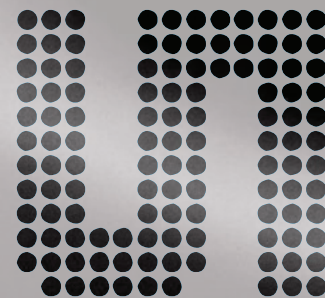


# Product Document

# Electric Power Steering (EPS)

[www.ams.com](http://www.ams.com)



## Position Sensor Example for Motor Position and Commutation using AS5147P

- Industry-leading robustness against unwanted magnetic stray fields
- AS5147P's integrated Dynamic Angle Error Compensation (DAEC™) circuitry enables nearly zero internal propagation delay
- ISO 26262 SEooC certification allows safety-critical systems to meet Automotive Safety Integrity Level (ASIL) goals
- Supports rotational shaft rates up to 28k rpm

We provide innovative analog solutions to the most challenging applications in sensor and sensor interfaces, power management, and wireless.

## General Description

To achieve higher fuel efficiencies and reduce CO<sub>2</sub> emissions, automakers are rapidly migrating from hydraulic to electronic based power steering systems in vehicles. With electronic power steering (EPS) systems, an electric motor takes the place of a hydraulic pump to provide steering assistance. A brushless DC (BLDC) motor is the preferred choice in EPS systems as it provides better starting torque and efficiency.

To ensure maximum performance of an EPS system a collection of sensor data is required, including torque sensing, handwheel position sensing, and motor position sensing. With its robust suite of interfaces including SPI, PWM, UVW and ABI, the AS5147P uniquely enables a single sensor device to provide absolute motor position, sensor diagnostics, and motor commutation feedback.

### Benefits

- Superior durability through contactless “system-on-chip” solution
- Lower systems cost
- High accuracy
- Low power consumption
- Minimal space requirement
- Increased functional safety via on-sensor diagnostics and ISO 26262 SEooC certification

### Features

Each **AS5147P** provides a high accuracy absolute motor position measurement via its SPI or PWM interface. With the **AS5147P** device and its UVW/ABI interfaces, system costs are reduced by eliminating the need for discrete motor commutation hall sensors and any shielding for magnetic stray fields

**AS5147P**'s integrated DAEC™ enables internal propagation delays and fast output refresh rates of just 1.9µs.

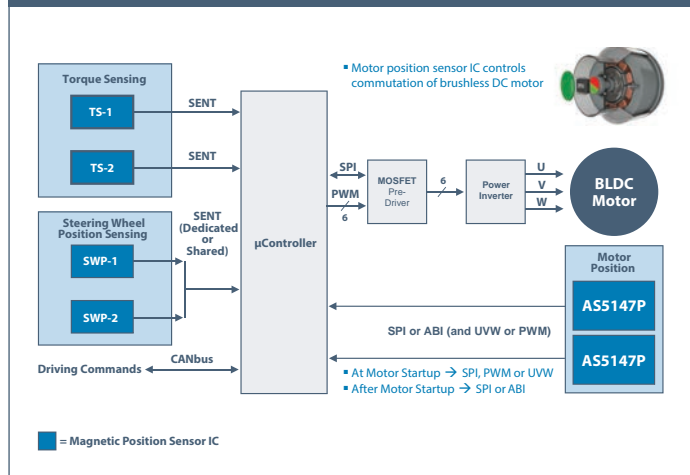
### Driving Forces

- Improved fuel efficiency and new lower emission regulations
- Vehicle safety standards
- Vehicle comfort
- Autonomous vehicles
- Electrification
- Immunity to magnetic interference

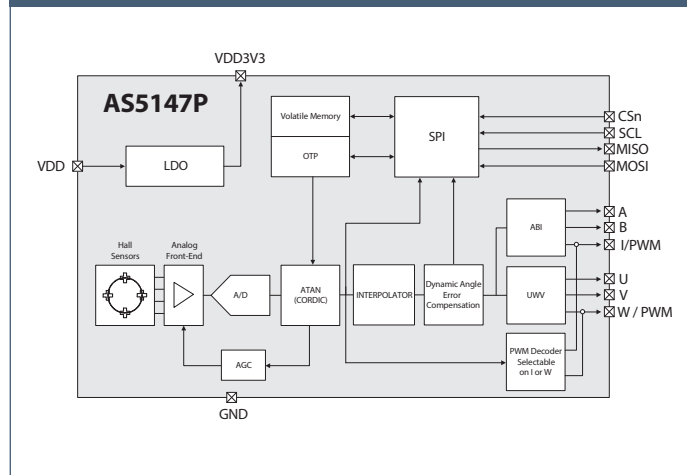
### Differentiators

- Industry-leading robustness against unwanted magnetic stray fields
- Integrated DAEC™
- ISO 26262 SEooC certification for safety critical systems
- Resolution of angle information on the ABI signals is 1024 pulses per revolution representing 12 bits
- Robust suite of interfaces including SPI, PWM, UVW and ABI
- 14-bit core resolution for high output accuracy and resolution
- Zero position is customer configurable for simplification of end-of-line assembly

## Base EPS Architecture with Magnetic Position Sensors



## AS5147P Block Diagram



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