BS-IC100D-M-D6EC

Integrated Navigation System Product manual

1. Overview

BS-IC100D-M-D6EC integrated navigation system has built-in high-performance MEMS gyroscope and accelerometer, which can receive external GNSS data, realize multi-sensor fusion and integrated navigation algorithm, and has inertial navigation capability and AHRS function when GNSS is invalid.

The product has the advantages of small size, high reliability and strong environmental adaptability. Its internal vibration isolation system and other proprietary product features ensure that it is robust enough to meet the needs of very demanding users. A standard communication interface and a wide range of input voltages make it easy for users to integrate into other devices. By matching different software, the products can be widely used in map acquisition, underwater robots, track detection, pipeline detection, unmanned vehicles, high-precision agriculture and other fields.

2. Functions and indicators

2.1 Main functions

The integrated navigation system can use the satellite navigation information received from the outside to carry out integrated navigation, and output the pitch, roll, course, position, speed, time and other information of the carrier; When the signal is lost, it outputs the position,

velocity and attitude information of the inertial solution, and has the AHRS function. When combined with navigation, it can output the raw information that can be used for post-processing to be processed by the IE post-processing software of NovAtel.

2.2 Performance index

The system performance is shown in Table 1.

Table 1 System Performance Requirements

Project		Metrics (RMS)	Remark
Heading accuracy	Dual GNSS	0.1°	2m baseline
	Single GNSS	0.5°	Need to maneuver
	GNSS failure retention accuracy	20°	
Attitude accuracy	GNSS is valid	0.1°	Static
		0.2°	Dynamic
Horizontal positioning accuracy	GNSS is valid	1.2m	Single point L1/L2
		2cm+1ppm	RTK
Horizontal velocity accuracy	GNSS is valid	0.1m/s	Single point L1/L2
Gyroscope	Measuring range	±1000°/s	
	Zero bias stability	2°/h	Allan variance
	Angular random walk	0.1°/√h	Allan variance
Accelerometer	Measuring range	±16g	
	Zero bias stability	30μg	Allan variance
	Speed random walk	0.07 (m/sec)/√h	Allan variance
Communication interface	RS422	Route 2	
	PPS	Route 1	Input, LVTTL
Electrical characteristics	Voltage	9~36VDC	
	Power consumption	≤5W	
	Ripple	100mV	P-P
Structural characteristics	Size	70mm×50mm×34mm	
	Weight	≤150g	
Use environment	Operating temperature	-50℃~+85℃	
	Storage temperature	-55℃~+95℃	
	Vibration	20~2000Hz，6.06g	
	Impact	1000g，0.5ms	
Reliability	MTBF	20000h	

Project		Metrics (RMS)	Remark
	Life span	> 15 years	
	Continuous working time	>120h	
Note: Unless otherwise specified, the accuracy index refers to RMS.			

3. How it works

3.1. Product composition

The composition of the product is shown in Figure 1.

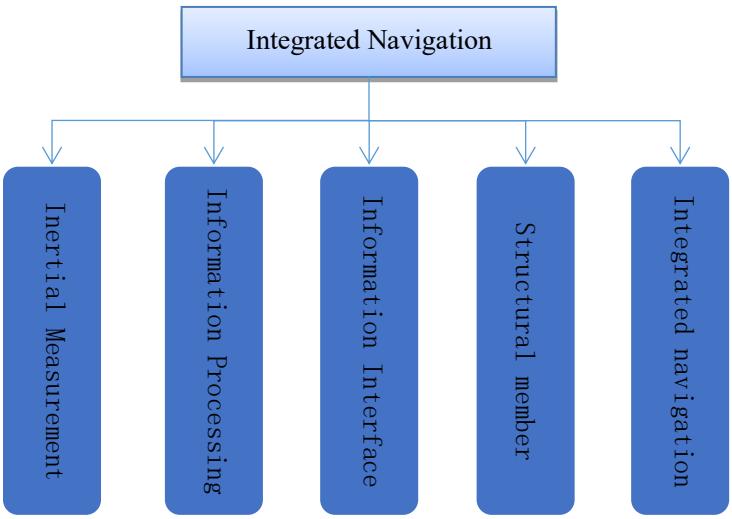

Figure 1 System composition

3.2. Basic principles

The inertial measurement unit consists of three accelerometers and three gyroscopes and is used for measuring the acceleration and the angular velocity of a carrier and sending the information to the information processing circuit; and the information processing circuit performs navigation settlement by using the acceleration and the angular velocity measured by the inertial measurement unit and simultaneously receives satellite navigation information output by an external GNSS receiver as a reference to perform combined navigation, The

navigation error of the inertial navigation is corrected, and the navigation information is output through the information interface circuit.

The basic principle is shown in Figure 2.

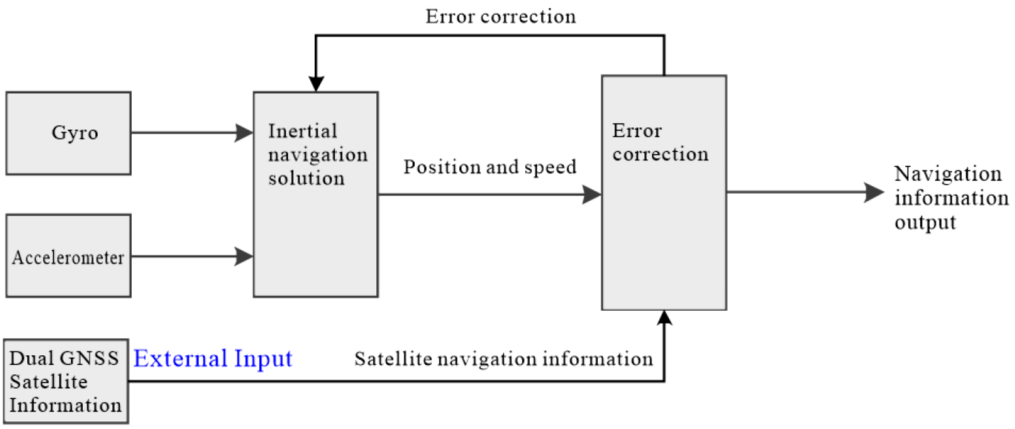

Fig. 2 Schematic diagram of working principle

4. Interface description

4.1 Overall dimension

The overall dimensions of the system are: 70mm × 50mm × 34mm (length × width × height), and the outline of the system is shown in Figure 3.

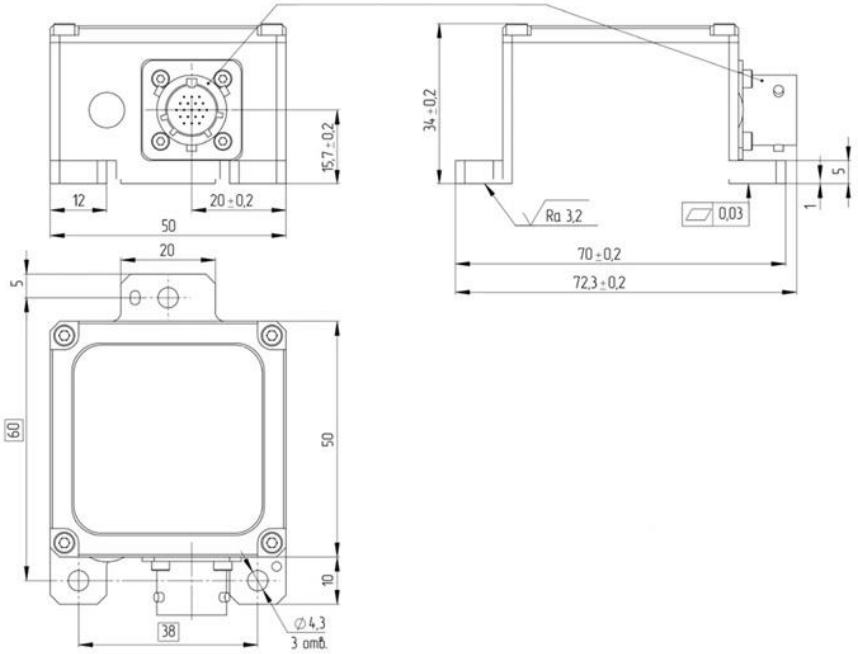

Fig. 3 Outline structure of integrated navigation system

4.2 Electrical interface

The contact sequence of the external connector of the system is shown in the figure below:

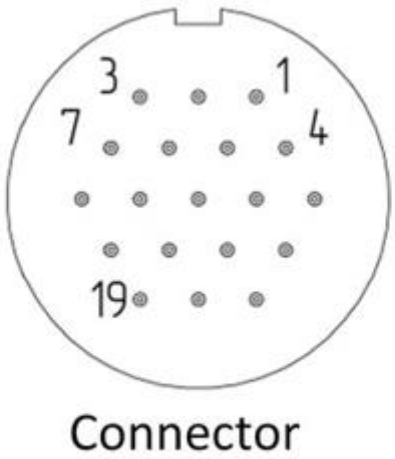

Fig. 4 Schematic diagram of external connector contact sequence of integrated navigation system