s
Zero bias instability 1	@25 ° C, ALLAN variance 1σ		0.4		°/hr
Non-orthogonal between axes			0.02		deg
Internal low-pass cutoff frequency	Software adjustable		47		Hz
ODR			100		Hz
Measuring delay				7.0	ms
Random Walk 1	@25 ° C, ALLAN variance 1σ		0.035		°/Vhr
Calibration coefficient error			1.0		‰

Note 1: IEEE standard, Allan variance curve given at static 25°C environment

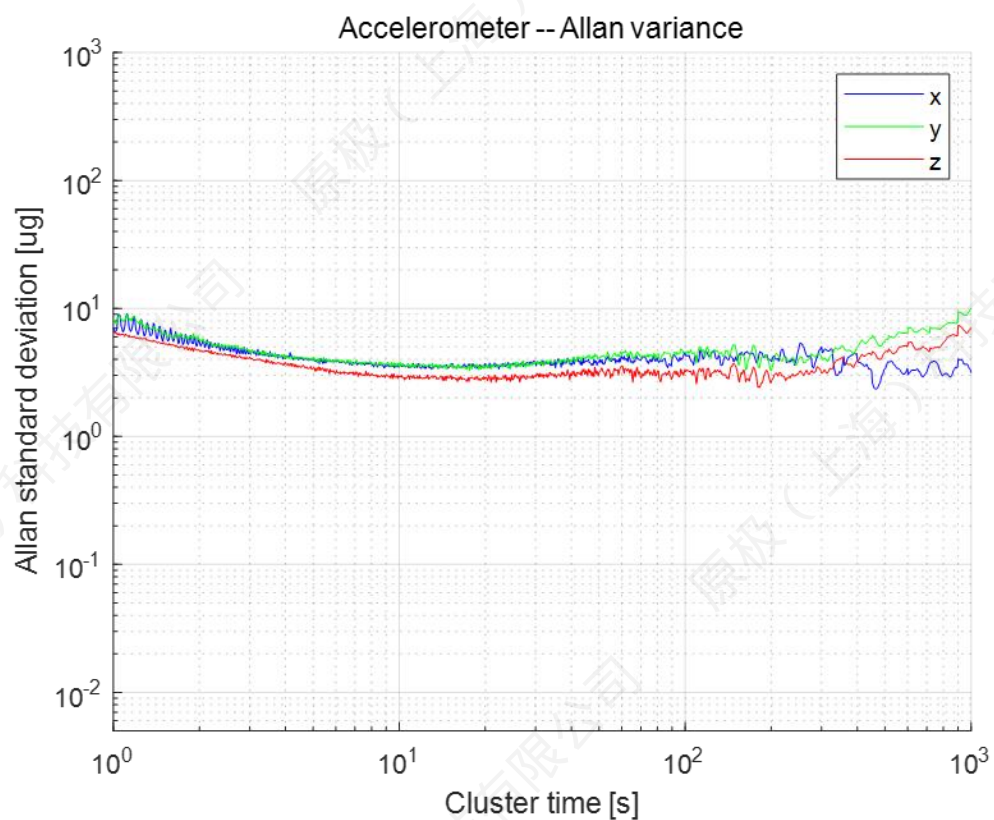
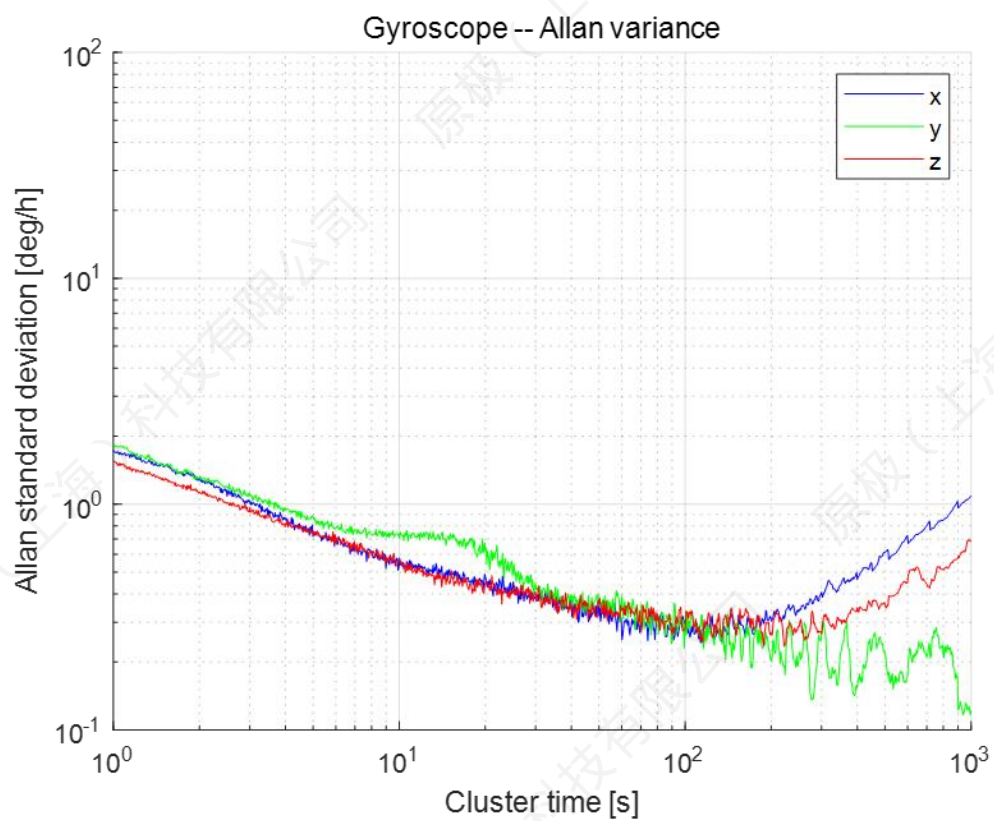
1.2 Key indicators of accelerometer

Table 2 Key indicators of accelerometer

Parameter	Test conditions/Remarks	Minimum value	Typical value	Maximum value	Units
Measuring range			Plus or minus 6		g
Zero bias instability 1	@25 ° C, ALLAN variance 1σ		5		Mu g
Non-orthogonal between axes			0.02		deg
Internal low-pass cutoff frequency	Software adjustable		47		Hz
ODR			100		Hz
Measuring delay				7.0	ms
Random Walk 1	@25 ° C, ALLAN variance 1σ		0.005		m/s/Vhr

Note 1: IEEE standard, Allan variance curve at static 25°C environment is given

1.3 Typical curve of ALLAN variance

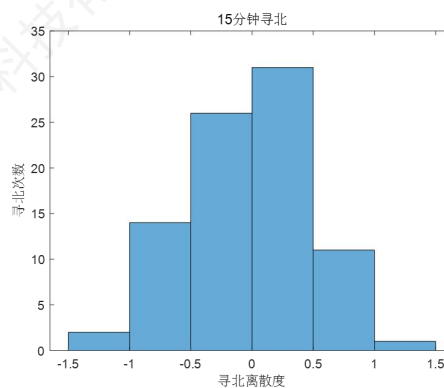
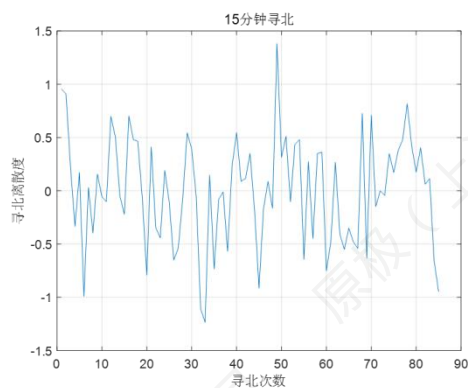
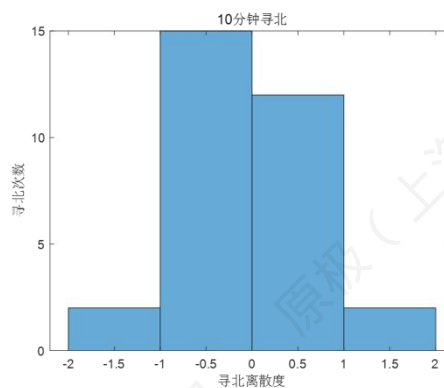
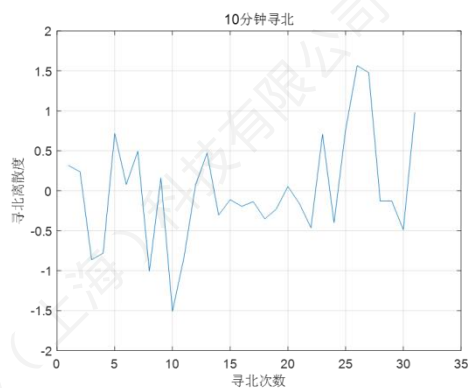


2. Seek north Parameter

2.1 Repeated north finding test

Supports north finding with inclination angles (roll and pitch) less than 20°

1σ accuracy, 0.71 degrees north in 10 minutes, 0.48 degrees north in 15 minutes



2.2 Northfinding Configuration instructions

Configure the 10-minute north finding command: AT+FN_ON=080830

Response return value: +FN_ON=30830

OK

Configure the 15-minute North finding instruction: AT+FN_ON=120830

Response return value: +FN_ON=120830

OK

Turn off the Northfinding command: AT+FN_OFF

Response return value: +FN_OFF

OK

Note; If the command is not sent in the middle, the start time of the north search is calculated from the first send time

Get the continuous heading instruction: AT+FN_YAW

Output data format:

North finding Angle: aw_new=37.91, (unit °)

North finding time: time=303, (in seconds)

Northseeking status: FN_STATIC=0

(0 indicates static, 1 indicates slosh, represents whether there is a non-static state in the process of north seeking to affect the accuracy, the state bit 0 indicates that the north seeking result is reliable),

3. Electrical characteristics

3.1 Maximum tolerance value

Table 3 Maximum absolute rating

Parameters	Symbols	Range	Units
Supply voltage	VIN	-0.3 to 15	V
Ground (GND)	GND	-	-
Temperature for use	Tot	-40 to 85	°C
Storage temperature	Tstg	-40 to 85	°C

3.2 Working Conditions

Table 4 Working conditions

Parameters	Symbols	Minimum value	Typical value	Maximum value	Units
Supply voltage	VIN	9	12	15	V
Vin ripple	Vrpp		+ 40		mV
Power Consumption	P	1.3		2.8	W
Use temperature	Tot	-40		85	°C
Storage temperature	Tstg	-40		85	°C

4. Shape structure

Figure 1 Outline structure and dimensions (unit: mm)

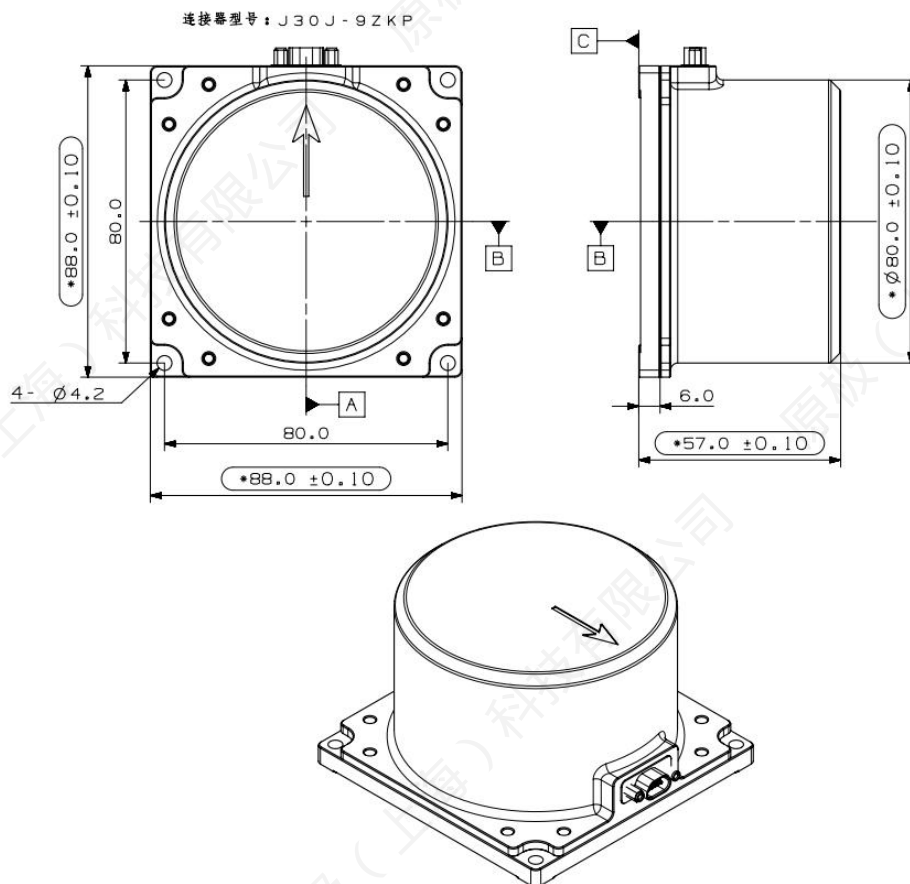


Figure 2 Connector schematic diagram

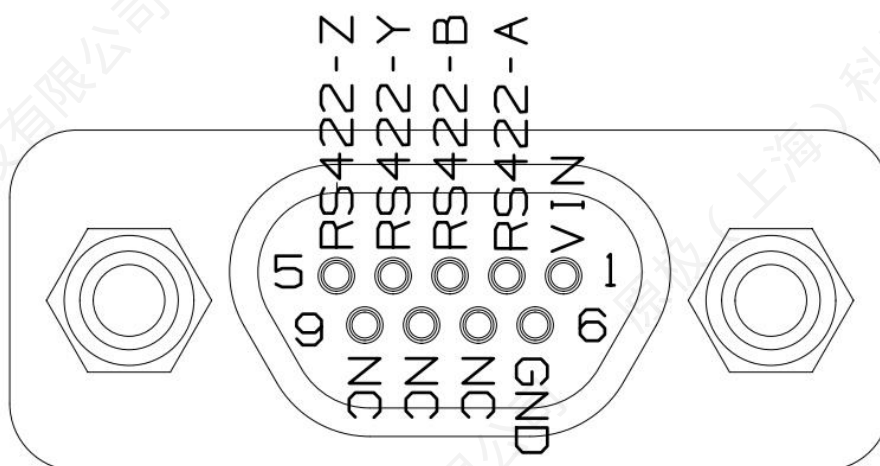


Table 5 Connector definitions

PIN	Definition	Description	Remarks
1	VIN	Power input, 9-24V input	
2	RS422-A	RS-422,RXD+	
3	RS422-B	RS-422,RXD-	
4	RS422-Y	RS-422,TXD+	
5	RS422-Z	RS-422,TXD-	
6	GND	Ground (GND)	
7	NC	Not pick up	
8	NC	Not pick up	
9	NC	Not pick up	