



UD-R8003GM GNSS + INS Deep Coupling

GNSS Deeply-coupled Inertial Navigation System

Dual-antenna RTK Positioning & Heading

Description

UD-R8003GM is the high precision integrated navigation system; based on the latest generation of 22 nm process, high-performance vehicle grade GNSS SoC chip, and supports multi frequency of all GNSS system.

UD-R8003GM equipped with a high-precision IMU that has been treated with full temperature secondary calibration, so improving key indicators such as zero bias instability. Powerful deep coupling with GNSS receiver and with RTK algorithm technology, built in SAIF (Smart Advanced Interference Defense) high-performance composite interference suppression technology, UD-R8003GM has obvious advantages in dynamic performance, and can effectively cope with harsh environments such as satellite signal interference and loss. It provides continuous, stable, and reliable high-precision position and attitude information for the carrier, and overcome the environment of complex urban road obstruction and highway signal interference

The hardware design with 2 SMA antenna-connectors; it provides 2 RS232 serial interfaces and 10/100Mbps Ethernet port, that can work with other sensors (such as LIDAR, SLAM, etc.) together for vehicle controlling.



Highlights

- Support RTK positioning with deep coupling algorithms
- With all-GNSS, multi-frequency band precise positioning
- Support modern signal systems such as BDS-3 and GLONASS
- Dual antenna precise direction finding
- Full temperature calibrated IMU module
- SAIF (Smart Advanced Interference Defense) interference suppression
- Overcome harsh environment, signal-to-noise ratio can reach 65 dBc
- Enhanced connection options including serial, and Ethernet



Technical Specification

System Type	GNSS/INS Receiver	
GNSS	BDS	B1I, B2I, B1C*, B2b (PPP)*
	GPS	L1C/A, L1C*, L2
	GLONASS	G1, G2
	Galileo	E1, E5b
	QZSS	L1C/A, L1C*, L2
Gyroscope	Range	±300 deg/s
	Angular random walk	0.5 deg /√hr
	Zero bias instability	5 deg/hr
	Full temperature zero bias	0.3 deg/s
	Scale error	4 ‰
	3-axis coupling error	1.7 ‰ (0.1°)
Accelerometer	Range	±16 g
	Velocity random walk	0.3 m/s /√hr
	Zero bias instability	50 µg
	Full temperature zero bias	5 mg
	Scale error	2 ‰
	3-axis coupling error	0.9 ‰ (0.05°)
Horizontal Accuracy (RMS)	Single point	1.5 m
	RTK	1 cm + 1 ppm
Vertical Accuracy (RMS)	Single point	2.5 m
	RTK	1.5 cm + 1 ppm
Time to First Fix (TTFF)	Cold start	≤ 30 s
	Hot start	≤ 5 s
	RTK initialization	≤ 5 s
	Reacquisition	≤ 1 s
Maximum Data Rate	GNSS measurement	10 Hz
	GNSS position	5 Hz
	INS position / attitude	100 Hz
	IMU raw data rate	100 Hz
Communication Port	Antenna	×2 (SMA)
	RS232	×2 (Push-pull self-locking)
	Ethernet	×1 (RJ45)
Physical	Dimension	116 x 114.2 x 38.6 mm
	Weight	432 g
	Input Voltage	+9 V ~ +32 VDC
	Consumption	1.6 W
Enviroment	Working Temperature	-40° C ~ +75° C
	Storage Temperature	-55° C ~ +85° C
	Humidity	95% (Non condense)
	Protection	IP67
	Vibration	JESD22-B103

Remark: * - Extension item, upgrade to corresponding firmware is required

Performance indicators of integrated navigation

Outage Duration	Positioning Mode	POSITION ACCURACY (M) RMS		VELOCITY ACCURACY (M/S) RMS		TTITUDE ACCURACY (DEGREES) RMS		
		Horizontal	Vertical	Horizontal	Vertical	Roll	Pitch	Azimuth
0 sec	RTK	0.015	0.020	0.025	0.020	0.030	0.030	0.160
10 sec	RTK	0.320	0.200	0.080	0.040	0.070	0.070	0.240