

# LS10 Inertial Navigation System

## 1. Brief introduction

LS10 Land Laser Inertial/GNSS Integrated Navigation System, is a high accuracy, commonly used land-based integrated navigation system, which independent R & D by Xi'an JIERUI. This system is mainly composed of a self developed high precision laser gyro, a quartz flexible accelerometer, an accelerometer acquisition circuit, a navigation computer, a secondary power supply component, a vibration system and so on. This system can continuously and real-time provide the instant position (longitude and latitude), velocity, acceleration, heading and attitude of the vehicles, and provides detailed navigation info according to driving mission plan, can meet the requirement of most of the application of general vehicle platform.



## 2. Features

### (1) Military quality

Military grade device standard, as a result of rigorous screening test, high reliability.

### (2) Anti interference autonomous north seeking

Under disturbed conditions, north seeking accuracy  $\leq 0.06^\circ/\text{h}$  ( $1\sigma$ )

This system uses the enhanced Kalman filter fusion algorithm, can rapidly complete high-precision north seeking during the situation of engine idle speed, personnel get off and so on, with the alignment function during marching forward.

### (3) Strong ability of autonomous navigation and integrated navigation

Pure inertial navigation accuracy  $\leq 1\text{ n mil/h}$  ( $1\sigma$ ), position accuracy is able to

$be \leq 0.2\%D$  by integrated an odometer.( D means Total Mileage)

A variety of navigation mode, can be combined with not only GNSS system (GPS, BD, GLONASS), to realize the integrated navigation function, but also available of pure inertial navigation function, and can combined with MDP, altimeter and other sensors, to achieve multi sensor fusion autonomous navigation function.

**(4) Good scalability**

The system can be compatible with any one or several systems of satellite navigation system, including GPS, BD, GLONASS, for integrated navigation. With selectable positioning accuracy.

**(5) Varied interfaces**

It can be compatible with RS422, CAN and other interfaces to facilitate the application of different vehicle platforms.

**(6) Auto Save Function**

**3. Performances**

Sr. No.	Item	Grade		Remark
		A	B	
<b>system performance</b>				
1	North seeking accuracy	1mil	2mil	(1σ)
2	Attitude accuracy	0.2mil	1mil	(1σ)
3	North seeking time	5min	5min	(1σ)
4	Course keeping/stand on accuracy	1mil/h	2mil/h	
5	Pure inertial navigation accuracy	≤1n mil	≤1.5n mil	(1σ)
6	Positioning accuracy(integrated odometer)	0.2%D	0.5%D	D means mileage (Km)
7	Horizontal positioning accuracy (Integrated GNSS)	Single point : 2m/5m (1σ) DGPS: 0.5m (1σ) RTK: 2cm+1ppm (1σ)		(1σ)
8	Velocity accuracy (Integrated GNSS)	0.02m/s		
<b>Core component</b>				
9	RLG bias stability	≤0.01°/h	≤0.02°/h	(1σ)
10	RLG scale factor	2PPm	5PPm	

11	Accelerometer bias stability	$\leq 0.05\text{mg}$	0.1mg	( $1\sigma$ )
<b>Environmental suitability</b>				
12	Shock	30g	30g	
13	Working temperature	$-40^{\circ}\text{C} \sim 65^{\circ}\text{C}$	$-40^{\circ}\text{C} \sim 65^{\circ}\text{C}$	
14	Storage temperature	$-45^{\circ}\text{C} \sim 75^{\circ}\text{C}$	$-45^{\circ}\text{C} \sim 75^{\circ}\text{C}$	
15	Vibration	Meet the vehicle vibration requirement of GJB150.16A-2009		
<b>Physical features</b>				
16	Size	368 mm×245 mm×255 mm		
17	Weight	13.5Kg		
18	Power supply	18VDC~36VDC		
19	Power dissipation	Working: 50W		
		Start: 150W		
<b>Interface features</b>				
20	Interface	RS232、RS422、CAN		Selectable
21	MTBF	$\geq 1500\text{h}$		
22	Data refresh rate	100Hz		
23	Band rate	115200bps		
24	Memory	32G		
<b>Measurement range</b>				
25	Azimuth measurement range	$\pm 180^{\circ}$		
26	Pitch measurement range	$\pm 90^{\circ}$		
27	Roll measurement range	$\pm 90^{\circ}$		
28	RLG angular rate	$\pm 300^{\circ}/\text{s}$		
29	Acceleration	$\pm 15\text{g}$		
30	Latitude	$< 60^{\circ}$		

## 4. Application

- (1). A variety of vehicle carrier or land-based platform.
- (2). Unmanned driving
- (3). Mission vehicle navigation, mapping.
- (4). Underwater, underground positioning navigation.