Standex Electronics

PARTNER | SOLVE | DELIVER®

Sowing Success with Smarter Sensors

How magnetic sensors from Standex Electronics field the challenges of heavy agricultural machinery.

SWITCHING SOLUTIONS THAT USE LITTLE TO NO POWER

Reed and Hall effect sensors are highly power-efficient.

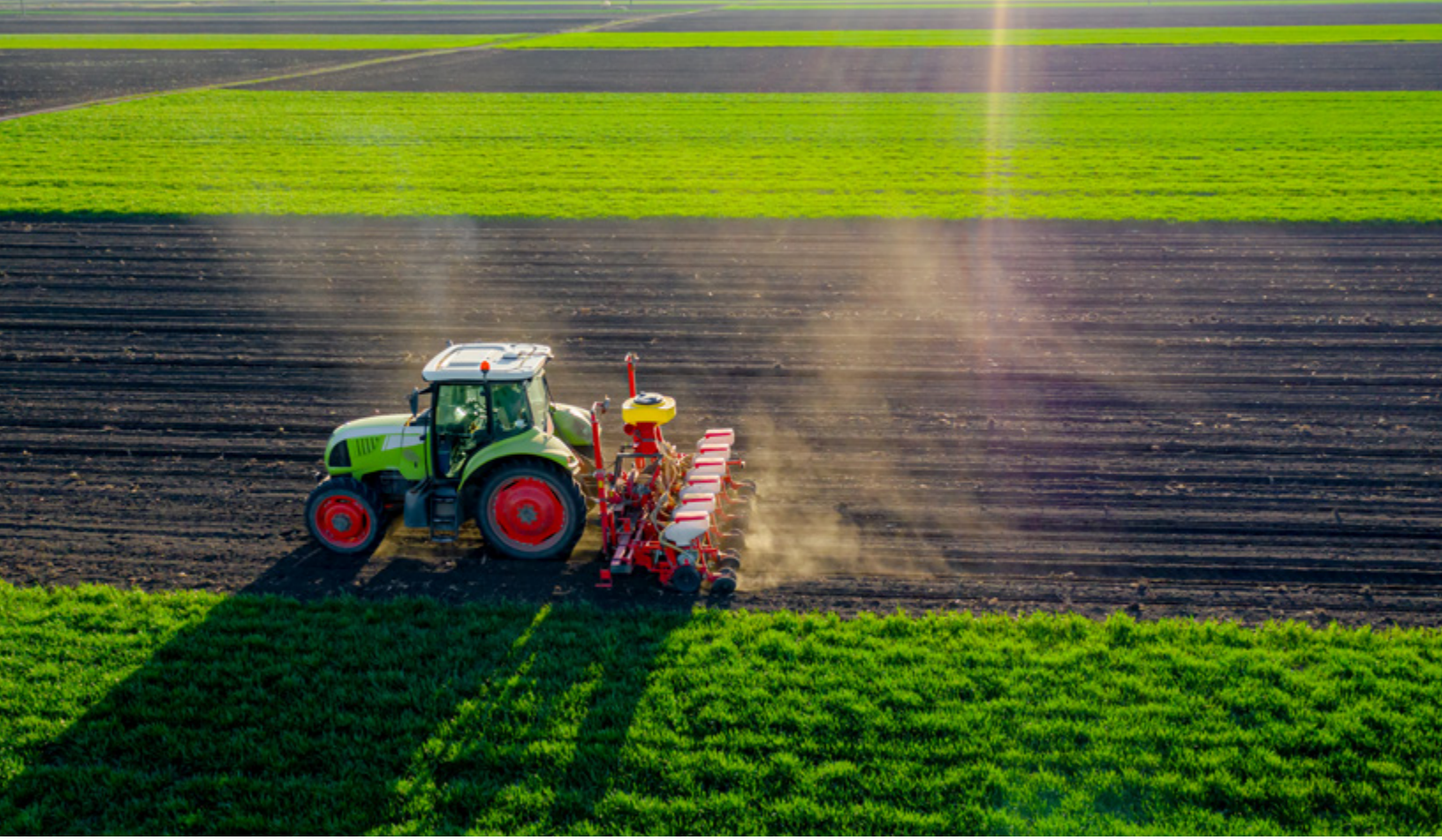
500M

500 MILLION+ CYCLES

Sensors can last for decades, with some switches exceeding billions of cycles.

SMALLEST SWITCHES IN THE WORLD

Standex Electronics is the go-to partner for developing sensors that satisfy the compact size and space requirements of today's agricultural equipment.



From planting and harvesting to transporting and processing, agricultural equipment has its work cut out for it. To monitor the diverse range of responsibilities, the industry increasingly turns to **magnetic sensors**.

Reed and Hall effect sensors are highly versatile. They can take on jobs involved in tracking rotational speeds, measuring flow rates of fertilizer, calculating crop yield, and detecting the height of blades for cutting. Smart agriculture introduces the need for even more sensors, with analysts predicting a 13.4% growth in intelligent farming by 2030.[1] Engineers and product designers need to source components that are up to the challenge.

1 Grandview Research, "Smart Agriculture Market Size, Share & Trends": https://www.grandviewresearch.com/industry-analysis/smart-agriculture-farming-market

How Do Reed Sensors Work?

Inside of a reed sensor is a glass envelope known as a reed switch, housing a pair of slender ferromagnetic blades. When a magnet approaches, the blades meet and connect a circuit. This sends a signal used for counting, sensing proximity, and position detection. As the magnetic field dissipates, the blades separate and return to their open state.

That's what makes reed sensors exceptionally energy efficient. They only consume power when the two blades meet in the "on" position.

Where can you find reed sensors? Security systems deploy these types of switches to detect breaches. Opening a door or window separates the sensor from a magnet, triggering an alarm. In cars, they control vanity mirror lighting by sensing whether the panel is open or closed.

Inside the Agriculture Industry:

Manufacturers of heavy farming equipment use **reed sensors** for:

Joystick controls: Positioning equipment arms

Passenger presence detection: The vehicle knows which seats are occupied, affecting seat belt warnings, ignition starts, and more

Fill/level sensors: Determine the yield in a grain tank in a corn harvester, or detect whether a tank is empty or full

SENSOR'S LONGEVITY, VERSATILITY MAKE THEM IDEAL IN AGRICUTURE

ELECTRONIC CONTROL UNIT HOE

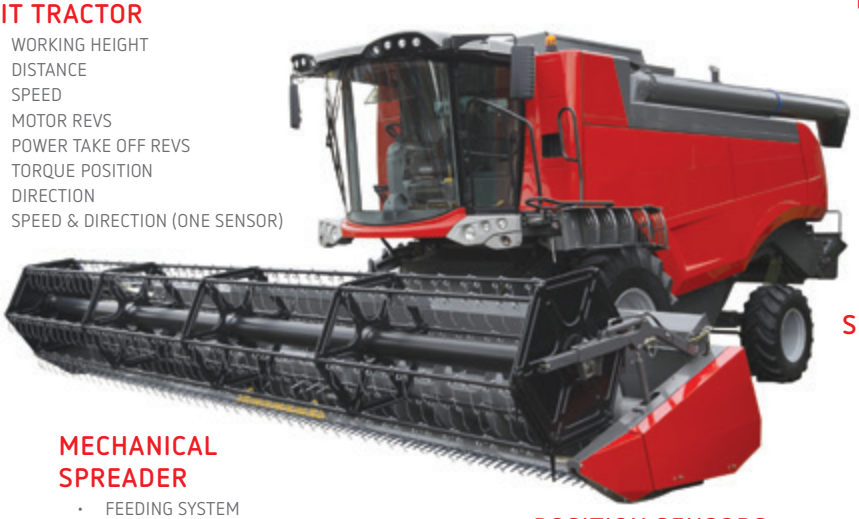
- WORKING HEIGHT
- DISTANCE
- SPEED
- DIRECTION

ELECTRONIC CONTROL UNIT SPRAYER

- FUEL CONTENTS
- PRESSURE
- FLOW RATE
- BOOM SECTIONS
- WORKING WIDTH
- FLOW RATE OF PUMP
- FLOW RATE OF AGENTS, BOOM SECTIONS
- HITCH CONTROL (HEIGHT OF SPRAYER BOOM)
- PTO REVS

ELECTRONIC CONTROL UNIT TRACTOR

- WORKING HEIGHT
- DISTANCE
- SPEED
- MOTOR REVS
- POWER TAKE OFF REVS
- TORQUE POSITION
- DIRECTION
- SPEED & DIRECTION (ONE SENSOR)



FLOW SENSORS

- RATE OF PUMP
- RATE OF AGENTS
- BOOM SECTIONS

LEVEL SENSORS

- FUEL
- COOLANT
- POWER STEERING
- DIFF GEARBOX OIL
- HYDRAULIC OIL
- BRAKE FLUID
- OIL LEVEL

SPEED SENSORS

- VEHICLE SPEED
- HARVESTER ELEVATOR SPEED
- FAN SPEED
- CHOPPER SPEED
- UNLOADING AUGER SPEED
- CLEANING AUGER SPEED

MECHANICAL SPREADER

- FEEDING SYSTEM
- CABIN - PEDAL, LEVER, GPS, INSTRUMENT PANEL
- THRESHING AND SEPARATING
- CLEANING SYSTEM
- UNLOADING AUGER - PIVOTING SPOUT

POSITION SENSORS

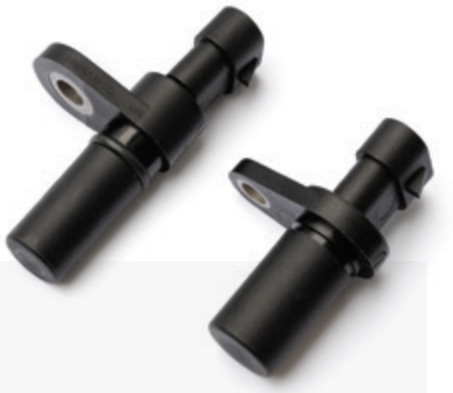
- WHEEL POSITION
- LINKAGE POSITION
- COUNTER KNIFE POSITION
- DOOR OPEN/CLOSE
- SPOUT ANGLE

How Do Hall Sensors Work?

Hall effect sensors take things a step further. They do more than detect the presence of a magnetic field — they can measure its strength. This makes Hall sensors a top choice for sensing projects that need to:

- Measure precise positions (like blades or gears) or liquid levels
- Control threshold values
- Sense direction or speed

Just look out your window: spot a vehicle and it's likely outfitted with a suite of Hall sensors. They're used to measure RPMs and provide your fuel gauge with the precise level in the tank.



Inside the Agriculture Industry:

Manufacturers of heavy farming equipment use Hall effect sensors for:

Rotational sensors: Determine the angle of a harvester spout

Full-range sensors: Monitor a brake pedal's up/down state and sense the amount of pressure the driver applies, for example

Gear tooth sensors: Check the position and speed of rotating gears

Flow meter sensors: Measure fertilizer output

ADVANCED MAGNETIC SENSING

Our versitle engineering expertise in magnetic sensing technologies and custom packaging allows us to be a one-stop-shop for your sensing requirements.

SENSING TECHNOLOGIES

		Fluid Level	Fluid Flow	Field Strength	Metal Detection	Angular Rotation	Proximity	Direction	Count	Speed	Alignment	Linear Position	Speed + Direction
REED	• **World leader in reed technology** • No power required • Cost effective solution • Reliable 2-wire device • High isolation • > 50 million in automotive applications	●	●		●	●	●		●				
HALL EFFECT	• **Sensor Solutions, Inc.** products added 3/22 • Digital or analog outputs • Programmable • Patented level sensor • Power consumption in low mA	●	●	●	●	●	●	●	●	●	●	●	●
CONDUCTIVE / CAPACITIVE	• Continuous fluid level analog output • Solid state reliable with no moving parts • Handles wide temperature range	●											

You'll also find them in action in the very room you're sitting in. Hall effect sensors can detect the rotating speed of a washing machine drum. They're also used for spot-on positioning of 3D printer nozzles.

Unlike reed sensors, Hall effect sensors require consistent power. In most cases, it's negligible, making both types a top choice for low-power, energy-efficient applications.

Which type of magnetic sensor did this agricultural machinery specialist choose? Discover how they made the choice.

The Challenge

A top manufacturer of agricultural heavy equipment came to Standex with an interesting reed sensor design in mind.

The sensor was two-pronged: one to detect if the brake was up or down, and a second to detect how much pressure was applied. Within each sensor was a critical safety feature to evaluate the function of the other sensor. If the brakes were not operating properly, the system could trigger shutdown mode.

The Answer

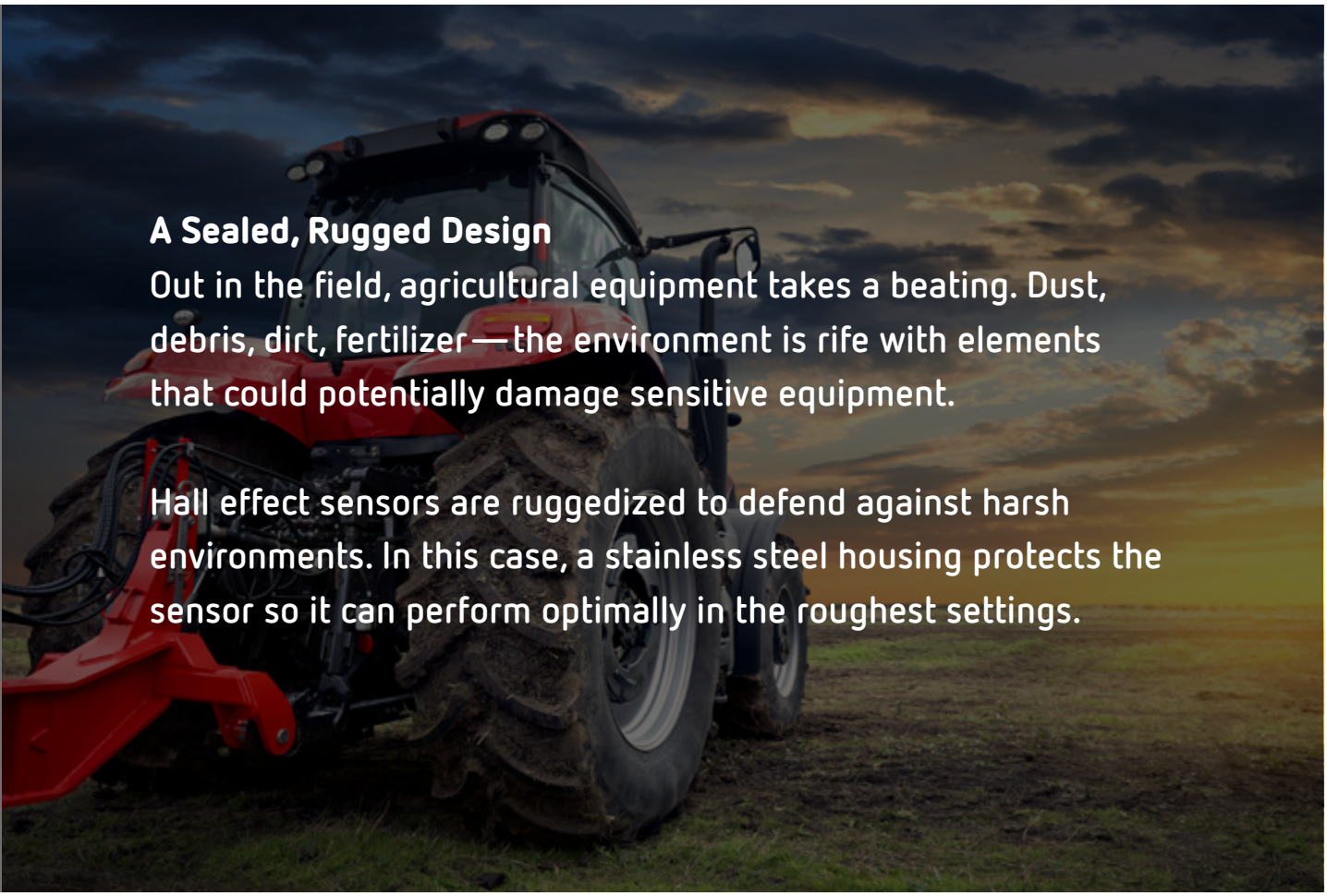
After lengthy testing, Standex proposed a new solution: designing the set using **Hall effect sensors**.

A Collaborative Pivot to Hall Effect Sensors

The Final Result: Two Hall Effect Sensors

Why Hall effect sensors for brake pedal sensing? Since they can detect more discrete fluctuations to a magnetic field, they can produce an accurate position reading.

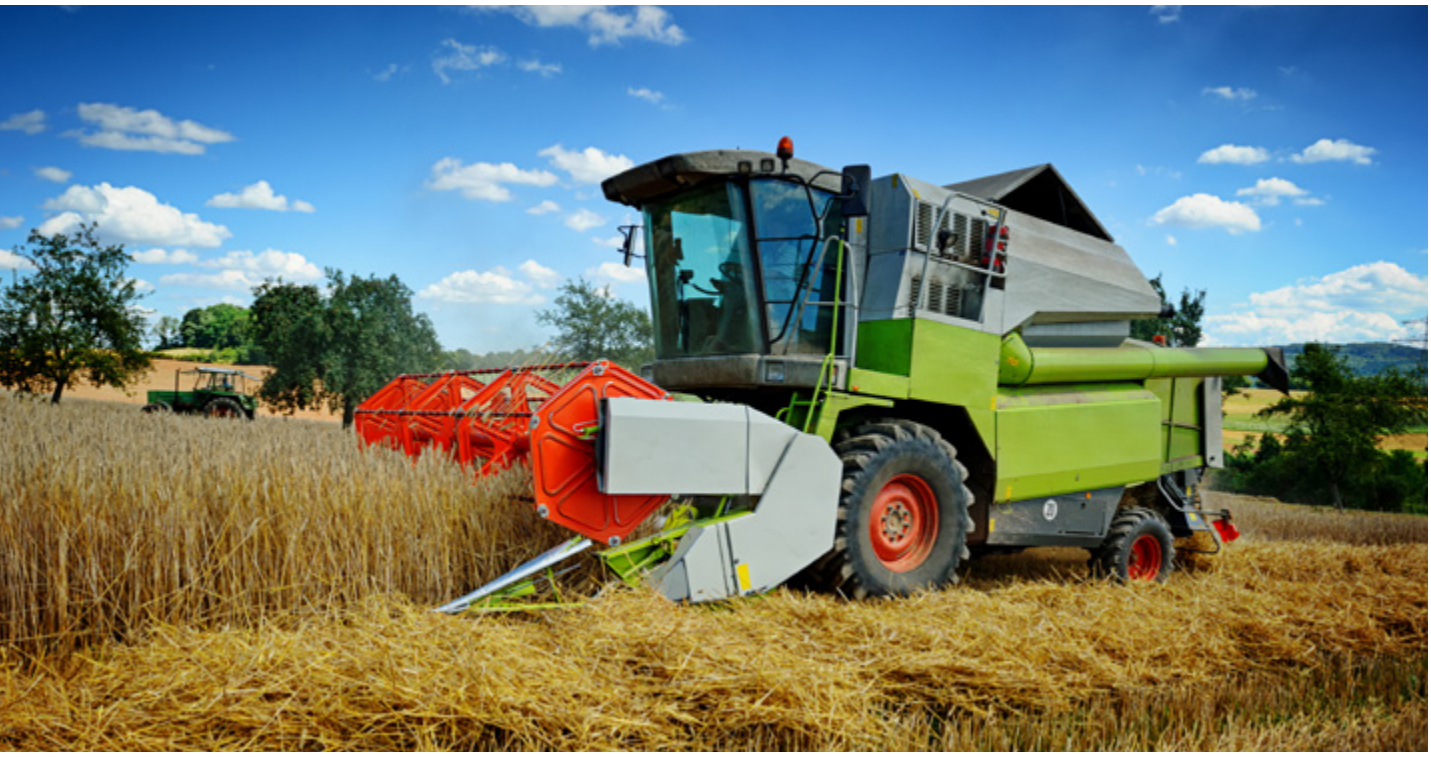
The ability to judge gentle taps vs. more forceful depressions is vital in safety-first applications like braking.



A Sealed, Rugged Design

Out in the field, agricultural equipment takes a beating. Dust, debris, dirt, fertilizer—the environment is rife with elements that could potentially damage sensitive equipment.

Hall effect sensors are ruggedized to defend against harsh environments. In this case, a stainless steel housing protects the sensor so it can perform optimally in the roughest settings.



Suits Tight Size Constraints

Beneath a tractor's brake pedal, there's little room for bulky components. Especially on a tractor that uses two separate pedals for independent rear-wheel braking.

We were able to provide the smallest available sensors to tuck into the compact space.

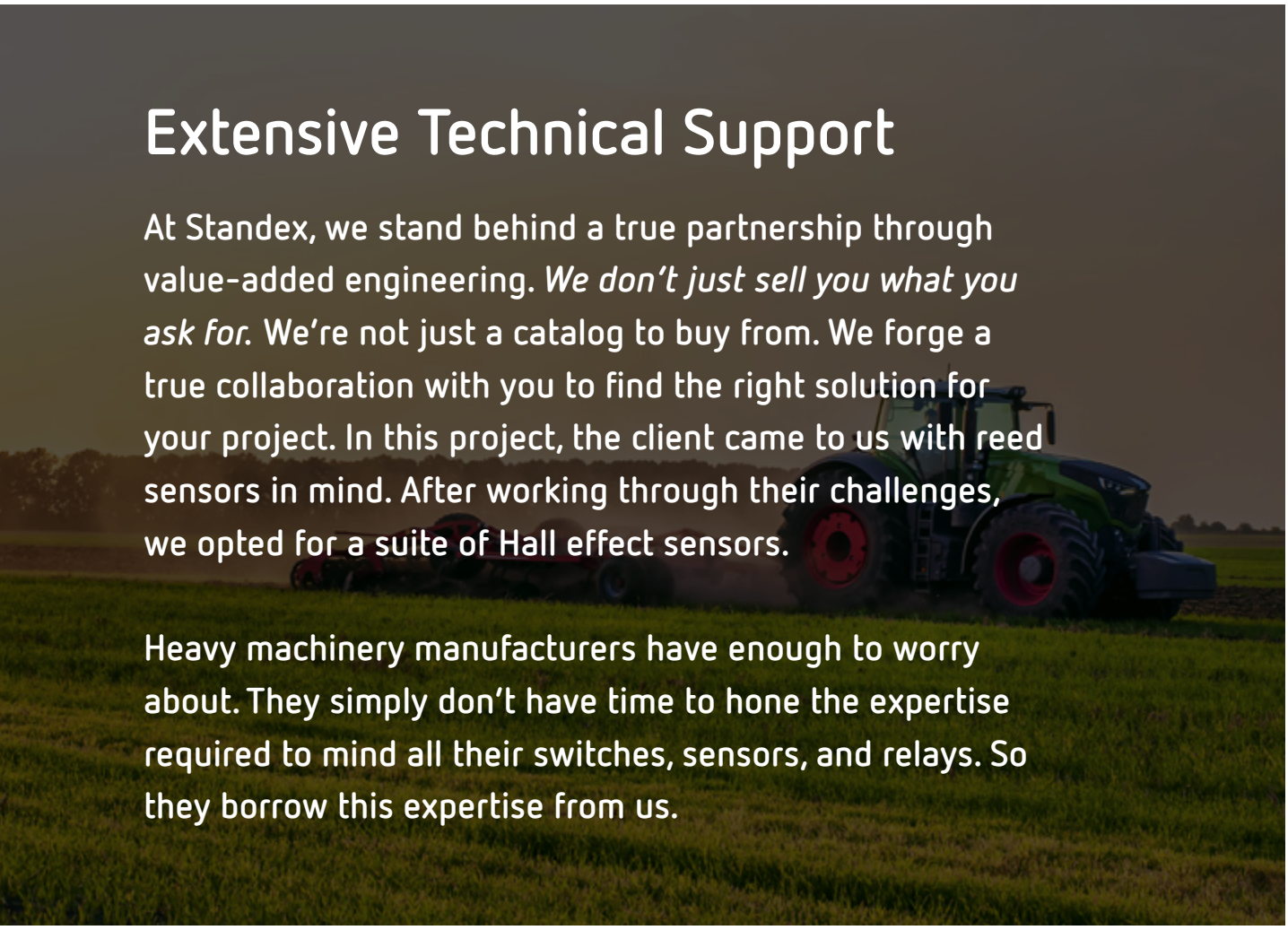
Customized Configurations Available

The client featured here first planned to use two reed sensors. But our team ultimately recommended a pair of Hall effect sensors.

Our team knows just the right sensors to use—and they don't always need to be the same type. Some projects benefit from a combination of both Hall and reed sensors: we can mix and match as needed.

What Brings the Client Back to Standex Time and Time Again?

To your end customer, our products are invisible. But they can make all the difference. If our products draw attention, that means they're not working. So we strive to remain invisible and unnoticeable—by ensuring our products work unfailingly.



Extensive Technical Support

At Standex, we stand behind a true partnership through value-added engineering. *We don't just sell you what you ask for.* We're not just a catalog to buy from. We forge a true collaboration with you to find the right solution for your project. In this project, the client came to us with reed sensors in mind. After working through their challenges, we opted for a suite of Hall effect sensors.

Heavy machinery manufacturers have enough to worry about. They simply don't have time to hone the expertise required to mind all their switches, sensors, and relays. So they borrow this expertise from us.

On-Site Labs and Testing

Choosing a partner that offers end-to-end testing and manufacturing solutions can streamline your design process. At our facilities, we provide a single destination for evaluating product life cycles, conducting laser welding, salt spray testing, 3D mapping, and more.

If you're in the neighborhood, we invite you to stop by for an on-site meeting and tour. Even if you're located across the world, our team of 1,400+ highly skilled global experts is well-versed in collaborating remotely.

Open to Low MOQ Projects

At Standex, we don't judge the value of a project by its quantity. Our team is open to ventures of all sizes, including this case of 5,000 customized sensors. But that didn't deter us from approaching this challenge with our full arsenal of resources and expertise.

Global Manufacturing Footprint

No need to worry, we've got your back when it comes to meeting manufacturing timelines—and we're flexible about where to do it. With access to our vast network of manufacturing facilities, you'll find that we can adapt to any supply chain challenges that come our way. You can also count on us to meet tight and timely delivery of custom-made solutions.

Where Else Will You Find Standex?

All industries use magnetic switches like reed and Hall effect sensors. They're tucked into sensing components for automotive, manufacturing, solar energy, consumer electronics, and so much more.

Now, more than ever, you need sensors that:

- **Consume minimal power**
- **Survive the most rugged conditions**
- **Last for millions, if not billions, of cycles**

We're here to help.

Please contact us to collaborate on the optimal solution for your specific needs.

PARTNER | SOLVE | DELIVER®

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