SGP501

RTK/PPP/IMU Dual-Antenna Navigation and Orientation Module

The SGP501 is a full-system, multi-frequency GNSS RTK/PPP/MEMS IMU integrated navigation module with dual-antenna orientation capability. Its six-degree-of-freedom IMU features high range and high-dynamic performance, while the tightly coupled RTK/PPP/inertial algorithm runs efficiently on-chip, delivering navigation data rates up to 100 Hz. It provides 100% navigation availability in urban canyons and extended tunnels, offering a high-precision integrated navigation solution with full three-dimensional attitude.

Technical Features

- Continuous navigation in complex environments such as urban canyons, underground parking lots, tunnels, and elevated bridges.
- Full-system, multi-frequency RTK positioning with centimeter-level accuracy.
- nationwide coverage: PPP-RTK (in some countries).
- Dual-antenna orientation capability.
- Full three-dimensional attitude (heading, pitch, roll).
- Flexible installation with free orientation along three axes.
- Optional integration of wheel-speed information.
- High-rate navigation data output configurable at 1/10/20/50/100 Hz.

Application Areas

- Autonomous Driving
- Agricultural Machinery
- UAV

Performance Specifications

Positioning Accuracy（1σ）	Open Sky*	RTK	0.01m + 1ppm
		PPP-AR	0.3m
		Standalone	1.5m
	Urban Environment		5.0m
	GNSS Outages	60s	10m
		>60s	1% of travel distance 0.3% of travel distance （by odometer aiding）
Attitude Accuracy（1σ）	Dual-Antenna Heading		0.1^0 (2m baseline)
	Heading hold	0.1^0/min	
	Heading	0.3^0 (±300deg/s); 0.8^0 (±1000deg/s)	
	Roll	0.5^0 (±300deg/s) ;1.2^0 (±1000deg/s)	
	Pitch	0.5^0 (±300deg/s); 1.2^0 (±1000deg/s)	
Velocity Accuracy（1σ）		0.05m/s	
Timing Accuracy（1σ）		20ns	
Solution Rate	Configurable 1/10/20/50/100Hz		
GNSS Frequency	BDS B1I/B2I/B3I; GPS L1C/A/L2P/L2C/L5 Galileo E1/E5a/E5b; GLONASS L1/L2 QZSS L1/L2/L5; SBAS		
Size	30mm x 40mm		

*: specifications are defined under the condition that the satellite signal strength exceeds 42 dB-Hz.