magnetfabrik bonn

Applications Brief

Current information from Magnetfabrik Bonn

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New sensor magnets for multichannel sensors

Multichannel sensors place considerable demands on the angular homogeneity of sensor magnets. Because sensors of this type are beginning to come onto the market, Magnetfabrik Bonn has developed a magnet based on polymer-bonded hard ferrite and with special magnetization designed to meet these requirements.

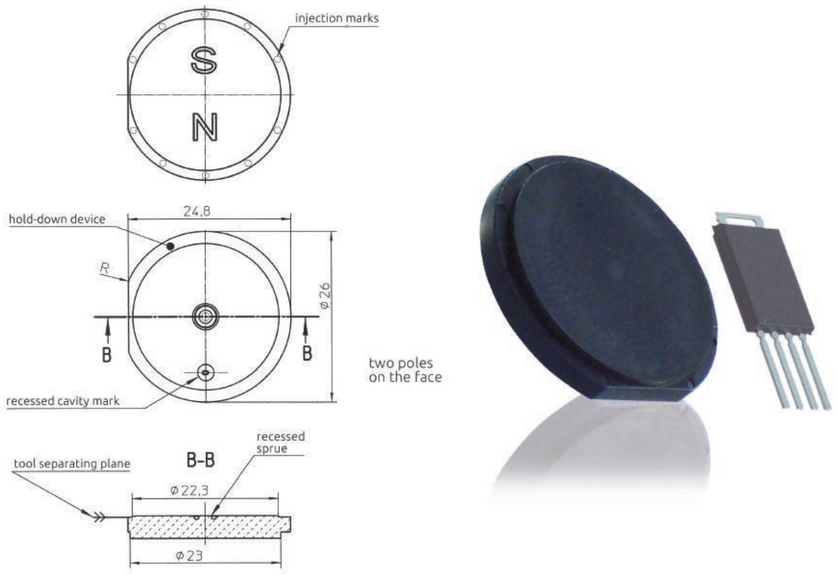

Figure 1: New, large ferrite sensor magnet 69.578-P

Whether in cars, machines or household appliances, permanent magnets in combination with magnetic field sensors can be found in many applications, where they reliably detect movements and positions. Whereas, in the past, microswitches were used, inexpensive robust Hall sensors have been the order of the day for many years now. These have the advantage of being contactless and wear-free.

Alongside traditional Hall sensors (which measure the Hall voltage resulting from an electrical current and a magnetic flux density), angle sensors based on the magnetoresistive effect are finding increasingly widespread use. These sensors measure the change in the electrical resistance of a material when an external magnetic field is applied.

Many applications that require constant (linear), rather than one-off, detection of movement make use of this effect. Again, the benefits compared with mechanical or optical position detection systems lie in the robust nature of contactless measurement, which is not affected by dirt, dust, oil and so on.

These advantages mean that the principle of the magnetoresistive effect has also become established in security applications as well as in traditional markets. In the "dual die sensors" that are beginning to come onto the market, a second, completely independent system is fitted in the sensor housing to provide a fallback in the event that the sensor or the electronic system fails.

But two measurement sensors mean that the magnetic field has to be measured at two separate locations. This results in stringent requirements with respect to the homogeneity of the sensor magnets, as both of the measurement sensors should ideally deliver the same signal. Typically, the field must be homogeneous to within approx. ±1° at a distance of 1-2 mm from the central axis.

High homogeneity requirements such as these can only be met with sensor magnets that have a correspondingly large pole face. We have developed a magnet of this type based on polymer-bonded hard ferrite and with special magnetization.

With radii greater than 2 mm, the angle error of this magnet is still in the range ±1° through ±1.5°. The low field decay value makes it possible to implement measuring distances >4 mm on the central axis.

Presented for the first time at the 2014 SENSOR+TEST trade fair, the magnet no.: 69.578-P is to be seen as a demonstration model showing the extreme requirements with respect to angular homogeneity that can be fulfilled across a large-volume magnet for position determination using sensors.

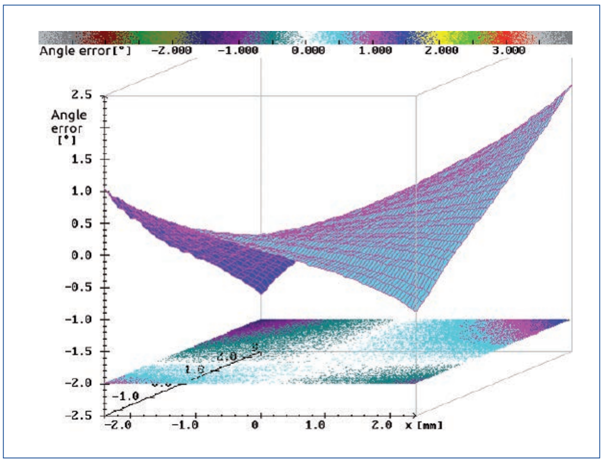

Figure 2: Angle homogeneity on the plane at a distance z of 2 mm using the example of the new, large 69.578-P ferrite sensor magnet

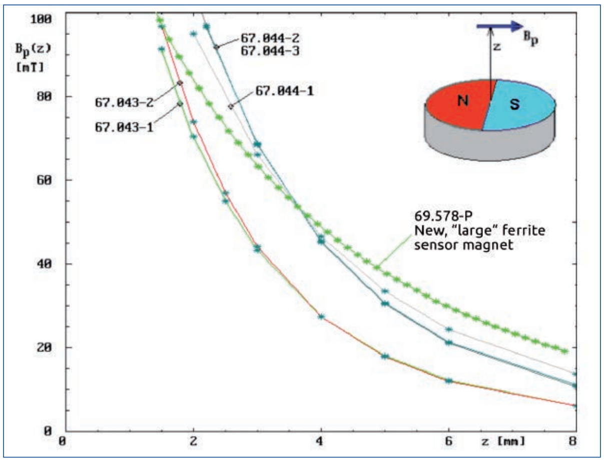

Figure 3: Field decay on the axis of our 67-series rare earth magnets (Ø 9/Ø 14 x 2.5) compared with the field decay of our new, large ferrite sensor magnet (Ø 26 x 3.5)

We would be happy to work together with you to develop your custom solution.

Put us to the test! Further information/Contact:
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