

Press Release

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Fertilizing with Precision – How Customized Sensors Ensure Every Granule Hits Its Target

Rauch Landmaschinenfabrik GmbH relies on customized sensors from Metallux AG for its high-precision fertilizer spreaders. They ensure that every application of fertilizer reaches exactly where it is needed – economically, sustainably and with centimeter-level precision.

Rauch Landmaschinenfabrik GmbH is an internationally active family-owned company founded in 1921 and headquartered in Rheinmünster, Germany. The company develops and manufactures high-precision fertilizer spreading and seeding technology for agriculture as well as spreading equipment for winter road maintenance.

Around 400 employees contribute to the company's success worldwide, including 45 in the development department alone. Its products are distributed in more than 50 countries through an international dealer network.

In the field of fertilizer technology, Rauch uses, among other solutions, disc spreaders in which rotating spreading discs distribute fertilizer granules across the field in precisely calculated trajectories, achieving working widths of up to 54 meters. Precise, targeted distribution depends on the exact coordination of disc speed, drop point and the properties of the fertilizer being used. Depending on particle size, shape and density, each granule has different flight characteristics and is therefore distributed differently across the field.

The objective is clear: to apply the right amount of fertilizer in exactly the right place. For farmers, this is crucial. Fertilizer supplies plants with essential nutrients, helps ensure high yields and contributes to long-term soil fertility. At the same time, it represents a significant cost factor. Under-application can lead to yield losses, while over-application not only causes unnecessary costs but can also impact the environment through excess nutrients entering soil and water.

Intelligent Fertilizer Spreaders for Precise Application

Precise, needs-based application is therefore key to economical and sustainable agriculture. This is exactly where Rauch's technology comes into play: it enables fertilizer to be used efficiently while ensuring that every square meter of the field receives the optimum amount.

One of Rauch's key strengths is the combination of innovative sensor technology and highly dynamic drive systems. A major distinguishing feature is Rauch's proprietary EMC technology (Electronic Massflow Control). It monitors the actual quantity of fertilizer being applied in real time and automatically adjusts the application rate. Variations in material properties, for example due to differences in granule size or fertilizer moisture, are compensated for immediately – ensuring consistently precise spreading results.

This system is complemented by the patented SpeedServo technology introduced in 2018. Highly dynamic electric actuators respond within fractions of a second and precisely adjust the dosing system. This is particularly important under changing conditions, for example in wedge-shaped field sections or for GPS-supported, site-specific application.

Customized Sensor Technology for Maximum Accuracy

A key component of this technology is the rotary potentiometer element from Metallux. As part of the SpeedServo actuator, the sensor detects the position or angle of the control elements. The sensor signal provides the basis for precise control of fertilizer application and forms the interface between mechanical movement and digital control.

Precise position detection is essential, as even the smallest deviations can affect fertilizer distribution and application rates. This is where a reliable and durable sensor proves its value: only accurate measurement data allows the spreading technology to exploit its full precision potential.

The sensor used in this application must meet demanding requirements. It not only has to provide precise position feedback but must also operate reliably over the long term under harsh conditions. The key characteristics of this absolute, analog conductive-plastic potentiometer element include:

- High measurement accuracy with excellent linearity and resolution
- High resistance to vibration and temperature fluctuations
- Long service life and wear-free operation even under demanding operating conditions
- High signal stability and reliability throughout its entire service life

For Rauch, Metallux therefore developed a customized sensor solution. The shape, diameter, angle of rotation and cable connection were precisely adapted to the requirements of the application. The wiper carrier was also specially designed: a precisely fitting connection ensures a secure fit on the shaft and prevents unwanted rotation. This ensures accurate position detection even under strong vibrations and dynamic loads.

A particular challenge during development was the extremely limited and low-profile installation space inside the actuator. For this reason, not only the internal design but also the external contour of the sensor was precisely adapted to the available installation space and the geometry of the motor. The result is a compact, robust and highly precise sensor solution that integrates seamlessly into Rauch's SpeedServo technology.

Working Together to Achieve the Optimum Solution

From Metallux's perspective, the project demonstrates the important contribution customized sensor solutions can make to the precision of modern agricultural machinery. Metallux products play a key role in the accuracy of Rauch's spreading technology. Especially in sensitive control processes, robust, precisely matched and reliable solutions are essential.

Rauch values Metallux for its combination of technical expertise, flexibility and quality. Maximilian Zimmer, Team Leader Product Electronics Development, explains:

“What we value about Metallux is its high level of expertise and reliability. You know what you are getting and can rely on your partner. The geographical proximity was an additional advantage, as it allowed us to discuss matters in person and make decisions quickly. This was particularly important for this project because the technology can only be tested during specific cycles and within limited time windows. Despite the tight schedule, we worked together to develop a very good, customized solution within a short period of time.”

With this solution, fertilizer reaches exactly where it can deliver the greatest benefit. In this way, precision in the field truly bears fruit.

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Pictures:



Rauch Disk Spreader Axis



Detailed view of a Rauch spreading disc



The Metallux potentiometer element is integrated into the actuator of Rauch's SpeedServo unit.



Metallux Standard Conductive Plastic Potentiometer Element

Profile Metallux AG

Metallux AG is an internationally active, leading developer and manufacturer of sensors in thick-film technology. The extensive product portfolio ranges from pressure, linear and rotary sensors to resistors and industrial joysticks for controlling vehicles and machines. Innovative products and customised solutions - Made in Germany: this is a combination that renowned customers from the fields of vehicle construction, medical technology, energy and environmental technology, materials handling and lifting technology and mechanical engineering have relied on for 40 years.

