

# IG-500E

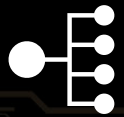


3D Orientation

0.35°  
ACCURACY



Heave



Aiding Equipment

GPS

Odometer

GNSS

RTK

USBL

DVL



INDUSTRIAL GRADE

## Inertial Navigation System Externally Aided

**IG-500 SERIES** When size and performance matter, professionals trust the proven MEMS-based IG-500 series. After many years of success, the IG-500 Series is recognized for its high performance and reliability.



# IG-500E - The only Miniature INS to fuse external aiding data

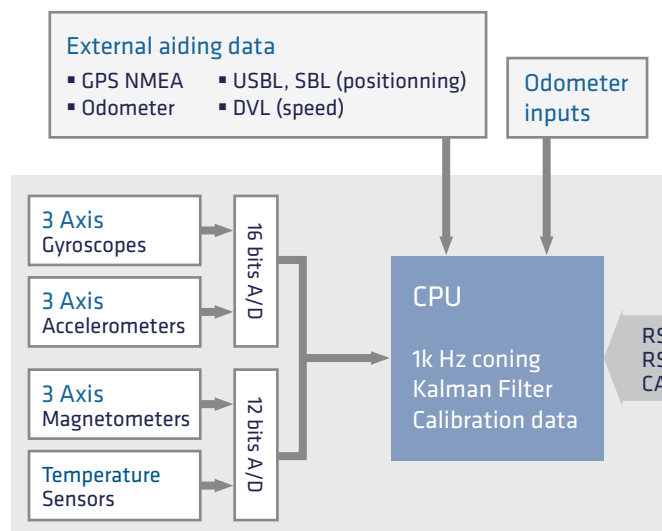


## KEY FEATURES

- » Accepts RTK GPS/GNSS, Odometer, DVL, USBL, etc
- » High update rate @ 100 Hz
- » NMEA/ASCII Output
- » Automatic magnetic declination and local gravity

## MINIATURE AND ROBUST

- » Compact and lightweight  
49 grams
- » Low power design down to  
650 mW
- » Robust aluminum  
enclosure



## 3D Orientation

- » Euler
- » Matrix
- » Quaternion

## 3D Navigation

- » 3D velocity
- » 3D Position

## Sensors

- » 3D Angular Rate
- » 3D Acceleration
- » 3D Magnetic field

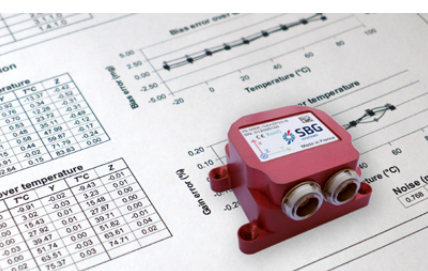
## Heave

The IG-500E is a miniature inertial navigation sensor which accepts external aiding data. It is composed of:

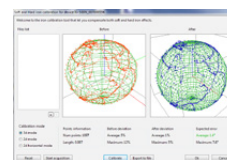
- » A MEMS-based Inertial Measurement Unit (IMU) integrating 3 gyroscopes, 3 accelerometers, and 3 magnetometers,
- » An on board Extended Kalman Filter.

## THE MOST ADVANCED CALIBRATION TECHNIQUES

To ensure high data integrity, the IG-500E is calibrated from -40 to 85°C for bias, linearity, gain, misalignments, cross-axis and gyro-g. Every sensor is then intensively tested, and shipped with its own calibration report.

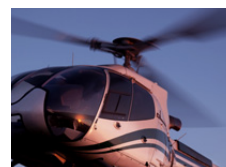


## COMPENSATION OF MAGNETIC DISTURBANCES



The magnetometer calibration tool compensates both soft and hard iron effects using a powerful algorithm. A calibration library is provided to be integrated in your system. You can easily calibrate your sensor in real conditions to obtain the most efficient compensation.

## HIGH IMMUNITY TO VIBRATIONS



The IG-500E is especially reliable in vibrating environments. Each accelerometer is calibrated, and powerful algorithms have been designed to filter vibrations such as a 1 k Hz coning and a FIR filtering.

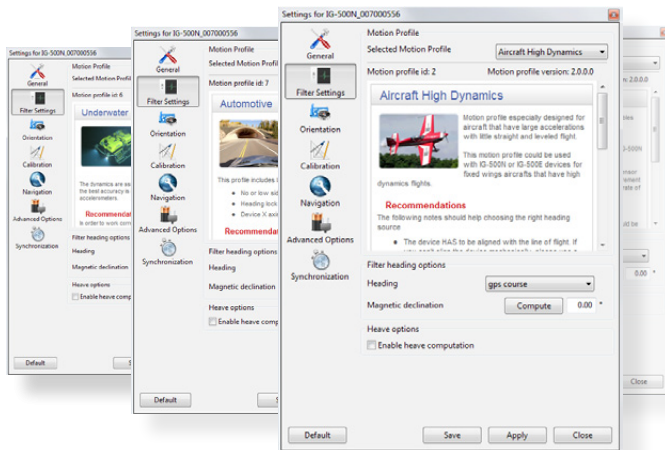
# Performance adjusted to your application

## MOTION PROFILES

Motion Profiles adjust automatically to:

- » Kalman Filter parameters,
- » Vibration level,
- » Dynamic model,
- » Magnetic disturbance immunity, etc.

In a few clicks, Motion Profiles tune your sensor to your application constraints.



*Example: If you want to install the IG-500 sensor in an airplane, select the "Aircraft High Dynamics" motion profile and all parameters will be automatically adjusted.*



## ROV/UAV NAVIGATION

Accurate roll, pitch, and heading are required for underwater vehicle stabilization & orientation. The IG-500E enables DVL and USBL inertial sensor fusion in a small, and affordable product.



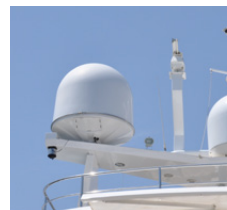
## IMPROVED GPS POSITIONING

To handle GPS Outages, the IG-500E can be combined with an RTK GPS/GNSS and an odometer. Whether you drive across a tunnel, a forest, or an urban canyon, this solution provides an unmatched accuracy.



## UGV CONTROL

Compact, lightweight, and cost-effective, the IG-500E is the ideal solution for UGV control. To deliver even more accurate data, it can be combined with an outdoor or indoor positioning system.



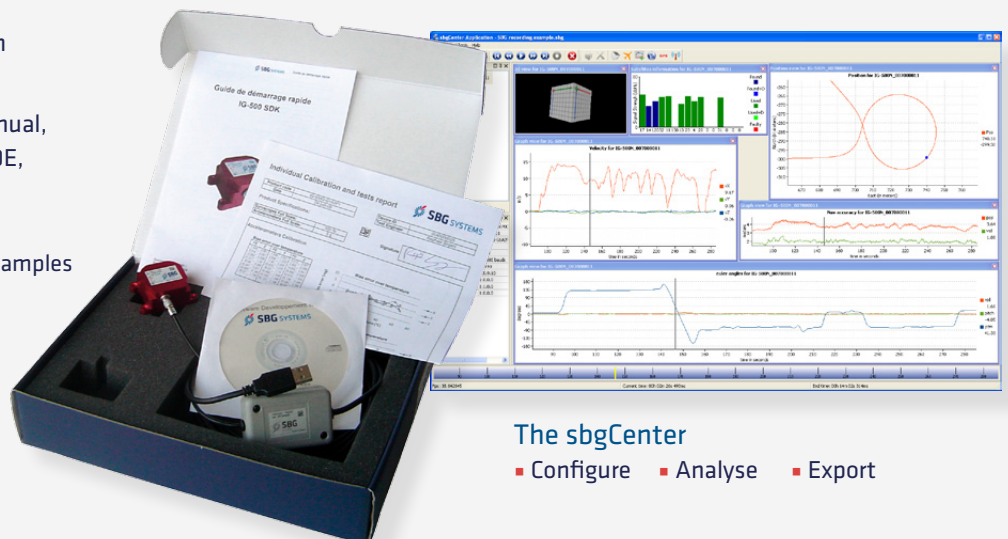
## ANTENNA TRACKING

The IG-500E provides accurate antenna position and orientation whether they are mounted on a boat, a car, or a helicopter. Combined with a dual antennas GPS, it delivers a robust true heading.

## Development kit

The Development Kit which comes with your IG-500E sensors contains:

- » A quick start guide and the user manual,
- » The calibration report of your IG-500E,
- » An USB converter cable,
- » And useful softwares and tools:
  - A C library and some code sources examples
  - The Magnetometer Calibration Tool
  - LabView & Matlab plugins
  - The sbgCenter configuration & analysis software
  - The sbgUpdater that automatically alerts you and install the new software version.



### The sbgCenter

- Configure
- Analyse
- Export

# IG-500E - Specifications

PARAMETER	SPECIFICATIONS			REMARKS
	Ground	Marine	Underwater	
<b>Performance</b>				
Roll/Pitch (Dynamic)	0.5° RMS	0.45° RMS	0.35° RMS	Under good velocity aiding
Heading (Dynamic)	0.5° RMS	1.0° RMS	0.8° RMS	Depends on heading aiding source
Resolution	< 0.05°	< 0.05°	< 0.05°	
Velocity (RMS)	< 0.1 m/s	< 0.1 m/s	< 0.1 m/s	Under good velocity aiding
Heave	-	10 cms or 10 %	-	Whichever is greater
Dead Reckoning	1 % of traveled distance			Depends on velocity aiding
Sensing range	360° in all axes, no mounting limitation			Solid state sensors

Inertial Sensors	Accelerometers			Gyroscopes			Magnetometers		
Measurement range	± 5 g	± 300 °/s	± 1.2 Gauss	Refer to sensors options table					
Non-linearity	< 0.2 %	< 0.05 %	< 0.2 %	% of full scale					
Initial bias error	± 5 mg	± 0.5 °/s	± 0.5 mGauss	Over temperature range					
Bias in-run stability	± 0.06 mg	20 °/hr	-	Allan variance - constant temperature					
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	< 0.05°	< 0.05°	< 0.1°						
Bandwidth	250 Hz	240 Hz	500 Hz	1 k Hz gyroscopes coning integrals					
Sampling rate	10,000 Hz	10,000 Hz	1,000 Hz	Advanced anti-aliasing FIR filters					

## Communication

Available data	Euler angles, quaternion, rotation matrix, velocity, position, heave, calibrated sensor data, delta angles, odometer data, device status, raw GPS data, UTC time reference, etc.	Each output can be enabled or disabled by the user. Output rate is user selectable
Output rate	100 Hz for orientation, velocity and position	500 Hz in IMU mode only
Serial interface	RS-232, RS-422, TTL 3.3V or USB Binary proprietary protocol and NMEA/ASCII	USB using an external adapter
CAN interface	CAN 2.0A/B up to 1 Mbit/s	

## External aiding

Interface options	Serial RS-232 or RS-422	Configurable protocol and slew rate
Serial data rate	9,600 to 921,600 bps	User selectable
Supported protocols	NMEA for navigation data and true heading, sbgCom for GPS data, remote magnetometers.	Contact us for more information
Odometers	Two axis odometer inputs such as wheel speed counter or 2D optical odometer.	User configurable

## Physical

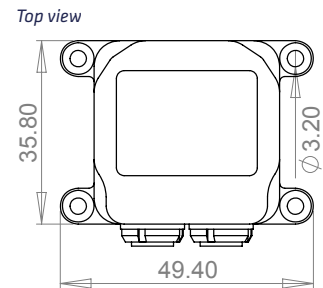
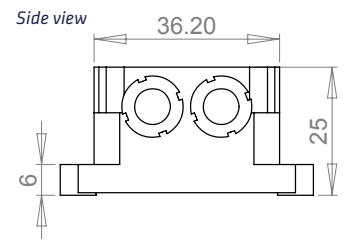
Dimensions OEM	27 x 30 x 14 mm, 1.1 x 1.2 x 0.6"	
Dimensions box	36 x 49 x 25 mm, 1.4 x 1.9 x 1"	
Weight OEM	10 grams, 0.02 pounds	
Weight box	49 grams, 0.1 pounds	
Specified temperature	-40 to 85°C, -40 to 185°F	Non-condensing environment
Storage temperature	-40 to 85°C, -40 to 185°F	
Shock Limit	1,000 g (Powered), 2,000 g (Unpowered)	Shocks can affect performance
Operating vibration	3 g RMS (20 Hz to 2 k Hz per MIL-STD 810G)	Valid for 18g accelerometers

## Electrical

Operating voltage	3.3 V to 30 V	
Power consumption	650 mW @ 5.0 V	Optimal power consumption at 5.0 V
SyncOut, Trigger	Open drain pull-up voltage: -0.3 to 25 V	Open drain, use a pull up resistor
SyncIn, Time pulse, Odometer	Low level < 0.8 V - Input range: ± 20 V High level > 2.2 V - Input delay: < 150 ns	Two inputs available and user configurable
Start-up time	< 1 s	Valid data

## MECHANICAL DRAWING

All dimensions are in millimeters



## PRODUCT CODE

▪ standard product options

IG-500E-G#A#P#-#

**GYROSCOPES**  
 2: 75 °/s  
 3: 150 °/s  
 4: 300 °/s  
 5: 600 °/s  
 6: 1200 °/s

**ACCELEROMETERS**  
 1: 2 g 2: 5 g 3: 18 g

**PROTOCOL MODE**

1: RS-232  
 2: Serial TTL  
 3: CAN 2.0A/B  
 4: RS-422

**PACKAGING**  
 S: Box version  
 O: OEM version

## OEM VERSION

