

## SPECIALIST RELIES ON EXPERTISE

### MAGNETIC POLARITY CHECK DURING THE RUNNING PRODUCTION PROCESS

Automation solutions increase the efficiency and profitability of the processing industry. If very special investments are required, it is a task for specialists such as the MKE. The company implements i.a. special machines for the automotive industry for the manufacture of hybrid components in insert technology. For this purpose, competent partners are sometimes required, for example when it comes to integrating a sensor solution in a fully automatic production line for rotors.

The metal and plastic goods production company m. b. H. (MKE) is a subsidiary of the Austrian Haas Group, the world's largest supplier of equipment and machines for the production of waffles, biscuits, ice cream cones, etc. In the past, high-quality lighters were the focus of the production of MKE based in Heidenreichstein, around 110 kilometers northeast of Linz. Since the mid-90s, the company has established itself as a full service provider in the field of metal and plastics processing with a broad product and service range.

„Our company is divided into the segments automation, contract manufacturing, precision engineering, hydrants and valves. We belong to the first area and are specialized exclusively on the development and realization of special machines for automotive suppliers, especially plastic processing companies,” explains Christian Diwald, team leader design of MKE's automation division, and clarifies: „Our specialty is the insert technology, where different components or metal components are assembled by insert molding with thermoplastic resin. For the production of such hybrid components that are difficult to produce with the classic injection molding, we develop automation solutions.”

#### AUTOMATED ROTOR ASSEMBLY

One of the recent developments that MKE released is an automated production line for rotors of DC motors, which are used in fans for automotive radiators. Christian Diwald says: „An essential part of this plant is a rotary table with several stations on which the magnets are inserted in the rotors for the DC drive before the extrusion-coating with plastic. Here it must be ensured that the eight magnets have the proper alignment.”

What is meant here concretely, becomes apparent with a glance at the individual stations of the round table. The first station is used to clean the fixture for the rotor to remove any residue from the previous production cycle. After that, the first four magnets with uniform orientation of all poles are installed (e.g. north pole upward). At the third station, the next four magnets follow with reversed polarity (e.g. south pole upward). Subsequent to this step, an iron packet is laid on and pressed. This is the insert-element for the plastic housing. The check of the correct magnetic pole alignment finally takes place at the fifth station. „With „correct“ is meant that the polarity, i.e. the north and south poles, of directly adjacent magnets must be alternately aligned. In order to examine this in the running manufacturing process, we searched for a suitable solution,” explains Christian Diwald.

#### HIGH PACKING DENSITY IS REQUIRED

The use of magnetic field measuring instruments, covering both the field strength and polarity, was rejected by MKE from the beginning. The design manager explains the reasons: „The measurement of the field strength was not relevant to us, as it is previously tested at another point in the system. In addition, magnetic field measuring instruments are not only complicated and expensive, but also too big for the relevant system area. The integration of such devices was unrealistic resulting from the packing density that is absolutely necessary.”

#### UNIPOLAR DEVICES DETECT NORTH AND SOUTH POLES

A quasi economical as compact and also easy to integrate solution ipf electronic could offer. The experts of the sensor company from Lüdenscheid are known for their wide-ranging application knowhow that could also help in this application. For the inspection station of the special machine of MKE the engineers of ipf electronic developed a prototype of the unipolar magnetic sensors **MC080180** and **MC080185** for south and north pole detection. The compact devices in design M8 (length 59mm) integrate all the necessary electronics and can be integrated easily as threaded devices according to Euro norm into existing applications. Due to its metal sleeve from stainless steel, protection class IP67 and an operating temperature range of -25°C to + 75°C, the sensors are also suitable for many applications where particularly robust solutions are needed. The magnetic sensitivity of both devices is approximately 10mT.

**BETTER SAFE THAN SORRY: DOUBLE-CHECK BY CROSSCHECK**

According to the number of magnets to be controlled, the test station of the round table provides a total of eight sensors, alternating one **MC080180** and **MC080185** for the recognition of south and north pole respectively. The digital signals of the individual devices are processed separately in the PLC of the special machine. If the examination reveals a false polarization of a magnet, the system is stopped immediately by the PLC in order to avoid the production of waste prior to extrusion.

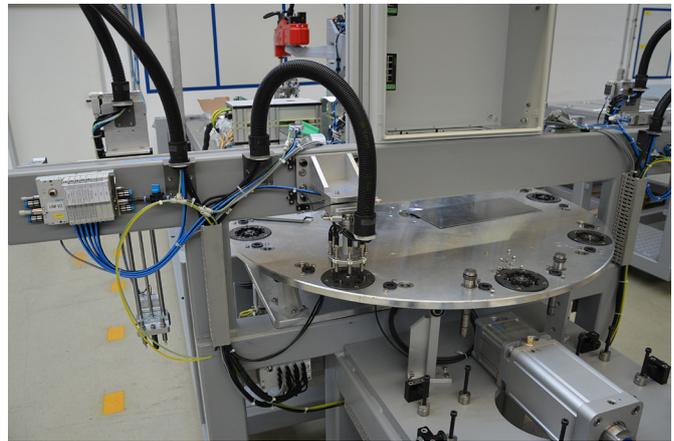
If the overall result of the test is correct, the PLC causes a crosscheck. „An additional measure to increase the reliability of the station,” Christian Diwald emphasizes, „because in this step the sensors are rotated by 45 degrees, so that they now have to provide the inverted results compared to the first test. With this plausibility check we ensure the proper functioning of the station, by ruling out e.g. a faulty sensor, a loose cable or a cable break.” The automation solution from MKE manufactures around 240 rotors per hour. Since the polarity check of a rotor’s magnets only requires tenths of a second, the solution for the test station fits perfectly into the overall concept of the special machine designed for high productivity.

**SUCCESSFUL TEAMWORK**

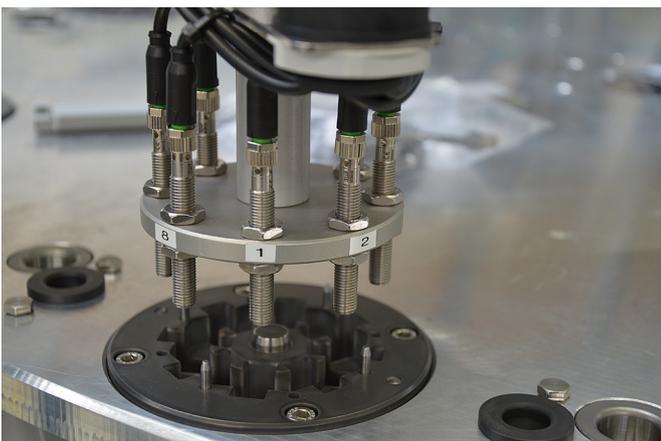
From Christian Diwald’s perspective, the result of collaboration with ipf electronic is very positive. „With the unipolar magnetic sensors, we can realize a very economical and yet compact test station, which makes a significant contribution to the process safety of our system.”



The test station has a total of eight sensors, alternating one **MC080180** and **MC080185** for the recognition of south and north pole respectively.



Compact and economical: The solution of ipf electronic fits perfectly into the overall concept of the plant.



The receptacle for the rotor, to which the eight magnets are mounted with alternating polarity. With the final placing and pressing an iron packet, the insert element for the plastic housing is completed.

