



Eaton's CMA valve drives dynamic machine control for PRINOTH snow groomers

Location:

Sterzing, Italy

Challenge:

PRINOTH sought an innovative solution that could tackle extreme, snow-covered slopes and provide skiers with pristine conditions.

Solution:

Eaton supplied a CMA Valve digitally configured with Eaton's Pro-FX® Configure software to help PRINOTH's snow groomers improve response time.

Results:

Eaton's CMA valve allowed faster response times for operators as well as significantly reducing manufacturing complexity.

"The CMA valve allowed PRINOTH to use fewer hydraulic components, which means lower costs and greater response times."

*Daniel Galler, mechanical engineer,
Eaton's Hydraulics Group*

Background

Whether snowboarding, downhill, or cross country skiing, resorts around the world count on well groomed slopes to keep the conditions safe and their customers happy. With snow groomers named HUSKY, BISON X and LEITWOLF (to name just three) PRINOTH delivers on performance with innovative technology, efficiency and a strong design.

Those core drivers power PRINOTH employees worldwide to develop the most innovative and smart snow groomers, and for good reason. The crews piloting the vehicles work in extreme conditions. Snow. Ice. Steep slopes. And, they do it all at night. They need to rely on state of the art equipment.

That's why PRINOTH relies on resource-efficient use of the snow groomers and provide ski resorts with the knowledge necessary to improve performance and reduce operating costs. Along with the equipment, they provide specialized training for snow groomer drivers. The combination helps ski resorts achieve the best result – the perfect run.

Challenge

Snow grooming is more than "mowing" snow on a mountain. Blade positions are constantly moving to collect the right amount of snow given the moisture level, temperature and other variables. Operators depend on feedback to know their blade settings, which is a delicate art and science. They require fast reaction times and the ability to sense the blade position when starting or stopping a movement.

PRINOTH made advances in engine management and in the interface between human and machine. But traditional hydraulic approaches applied to biggest machines, with more than 500 horse power - making the machine extremely fast on the slopes, were not allowing enough response time. Also, with traditional systems, the hydraulic options to achieve good flow control was an overuse of orifice restrictors which could generate noise in some conditions.

Eaton was challenged to provide innovative components to help PRINOTH make smarter, more dynamic machines.



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Solution

Dynamic Machine Control means quieter, quicker and more efficient operation. Eaton provided a CMA valve digitally tuned with the Pro-FX Technology platform to help PRINOTH improve response times on the machines. The CMA valve is an advanced mobile valve with independent metering, which offers nearly endless possibilities to differentiate machine capabilities. The CAN-enabled electrohydraulic mobile valve also features on-board electronics and sophisticated software algorithms, providing PRINOTH with market-leading intelligence, capabilities, dynamics and control.

Results

The CMA valve has helped produce remarkable changes in response times. Where older systems had a typical response time of 1.1 s, systems making use of the CMA valve produce response times of 0.15 s. For the operator adjusting the blades on a snow groomer, this appears as a nearly instant response, which allows for precise control on the slopes no matter the conditions.

Because the Eaton CMA valve functions as an embedded system, it communicates on the CAN bus and does not require dedicated wiring. An embedded system simplifies both the manufacturing and the subsequent servicing.

With the LEITWOLF model in particular, PRINOTH used CMA valve technology to make dramatic leaps in improving serviceability.

"Eaton's CMA valve helped PRINOTH to simplify and customize the hydraulic system. PRINOTH is able now to provide a more effective service to the final customer, thanks to the embedded diagnostic system of the valves" said Alberto Paoletti – System development Engineer. "Service engineers use a diagnosis program to monitor valve status and issues are reported to the snow groomer driver to further identify and resolve potential problems."

With its competence in manufacturing tracked vehicles, PRINOTH also develops tracked utility vehicles for off-road use in remote areas as well as tracked carriers with mulching attachments for the sustainable management of vegetation areas.

"By incorporating Eaton CMA

valves, PRINOTH is able to support almost in real time any customer, wherever they are operating in the world with LEITWOLF, connecting remotely to perform the first analysis and sometimes even fixing the problem immediately," said Daniel Galler, mechanical engineer, Eaton's Hydraulics Group.

Dynamic machine control is the driving force behind smarter machines, including snow groomers. Several innovations become available when using Eaton products that provide for DMC.

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Document No. E-VLOV-AA001-E
May 2016

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