Gear selection indication

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TRANSMISSION SYSTEMS
Gear-shifting applications

Context

Electronic control systems offer major benefi ts in driving comfort, assistance, safety and fuel economy. For this, they require input information, creating a need for sensors.

In today's automatic transmissions (AT) and recent automated manual (AMT) and dual clutch (DCT) transmissions, the driver selects the desired driving mode via a gear selection lever or other control device. A number of electronic control systems need to know the position of the gearshift lever (P, R, N, D, L) to implement advanced driving functions such as:

- Gear changing
- Keyless start
- Start lock
- Hill-holding
- Automatic parking break release
- Gear indication
- Reverse light control

Sensing of gearshift lever positions can be done in various ways, for instance using a number of binary-output Hall position switches and a specially encoded magnet. Another possibility is to use an analog-output position sensor requiring no encoded target. This solution offers greater flexibility as it can be reprogrammed for adaptation to new gear-shift confi gurations.

Electricfil masters all the leading sensor technologies to bring you the right sensing solution for your every need.

Function needs

To implement a number of driver assistance, safety and optimization functions, electronic control units need to know the position of the gearshift lever (P, R, N, D or L). This information is provided by transmission range sensors (TRS) or switches.

Sensors needs

The sensors that provide this information must offer:

- High accuracy
- Small size
- Fast response

- Easy integration
- High reliability
- Diagnostic capabilities

Depending on where they are installed, they must also withstand severe environmental conditions:

- High temperatures
- Rapid temperature fluctuations
- Electromagnetic disturbances
- Vibrations
- Corrosive liquids

Electricfil solutions

Electricfil Automotive masters **all leading sensor technologies** to produce optimum sensing solutions for every need. The solution path is based on more than 25 years of experience in the field.

- **Analysis of customer needs** to select the most suitable sensor type from our proven core technologies (LVDT, Hall, Eddy-Current, GMR, AMR, VR, etc.)
- **Determination of degree of integration** (single sensor, sensor cluster or mechatronic module)
- **Circuit design and ASIC development** if required
- **Selection of electronic components and assembly technology** (e.g. surface mounted devices, discrete components)
- **Package design,** including the selection of materials (PA, PPS, PBT, etc.), assembly process (laser, thermal or vibration welding), potting, overmolding and encapsulation techniques, sizing, etc.
- **Selection of interconnections** (leadframe, fl ex foil, cable harness, etc.)
- **Magnetic circuit design** (magnet materials, pole piece dimensions, etc.)
- **FMEA, reliability studies, computer simulations, prototyping, initial samples,** etc.

Electricfil sensing solutions for gear selection indication

- > **LVDT linear/angular position sensor**
- > **Hall linear/angular position sensor**
- > **Eddy-current linear position sensor**
- > **Encoded Hall linear/angular position sensor**