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HYDRAULIC MEASUREMENT AND CONTROL

CUSTOMER CASE STUDY

MOBILE CONDITION MONITORING

Webtec IoT-enabled hydraulic flow monitors expedite development of leading-edge farm machinery

Kuhn North America (Kuhn), a leading manufacturer of agricultural and industrial equipment, is leveraging the benefits of Webtec CTA series hydraulic system flow monitors to expedite the development journey and time-to-market of its latest three-head Merger. Thanks to the adoption of three IoT-enabled CTA units on each prototype, Kuhn is able to identify potential issues remotely. Several prototype Mergers are currently undergoing real-world tests at pilot customers across the USA ahead of production.

KUHN

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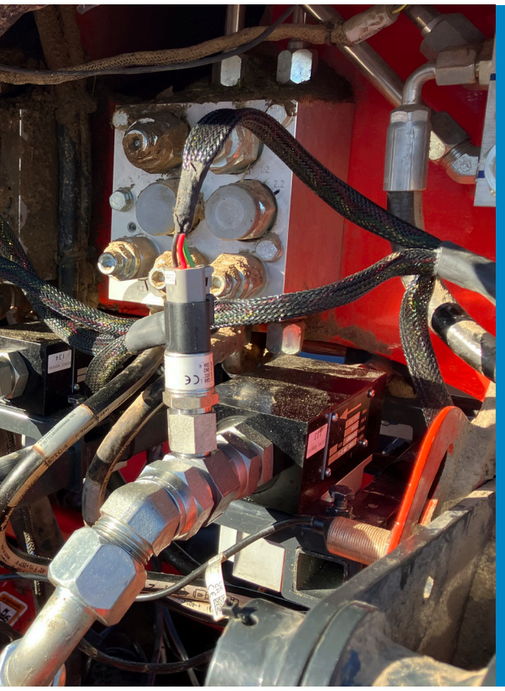

KUHN

Kuhn, headquartered in Brodhead, Wisconsin, specializes in machinery that enhances the efficiency and productivity of farming operations. The company has come a long way since Joseph Kuhn founded a village forge in 1828, evolving to become one of the world's largest manufacturers of equipment for the agriculture market. Popular solutions include a broad range of hay and forage, livestock, and crop production tools, as well as landscape and road maintenance equipment. Today, the company markets thousands of machines every year in North America and worldwide under the Kuhn, Kuhn Knight, and Kuhn Krause brands.

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Harvesting efficiency

The latest development project at the 500-employee Midwest Distribution Center and Manufacturing Facility of Kuhn in Brodhead is a new three-head Merger that aims to maximize hay harvesting efficiency. With user-friendly controls and robust construction, the Merger will present the perfect solution for farmers seeking to enhance productivity and achieve consistent, high-quality results.

The need to continue innovating, even in a sector that extends back to dawn of civilization, is paramount. Kuhn faces a range of strategic and operational challenges driven by shifts in technology, global markets, sustainability demands, and workforce dynamics. These challenges are both sector-specific and company-specific.

For example, the current trend of farm expansion is leading to higher capacity demands, meaning Kuhn must design equipment with greater efficiency and durability. Farmers also increasingly expect smart, connected technologies without compromising ease-of-use. Skilled labor shortages, meanwhile, ensure Kuhn must offer more manpower-saving automation. And of course, sustainability and compliance with environmental regulations hold further influence over newly developed solutions.

To remain cost-competitive, it is essential that Kuhn maintains its strong investment in innovation without inflating costs, an ethos applied effectively to its new Merger.

Webtec hydraulic flow monitors

A carefully managed prototype phase is essential in any new product development process, which is why the company turned to Webtec for assistance in its latest project. A customer of Webtec since 2010, Kuhn invested in multiple sets of Webtec CTA heavy-duty hydraulic flow monitors in December 2024. The units were acquired in two sizes (16 and 40 gpm) to suit different machines from Webtec's authorized regional distributor FSC (Fluid System Components in WI). By February 2025, three CTA flow monitors were fitted to each prototype of the 42 ft wide Merger, which is driven by a triple 12 gpm hydraulic gear pump running at up to 3500 psi.

The Webtec CTA units, which have a very high protection against dust, moisture and vibration (to IP6K9K and SAE J1455 standards), monitor hydraulic pressure line flows as the prototypes undertake real harvesting processes for a whole season at pilot customers across the USA. With the CTA compact turbine flow monitors in place, Kuhn engineers are able to identify any potential issues and make design adjustments prior to production.

Key here is the CTA's SAE J1939 CAN-bus interface for monitoring and transmitting oil flow and temperature data (a 4-20 mA analogue output is also now available for flow reporting). The industry standardized J1939 communication protocol for heavy-duty vehicles provides a common language for electronic control units (ECUs) to communicate with one another.

Webtec is always available to help customers meet application-specific requirements, for this project Webtec provided assistance in reprogramming PGN's (Parameter Group Numbers) where multiple monitors were installed on the same BUS. J1939 messages are identified by 18-bit Parameter Group Numbers (PGNs), so reprogramming was necessary to assign a different PGN to each of the three CTA's used in a set. If required, customers can also reprogramme CTA units in the field using an off-the-shelf tool.

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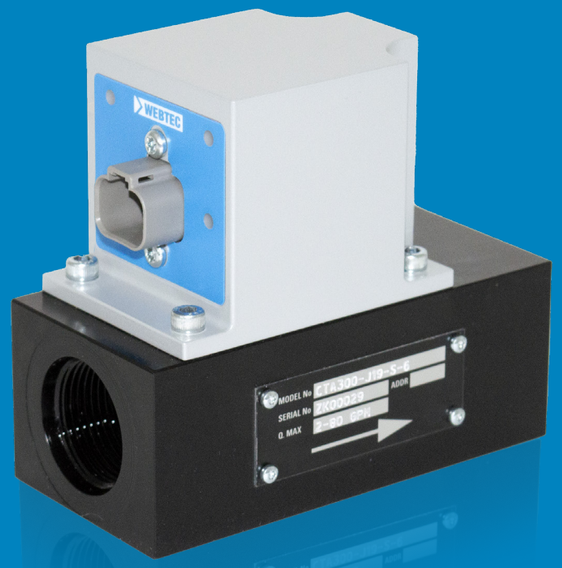

MOBILE CONDITION MONITORING

Remote monitoring

With Webtec's CTA units now connected to the CAN-BUS, the Kuhn team can monitor its Merger prototypes wherever they are located using an IoT condition monitoring solution. Data for flow and temperature is fed via J1939 to telematics (with over 45 channels of data), helping the engineers monitor and analyze the entire system's performance remotely. Alongside high levels of insight, further benefits include major savings in travel time and costs, with company personnel no longer required to board flights at short notice.

Webtec's CTA units provide considerable value to Kuhn. The purpose of any prototype phase is to reveal issues that the manufacturer needs to resolve prior to production. In the case of the three-head Merger, Kuhn noticed a potential problem that initially pointed to the hydraulic pump. However, thanks to true flow rate data provided by Webtec's CTA compact turbine flow monitors, Kuhn engineers could discount any pump issues. The CTA provided flow and temperature data directly to the CAN BUS. From here it was possible to compare actual flow to theoretical flow (speed x displacement) and calculate volumetric efficiency, confirming correct pump performance.

Engineers subsequently traced different signals through the system to evaluate the operation of each component. The issue was soon isolated to a highly unusual fault with a mechanical adaptor. Kuhn simply shipped a replacement to the customer's nearest located dealer for fitting.

Eliminating any issues with the pumps is vital because Mergers see around 1,800 hours of use over their lifetime; approximately 200-250 hours per year for 5-7 years is typical. These machines form a critical part of harvesting and users expect zero downtime.

Fast development cycles

Thanks to Webtec's CTA units, Kuhn is receiving real-world lifecycle experience on new machine prototypes in real time, shortening development cycles and allowing the company to provide more innovative and technically advanced solutions in line with growing customer demands. The company's investment in advanced technology for its prototypes underscores its commitment to delivering high-quality, innovative agricultural machinery to farmers domestically and worldwide.

"We have been working very successfully with Webtec on this project" says Jake Peterson, Product Evaluation Test Engineer at Kuhn "For Kuhn's new triple-head Merger, we partnered with the Webtec engineering team on the installation of our CTA heavy-duty hydraulic flow monitors and they provided assistance with PGN reprogramming. We are really happy to report that all is going according to plan with both the CTAs and the prototype attachments."

For further information visit www.webtec.com/products/ITFYNB16

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