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### Higher controllability for mini-midi excavators through Walvoil technologies: the new DPX-HS directional valve

The new DPX-HS is an hydraulic directional valve specifically designed by Walvoil for Mini and Midi-excavator application. This type of machines is today typically controlled through two possible technologies:

- Load Sensing valves in combination with a Load Sensing pump provide a precise control, calibrated and independent speed for each function. Thanks to its ease of use it represents on one hand today's best technology for non-professional operators and for the rental market. On the other side, machine reactivity and control smoothness can result defective, especially on specific and delicate functions like Slewing;
- Open Center valves in combination with 3 fixed pump system, represent a simpler and more cost effective solution, guaranteeing perfect force sensibility and fast control, but require on the other hand high operator skills.

The new Walvoil DPX-HS innovative circuit combines Open Center working sections for Slewing and secondary functions and Load Sensing sections for the Boom operation, in order to bring significant performance improvement

and ease of use in a cost efficient and compact solution, in combination with a 2 pumps system (variable + fixed). Boom operations are simple, intuitive, totally independent from each other, while Slewing function is not even minimally affected by the simultaneous use of the Boom and keeps a completely independent control with Open Center typical smooth and soft start and brake.



Additionally, on mini-excavators, where up to 3 or 4 simultaneous operations are common, it is very easy to run into the problem of flow saturation. It happens every time that the operator is demanding more oil flow than the pump can deliver: the Flow Sharing helps to guarantee movement contemporaneity, but it results in a

slowdown of actuators speed anyway. The special DPX-HS circuit allows to autonomously share the fixed pump flow to boost the Boom operation whenever the variable pump cannot meet the flow demand. The addition of the fixed pump is very soft without the operator noticing it. The Slew function that typically needs the maximum controllability, keeps on having a priority on any other function. The special device that allows the two pumps to sum can be disabled by a

dedicated relief valve that vents the fixed pump to tank. This system allows to define a pressure step that limits the power required for the engine.

The two pressure step system given by the dedicated relief valve allows a better match with engine characteristics, thus resulting in careful power and consumption management. A better energetic use of the engine is hence possible. Machine productivity as well can get a positive boost by the DPX-HS circuit: the sum of two pumps results in fast and precise operations and in increased productivity. The slewing smoothness and independent control can drastically reduce the operator's fatigue, by better managing acceleration and deceleration phases. Both professional and rental market operators can take the utmost advantage of this solution.

All common excavator solutions like travel special control, regenerative arm, lowering control, low leak ports can be easily implemented on the valve, as well as special Hydraulic Integrated Circuits. Different prototypes have been tested on hydraulic benches as well as on machines demonstrating the advantages of the combined technologies. Different projects with major OEM will be started in the next months.

The system is available on:

- "50 size" suitable for 1-3 t mini-excavator
- "100 size" suitable for 2-6 t mini-excavator
- "160 size" suitable for 5-9 t midi-excavator.

The system has been filed for patent (WO2017103100).

Thanks to this innovative directional valve, Walvoil will be present at the next Intermat in Paris with a furtherly integrated range of products whose other latest news are: 2SPW cast iron pump, Galtech branded, particularly suitable for all applications where traditional aluminum pumps are used at the limit of their performance; EX Series, Load-Sensing Flow-Sharing sectional valves by Hydrocontrol introducing interesting options of further increase of energy saving and high levels of efficiency, as well as of stability; Galtech Fan Drive, a new range of vehicle cooling systems based on external gear motors; and Walvoil AJW-CJW Analog and CAN bus Joysticks, interesting for their compact dimensions, their ergonomics, specifically tailored to off-highway operating machines and fitted for all Walvoil handles.

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