
PARTNER | SOLVE | DELIVER®
EMPOWERING UTILITY VEHICLES
With Advanced Custom Speed Sensors
Standex Electronics

Safely Engaging 4WD on the Go

A leader in professional turf, landscape, rental, and construction equipment manufacturing, faced a challenge with their utility vehicles. They needed a reliable way to ensure that the drive could safely engage the 4-wheel drive (4WD) power take-off (PTO) system without risking damage to the drivetrain. Engaging 4WD at inappropriate speeds or in the wrong direction could lead to costly repairs and equipment downtime.

To address this issue, the customer approached Standex Electronics, with a unique set of requirements. They needed a sensor that could accurately measure both speed and direction to confirm that conditions were safe for 4WD engagement. This sensor would need to integrate seamlessly with its existing control systems and withstand the harsh environments typical of utility vehicle operations.

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

- ISO 9001:2015 Certified
- CE Certified
- RoHS Compliant
- REACH Compliant

Custom Intelligent Speed Switch Sensor

The project began with the customer testing a standard Standex Electronics quadrature gear tooth sensor. While this provided accurate speed and direction data, the customer's engineers found they needed additional processing to interpret the signals and determine when it was safe to engage 4WD. Recognizing an opportunity for innovation, Standex Electronics proposed an elegant solution: integrating the speed switch functionality directly into the sensor itself.

This approach led to the development of the CS1236, a custom Ferrous Target Directional Speed Switch. This innovative sensor combines several key features:

1. **Programmable speed threshold:** The sensor can be factory-set to a specific trip frequency, allowing it to trigger at the optimal speed for 4WD engagement.
2. **Direction discrimination:** The CS1236 ignores movement in the opposite direction, ensuring 4WD is only engaged when the vehicle is moving in the intended direction.
3. **Built-in signal processing:** The sensor itself determines if speed and direction conditions are met, outputting a simple "go/no-go" signal for 4WD engagement.
4. **Robust design:** Housed in an aluminum body with a 5/8-18 x 1.75" thread, the sensor is built to withstand the rigors of off-road use.
5. **Easy integration:** A 3-pin Deutsch DT connector with 5-inch 20 AWG XLPE wiring simplifies installation and ensures a reliable connection.

By incorporating the decision-making logic into the sensor, this solution eliminated the need for a separate, expensive controller. This not only reduced system complexity and reduced cost but also improved reliability by minimizing potential points of failure.

Collaborative Development Process

Standex Electronics' engineering team worked closely with the customer to refine the sensor's performance. This collaborative effort included:

1. **On-site support:** Two Standex Electronics engineers visited the customer's facilities to work directly with their team, ensuring a deep understanding of the application requirements.
2. **Iterative firmware development:** The sensor's internal programming was fine-tuned to meet the customer's exact speed and direction requirements.
3. **Optimization testing:** Standex Electronics helped the customer determine the optimal minimum speed requirement by testing different switch points under various operating conditions.

This hands-on approach and rapid prototyping capability allowed the project to progress from an initial concept to a production-ready solution in just 9–12 months. The resulting CS1236 sensor not only met the customer's immediate needs for the utility vehicles but has since been adopted for use across multiple vehicle models in their product line.

Rugged Design for Demanding Environments

Utility vehicles operate in challenging conditions, from dusty construction sites to muddy agricultural fields. The CS1236 is engineered to excel in these environments:

1. **IP67-rated housing:** The aluminum body and sealed construction protect against dust and temporary immersion in water.
2. **Wide operating temperature range:** Reliable performance from -40°C to 125°C ensures functionality in extreme weather conditions.
3. **Load dump protection:** Built-in safeguards against voltage spikes protect the sensor and connected systems.
4. **Precision gap sensing:** The sensor maintains accurate readings with air gaps up to 2.5mm (for a 30T gear at 5.5mm pitch), allowing for some positional variation due to vibration or manufacturing tolerances.

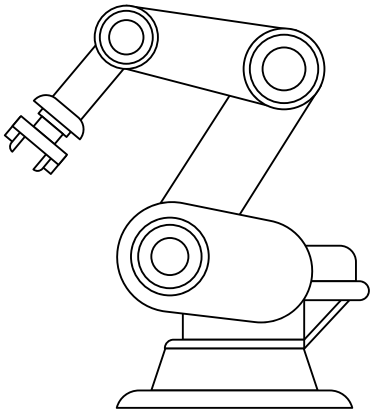
These features make sure that the CS1236 provides consistent, reliable performance throughout the service life of the vehicle, minimizing maintenance needs and enhancing overall system reliability.

Expanding Standex Electronics' Product Portfolio

The success of the CS1236 project with the customer led Standex Electronics to recognize a broader market need for intelligent speed-sensing solutions. As a result, we expanded our catalog offerings to include a new category of programmable speed switch sensors. This development has opened up opportunities in various industries beyond agricultural and turf equipment, including:

1. Construction and mining equipment
2. Industrial automation
3. Material handling system
4. Renewable energy applications (wind turbines, solar tracking)

By leveraging the core technology developed for the customer, Standex Electronics can now offer customizable speed and direction sensing solutions to a wide range of OEM customers, further solidifying its position as a leader in magnetic sensing technology.



Standex Electronics' Custom Design Capabilities

The customer's project showcases Standex Electronics' ability to develop innovative, application-specific sensing solutions. Our team of experienced engineers combines deep expertise in magnetic field sensing with a collaborative approach to problem-solving. Whether you need a modified version of an existing sensor or a completely custom design, Standex Electronics has the capabilities to meet your most challenging requirements.

To learn more about how Standex Electronics can help solve your toughest sensing challenges, visit www.standexelectronics.com.

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