

Signal transmitter with different caps

## OECHSLER signal transmitters – more functions in a minimum of space

*New approaches to sensoric applications – PBMs and In-Mold Assembly | Page 1*

*Intelligent linking of technologies – Example: Rotary encoders | Page 2*

*At a glance – The range of OECHSLER products and services | Page 2*

### Functional variety and efficient production

For many years, OECHSLER has established itself as an innovative partner providing future-oriented solutions in the field of plastics for key industries such as automotive and medical. In this context, the spectrum of products developed and manufactured ranges from technical plastic parts, precision and design components, various kinds of driving units to complex mechatronic assemblies. OECHSLER offers the complete range of services from parts development to the final product and keeps present trends purposefully in mind when implementing demanding customer projects. Applications for mechatronics are getting smaller and smaller, but nevertheless they are to combine many functions in

an extremely confined space thus requiring basically new approaches when it comes to the development and manufacture of component assemblies. It is especially the successful combination of special injection molding techniques such as insert molding and in-mold assembly that opens up completely new applications. A substantial building block in this context is free form-design in injection molding, another one is the use of plastics which are modified so that they feature electrically or thermally conductive or magnetic properties.

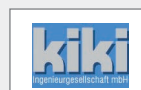
Magnetic sensor applications pose important questions that have to be dealt with in development and manufacture. These include:

- the layout of the magnetic field of permanent magnets in the cavity, which is to be exactly adapted to the respective application
- the homogeneous magnetic properties of the permanent magnet
- the precise positioning of the magnetic sensor (Hall- or MR-sensor) within the assembly unit
- the bearing of the permanent magnet is to be positionally accurate and without any play.



OECHSLER magnetic sensor

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Seven Partners – together to stand a project

# Magnetic sensors – Intelligently linking up promising technologies in injection molding

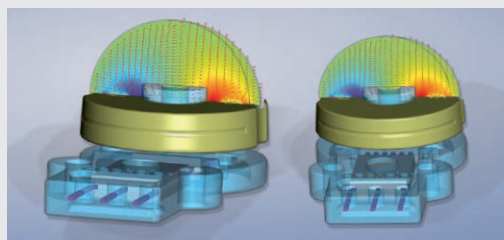
The idea at the beginning of the development project pursued in co-operation with the Chair of Polymer Technology (University of Erlangen-Nuremberg, Germany) was to depart from the beaten track and to work out new manufacturing concepts, in the implementation of which completely new approaches to plastics applications can be found.

As for the production of the innovative rotary encoder, the decision went in favor of a combination of in-mold assembly and insert-technology, whereby the electronic element is placed in position inside the tool prior to molding. Without any additional processing or assembly steps, the fully operational sensor is removed from the injection molding machine.

In a first step, a permanent magnet is injection-molded from a PA6 ferrite compound (MATE). During the injection molding process, the magnetic filler particles in the cavity are aligned according to the pole distribution and saturation-magnetized by a magnetic alignment field integrated in the tool. Prior to injection molding the second component from an easily flowing PBT-GF30 (BASF) material, a magneto-resistive (MR) sensor (NXP) is introduced in the tool by a fully automatic handling system, and

the pre-molded permanent magnet positioned in the overmolding cavity. In parallel to this, a driver cap made of translucent MABS (BASF) is manufactured for the magnet and automatically slid over it outside the injection mold.

The injection molding machine and the automation equipment come from the companies Arburg, Xenon and Kiki. The electronic components are inserted with pick-and-place systems commonly used in the electronics industry. The tool concept strictly follows the specific requirements of the component function and takes into account the features of the plastics employed. The compact design of the rotary encoder and the precise positioning of the MR-sensor in relation to the permanent magnet makes a number of additional components and their assembly unnecessary. Thus, the process and tolerance chain is shortened and, at the same time, quality is considerably increased.



CAD with magnetic field

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## OECHSLER – Product range and services at a glance

- Development of micro- and precision components, assemblies, actuators, and sensors
- Layout and calculation of magnetic systems for actuatoric and sensoric applications
- Advisory service in the choice of material and design
- High-performance injection molds for standard and special techniques and for processing of highly-filled thermoplastics
- Magnetic layout of tools by means of FEM-simulation for integrating magnetic alignment and saturation fields
- Manufacture of precision technical components by using ultra-modern injection molding and tempering techniques
- Integration of semi- and fully automatic handling equipment
- Manual, semi- and fully automatic assembly of subassemblies; automated test techniques
- Certified in accordance with the standards ISO TS 16949, ISO 13485 and ISO 14001

### Locations:

#### Germany

- Ansbach
- Weißenburg
- KÜps

#### China

- Taicang

#### Romania

- Lipova



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