

# Position sensor for adaptive speed control



Pushing Performance

HARTING Mitronics

People | Power | Partnership

## Intended use and function

The sensor is manufactured in MID technology and is employed in the Adaptive Cruise Control System (ACC) from Continental AG. An ACC system allows the driver to select a constant speed while always maintaining a safe distance to the vehicle in front. The newly developed radar system features a broad detection angle and high resolution. As a result, vehicles can be braked to a standstill from even higher speeds than before. The system furthermore detects when the vehicle starts moving again. The ACC system also warns the driver in good time of possible rear-end collisions. It can provide a life-saving reduction in the braking distance with foresighted preconditioning of the brakes. Moreover, ACC sensors also detect pedestrians and objects on the road. This allows a significant improvement in the driving safety for the driver, passengers and other road users. The MID application finds use in cars and trucks, as well as in the industrial arena.

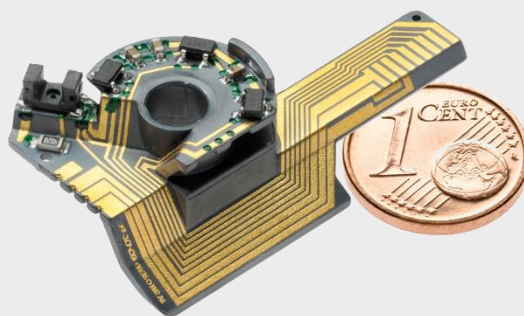


Figure 1: MID position sensor for adaptive speed control

## Advantages of the MID solution

- MID technology allows a more compact sensor.
- The new solution guarantees greater precision for the component arrangement (e.g., Hall sensors, photoelectric barriers).
- The MID component allows precise mechanical immobilization of the axle.
- The electric wiring can be simplified by the use of MID technology.

Application areas	Automobiles, sensors
User	Continental AG
Product	ACC sensor
Main function	Interconnect device

# Position sensor for adaptive speed control

HARTING Mitronics



Pushing Performance

People | Power | Partnership

## Project implementation

The preliminary technical development started in 2006 and the first prototypes were handed over to the client Continental in 2007. The product was created in connection with intensive and close cooperation among the various component manufacturers under the leadership of the Continental AG Development Department in Lindau, Germany. Verifications during development confirmed the MID technology's reliability. The process and product concepts were further developed in pilot series and ultimately resulted in a market launch in the Mercedes-Benz E Class in 2009.

## Functions of the MID component

- Precise commutation of the motor unit. This is crucial for the quality of the radar signal that is formed by the rotation of a metal drum. The drum is given a defined surface structure. It deflects the radar beam in the near and far range depending on the positioning.
- The MID element is a carrier for three Hall sensors and one optocoupler.
- The integration of a connector through which the signals are transferred to the outside and also solder pads for the supply lines to the motor coils.

## Manufacturing aspects

- LPKF-LDS technology is used to structure the injection molded component from the material LCP. Metallization is done without external current and consists of Cu-Ni-Au, which is a typical layer composition for MIDs.
- The high level of automation and the development of a dedicated assembly and test system result in economical product production.
- The components are assembled on an assembly line that has been adapted especially for this purpose and that uses a conventional Pick&Place procedure.
- Vapor phase soldering is used as the connection method.
- In order to prevent the solder from migrating along the metallized conductor paths, solder resist is applied at critical points.
  - Subsequent to metallization, the interconnect devices are examined for conductor path defects such as breaks, bridges, cracks, delamination and foreign deposits.
  - The test after packaging corresponds to the standards defined in the PCB industry's IPC650, with the system from HARTING Mitronics being able to carry out the tests on 3D objects.
- Finally the functional capability and signal integrity are tested.

Substrate material	LCP (Vectra E 840i LDS)
Structuring	LDS
Metallization	Chemical Cu-Ni-Au
Connection technology	Soldering (vapor phase)
Number of components	8
Start of production	2010
Production run	200,000 p.a.
Development period	2 years