HydraForce

Hydraulic System Redesign Enables Performance Improvements for Agricultural OEM

MEGAN TOLLEY, PR & Marketing Coordinator, *Hydraforce Ltd.*

HydraForce collaborated with SaMASZ to redesign the hydraulic and electronic control systems for a tractor mounted disc mower, enabling new performance features and implementation of ISOBUS.

HydraForce recently partnered with SaMASZ, a manufacturer of agricultural equipment, to design a new tractor mounted disc mower using improved hydraulic systems and ISOBUS technology to increase efficiency, sustainability, and improve ergonomics for machine operators.

Prior to HydraForce joining the project, the original design of the SaMASZ mower consisted of a controller, operator panel, and four individual hydraulic blocks, connected with hydraulic hoses. The combination of four blocks made the mower vulnerable to hydraulic leaks and damage; assembly of the hydraulic system required ongoing expertise, resulting in a longer manufacturing process.

In addition, the machine's conveyor belts were controlled by the hydraulic system, leading to high service costs due to continuous oil and filter changes and the requirement of an oil cooling system.

Due to these collective issues, SaMASZ partnered with HydraForce to redesign the mower's hydraulic and electronic control system, allowing the OEM to take full advantage of HydraForce's hydraulic expertise.

New Hydraulic System Enables Compact Design and Enhanced Capabilities

Partnering with SaMASZ provided the opportunity for HydraForce to design a dedicated manifold to house multiple cartridge valves which would result in a more versatile compact hydraulic system as well as provide additional hydraulic features, such as a transport latch, side guards and hydropneumatic suspension with breakaway functionality to lift the mower and avoid obstacles in the field.

HydraForce designed three custom hydraulic manifolds, each of which is used for a different function on the SaMASZ tractor mounted disc mower. HydraForce

To create the hydraulic solution, HydraForce designed a set of three custom hydraulic manifolds, providing SaMASZ with the ability to customize machines according to users' individual equipment and machine capabilities.

Each hydraulic manifold holds a different function for the machine, and by flanging each block together it eliminates the possibility of hose or fitting leakages, resulting in a more compact hydraulic solution.

The function of the main manifold is to operate the machine actuators by controlling the general functions of the mower, including the hydraulic breakaway system, and the lifting and lowering of conveyors, protective side guards, and transport safety devices. This manifold is also responsible for the folding and unfolding of the machine back to the transport position as well as the raising and lowering function between the headland and working positions, all of which help to protect the mower against external damage.

READ MORE: Trends Impacting Agricultural Equipment Component and System Designs

The secondary (optional) manifold is offered by SaMASZ as part of the standard machine equipment and is responsible for controlling the front mower. Its function is to allow users to raise and lower the front mower when working or preparing the machine for transport, which provides the possibility to set the pressure in the hydraulic system of the front mower.

The third and final manifold is responsible for driving the conveyors by using oil from the machine's load-sensing system. Use of this third manifold as a flanged section also makes it possible to replace it with another attachable conveyor drive system.

"The newly developed hydraulic system has given us the possibility to drive the conveyor belts from the tractor's load-sensing system, resulting in zero requirement for an oil tank

The main manifold developed by HydraForce controls general functions of the SaMASZ mower including lifting and lowering of conveyors. HydraForce

on the machine and no need for additional oil cooling," explained Krystian Gotlib, Manager of Hydraulic and Control Section in the R&D Department at SaMASZ.

"Another advantage of the new solution is the ability to automatically adjust the pressure in the hydraulic suspension system so that pressure of the cutter bars on the ground remains the same, regardless of the height of the hitch or the unevenness of the meadow," he said.

Electronic Control System Improves Machine Performance and Compatibility

As part of the redesign, HydraForce also provided SaMASZ with a new electronic control system which added new features to improve the overall implement control while offering

HydraForce developed a new electronic control system for the SaMASZ mower which allowed implementation of ISOBUS, providing operators with the ability to choose all of the implements' functions from a virtual terminal leading to improved ease of use. HydraForce

With the new electronic system developed by HydraForce, it was possible to receive ISOBUS certification which ensures the SaMASZ disc mower will work seamlessly with various models of agricultural tractors, ISOBUS terminals and other external equipment. HydraForce

even more customer value to SaMASZ as the equipment manufacturer could purchase the complete solution from one supplier.

This new electronic system facilitated the implementation of ISOBUS, a standardized communication protocol used by agricultural and forestry machines.

The electronic system was developed in house at HydraForce in Europe & the United Kingdom and is the company's first ISOBUS project. Incorporating ISOBUS has allowed SaMASZ to extend its portfolio with a new control solution by providing operators with the ability to choose all of the implements' functions from a virtual terminal.

READ MORE: Increased Demand for Electronic Controls Driving Hydraulic System Designs

For those operators who already use ISOBUS compatible tractors, it is not a requirement for them to have an additional control panel which provides savings for end users. Whereas for those customers without an ISOBUS compatible tractor, SaMASZ offers ISOBUS-certified virtual terminals. The implement also presents the ability to map functions to an AUX-N joystick, allowing easier and more comfortable control for the operator.

The SaMASZ KDD 911 STH ISOBUS received ISOBUS certification by the AEF (Agricultural Industry Electronics Foundation), allowing the mower to be listed on the official database — a tool which can be used by farmers and dealers to compare the compatibility of different manufacturers of ISOBUS machines.

"By obtaining the AEF certification, our customers can be assured that the KDD STH/WTH mower set works seamlessly with various models of agricultural tractors, ISOBUS terminals and other external equipment to meet the relevant standards," explained Gotlib.

The mower is the first of its kind in the SaMASZ portfolio to be equipped with this type of hydraulic and electronic control system which has made the brand more attractive to

the wider global market.

"The provision of a complete hydraulic and machine control solution by HydraForce has reduced costs and saved time, both during the project and in the machine's implementation," said Gotlib.

"The high level of expertise within HydraForce has provided a smooth and seamless development of the entire control system for the mower, and the team's engineering knowledge of load-sensing and ISOBUS control, coupled with the ability to implement and link these systems, proved to be an invaluable benefit."

Working with HydraForce enabled SaMASZ to add new features whilst still maintaining the optimum performance that farmers have come to expect from the SaMASZ brand. The SaMASZ KDD STH ISOBUS was officially released to the market at the end of 2023 and promises an efficient and comfortable solution for the agricultural market.