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ENHANCING GRAIN FLOW CONTROL

with Position Sensors



 **Standex**
Electronics



Grain Door Position Sensing Challenges

Controlling grain flow during loading and unloading operations is critical for agricultural equipment efficiency and operator convenience. A leading manufacturer of agricultural equipment, needed a reliable way to detect the position of the grain door as it slides open and closed. This position information needed to be relayed to the operator in the tractor cab, allowing them to control the grain flow without having to manually check the door position.

Without this capability, operators would need to frequently stop the tractor, exit the cab, and

Check out the full list of Standex's testing and certifications.

- AS9100 Certified
- ISO9001 Certified
- IATF16949 Certified
- ITAR & NIST Compliant
- IP67 rated for harsh environments
- UL-Recognized and AEC-Q200 Compliant

visually check the grain door position. This time-consuming process significantly reduces overall efficiency and productivity, especially during busy harvest seasons when every minute counts.

The sensing solution needed to be passive and retain the last known door position even if the tractor's power cycled on and off. It also

needed to be robust enough to withstand the harsh environmental conditions of agricultural applications. Additionally, there was no ability to mount a separate target magnet on the grain door itself. The customer turned to Standex Electronics to develop a custom position-sensing solution to meet these unique requirements.



Reed Switch Solution for Grain Door Position Indication

Innovative Ferrous Metal Detection Reed Sensor

While most reed sensors require an external target magnet, Standex's innovative MK02 series integrates the magnet and reed switch into a single package. This allows the sensor to directly detect the ferrous metal of the grain door, eliminating the need for a separate target magnet.

Standex designed a solution using four MK02 sensors mounted along the path of the grain door. These sensors detect the door position at set increments: fully open, 1/3 closed, 2/3 closed, and fully closed. The normally open reed switch contacts ensure the last known

position is preserved even if tractor power is interrupted. Normally closed and SPDT contacts are also available depending on the control logic requirements.

Ease of Installation

The MK02's compact, all-in-one design simplifies installation compared to traditional reed sensors. With no separate target magnet to align, the sensor can be easily mounted in the optimal position to detect the grain door. The 4-wire flying leads allow for simple wiring, while optional custom wire harnesses with sealed connectors provide plug-and-play integration with the tractor's control system.



Approvals

The MK02 series is REACH and RoHS compliant, ensuring it meets strict environmental regulations. Additionally, the sensors are UL-recognized, providing peace of mind that they have been thoroughly tested for safety and reliability. These approvals streamline the integration process for the customer, allowing them to focus on delivering high-quality, innovative agricultural equipment.

Custom Solution Beats Hall Effect Alternatives

The MK02's compact, self-contained design provides significant advantages over alternative technologies like Hall effect sensors. Hall sensors required constant power and were more expensive while latching Hall sensors were susceptible to errors if power was lost or the door was manually moved while the sensor was unpowered. The MK02's ferrous metal detection capability and power-off position retention make it the ideal fit for the customer's application.





Rugged Sensor for Harsh Agricultural Environments

Agricultural equipment must withstand extreme environmental conditions, from dust and dirt to moisture and wide temperature swings. The MK02 is well-suited to these demanding applications thanks to its IP67-rated plastic housing. The housing protects the internal reed switch from contaminants while also providing excellent resistance to degradation from prolonged UV exposure.

Standex worked closely with the customer's engineering team to integrate the MK02 sensors into the grain trailer design. The sensor's compact form factor and available flying leads simplify mounting and wiring. For added flexibility, Standex also offers custom wire harnesses with sealed connectors, allowing the sensors to seamlessly integrate with the customer's control architecture.

Collaborative Design Process

The collaborative design process between Standex and the customer engineers resulted in a production-ready solution in just 10–14 months. Standex's on-site engineering support and rapid prototyping capabilities were key to

achieving this accelerated timeline. The MK02-based grain door sensing system is now deployed on the customer's equipment, enhancing operator efficiency and equipment performance.

Standex Custom Design Capabilities

Standex Electronics' expertise in custom sensor design was crucial in developing the ideal grain door position sensing solution for the customer. By leveraging their MK02 series and adapting it to meet the customer's specific requirements, Standex delivered a robust, reliable system that enhances operator efficiency and equipment performance.

sensing technologies to market in challenging agricultural applications.

To learn more about how Standex Electronics can help solve your toughest sensing challenges, visit www.standexelectronics.com or contact them to discuss your application needs.

This project showcases Standex's ability to collaborate closely with manufacturers, rapidly prototype custom solutions, and bring innovative



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