

ADMA-Micro

Our smallest GNSS-aided inertial navigation system with maximum performance level.

The **ADMA-Micro** is our smallest GNSS-aided inertial measurement unit (IMU). It measures the 3D position in real-time within an accuracy of 0.01 m (1σ)^{*2}. Based on accelerations and rotation rates, which are also measured, velocities, position angles and heading can be determined. The use of MEMS gyros and accelerometers makes it possible to create a highly accurate, compact and lightweight device. Different structural shape allows choosing the right design for a variety of applications, including vehicles and VRUs (Vulnerable Road Users), construction machines, UGVs (Unmanned Ground Vehicles) and robotics.



Thanks to almost 35 years of GeneSys experience in inertial navigation systems, the ADMA-Micro is a fully-fledged GNSS-aided INS system combined with an advanced Kalman filter. High flexibility and an embedded webinterface provide quick and individual workflows. A wide range of free software solutions, such as the Data Reader Library for decoding the ADMAnet data stream or the ROS driver, allow an easy toolchain integration.

0.01 m	0.06 km/h	0.06 °	0.06 °	< 1 ms	100 / 200 Hz
Position accuracy (1σ) ^{*2}	Velocity accuracy (RMS) ^{*3}	Heading accuracy (1σ) ^{*3}	Roll/Pitch accuracy (1σ) ^{*3}	Data latency	Data output rate

KEY FEATURES

- Our smallest GNSS/INS system
- Advanced Kalman filter for sensor fusion
- Centimeter-level positional accuracy RTK
- Real-time 3D position, velocity and attitude measurement up to 200Hz
- Data latency <1 msec
- Dual antenna support for highly accurate heading in static and low dynamic conditions
- Multi GNSS capability for a high position reliability
- Fully compatible with existing ADMA systems
- Embedded webinterface for easy configuration

APPLICATIONS

The ADMA-Micro achieves highly accurate measurements of position, velocity, angles, rotation rates or accelerations of a moving object. The system is small, rugged and low powered, making it ideal for a range of applications including:

- Autonomous vehicle (AV) operation
- ADAS Evaluation e.g., ACC, FCW, AEB (VRU, Car2Car), LSS (LDW, LKA)
- Simultaneous Localization and Mapping (SLAM)
- Validation of predictive vehicle safety functions with e.g., Camera, Radar, Lidar sensors
- Vulnerable Road Users (VRU) Tracking
- Comprehensive vehicle safety functions with connected sensor systems and V2X

ADMA ADD-ONS AND OPTIONS

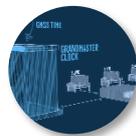
Meet new measurement and testing requirements with Add-Ons and Options.

The new generation of ADMA 3.5 devices now allows our customers to meet their new and changing needs. Our focus is on straight-forward use and increased productivity. The Add-Ons and Options can be activated quickly and conveniently by entering a license key. This is possible at any time without modifications to the hardware. A high degree of flexibility is thus ensured.



Add-On DELTA 1:5

Relative data calculation via WiFi in real-time for multi-vehicle operation



Add-On PTP

Time synchronization with generalized Precision Time Protocol (gPTP)



Add-On LATDEV

Real-time calculation of the lateral deviation



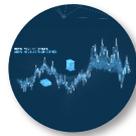
Add-On BRAKING

Real-time calculation of brake performance data according to international regulations



Add-On FILTER

Option for online signal filtering



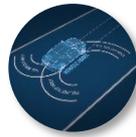
Add-On Smoothing

Define maximum step size for the GNSS signal



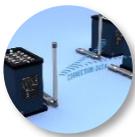
Option Dual-Ant

Two GNSS antenna option



Option Vehicle Model

2D vehicle model predicts vehicle behavior, supports IMU & adapts to conditions



Option DGNSS Correction Data

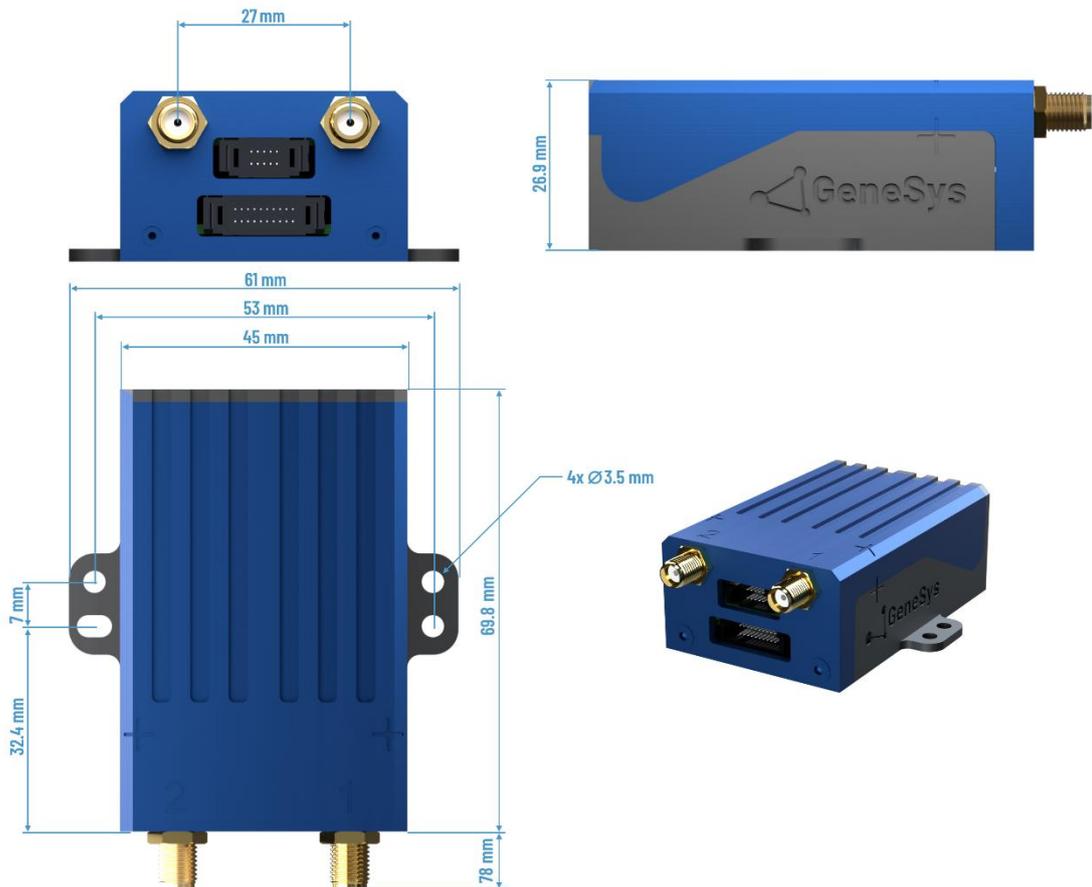
Correction data reception via Ethernet



Option Internal Memory

Storing ADMA measurement data in internal memory

DIMENSIONS - ADMA-MICRO-OEM



DIMENSIONS – ADMA-MICRO



TECHNICAL DATA

Complete system	
GNSS constellations	GPS L1, L2 GLONASS L1, L2 BeiDou B1, B2 Galileo E1, E5
Dual antenna	Optional
Position accuracy (1σ) ^{*2}	0.01 / 0.20 / 0.60 / 1.20 / 1.50 m
Angle measurement range roll / pitch / yaw	60 ° / 60 ° / ± 180 °
Angle Measurement accuracy roll & pitch (1σ) / yaw (1σ) / sideslip (RMS)	0.06 / 0.06 / 0.2 °
Angle resolution	0.01 °
Velocity accuracy (RMS) ^{*3}	0.06 km/h
Position error after 10 / 30 / 60 sec GNSS outage (RMS) ^{*3}	0.5 / 5.0 / 30.0 m
Velocity error after 10 / 30 / 60 sec GNSS outage (RMS) ^{*3}	0.10 / 0.40 / 1.50 m/sec
Roll / Pitch angle error after 10 / 30 / 60 sec GNSS outage (RMS) ^{*3}	0.06 / 0.15 / 0.25 °
Heading angle error after 10 / 30 / 60 sec GNSS outage (RMS) ^{*3}	0.06 / 0.15 / 0.25 °
Data update rate	100 Hz / 200 Hz
Calculation latency	1 msec

The performance figures given are based on measurements taken using the latest firmware version 35.3. Performance figures for comparable systems were obtained at different times and using different firmware versions and are therefore only comparable to a limited extent.

Sensors - Gyros

Sensor Technology	3 MEMS gyros
Measurement range	$\pm 450^\circ/\text{s}^4$
Data output resolution	0.0001 $^\circ/\text{s}$
Bias repeatability typ. (1σ)	0.14 $^\circ/\text{sec}$ y-axis and z-axis 1.4 $^\circ/\text{sec}$ x-axis
In-run-bias typ.	2.7 $^\circ/\text{h}$ x-axis 2.2 $^\circ/\text{h}$ y-axis 1.6 $^\circ/\text{h}$ z-axis
Noise (random walk) typ.	0.15 $^\circ/\sqrt{\text{h}}$ x-axis and y-axis 0.2 $^\circ/\sqrt{\text{h}}$ z-axis
Sensor bandwidth	480 Hz x-axis and y-axis 590 Hz z-axis

Sensors - Accelerometers

Sensor Technology	3 MEMS accelerometers
Measurement range	± 15 g
Data output resolution	0.0001 g
Bias repeatability typ.	15 mg
In-run-bias typically (1σ)	12.75 μg x-axis and y-axis 13.66 μg z-axis
Noise (random walk) typ.	90 $\mu\text{g}/\sqrt{\text{Hz}}$ x-axis and y-axis 75 $\mu\text{g}/\sqrt{\text{Hz}}$ z-axis
Sensor bandwidth	750 Hz

Interfaces

Ethernet	1x 1 Gbit Data input/output, configuration and firmware update, driving robot data output, optional for relative data calculation and DGNSS routing.
CAN	1x CAN 2b, 1 Mbit Data output, input*1
Serial	1x RS232 GNSS Receiver / DGNSS correction data input, IPS (Indoor Positioning System)
Digital/Analog Input	2x Digital / Analog (16 bit) e.g. Frequency, Brake trigger, ...
Digital Output	2x Signal Out e.g. PPS, Frequency, PPD Pulse per distance, ...
Connector type	Samtec; Lemo
GNSS	2x SMA GNSS Antenna connectors

Hardware / Miscellaneous

	OEM-Version	LEMO-Version
Dimension (W x L x H)	78.0 x 61.0 x 26.9 mm	93.0x 71.5 x 32.5 mm
Internal Memory	up to 64 GB	
Weight	0.116 kg	0,229 kg
Power supply	5 VDC typ. 7.5 W	9 to 32 VDC typ. 7.5 W
Operating temperature	-20 °C to +75 °C	
Protection class	IP 20	IP 67
Shock and vibration ratings	DIN EN 60068-2-27:2010-02 DIN EN 60068-2-64: 2020-09 DIN EN 600068-2-6: 2008-10	

*1 Optional

*2 Depending on GNSS conditions, correction data and license model

*3 Typical values according to internal test standards with settled Kalman filter.

*4 Calibration range 0 °/sec to 200 °/sec

For any further questions: support@genesys-offenburg.de