

High-precision Combined Navigation System

X1-6H

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Dual-antenna RTK Positioning & Heading GNSS/INS High-precision Combined Navigation

Dual-antenna Positioning&Heading

The GNSS signals received through dual antennas can independently provide precise position and attitude information, further enhancing the robustness and usability of the integrated navigation system.

High-precision Combined Navigation

The X1-6H is a highly integrated GNSS/INS combined navigation system that has deeply-coupled GNSS and IMU measurement technology. It offers high stability and can provide real-time, high-precision position, velocity, and attitude.

High-scalability

Software scalability: Customers can upgrade the software firmware for free within three years. Hardware scalability: Supports various interfaces, including Ethernet/serial ports and provides event synchronization I/O, allowing it to work in conjunction with other sensors such as LIDAR and SLAM.

High-reliability

Adapts to various complex environments, it can maintain reliable and stable positioning performance for a period of time even in harsh conditions such as satellite signal loss or interference.

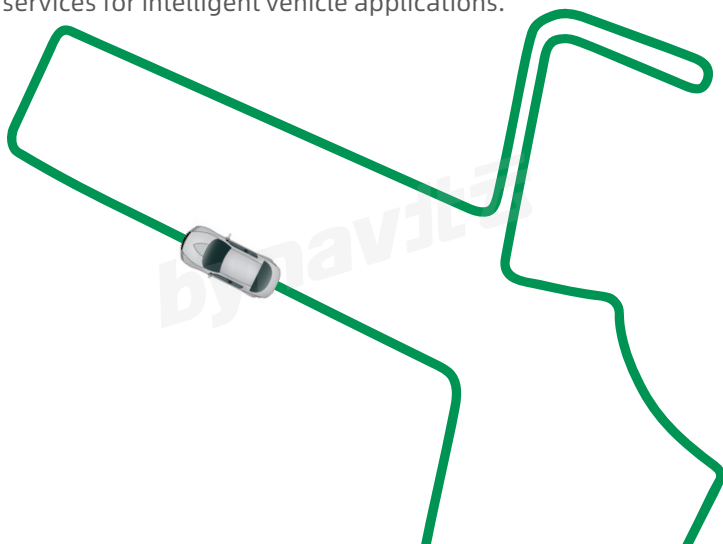
Scenario Optimization

Optimized for in-vehicle applications: Modeled according to vehicle characteristics, it can handle environments such as complex urban road obstructions and highway signal interference, providing continuous, stable and reliable real-time high-precision positioning services for intelligent vehicle applications.



Feature

- » Deeply Coupled GNSS/INS Combined Navigation Engine
- » Built-in High-Precision Positioning & Heading Board
- » Built-in Tactical-Grade IMU Module
- » Support Various Interfaces
- » Dedicated Multi-Vector RTK Positioning Engine
- » Full-constellation & Multi-frequency RTK Solution
- » Support Modern Signal Systems Such as BDS-3 and Galileo
- » Support GNSS/IMU Raw Data Output and Post-Processing
- » Ultra-low Positioning Calculation Latency



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Performance¹

GNSS Signal

Full-constellation Multi-frequency

Tracking

BDS-2	B1I, B2I, B3I
BDS-3	B1I, B1C*, B2a, B3I
GPS	L1 C/A, L2, L5
GLO	G1, G2
GAL	E1, E5a, E5b
QZSS	L1 C/A, L2, L5

Horizontal Positioning Accuracy (RMS)

Single Point	1.5 m
RTK	1 cm + 1 ppm

Vertical Positioning Accuracy (RMS)

Single Point	2.5 m
RTK	1.5 cm + 1 ppm

Initialization

Initialization Time	≤ 10 s
Initialization Reliability	> 99.9%

Max Transfer Rate

GNSS Observation	5 Hz
RTK Result	5 Hz
INS Result	125 Hz
IMU Raw Data	125 Hz

Time To First Fix

Cold Start ²	≤ 60 s
Warm Start ³	≤ 40 s

Timing Accuracy ⁴	20 ns
Velocity Limit	300 m/s
Re-acquisition Time	≤ 1 s
Solution Delay	
INS Solution Delay	≤ 5 ms
RTK Solution Delay	≤ 60 ms

IMU Performance⁵

Gyroscope

Measurement Range	±450 °/s
Bias Repeatability	0.1 °/s
Bias Instability	1.2 °/h
Angle Random Walk	0.08 °/√h

Accelerometer

Measurement Range	±10 g
Bias Repeatability	3 mg
Bias Instability	16 μg
Velocity Random Walk	0.033 m/s/√h

Interface

RS-232×2	Up to 921,600 bps
Ethernet Port × 1	10/100 Mbps
CAN BUS × 1	1 Mbps
EVENT OUT × 1	
PPS OUT × 1	

Mechanical and

Electrical

Size	116×114.2×38.6 mm
Weight	432 g
Power Supply	
Input Voltage	+9V ~ +32 VDC
Power Consumption ⁶	4.8 W
Antenna LNA Power Output	
Output Voltage	5 V DC
Max Current	200 mA

Connector

Dual Antennas	SMA
Serial Port, PPS, EVENT	Push-Pull Connector
Serial Port, CAN	Push-Pull Connector
Ethernet Port	RJ45
Power Supply	Push-Pull Connector

Indicator LED

Power Supply

Environment

Operation	
Temperature	-40° C ~ +75° C
Storage	
Temperature	-55° C ~ +85° C
Humidity	95%
	Non-condensing
Waterproof	IEC 60529 IPX7
Dustproof	IEC 60529 IP6X
Shock	JESD22-B103

Accessory

Power cable x 1
Communication Cable x 2
M5 Screw x 4

Optional

Antenna x 2
RF Cable x 2
RJ45 Ethernet Cable x 1
DTU Kit x 1

Note:

1. Typical value. Performance will be affected by GNSS status, satellites' location, baseline length, multipath and other interference;
 2. Typical value. There is no almanac, ephemeris and approximate position or time;
 3. Typical value. Almanac, ephemeris and approximate position or time are preserved;
 4. Optional. Bias caused by RF and antenna is not included;
 5. Typical value. (Provided by IMU manufacturer);
 6. Typical value. Power of antenna and peripherals is not included;
 7. The 1 ppm error introduced by the baseline needs to be added to all the errors.
 8. Requires the IE post-processing software (sold separately).
 9. Using 1 km baseline and the receiver with good antenna performance, without considering possible errors due to antenna phase center offset;
- * Optional

More information, please refer to



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Wechat Official Account

GNSS Signal-Interrupted Test⁷

Loss Time	Positioning Mode	Positioning Accuracy (m)		Velocity Accuracy (m/s)		Attitude Accuracy (°) RMS		
		RMS		RMS				
		Horizontal	Vertical	Horizontal	Vertical	Roll	Pitch	Yaw
0 s	RTK ⁹	0.010	0.020	0.016	0.012	0.015	0.015	0.076
	Post-process ⁸	0.010	0.020	0.013	0.011	0.006	0.006	0.020
10 s	RTK ⁹	0.180	0.125	0.047	0.023	0.028	0.028	0.095
	Post-process ⁸	0.010	0.020	0.016	0.015	0.007	0.007	0.022

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