SENSOR.KOSMOS.

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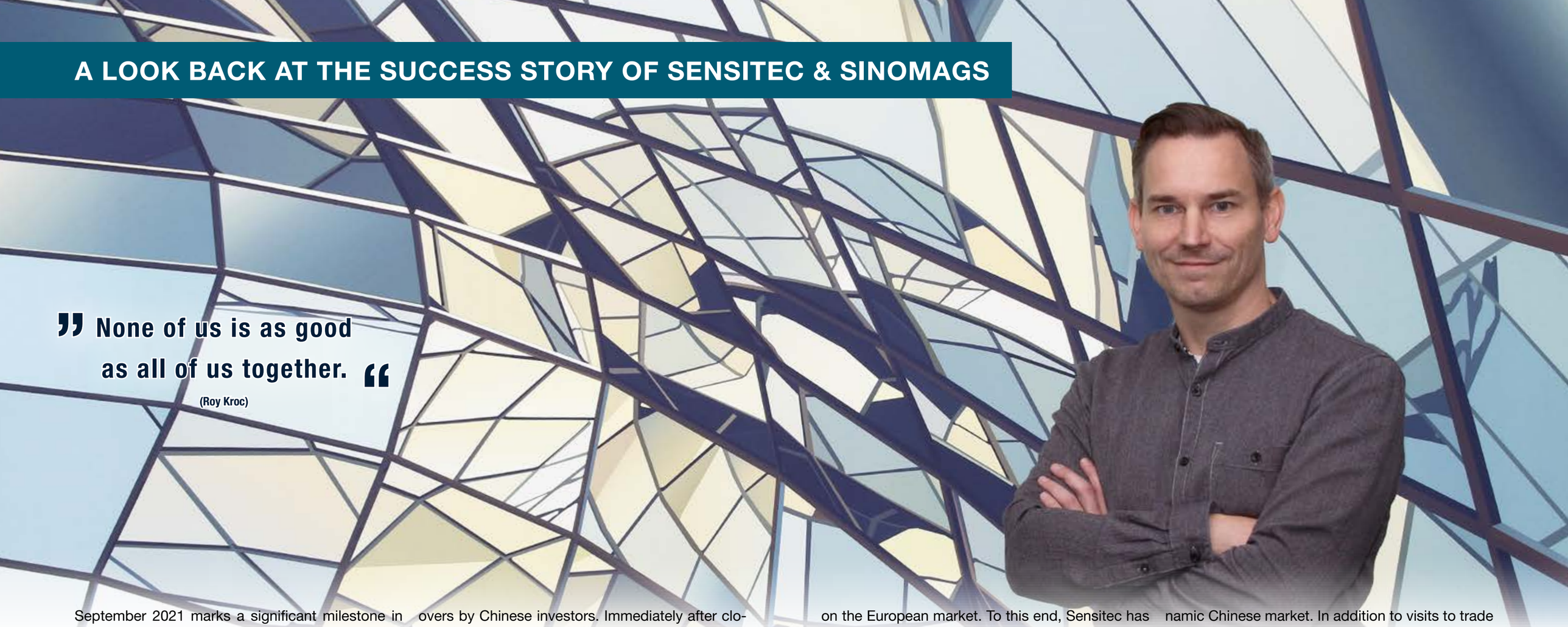
Two years of Sensitec & Sinomags

What conclusions can we draw from this?

A LOOK BACK AT THE SUCCESS STORY OF SENSITEC & SINOMAGS



> **„None of us is as good as all of us together.“**
>
> (Roy Kroc)

September 2021 marks a significant milestone in Sensitec‘s history: The closing - the completion of the sale process to Sinomags. From this point on, Sensitec will be 100% owned by the Sinomags Group from China. Over the past two years, the two companies have come together and worked together, and we can draw a very positive balance, despite some hurdles that had to be overcome and continue to be overcome.

What has happened between 2021 and now?
The Covid-19 pandemic was undoubtedly one of the biggest challenges that made it difficult for the two companies to come together quickly and intensively. Face-to-face meetings between Sinomags and Sensitec employees were almost impossible due to lockdowns and massive travel restrictions. Nevertheless, we managed to develop a new joint strategy in 2022, which is largely based on close cooperation between the teams from Germany and China.

The takeover of Sensitec by a Chinese company initially caused uncertainty among some customers, as the media often reported on European companies that got into difficulties following takeovers by Chinese investors. Immediately after closing, however, personal discussions were held with key customers to ensure that customer relationships were not at risk, but rather that Sinomags had a strong interest in the acquisition.
Sinomags is very interested in intensifying these relationships. The synergy between the two companies was one of the main reasons behind Sinomags‘ decision to acquire.
Sensitec has its own MR wafer factory and strong market access in Germany, as well as worldwide recognition. Sinomags, on the other hand, can boast an innovative and constantly growing current sensor portfolio and has a team of experts who have also been working with MR technology for many years. Within a few years, Sinomags has established itself as a leading current sensor manufacturer in China with rapid growth to over 1000 employees.

Back to the strategy: Sensitec also had a small current sensor portfolio in the past, but this was never systematically developed further and remained rather specialized in terms of the type of sensors. Nevertheless, application and product know-how in the field of current sensors is available to promote Sinomag‘s extensive portfolio of current sensors on the European market. To this end, Sensitec has focused more strongly on current sensors within the company and a team has been formed to develop and drive forward all activities in this area. In the area of position sensors, the focus was on the development of new sensor modules and the optimization of existing products, with the improvement of the supply chain playing a central role. Cooperation and exchange between the employees of both companies is crucial in order to make the best possible use of future opportunities.

In 2023, after overcoming the Covid-19 crisis, it was possible to travel again. Dr. Wang, CEO of Sinomags and Sensitec, held intensive personal discussions on all topics at the sites in Wetzlar and Mainz. As he himself comes from the field of MR sensor technologyand with many years of experience at companies such as TDK and Seagate, he not only contributed his leadership qualities and future prospects, but also provided specific technical input. He therefore also enriched technical meetings with his experience and his view of the Chinese market and its requirements.
Sensitec employees also traveled to China to intensify their contacts and gain insights into the dynamic Chinese market. In addition to visits to trade fairs, where Sensitec was also represented as an exhibitor, we visited Sinomags sites in the greater Shanghai area and were able to get an idea of the opportunities in the areas of production and development. In addition to many business meetings, there was also plenty of opportunity for personal contacts and activities with employees from the various locations in China. In the future, colleagues from China will also visit Germany to further strengthen cooperation.
Even though the effort involved in looking after traveling colleagues in the other country is a great expense, the impressions and the bond that the activities create are extremely valuable. After two years of close cooperation and a joint strategy, we can now see that the synergies are having an effect. Despite language hurdles and the influence of the time difference in day-to-day business, the teams are working together more and more harmoniously. Personal barriers on both sides can only be broken down through long-term exchange and cooperation. But here, too, you quickly realize that despite the differences in culture, we all speak the same language when it comes to technology and our shared enthusiasm quickly unites us.

René Buß

CHINA - SHANGHAI

中国-上海

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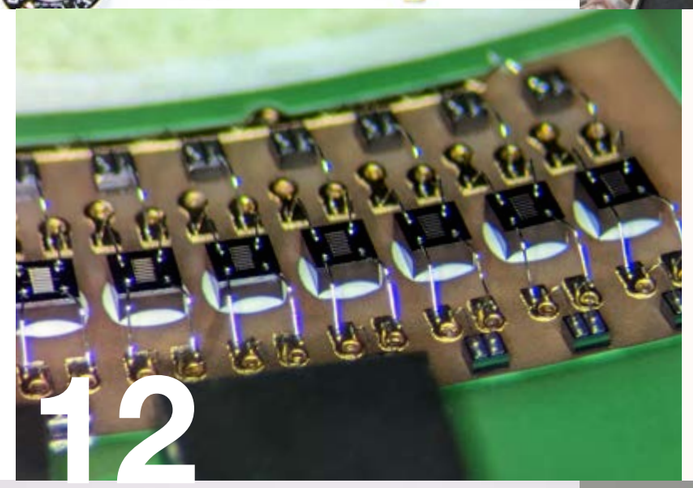

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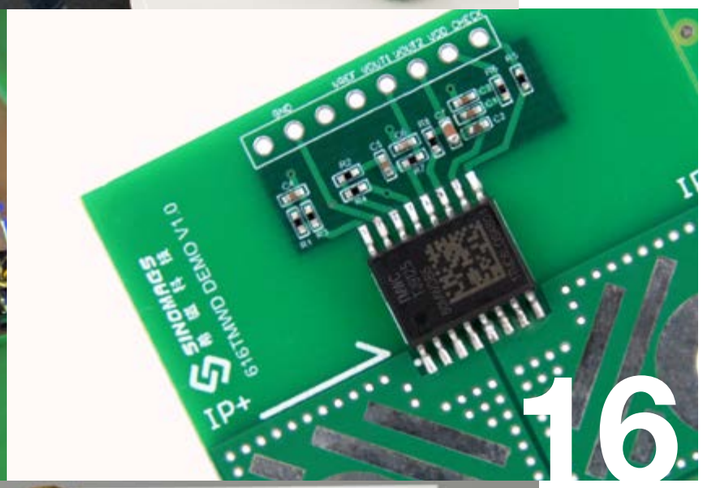

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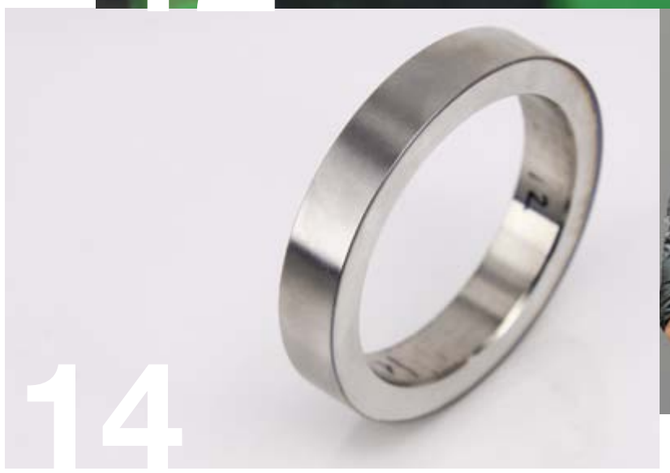

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CURRENT SENSORS FROM SENSITEC

Wide portfolio and comprehensive service

As a subsidiary of the Sinomags Group, Sensitec now also has access to a comprehensive product portfolio of current sensors. This portfolio meets the requirements of a wide range of industries and applications. It includes sensors for the charging infrastructure, onboard chargers, leakage current sensors for photovoltaic systems and broadband current sensors for modern drive technology. The products are divided into two main areas: Module-level based current sensors for THT mounting on printed circuit boards or with cable connection and chip-level based sensors that are mounted as SMD components on the printed circuit board, for example on the printed circuit board in the reflow process, for example.

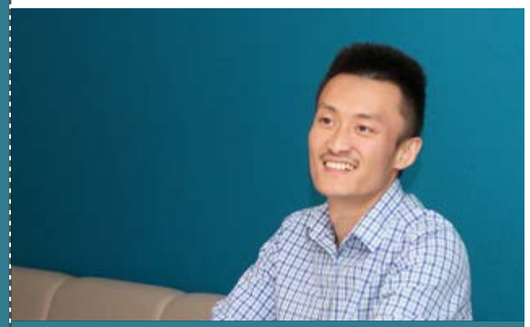
Sinomags does not rely exclusively on MR technology for its products. Hall or flux-gate sensor elements are also used. Open to all technologies in order to to generate the optimum price-performance ratio in the product. In order to offer customers the best possible service for the right choice of sensor and the subsequent design-in, Sensitec has now established a field application service in addition to its technical sales.

With his many years of experience in the field of Sensitec current sensors and application know-how, Matthias Brusius has taken on the role of Senior Field Application Engineer and, together with the new Product Manager Hui Wang, forms the core of the new current team at Sensitec. Together with the sales department and access to additional development resources (also at Sinomags), a highly qualified team is ready to provide customers with the best possible sensor solution for the respective application.

René Buß

MY NAME IS MATTHIAS BRUSIUS.

I am 43 years old, married and father of 5 children. After completing my studies in information and communication technology at the FH Giessen-Friedberg, I joined Sensitec GmbH in 2005 as a development engineer for current sensors. Over the years, I was able to gain a lot of experience in the functionality and application areas of current sensors.
I was involved in the development and further development of CMS2000, CDS4000 and CFS1000 as a senior engineer and have learned a lot about power electronics as a field of application for current sensors in countless discussions with customers. With the megatrends of renewable energy and electromobility, this sector is booming more than ever before and Sinomags can make a major contribution to better, more sustainable energy generation and use with its large portfolio of innovative current sensors. I am proud and pleased to make a contribution here with my team colleagues. In the future, I will contribute my current sensor expertise as a Field Application Engineer to help our customers with selection and design-in.



MY NAME IS HUI WANG.

From 2018 to 2021, I studied industrial engineering in Lübeck and then worked as a technical consultant for a software company. I wanted to work for a company that manufactures innovative products. With Sensitec, I found the ideal employer for me. Since August 01, 2023, I have been part of the current team at Sensitec GmbH. As Product Manager, my main focus is on closely linking customer requirements with the development team at Sinomags and our parent company.

Our team is characterized not only by its technical expertise, but also by its ability to quickly identify customer pain points. We understand that the world of technology is constantly evolving and that our customers are always looking for innovative solutions. This is where we come in, introducing new technologies and providing our customers with solutions that help them move forward.

HUMAN RESOURCES

Tackling the shortage of skilled workers

The shortage of skilled workers in Germany is omnipresent and a challenge that need to be addressed. The reasons for this are manifold: demographic change, the desire for a good work-life balance, global competition, and digitalization. Prognoses show that we are only at the beginning of the shortage of skilled workers. Clearly, this is slowing down competitiveness and growth.

So, what can we do and what measures are there?
First and foremost, we need to adapt to market conditions. In an employee market, companies are supposed to compete for employees and not the other way around. We therefore have to offer applicants something and should differentiate ourselves from other companies. The application process also needs to be scrutinized and adapted to the times.
Another important aspect is to increase employee loyalty and prevent the brain drain. The training of in-house specialists is one of the most sustainable methods. Employees must be offered targeted further training, and in particular young people can take part in dual training, internships, or vacation jobs with us.

A good employer brand is also indispensable and requires appropriate marketing methods, which we also implement. We review old business processes and adapt them to the current situation. Ultimately, it is about taking as many methods as possible and combining them with one another to master the challenge of a tight labor market.

Our Benefits:

Jasmin Hahn

Astrid Kuhlmann (42)) is Head of Human Resources at Sensitec GmbH.
As head of department, she is responsible for recruiting and advises executives and management on various personnel-related issues. In addition, she collaborates closely with the works councils and takes care of everything extraordinary HR matters.

With a degree in Business Administration and Business Romance, she joined the former group of companies in 03/2011 and has been part of Sensitec since 01/2019. In addition, Astrid is a member of the examination board of the Chamber of Industry and Commerce for industrial clerks (IHK) and teaches business administration at the Technical University of Central Hesse (THM).

Yangwenjia Zhou (45) has been with Sensitec since June of this year. Her area of responsibility includes the area of „training and further education“, but Yangwenjia also supports the team in other administrative areas.

She has lived in Germany for over 20 years and studied economics at the University of Kassel. In 2008 she received her diploma in economics. She also has further expertise in the field of controlling.

Bärbel Uhl (50) had been working for the former group of companies since 07/200. In 2003, after the founder of Sensitec GmbH had acquired the previous company Naomi in Mainz, Bärbel initially only supported the Mainz location with monthly payroll accounting and additional activities in this area.
Later, she also took over the payroll accounting and the accompanying work for the Wetzlar site. Over the years, the field of activity has grown more and more. In addition, there was the processing of time recording, the creation of statistics and evaluations, the processing of certificates and forms as well as the answering of internal and external enquiries.

With her commercial training and her many years of professional experience, supplemented by continuous further training, Bärbel has become an indispensable part of the company.

AXIAL ENCODER PAM7941

Robotic Solution

Since 2023, a new generation of TMR-based sensors has enabled Sensitec to design and implement MR positioning systems in which the MR sensor chips are aligned parallel to the magnetic scale. For the first time, this flat and compact design with the advantages of TMR technology has been realized in an axial encoder **PAM7941**.

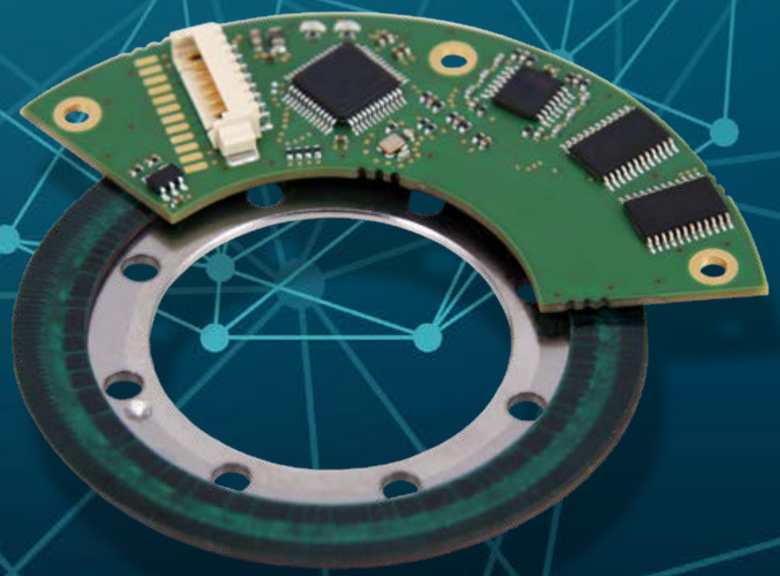
PAM7941 was presented to a wide audience at electronica China in Shanghai in July 2023 and met with great interest.

Thanks to its compact height of less than 6 mm, the **PAM7941** can also be integrated where there is little space available for an encoder, for example in the joints of robots and cobots. The target application of robotics was a clear focus during the development of the **PAM7941**. With its high accuracy of ±0.01° and a resolution of up to 21 bit, the True-Power-On absolute measuring system delivers outstanding properties for this area of application. The high precision is made possible by integrated auto-calibration functions that correct both linear and non-linear errors. In addition to the high precision, the **PAM7941** can also detect and resolve fast rotations thanks to a sampling rate of 120kHz, making it suitable for use in AGVs.

Thanks to the use of Sensitec‘s own TMR sensors, the dual-track magnetized **PAM7941** is robust with regard to the installation position in the application, both on the incremental track and on the code track.

This is made possible by designing the sensors specifically for the intended application. The absolute position can be transmitted via SPI, SSI or BiSS-C interface.

Multiturn information can be read out via the integrated multiturn counter. The availability of the information as a true power-on feature can be enabled by means of an optional battery, whereby **PAM7941** represents only the starting point of a broad product family of axial encoders. Diameters between 27mm and 400mm are achievable with the available technology.



Eike Guthörl

POL RING 2.0

MIBA RING with EBR7914

NEW POSSIBILITIES THROUGH HARD MAGNETIC COATINGS

Aggressive chemicals, high frequencies, high temperatures. The more demanding the environmental conditions of an application, the more efforts must be invested in the design of a suitable measuring system.

This also applies to xMR sensor systems. At the same time, the selection of a qualified measurement body can quickly be limited by demanding conditions. Sintered hard ferrites, which have excellent temperature properties, fail at high speeds due to their brittle nature and are difficult to apply. Elastomer-based magnetic rings are easier to install than sintered pole wheels and cover a high temperature range, but show swelling behavior with certain chemicals.

If no suitable magnetic material can be found for the application, the only option is usually to use a passive embodiment, which is often more expensive to procure or manufacture.

In cooperation with Miba AG, a new type of pole wheel has now been developed that combines the advantages of all conventional technologies in a single ring. It is based on a steel beam, similar to elastomic rings, but carries a sputtered-on, hard magnetic samarium-cobalt magnetic layer. Thanks to the sputtering process, the layers are applied extremely precisely, homogeneously and with only a few hundred micrometers. The strength of the connection between the magnetic layer and the steel beam is similar to that of a welded joint, which is why the pole wheels can be used without hesitation at speeds of over 30,000 revolutions per minute and have excellent long-term resistance in a wide variety of oils - at operating temperatures of up to 220°C. In addition, thanks to the steel carrier, the rings can be easily and safely integrated into the application. There are almost no limits to the possible diameters and smaller variants of approx. 30 mm as well as large variants of 200 mm diameter can be realized.

By combining a hard magnetic layer and a magnetization process specially adapted to the technology, codes are generated that are comparable to elastomized material in terms of their field strengths and can therefore be used, for example, as usual with AMR sensors in saturation mode (strong-field sensors). As usual, incremental systems with and without reference as well as absolute systems can be realized for magnetization.

In combination with our robust xMR sensor technology, this results in a superior sensor system that always delivers reliable results even in the harshest conditions.

David Quirnheim Pais

CORELESS CURRENT SENSORS FROM SINOMAGS

The STK-616 series offers a wide range of applications at a low price

For lower currents, coreless current sensors have become a trend in many industries. Many customers want solutions that are well into the low single-digit euro range, or even lower, in larger quantities and are available in standard SMD packages.

Such chip-level sensors can provide an internal current path or be mounted near the conductor, which then serves as the current path for measurement. Since there is no additional flux concentrator, the sensor must be located in close proximity to the current conductor, which requires innovative concepts for stray field suppression and isolation.

Differential measurement at two points with separate TMR half-bridge chips or a single-chip gradiometer are therefore becoming increasingly popular in the market.

The technical advantages of coreless current sensors compared to shunt solutions are the reduction of the measurement system due to the elimination of peripheral circuitry and heat sinks, as well as lower primary conductor impedances and thus less heat generation with galvanic isolation. Additional supply voltage and PCB area can also be saved. Small miniature-core-based sensors and high-current, wide-conductor SMDs will be available soon.

While isolation to external conductors is easy to implement, secure, reinforced insulation according to standard specifications is a challenge for the compact IC package solutions. The previous **STK-616-M series** sensors use a multifunctional PCB chip carrier made of BT material as an insulator, shield and wiring layer.

The earlier models of the **STK-616 series** instead used elaborate assembly with a printed circuit board as a carrier with a current path on the inner layer and an isolation barrier to prevent creepage around the sensor chip.

The conversion from such PCB-based sensors to the transfer-molded IC packages brings various advantages for production. The coreless current sensor in a standard package is less expensive and compatible compared to PCB-based sensors.

A standard reflow soldering process can be used for processing, which saves the costly and time-consuming wave soldering process compared to leaded current sensors. To reduce manufacturing costs, the production and testing process can be automated with fully automatic pick and place machines.

The **STK-616 series** offers a high product flexibility of coreless current sensors through additional functionalities such as OCD (Over Current Detection) and filtering, as well as variants for high frequency ranges with a bandwidth of up to 2 MHz. Sensors with an additional measuring range for Arc Fault Circuit Interrupter (AFCI) detection, such as the **STK-616TMWD**, are also part of the Sinomags Group‘s portfolio. This makes it possible to detect electric arcs as the cause of fire, e.g. in PV installations.

Our latest product **STK-616AM** is equipped with extra-wide solder tabs for the primary current, which also allows the use of the coreless current sensor at larger currents up to 100 A. The product CFS1000 and its successor CFS3000 can also be used for large currents in various arrangement concepts thanks to an external current path.

Laurin Becker *Matthias Brusius* *Hui Wang*

ROTEC
TORSIONAL VIBRATION PROFESSIONALS

takes over evaluation unit for valve train measurements from Sensitec

VISPIRON ROTEC GmbH exclusively takes over the production and distribution of the Multi Channel Box from Sensitec, an evaluation unit for real-time measurements on the valve train. The electronics will be available in the new design from January 2024.

VISPIRON ROTEC exclusively takes over the production and distribution of the Multi Channel Box (SPP-3001) from Sensitec. With a new design and the same functionality, the evaluation unit for real-time measurements will be available in the future under the product name Electronic Valve Train Measurement Module (ELVTMM). In addition, VISPIRON ROTEC exclusively distributes the proven GMR sensor from Sensitec for valve lift measurement on fired engines. In combination, the electronics and the sensor are used to measure valve lift or valve rotation in combustion engines. The measurement solution can also be used for other applications where the detection of movements at difficult measurement points is required.

The valve train measurement module is configured on the PC via a USB interface and user interface. Displacement measurement works on the principle of scanning a ferromagnetic tooth structure by a magnetically biased GMR sensor. The outstanding advantage is that the measurement takes place directly at the valve. In addition, the measurement can be done on a fired engine.

ELVTMM is able to calculate the valve lift with an accuracy of +/- 10 µm. The result is provided as an output voltage between 0-10 V, proportional to the valve movement. The Valve Train Measurement Module offers up to four measurement channels, a high resolution and has a high sampling frequency of the sensor raw signals. The valve position is detected within 1 µm and output in real time as an analog voltage. This means that even very fast movements can be reliably detected.

The GMR sensor head was specially optimized for measurement at difficult measuring points and is therefore very compact and robust. Due to the optimized combination and arrangement of sensor chips and permanent magnet, sine/cosine output signals with an excellent signal-to-noise ratio are generated, which can be interpolated with a very high resolution. VISPIRON ROTEC's RASdelta hardware and RAS software also offers a dedicated software module for measurement on fired valve train systems and allow high resolution data acquisition and tailor-made processing of displacement and rotational speed signals. Following the takeover by the Sinomags Group, Sensitec has revised its range of services and removed the business area of sensor technology for test benches from its target focus. „We are now focusing more on the broad area of current sensors, whose share has increased massively with Sinomags," explained Glenn von Manteuffel, who initiated the partnership with VISPIRON ROTEC in his sales territory of southern Germany. He added: „We are very pleased that the acquisition of the valve lift sensors by VISPIRON ROTEC has started so successfully and that now, in a second step, our evaluation box will also be available for existing and new customers. The real-time measurement represents a unique selling point that cannot be found on the market in this way."

„By acquiring the electronics for real-time measurements on the valve train, we can continue to offer our and all Sensitec customers a powerful measurement solution to capture and analyze the motion sequences from the valves of a fired engine „online". We support the development of drive technology by testing valve train functionality and optimizing the efficiency of the engine by reducing fuel consumption and emissions," says Kevin Rohwedder, COO of VISPIRON ROTEC. Rohwedder, COO von VISPIRON ROTEC.

About VISPIRON ROTEC

VISPIRON ROTEC GmbH has been a world leader in the development, production and distribution of sophisticated measurement technology for the analysis of torsional/rotational vibrations for over 30 years. The measurement system RASdelta impresses with a unique measuring principle, a high torsional angle resolution as well as the highly precise acquisition and extensive evaluation of measurement data. With a worldwide sales network, VISPIRON ROTEC offers its customers first-class service on site.

Our monitoring system of VISPIRON ROTEC is suitable for continuous monitoring of drive trains in marine engines, gas/steam turbines, wind turbines, etc. Long-term analysis enables undesirable trends to be detected timely and countermeasures to be taken. Damage and long downtimes can thus be avoided, and maintenance intervals extended. The analyzed data is prepared for use in the cloud.

For problems and complex measurement tasks involving vibration and noise analyses on drive components, gearboxes and turbines, our ROTEC ENGINEERING team supports with broad expertise and years of experience. In addition, VISPIRON ROTEC develops individual sensor solutions on request and offers user training on the RASdelta measurement system as well as demo measurements.

Kevin Rohwedder, Sales Rotec (left) and Glenn von Manteuffel,Sales Sensitec (right)

NEWS

TRADE FAIR DATES

We will be present at **SPS Smart Productions Solutions** in Nuremberg from November 14, 2023 to November 16, 2023.

We look forward to welcoming you again in person!

SPS Hall 4A | 626

Sensitec GmbH
Schanzenfeldstr. 2
35578 Wetzlar · Germany

Tel. +49 6441 5291-0
Fax +49 6441 5291-117

www.sensitec.com
sensitec@sensitec.com

Editorial | Layout:
Jasmin Hahn

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MAGNETORESISTIVE SENSORS