



ROTOR POSITION SENSOR IC FOR E-MACHINES

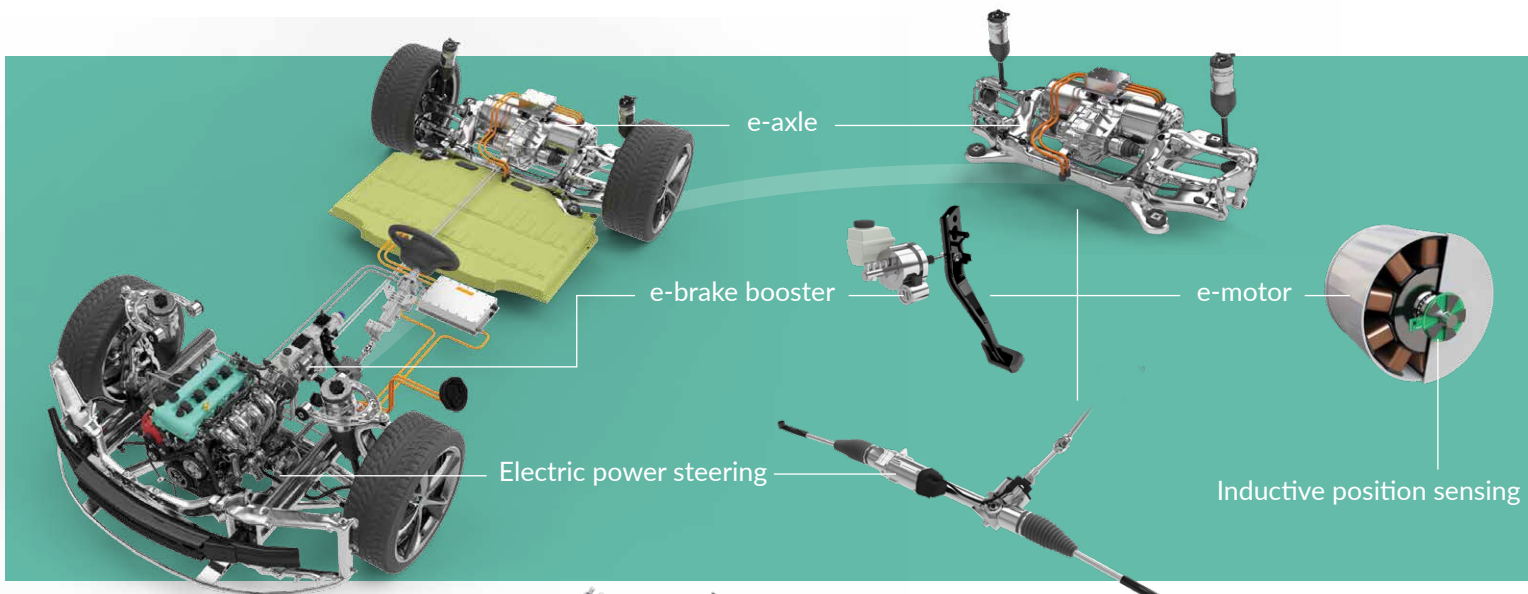
Electric and hybrid vehicles' electric traction motors (e-machines) are key safety critical components in the powertrain of the future. One of the main challenges in the design relies on the synchronization of the stator supply currents with the rotor position. It leads to an optimal efficiency, best torque control and low torque variations.

The key requirements to ensure a competitive concept include:

- scalable design for different motor designs and position sensor placements flexibility
- system weight reduction

An error in the signals synchronization would immediately lower the overall performances of the system if not leading to a safety issue. To ensure accurate and reliable operation the position sensor performance has the following characteristics:

- reliable and accurate position sensing at mechanical speeds beyond 25'000 RPM
- highly accurate position sensing
- system integration up to ASIL D rate



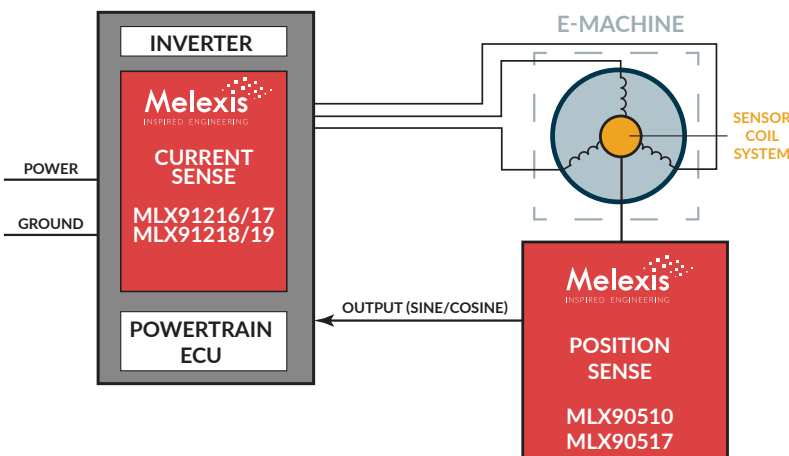
Block diagram



Melexis solutions for inductive position sensing

The MLX90510 (MLX90517) is an inductive position sensor IC used for absolute rotary motion/position sensing in safety critical automotive applications. Its main specifications benefit e-machine types of applications directly:

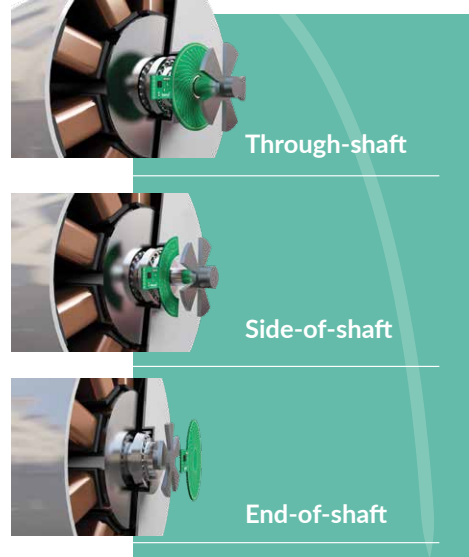
- mechanical mounting position freedom while the coil system is printed on a PCB and can be easily adapted for different E-machine types
- end-of-shaft, side-of-shaft and through-shaft operation
- improved cost structure of the PMSM and BLDC e-machine control systems in electrical powertrains for hybrid and battery electrical vehicles by implementing a cost-effective inductive high speed resolver
- no expensive shielding required thanks to this inductive position sensor operating with high frequencies within a narrow frequency band well outside the switching frequency of the high power inverter



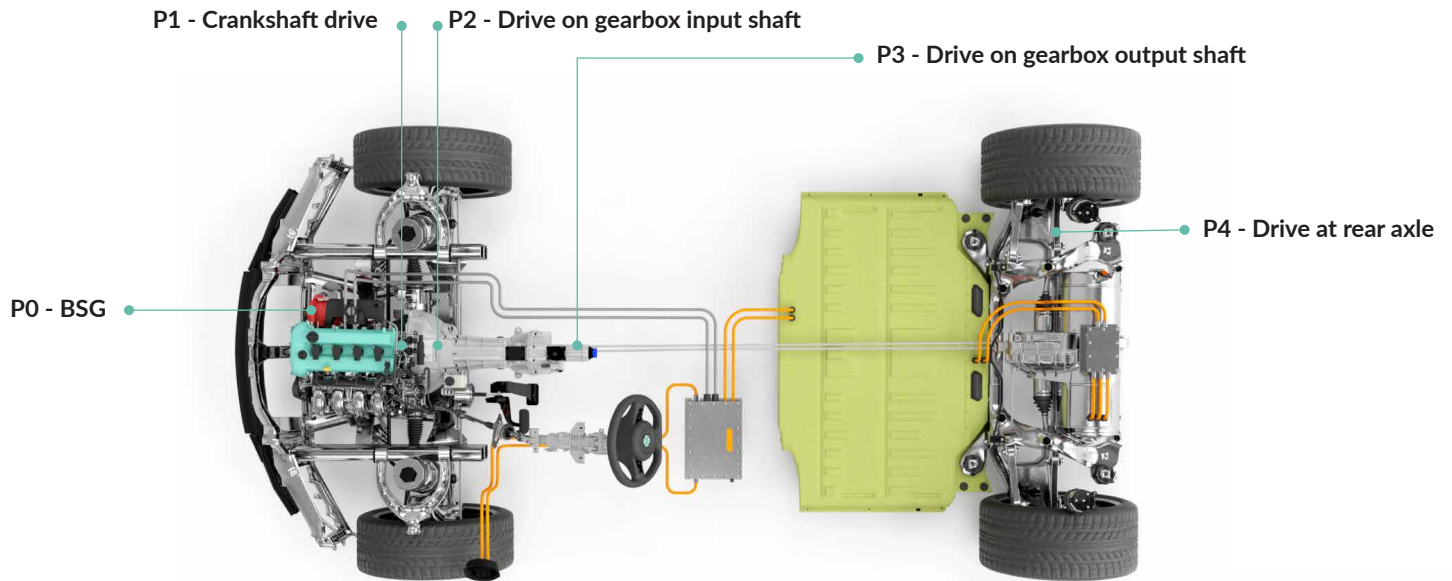


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- (MLX90510) innovative digital angle calculation with propagation delay compensation (system propagation delay $< \pm 120$ ns over full operating range)
- high accuracy $< \pm 0.36^\circ$ up to 240'000 electrical RPM over full operating range
- differential Sine and Cosine analog output independent from analog input voltage amplitude variations due to airgap variations
- magnetic stray field immune for DC and AC stray fields (ISO 11452-8)
- IC compliant to ISO26262 ASIL C (D), supporting system integration up to ASIL D rate
- ambient operating temperature range from -40°C to 160°C
- wide operating supply voltage range, including overvoltage and reverse-polarity protection: -24 V to $+24$ V
- TSSOP-16 package RoHS compliant



Application



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