

ADMA-Speed

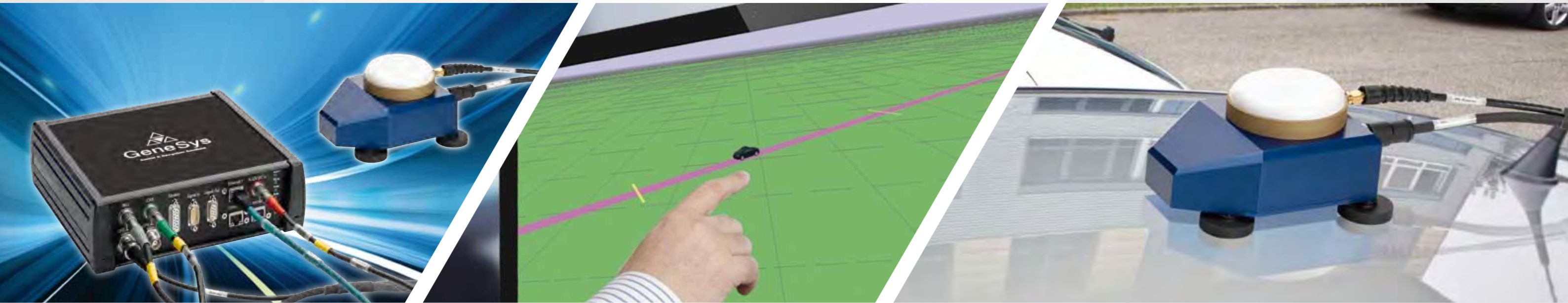
Speed and Braking Distance Sensor



Precise speed measurement and more

Range of applications

- ▲ brake test
- ▲ precise speed measurement
- ▲ acceleration and deceleration testing
- ▲ basic vehicle dynamics testing
- ▲ road holding test
- ▲ tire testing
- ▲ ADAS (Advanced Driver Assistant System)
- ▲ verification of automotive inertial sensors
- ▲ ABS / ESP ISO 26262 certification



About ADMA-Speed

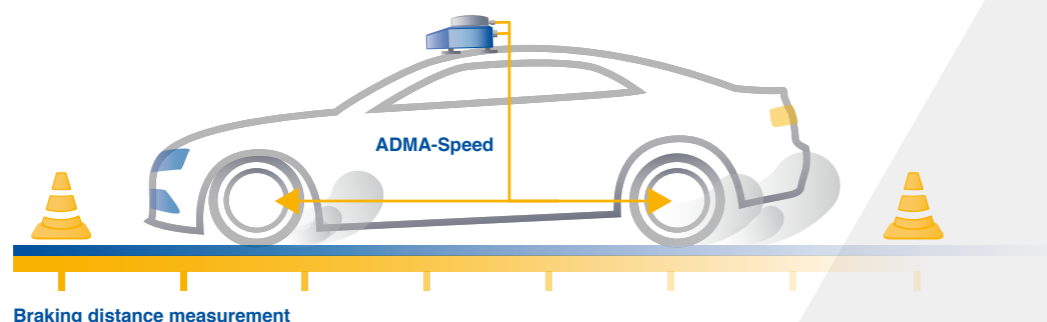
ADMA-Speed is a GPS speed sensor with integrated inertial sensors. It is optimized for brake tests. For easy installation, the inertial sensors are integrated in the GPS antenna. All motion data of the vehicle is calculated by means of the tried and tested ADMA technology. In the basic version acceleration, speed braking distance and position is transmitted via the CAN and Ethernet interface. ADMA-Speed eliminates the known disadvantages of GPS speed sensors.



Options

Optionally, ADMA-Speed can be expanded to a fullfledged GPS-aided inertial system, e.g. for vehicle dynamics testing or verification of ADAS systems.

- ▲ Output of lateral deviation
- ▲ Output of all motion states (acceleration, velocity, position, angular rate, angle)
- ▲ 2 antenna version for course angle without initialization
- ▲ 2 cm position accuracy
- ▲ Data output rate 1 kHz
- ▲ Relative data calculation (e.g. range) via WiFi in real-time for multi-vehicle operation



Braking distance measurement

Properties

- ▲ User-friendly handling thanks to the combination of GPS antenna and inertial sensors in one housing
- ▲ Mounting by means of powerful magnets on the vehicle roof
- ▲ Pitch compensation during braking
- ▲ Considerably smoother speed signal in comparison to GPS
- ▲ Compensation of GPS data latency
- ▲ Correction of acceleration-dependent GPS signal distortion
- ▲ Speed calculation at the vehicle center of gravity
- ▲ Data processing unit with tried and tested Kalman filter technology
- ▲ Output of acceleration, speed and braking distance via CAN interface in real-time
- ▲ Speed and signal-triggered braking distance
- ▲ Signal inputs for braking trigger or light barrier

Scope of Delivery

- ▲ Data processing unit
- ▲ Sensor unit with GPS-antenna
- ▲ CAN cable 5 m
- ▲ Ethernet cable 2 m
- ▲ GPS antenna cable 4 m
- ▲ IMU cable 4 m
- ▲ Power cable 4 m
- ▲ Documentation
- ▲ Transport Case
- ▲ Ethernet Data Logger Software with Brake Test Function

Technical Data

Data processing unit ADMA-Speed

GPS

Position accuracy	0.01 / 0.2 / 0.4 / 0.6 / 1.2 / 1.5 m (depending on license model and DGPS corrections)
Data update rate	up to 50 msec (internally interpolated from 20 to 2.5 msec, optionally 1 msec)
WAAS / EGNOS-DGPS corrections	via satellite
DGPS corrections	via GPRS-/GSM-/RF modem
RTK2-DGPS	via GPRS-/GSM-/RF modem (optional)
GLONASS / Galileo / BeiDou / L-Band	optional

SYSTEM PERFORMANCE

Angle measuring range heading/roll/pitch	± 180 / 60 / 60°
Angle measuring accuracy roll & pitch / heading / slip	0.02 (1σ) / 0.05 (1σ) / 0.15° RMS
Angle resolution	0.005°
Velocity accuracy*	0.04 km/h RMS
Lateral velocity*	0.2 % RMS
GPS outage position error*	after 10 / 30 / 60 sec: 0.4 / 5.0 / 40.0 m RMS
GPS outage velocity error*	after 10 / 30 / 60 sec: 0.06 / 0.5 / 1.8 m/sec RMS
GPS outage pitch / roll angle error*	after 10 / 30 / 60 sec: 0.05 / 0.15 / 0.35° RMS
GPS outage heading angle error*	after 10 / 30 / 60 sec: 0.1 / 0.3 / 0.5° RMS
Data update rate / calculation latency	50 - 400 Hz (up to 1000 Hz optional) / 1 ms
Stopping distance accuracy*	5 cm RMS

INTERFACES

Ethernet 1	1 Gbit, for data output, configuration and firmware update
Ethernet 2	1 Gbit, for driving robot, output
Ethernet 3	1 Gbit, optional for relative data calculation (e.g. range) and DGPS routing, input/output
CAN	CAN 2b, 1 Mbit, for data output
Signal inputs	3 TTL, optically isolated (e.g. for light barrier or brake trigger)
Signal output	4 TTL, optically isolated (e.g. for synchronization and error indication)
GPS antenna input	1, optional 2
IMU input	1 (ADMA components only)
DGPS correction data input	1 (GSM-/GPRS-/RF modem interface)

MISCELLANEOUS

Initial alignment	with internal GPS receiver
Power supply	12 VDC nominal (9-32 VDC), 18 Watt typ. with ADMA-Speed-Ant, without other devices
Dimensions (W x L x H)	225 x 235 x 75 mm
Weight	2.3 kg
Protection class	IP 50 (IP 65 on request)
Temperature range (operational)	-20 to +60° C

* typical values according to internal test standards with settled Kalman filter

Technical Data

Sensor unit ADMA-Speed-ANT

GYROS

Quantity / Type	3 MEMS gyros
Measurement range	± 450 °/s
Resolution	3 x 10 ⁻⁷ °/s
Bias temperature drift typically	± 0.0025 °/s / °C (1σ)
In-run-bias typically	6 °/h (1σ)
Gyro noise typically	0.4 °/√h
Scale factor accuracy typically	± 1 %
Sensor bandwidth	330 Hz

ACCELEROMETERS

Quantity / Type	3 MEMS accelerometers
Measurement range	± 5 g, optional ± 10 g
Measurement accuracy	better than 5 mg (without Kalman filter corrections)
In-run-bias typically	32 μg (1σ)
Measurement resolution	3.8 x 10 ⁻⁹ g
Sensor bandwidth	330 Hz

SATELLITE RECEPTION

ADMA-Speed-Ant-GG1 (standard)	GPS L1, GLONASS L1, Galileo E1/E2/L6, Compass B1, IRNSS L1, L-Band
ADMA-Speed-Ant-GG2 (optional)	GPS L1/L2/L5, GLONASS L1/L2, Galileo E1/E2/E5/E5a/E5b/E6/L6, Compass B1/B3, IRNSS L1/L5, L-Band

MISCELLANEOUS

Dimensions (W x L x H)	110 x 130 x 70 mm (with magnets), 87 x 130 x 60 mm (without magnets)
Weight	0.75 kg
Protection class	IP 67
Temperature range	-40 to +85 °C

Ordering Variants

▲ ADMA-SPEED-BASIC

Standard version of data processing unit for speed and brake distance

▲ ADMA-SPEED-ANT-GG1

Sensor unit with single band antenna for ~ 1m accuracy

▲ ADMA-SPEED-ANT-GG2

Sensor unit with dual band antenna for ~ 2cm accuracy

▲ ADMA-SPEED-OPT-GLONASS

GPS receiver license option; improvement of GLONASS satellite visibility

▲ ADMA-SPEED-OPT-RTK2

GPS receiver license option; position accuracy 2 cm

▲ ADMA-SPEED-OPT-10g

Accelerometers ± 10g

▲ ADMA-SPEED-OPT-DUAL-ANT

2 antenna version for course angle without initialization (eg low speed application)

▲ ADMA-SPEED-OPT-1KHZ

1 kHz data output rate via Ethernet

▲ ADMA-SPEED-OPT-FULL-INS

Firmware license option for full ADMA data set

▲ ADMA-SPEED-OPT-DELTA *

Refer to page 6 and 7 for more details

▲ ADMA-SPEED-BRAKING *

Refer to page 6 and 7 for more details

▲ ADMA-SPEED-ACCELERATE *

Refer to page 6 and 7 for more details

▲ ADMA-SPEED-DGPS *

Refer to page 6 and 7 for more details

▲ ADMA-SPEED-OPT-LATDEV *

Refer to page 6 and 7 for more details

▲ ADMA-SPEED-GPS-RAW *

Refer to page 6 and 7 for more details

Auxiliary Accessories

- ▲ Signal-In cable (for brake/light barrier trigger)
- ▲ Signal-Out cable (for synchronization and error signals)
- ▲ Ethernet cable for driving robot (in combination with FULL-INS option)
- ▲ GPRS-DGPS-Box with accessories for RTK network connection
- ▲ RF modem set with accessories for DGPS correction data reception from local GPS Base Station
- ▲ Display with WiFi adapter for driver guidance and data storage

▲ Includes BRAKING option

▲ All new functions of ADMA (refer to page 6-7) are also available for ADMA-Speed

ADMA-options – extending capabilities

With ADMA3 product family we are proud to have established new functions, driven by the customer's requirements.

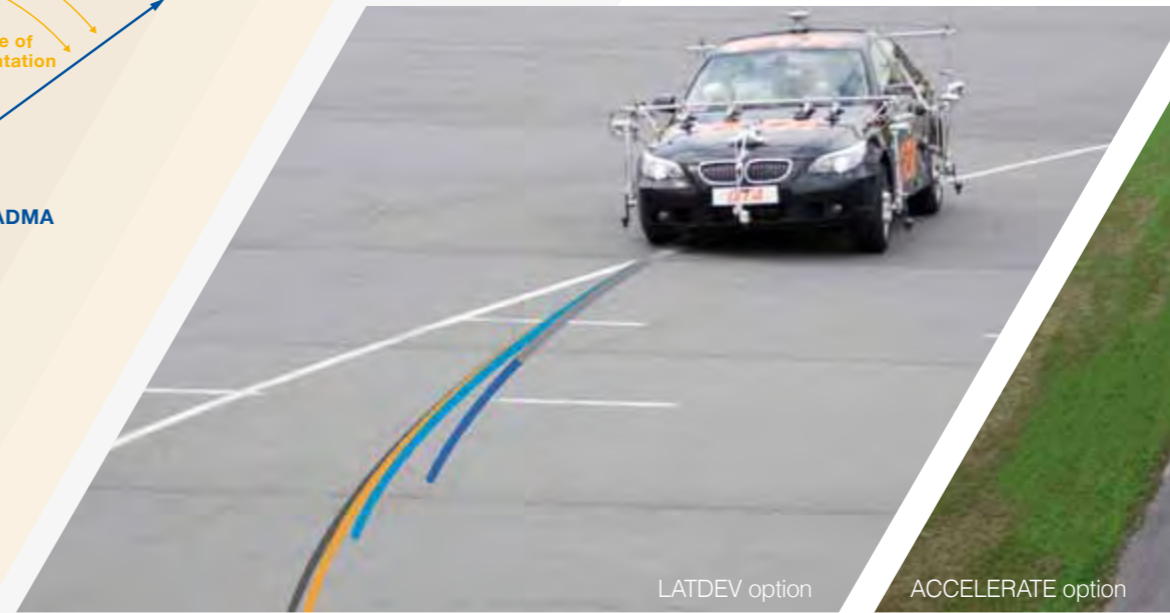
The goal is to improve the usability and to increase the productivity.

We have created firmware options, called ADMA Add-Ons. The options are activated by upload of a license code to the ADMA.

The license upload can be done at any instant giving the highest degree of flexibility.



DELTA option



LATDEV option



ACCELERATE option

Overview

▲ DELTA option

Relative data calculation (e.g., distance) via WiFi in real-time for multi-vehicle operation

The "DELTA" option enables the direct output of relative data between two vehicles, for example distance, velocity and angle. Other than a WiFi connection between the two ADMA's, no additional hardware is required. Data is provided in real time with minimum latency. This option is widely used for ADAS tests, especially AEB, FCW and ACC. Our customers rely on the ADMA option both when establishing a precise distance reference and for distance control of steering robots.

DELTA option is available for all ADMA models.

▲ BRAKING option

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

The "Braking" option is the sophisticated solution for brake performance measurement. Enabling brake pedal triggered as well as velocity threshold triggered measurement, all relevant parameters, including mean deceleration, brake distance and trigger speed are provided. Both full brake and fading test are supported.

BRAKING option is available for all ADMA models. For ADMA-Speed it is included, even in the basic version.



BRAKING option Ethernet Logger software

The **GeneSys Ethernet Logger software** includes acoustic driver guidance features and is provided free of charge. Running on a Laptop or Tablet PC, it allows for real time monitoring of measured parameters. All braking results can be stored both as a result chart and a full data stream.

▲ DGPS option

Correction data via Ethernet

The "DGPS" option provides the capability to receive DGPS correction data forwarded from a second ADMA via WiFi. This is the preferred option for multi-vehicle applications, e.g., ACC, AEB and FCW testing. This option is used in place of radio modems, increasing the availability of DGPS correction data, especially on public roads.

DGPS option is available for all ADMA models.

▲ GPS-RAW option

Output of GPS raw data via Ethernet interface

The "GPS-RAW" option provides raw GPS data via Ethernet connection. GPS raw data is required to improve GPS accuracy in post processing, for instance with our ADMA-PP post processing engine. We provide Ethernet logger software free of charge which can be used to record the data.

GPS-RAW option is available for all ADMA models.

Coming soon

▲ ACCELERATE option

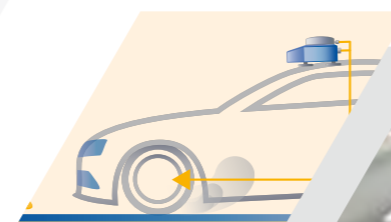
Real-time calculation of acceleration performance data.

ACCELERATE option is available for all ADMA models.

▲ LATDEV option

Real-time calculation of lateral deviation.

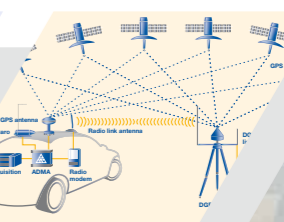
LATDEV option is available for all ADMA models.



Brake test



DGPS correction on public roads



GPS RAW data logging for precise positioning





GeneSys

Sensor & Navigation Solutions

GeneSys Elektronik GmbH

In der Spoeck 10

77656 Offenburg

Germany

Phone +49 781 969279-0

Fax +49 781 969279-11

mail@genesys-offenburg.de

www.genesys-offenburg.de

