ALPHA INS

GNSS Receiver Enclosure



Key Features

- Spoofing & Jamming Detection
- Advanced Multipath Mitigation
- 874 Channels, all constellations
- Fast Acquisition Channels
- Up to 200 Hz Output
- S-Band & L-Band
- Full attitude determination
- Single & Dual Antennas

ALPHA INS is an advanced GNSS-aided Inertial Navigation System in a rugged environmental enclosure. Available in single and dual antenna options.

Experience enhanced performance in challenging environments with patented anti-spoofing and jamming detection, all-constellation tracking, and fast acquisition.

Accelerometers and gyroscopes are fully calibrated, temperature-compensated, and mathematically aligned to an orthogonal coordinate system.

ALPHA INS Specifications

Tracking	Total Channels	874	
	GPS	L1 C/A, L1C, P1, P2, L2C, L5	
	GLONASS	L1 C/A, P1, P2, L2 C/A, L3	
	Galileo	E1, E5, E5A, E5B, E6	
	BeiDou	B1, B1C, B2B, B2, B2A, B3	
	QZSS	L1C C/A, L1C, L2C, L5, L6, L1S, L1Sb, L5S	
	SBAS	L1, L5	
	NavIC	L1, L5, S	
	L-Band	1525 - 1560 Mhz	
Performance*		Horizontal (m)	Vertical (m)
	Autonomous (Stand alone)	1.000	1.500
	SBAS	0.500	0.850
	DGPS	0.250	0.500
	RTK	0.008 + 1 ppm	0.015 + 1 ppm
	Free inertial, land vehicles	0.5%**, DT (with velocity constraints/ZARU/ZUPT aiding)	
Signal Protectoin	J/S Ratio	Up to 57 dB	
Time to First Fix	Cold Start	< 35 s	
	Warm Start	< 5 s	
	Reacquisition	< 1 s	
	RTK Initialization	2 - 6 s	
Output Rate	Position / Measurements	**2S/3S:** up to 200 Hz; **DUO:** up to 100 Hz	
	Heading	**2S/3S:** up to 200 Hz; **DUO:** up to 100 Hz	
Wireless I/O	Bluetooth	Bluetooth V2.0 Class 2, SPP Slave and Master Profiles	
Wired I/O	GNSS Antenna	+5 VDC, 0.16 A max (TNC); **2S/3S:** 1 antenna; **DUO:** 2 antennas	
	USB	1 x USB 2.0 High-speed. **2S:** Up to 1.5 Mbps, **3S:** 12Mpbs (5-pin ODU)	
	Serial	1 x RS232 up to 460.8 kbps (7-pin ODU)	
	Event Marker	1 x Event Marker (BNC)	
Storage	Internal Memory	Up to 16 GB	
Status/Interface	Keys	**3S & DUO:** Power & Function	
	LEDs	**3S & DUO:** Status & Recording	
Power	Input Voltage	4.5 to 40 VDC, 5-pin ODU	
	Power Consumption	2.6 W, typical	
Physical	Dimensions	148 x 85 x 35 mm	
	Weight	370 g	
Environmental	Operating Temperature	-40°C to +70° C	
	Storage Temperature	-40°C to +85°C	
	Shock & Vibration	MIL-STD-810H (Method 516.7 & 514.8)	
	Ingress Protection	IP66	

ALPHA INS Family Nomenclature
2S/3S: single antenna; TR-2S & TR-3S variants.
DUO: dual antenna; TR-3S DUO variant.

ALPHA INS Specifications

IMU performance (KERNEL-110)	Gyroscope performance	Technology	MEMS		
		Dynamic range	± 2000 °/s		
		Bias in-run stability	2 °/hr		
		Noise. Angular Random Walk (ARW)	0.3 °/√hr		
	Accelerometer performance	Technology	MEMS		
			Kernel 110-08	Kernel 110-15	Kernel 110-40
		Dynamic range	± 8g	± 15g	± 40g
		Bias in-run stability	0.1mg	0.03mg	0.05mg
		Noise. Angular Random Walk (ARW)	0.02m/s/√hr	0.045m/s/√hr	0.06m/s/√hr
IMU performance (KERNEL-201)	Gyroscope performance	Technology	MEMS		
		Dynamic range	± 450 °/s		
		Bias in-run stability	0.7 °/hr		
		Noise. Angular Random Walk (ARW)	0.065 °/√hr		
	Accelerometer performance	Technology	MEMS		
			Kernel 201-08	Kernel 201-40	
		Dynamic range	± 8g	± 40g	
		Bias in-run stability	0.005 mg	0.025 mg	
		Noise. Angular Random Walk (ARW)	0.015 m/s/√hr	0.045 m/s/√hr	

GNSS+INS Accuracy (RMS)* **	**Outage (s)**	Position Mode	**Position Accuracy**		**Attitude Accuracy**	
			Horizontal (m)	Vertical (m)	Heading (deg)	Pitch/Roll (deg)
	0	Stand Alone	< 1	< 1.5	< 0.1	< 0.05
		RTK	< 0.008	< 0.015		
	60	Stand Alone	< 8	< 4	< 0.15	< 0.09
		RTK	< 7	< 2		

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*Dual-antenna GNSS measurements are dependent on GNSS RTK performance.
GNSS performance is dependent on signal quality, satellite geometry, ionospheric and tropospheric conditions, baseline length, multipath effects and RF interference.
** Under ideal conditions, including proper static alignment and suitable in-field dynamic motion during GNSS signal loss.
***Performance may degrade under unmitigated vibration or significant temperature variation; unit-to-unit variation may occur.

Refer to the user manual for full specifications. Specifications may be changed without notice.