

## GPS aided Orientation Sensor



The IG-500N is a miniature and high performance GPS enhanced Attitude and Heading Reference System (AHRS). With its embedded Extended Kalman Filter, the IG-500N delivers unmatched precision for attitude and position measurements even during very high dynamic conditions.

### All in one: the IG-500N

The IG-500N includes a MEMS based Inertial Measurement Unit (IMU), a GPS receiver and a pressure sensor. It provides precise drift-free attitude and position, even in long time turns.

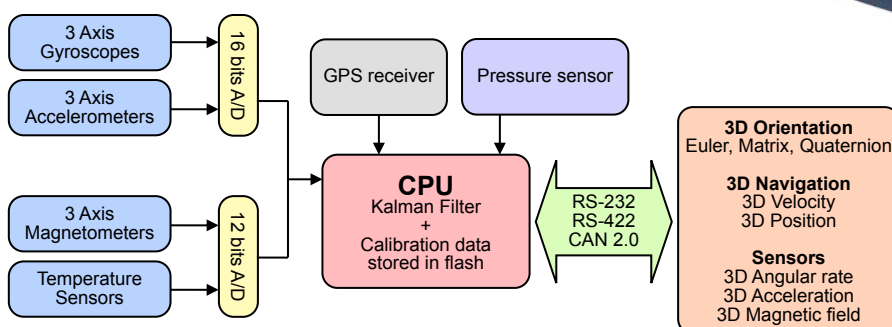
This miniature Inertial Navigation System (INS) runs a real time, on board, Extended Kalman Filter that computes orientation, position and velocity data at high update rates, up to 100 Hz.

The attitude accuracy is also improved, compared to traditional AHRS, by removing transient accelerations measured by the GPS receiver.

### Easy and fast integration

SBG Systems has designed a powerful and easy to use Development Kit for this product. In just a few seconds, you can start evaluating and configuring your new device. Integrating the IG-500N in your application is even easier.

### Simplified Block Diagram



### Key Features

- GPS enhanced 3D velocity, position and orientation at high update rate (100 Hz)
- Accurate attitude even in high G maneuvers
- Precise UTC referenced output and SyncOut signal
- Embedded 4Hz GPS receiver & barometric sensor
- Wide inertial sensors range options
- Calibrated over full temperature range -40 to 85°C for bias, gain, misalignments, cross-axis and gyro-g
- Advanced and easy to use magnetometers compensation procedure for soft and hard iron
- Available protocols RS-232, RS-422, CAN and USB
- Very compact and lightweight design (44 grams)
- Very low power design down to 800 mW
- Robust and high precision aluminum enclosure

### Fields of use

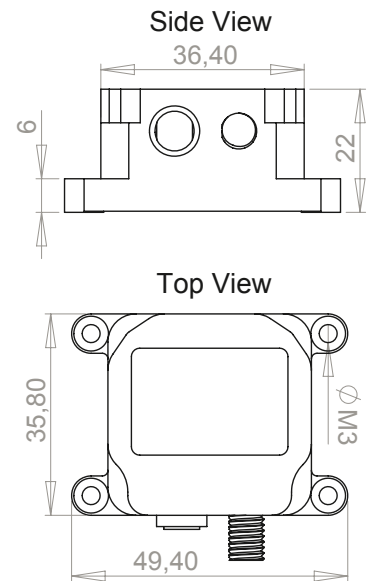
- Unmanned vehicles
- Vehicle motion analysis
- Aerospace
- Robotics
- Marine industry



## Technical Specifications

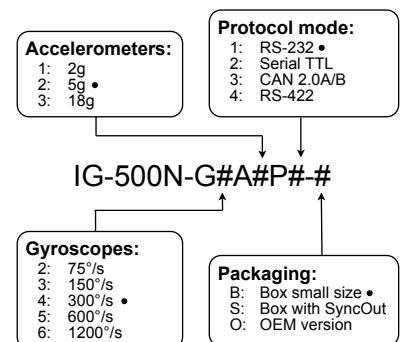
Parameter	Specification	Remarks		
<b>Attitude</b>				
Sensing range	360° in all axes			
Static accuracy	± 0.5° (Pitch, Roll) ± 1° (Heading)	Stabilized Kalman Filter Homogenous magnetic field		
Dynamic accuracy	± 1.0° RMS	Under good GPS availability		
Repeatability	< 0.2°			
Resolution	< 0.05°			
Output frequency	0 to 500 Hz 0 to 100 Hz	Calibrated sensors only Sensors, attitude, velocity, position		
<b>Standard Sensors</b>				
	Accelerometers	Gyroscopes	Magnetometers	
Measurement range	± 5 g	± 300 °/s	± 1.2 Gauss	Refer to sensors options table
Non-linearity	< 0.2% of FS	< 0.1% of FS	< 0.2% of FS	
Bias stability	± 5 mg	± 0.5 °/s	± 0.5 mGauss	Over temperature range Kalman filter stabilized
	-	< 0.1 °/s	-	
Scale factor stability	< 0.1%	< 0.05%	< 0.5%	Over temperature range
Noise density	0.25 mg/√Hz	0.05 °/s/√Hz	0.01 mG/√Hz	
Alignment error	< 0.1°	< 0.1°	< 0.1°	
Bandwidth	50 Hz	40 Hz	500 Hz	Additional software filter available
Sampling rate	10 000 Hz	10 000 Hz	1 000 Hz	
<b>GPS Receiver</b>				
Receiver type	L1 frequency, C/A Code, 50-Channels, 4 Hz			
Position accuracy	2.0 meters 2.5 meters 5.0 meters	with SBAS support CEP (Horizontal accuracy) SEP (Vertical accuracy)		
Acquisition time	< 1.0 s / 29 s			
Tracking sensitivity	-160 dB			
<b>Pressure Sensor</b>				
Resolution	2.5 Pa	20 cm resolution		
Pressure accuracy	± 50 Pa / ± 150 Pa	Relative / Absolute		
Long term stability	100 Pa	Over 12 months		
Update rate	100 Hz			
<b>Communication</b>				
Output modes	Euler angles, Quaternion, Matrix, 3D velocity, 3D position, Calibrated sensor data, Raw sensor and GPS data	Each output can be enabled or disabled by the user		
Interface options	Serial (RS-232, RS-422 or TTL 3.3V) CAN 2.0A/B up to 1 Mbit/s Usb using provided UsbToUart	RS-422 and CAN 2.0A/B are only available for OEM and S packages		
Serial data rate	9 600 to 921 600 bps	Configurable slew rate		
<b>Physical</b>				
Dimensions OEM	27x30x14 mm			
Dimensions box	36x49x22 mm / 36x49x25 mm	B package / S package		
Weight OEM	10 grams			
Weight box	44 grams / 49 grams	B package / S package		
Specified temperature	-40 to 85°C	Non-condensing environment		
Shock limit	1 000g (Powered), 2 000g (Unpowered)	Shocks can affect performance		
<b>Electrical</b>				
Operating voltage	3.3 V to 30 V			
Power consumption	800 mW @ 5.0 V	High efficiency DC/DC converter		
SyncOut, Trigger	Open drain pull-up voltage -0.3 to 25 V	Open drain, use a pull-up resistor		
Start-up time	< 1 s	Valid data		

### Mechanical drawing



All dimensions are in millimeters

### Product code options



• standard product options