

GyroLocator

Gyro Navigation System

303Gu

Specification & Instructions for Use

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1. GyroLocator 303Gu

GyroLocator 303Gu is a hybrid system consisting of a complex inertial navigation sensor designed to transfer data on length, width, azimuth and speed in the format NMEA-0183 in connection with a GPS-receiver.

This intelligent module GyroLocator transfers data between the intervals, in which the GPS-receiver does not receive any new data. It transfers data on the relative position and thus optimises the current position and speed.

GyroLocator 303Gu consists of a compact unit and is connected to the car navigation system or a host system. A modification of the existing car electronics is thus not necessary.

In case the satellite signal should fail completely (e.g. in a tunnel, under a bridge, among high buildings), the GPS data will also be generated by the module for a longer period.

The interval of the signal that is received from the satellite amounts to 1 second. During the intervals between these signals, the new position is calculated based on the data received from the 303Gu in such a way that the Gyro-Speed sensor scans the existing data with a frequency of 10 Hz., with the integrated algorithm increasing the accuracy of the GPS data received. To obtain a synchronisation with the GPS, the output signals are also emitted in intervals of 1 second each. This system (NGH 303G) consists of two modules: the GPS receiver and the sensor module. The GPS receiver (TIM-5H) is manufactured by μ -blox, is Galileo ready and features a 50 channel SuperSense technology.

The sensor module consists of an acceleration sensor and two vibrating gyros, which represent the so-called inertia platform. The sensor fusion of both sensor types makes the autonomous measuring of speed and driving direction possible. A 32-bit RISC-processor calculates and optimises the data of the GPS-receiver via its algorithm.

In addition, there is the possibility to connect the device with the speed pulse signal of the MSO Speed Wedge true ground speed RADAR sensor in order to increase the accuracy.

The normal output delay of the current position amounts to approx. 2 seconds in the autonomous mode without speed pulse signal. The algorithm of the SYSTEM 303Gu calculates the position in advance and transfers the generated position. In case the GPS signal should fail and the vehicle is broken down to standstill, this might result in an output delay of up to 7 seconds.

These inaccuracies can be avoided by means of the SYSTEM 303Gu. If you drive in the *Speed pulse Signal mode* this mode will be automatically switched on if a speed pulse signal is transferred via the BNC-Connector. Every time you start the vehicle, the SYSTEM 303Gu will check after the device is switched on, if a speed pulse signal is fed to the BNC bush. The frequency of this signal depends on the speed and on the wheel diameter. To avoid a complicated input of calibration data, which might lead to faults, the SYSTEM 303Gu was equipped with an algorithm which calculates the pulse signal to speed ratio very precisely in the following way: The GPS data received are compared with the data from the RADAR signal and adjusted accordingly. Depending on the increasing driving period and/or speed, the pulse signal to speed ratio which is "suitable" for the respective speed is thus calculated more precisely as could be done "manually". If the GPS signal fails for a longer period, the possibility of deviating from the current position is thus once more decreased.

2. Specification

2.1. Sensor components

- 1 Yaw Gyro
- 1 Pitch Gyro
- 1 acceleration sensor

2.2. Angular velocity

Max. 100°/sec.

2.3. Accuracy

< 3°

2.4. Temperature range

-20° ~ +70°C

2.5. Acceleration sensor

0 ~ ±2g

2.6. GPS & format

Interface: RS232 Data output interval of 1Hz
Protocol: NMEA 0183

\$GPGGA } Both protocols must
be switched on } at least
\$GPRMC }

Other protocols can be issued (see Instructions for µ-blox TIM-5H)

➔ Attention: As for \$GPGGA<6>, the automatic change-over from „1“ to „2“ shall apply for the reception of D-GPS or SBAS as EGNOS & WAAS

2.7. Communication

- 9,600 bps or 38,400 bps for NGH303/10Hz/S version
- No parity
- 8 bit
- 1 stop bit

2.8. Power supply

+10 to 28V / 2.5A max

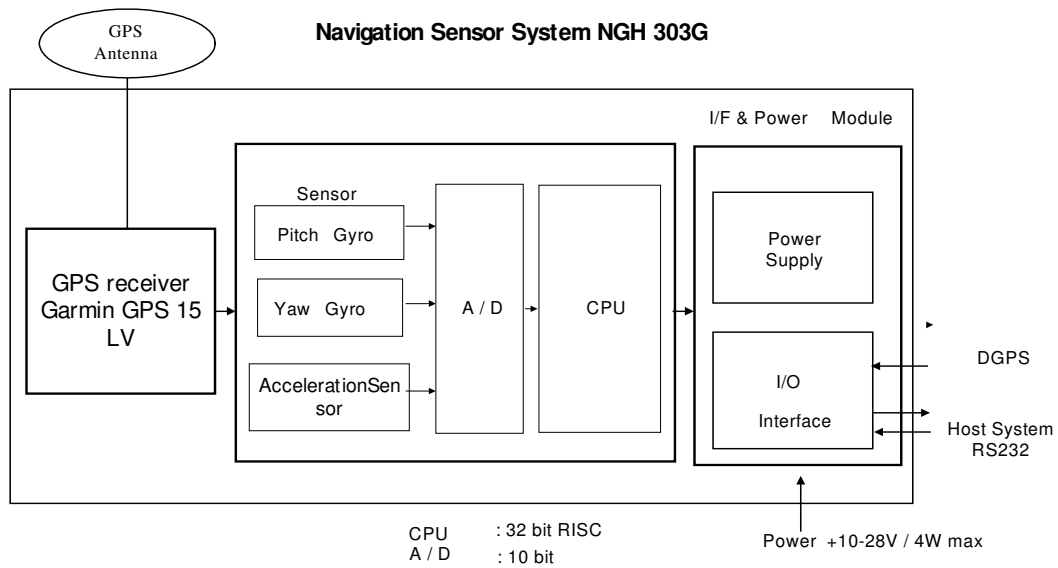
2.9. Dimensions

Length:	188 mm	} Without fixing legs
Width:	100 mm	
Height:	56 mm	

2.10. Speed pulse

Approx. 5V – 12V low active

3. Structure

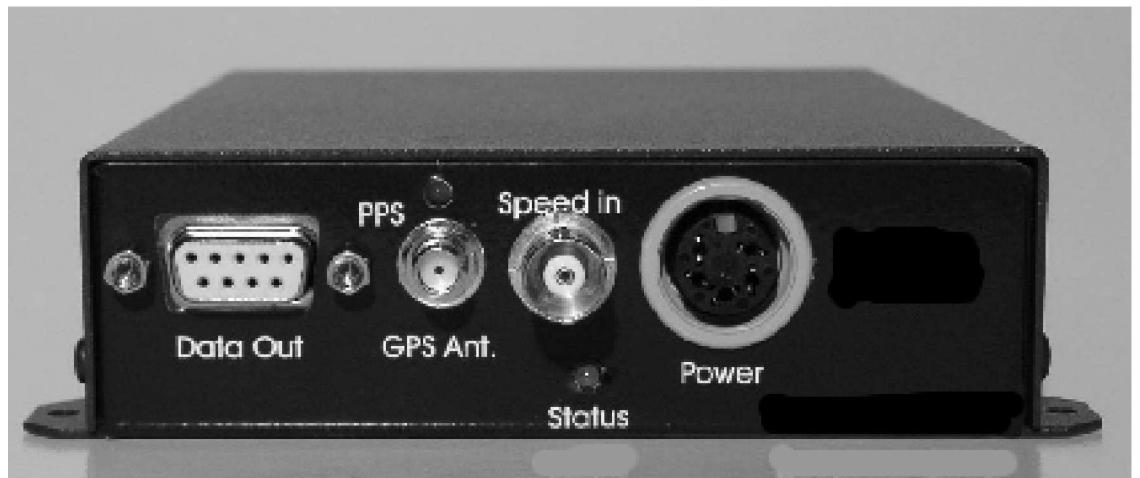


4. Installation

4.1. Installation in the Vehicle

The module should be fixed in emphasis proximity (revolve of the vehicle) as close as possible. The **arrow** on the top of the casing must exactly point in the **driving direction** and in such a way that it will undergo as low vibrations as possible. Furthermore, the system should be subjected only to minor thermal fluctuations (e.g. sunlight, air condition, heating).

4.2. Front Panel



4.3. Connections

Plugs	Connections	Function
Power (DIN5P, female)	Pin 1 *Red	Power +9.6-28V
	Pin 2 *Blue	Ground
	Pin 3 *Yellow	DGPS in
	Pin 4	
	Pin 5 *Green	PPS out
Data Out (D-Sub 9, female)	Pin 2	Send Data
	Pin 3	Receive Data
	Pin 5	Ground
Speed Pulse in (BNC, female)	Inner pin	Vehicle speed pulse signal input
	Outer	Ground
GPS Ant. (SMA Female)	Inner pin	Antenna RF signal input Power for active antenna (5V)
	Outer	Ground

4.4. LED Status indicator

4.4.1 PPS LED (red): Pulse per second

●: Red

4.4.2 Status LED (Green, Orange and Off)

●: Off

●: Orange

●: Green

Status LED indication / 1 sec interval change	
Color Pattern	Explanation
●●●●	Power on Initialization
●●●●	Initialized <input type="checkbox"/> Non Speed pulse <input type="checkbox"/> Non GPS fix <input type="checkbox"/>
●●●●●●●●●●●●●●●●	Initialized <input type="checkbox"/> Speed pulse <input type="checkbox"/> Non GPS fix <input type="checkbox"/>
↑ ↑	↑ Means That speed pulses has no logical level change.
●●●●	Initialized <input type="checkbox"/> Non Speed pulse <input type="checkbox"/> GPS fixed <input type="checkbox"/>
●●●●●●●●●●●●●●●●	Initialized <input type="checkbox"/> Speed pulse <input type="checkbox"/> GPS fix <input type="checkbox"/>
↑	↑●●● Means, that the speed pulses has no logic changes.

5. Notes for the User

The following notes for the user should be observed especially prior to putting the system into operation.

5.1. Power Supply

Owing to a Power-on-Reset and an initialising of the system being carried out each time the car is started, it must be possible to switch off the operating voltage. Furthermore, the operating voltage should have as low interferences as possible.

At power on, it takes the current strongly (<2.5A) for a while, because the system needs to charge a super capacitor.

5.2. GPS-Antenna

The antenna will have to be installed outside the vehicle interior (e.g. on the roof). The receiver quality will be improved if there are as few other objects as possible that might reflect the signal. When mounting the cables, please take care to avoid damaging possibly present coax cables.

5.3. Speed pulse signal

The speed pulse signal in the vehicle will be conveyed via the BNC plug. Please take care that a short circuit of the speed pulse signal by grounding is avoided.

IMPORTANT!

- The drifting of the sensors is strongly influenced by thermal fluctuations.
- Please take care to reduce temperature changes and vibrations during the initialisation phase (approx. 7 seconds after the system is switched on) to a minimum
- To minimize a possible thermal drifting, we recommend a further Power-on-Reset.

6. Dimensions(mm) & View