

Application brief

Position sensors in parking lock and gear fork

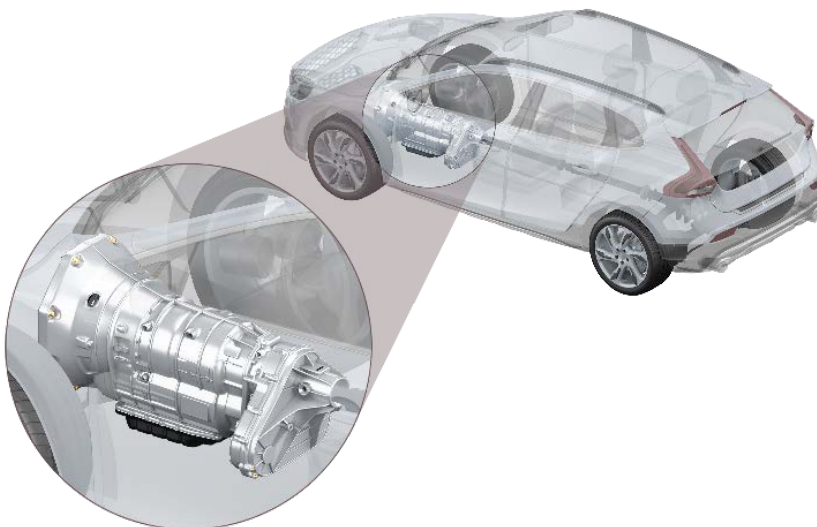
Reliable, accurate and efficient with XENSIV™ magnetic position sensors

For all the development trends in transmission systems, reliable and accurate sensors are the key ingredient for success. High performance and efficient transmission systems require intelligent actuation systems, which perform optimum and smooth actuation of gears.

The parking lock is a safety and security mechanism to prevent the vehicle for unintended moving in ignition-off condition as well as anti-theft protection. It is either controlled manually by the driver or automatically by engaging the gear lever in the “Park” position. Parking brakes are used in all kind of transmission types and will remain also in the future in battery electric vehicles.

This article will summarize how the position sensor works in the park lock and gear fork application, as well as a detailed introduction to our position sensor and what are the benefits of using the position sensor in the park lock and gear folk system.

Schematic view on a transmission



Angle sensor benefits

- > High angle accuracy
- > Low power consumption

Hall switch benefits

- > Easy drop-in replacement
- > High supply voltage range and load dump capability

3D sensor benefits

- > Component reduction due to 3D magnetic measurement principle
- > Best accuracy-package size fit

Linear Hall benefits

- > High linear and high resolution
- > Low drift of output signal overtemperature and lifetime

Parking lock and gear fork

By engaging the parking lock, the transmission gets physically locked by a pawl that is pushed into a notched wheel on the shaft preventing the shaft and hence the driven wheels from rotating. By disengaging the parking lock, the pawl is retracted and the shaft is free to move again. The position of the parking lock is controlled by a magnetic position sensor that determines the positions “P engaged” and “P not engaged”.

A similar use case is the gear fork that controls the engagement and disengagement of the different gears in the transmission with a linear movement. Position sensors are used to ensure smooth and safe operation when switching gears. For both applications different realizations with Hall switches, linear, angle or 3D Hall sensors are possible according to the overall system implementation of the OEM.

Position sensor in the application

There are several different applications with many different implementations where we can offer more or less all our position sensor solutions. Next, we will introduce two typical examples, which have also been verified by our major customers.

Park lock function in the gear stick

Locks the manual gear selection option of the gear stick while the car is parked. This we know from many of our key customers with different sensing approaches. One example is to use the TLE493D-A1B6 for rotation measurement.

Park lock function in the gear box

Also called “park lock actuator” or “park pawl” also other names are available. One gear is locked mechanically to avoid that the car moves, while parked. A linear movement is needed, activated by an electrical motor. Therefore, a rotation is transferred to linear movement, which offers many sensing solutions. We know about magnetic angle sensor, magnetic switches and magnetic linear position sensor.

In general, it depends on the customer, which position measurement is implemented.

Infineon is the perfect partner, and its wide-ranging magnetic sensor portfolio is the perfect choice to meet future market requirements, ensuring sustainable growth. To learn more about transmission systems and how to solve today’s challenges, have a look into Infineon’s “Efficient transmission systems” whitepaper available for download at www.infineon.com/magnetic-position

Product name	Ordering code	Description
TLE5012	SP001205296	GMR digital angle sensor
TLE5501-E0001	SP001621824	TMR analog sensor
TLE4964-xM	SP000923326	Switch
TLE4961-xM	SP000923322	Latch
TLE4961-1L	SP000848038	Latch
TLE4963-xM	SP000930182	Latch
TLE4968-xM	SP000923334	Latch
TLE4966-xG	SP002983188	Double Hall
TLE4997x	SP000902756	Linear Hall
TLE4998x	SP000476468	Linear Hall
TLE4999x	SP002662500	Linear Hall
TLE493D-P2B6	SP005557415	3D magnetic Hall sensor



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