

A background image of a green tractor in a field at sunset. The tractor is in the center, facing away from the viewer, with its headlights on. The field is filled with green plants, and the sky is a mix of orange and blue. The image is overlaid with a semi-transparent dark blue geometric shape that frames the text.

Powering Sustainability: Standex Relays Propel Autonomous Electric Tractors Forward



Successful electrification of traditionally gas-powered agricultural machinery hinges on overcoming battery management challenges.

The Tractor Electrification Challenge

The customer Tractor, at the forefront of sustainable agricultural machinery, is leading the transition from traditional gas/diesel-powered tractors to all-electric tractors. However, this shift presents an array of obstacles.

Safe and Efficient Battery Management

One crucial hurdle was ensuring the safe and efficient management of the customer's high-voltage batteries. This involved achieving robust galvanic isolation between circuits. Without proper isolation, technicians performing diagnostics could be at risk of encountering short circuits if stray current jumps between circuits. Additionally, the customer required advanced charging capabilities, comprehensive diagnostics for battery health monitoring, and granular control over the entire battery management system (BMS). These functionalities were critical for optimizing battery performance, preventing unexpected downtime in the field, and extending the overall lifespan of the battery packs.



Minimizing Parasitic Battery Drain

Another major challenge was minimizing parasitic battery drain. Even a small current draw when the tractor is inactive can significantly impact operational range and overall efficiency. The customer highlighted a specific concern during development: the possibility of technicians accidentally leaving a connection loose in the AC distribution box. This could lead to unintended current flow and pose a safety risk.

Reliable and Efficient AC/DC Conversion

The project also demanded a dependable method for reliable and efficient AC/DC conversion. Traditionally used onboard controllers rely on relays to convert incoming AC power from charging stations to DC power for the tractor's internal systems. Here, minimizing power losses during conversion was crucial for maintaining optimal performance of all onboard electrical components.



Engineering a Sustainable Solution

The success of the customer's autonomous electric tractor venture was dependent on overcoming battery management and efficiency challenges. Standex reed relays were the ideal solution. Their superior isolation prevented technician safety risks during diagnostics by stopping short circuits. The relays' zero-power consumption feature eliminated parasitic drain, maximizing battery life. Additionally, Standex relays facilitated seamless AC/DC conversion, ensuring peak performance for onboard systems. These solutions directly addressed the customer's engineering requirements.

Building a Powerful Partnership

Beyond providing technical solutions, Standex's collaborative approach and dedication to customer success played a crucial role in this project's success. The customer found Standex to be an active collaborator, not just for their innovative relays, but also for their unwavering support and commitment to finding the perfect solution. This partnership was driven by:

Attentive and Available Support

Standex readily provided reed relay samples for testing and troubleshooting assistance, ensuring a smooth product development process.

Collaborative Problem-Solving

Both engineering teams worked closely to identify challenges and devise solutions tailored to the customer's specific requirements.

Open Communication

Standex maintained clear and consistent communication throughout the project, fostering a strong foundation of trust and collaboration.





By demonstrating a willingness to go the extra mile, Standex proved to be more than just a parts manufacturer — it became a partner in the customer's tractor electrification efforts. And, by enabling the efficient electrification of major farm equipment, Standex is playing a key role in fostering a more sustainable, connected, and efficient agricultural future.

Standex KT and MHV Reed Relays

In the rapidly advancing field of agricultural electrification, engineers are seeking reliable and efficient solutions for electric tractors. KT and MHV Series Reed Relays offer a distinct combination of features that address key issues in this industry.

One standout feature of Standex reed relays lies in their superior high-voltage isolation capabilities. Unlike traditional solutions, they excel at keeping high-voltage circuits separate, a critical safety and system integrity requirement in electric tractors. These tractors use battery systems with significantly higher voltages than their conventional counterparts, so proper isolation is fundamental to safeguarding equipment and personnel during operation and maintenance.

Another primary advantage of Standex reed relays lies in their zero-power consumption feature. Traditional relays can cause a parasitic drain of several milliamps, constantly siphoning power from the battery when not in use. Standex relays completely open their internal switches in the off state, eliminating this continual power drain. Every milliamp saved translates to longer operation times and minimized downtime in the field — a major factor for maximizing productivity.





Standex Electronics

Worldwide Headquarters

4150 Thunderbird Lane
Fairfield, OH 45014 USA
+1.866.STANDEX (782.6339)
info@standexelectronics.com

Agile Americas (NH)
+1.800.805.8991
info@agilemagco.com

Minntronix Americas (SD)
+1.605.884.0195
productsales@minntronix.com

Northlake Americas (WI)
+1.262.857.9600
sales@northlake-eng.com

Renco Americas (FL)
+1.800.645.5828
sales@rencousa.com

StandexMeder Europe (Germany)
+49.7733.9253.200
salesemea@standexelectronics.com

StandexMeder Asia (Shanghai)
+86.21.37606000
salesasia@standexelectronics.com

Standex Electronics India (Chennai)
+91.98867.57533
salesindia@standexelectronics.com

Standex Electronics Japan (Kofu)
+81.42.698.0026
sej-sales@standex.co.jp



standexelectronics.com