

# LITTLEST THINGS

Environmental and performance issues with mobile machines can come down to, and be improved by, some of the smallest components – the valves

Today's mobile machine manufacturers are facing a number of new demands from customers and legislators to supply the market with more energy-efficient machines that preserve the environment and minimise fuel consumption. At the same time, the expectations of what a mobile machine should deliver in terms of productivity, controllability and flexibility have increased over the years as labour rates and other costs keep increasing.

Systems have become more complex with regard to the hydraulic components and how they interface with electronic components, and the electronic control systems that are available today. The increased complexity of these systems and the demand for fast, easy and low-cost serviceability anywhere in the world has presented new challenges.

Nimco Controls has taken an integrated approach to these problems with components that not only meet the demands for fuel efficiency, high controllability and flexible system integration, but also allow fault diagnosis from a remote location.

## Fuel efficiency and load controllability

At the heart of this system is the new CV 2000 LS valve, which is an electro-proportional post-compensated load-

sensing directional control valve that allows constant flow at each of the valve's cylinder ports independently from the pressure created by a load at any time.

The CV 2000 LS post-compensated valve has a number of advantages over traditional pre-compensated load-sensing valves – the most important being that it avoids the effects of pump saturation – i.e. when more flow than can be fed by the pump is needed to operate functions that are required at the same time.

Pump saturation causes the cylinder port, which operates the heaviest load, to stop completely so that all other functions will be supplied with the oil flow needed for operation. With the CV 2000 LS valve, all functions will operate regardless of pump saturation. It will maintain operation of all functions at all times, but at a reduced speed in proportion to the pump saturation level at any time.



The load-sensing feature with variable pump offers large energy savings by only using the flow and pressure necessary to operate a function. It also works with the greatest-required pressure in the system, but has a standby pressure of around 14 bar going through the valve in idle, which reduces the energy losses in the system. The CV 2000 LS valve offers the possibility to lower the pressure in idle down to 2 bar when the valve is not operating, which further reduces energy consumption.

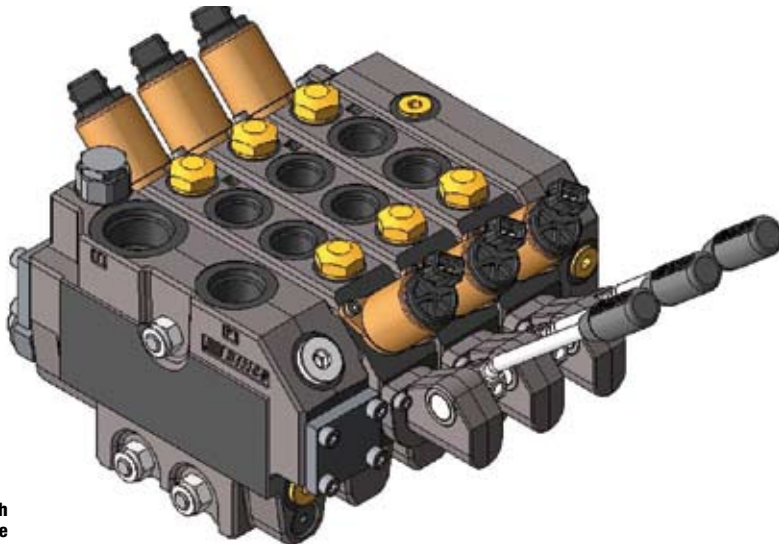
The CV 2000 LS sectional valve allows for flow rates up to 125 l/min at 320 bar and can be used either for fixed- or variable-displacement pumps. It can be controlled with either 12 or 24V proportional pressure-reducing valves or hydraulic controls, both with manual override. It can be equipped with all types of secondary relief and anti-cavitation valves, and offers LS pressure-relief valves for integration on each cylinder port, which limits the pressure to any such port to a predetermined level.

Other interesting features of the CV 2000 LS valve are the opportunity of having manual and electrical stroke limiters by using the option of integrated spool position sensors to detect the spool's

**The CV 2000 LS is a post-compensated load-sensing valve with a flow rate of 125 l/min per port**



The EasyProg CanBus system



CV 2000 LS with manual override option

position and feed the signal back to an electronic control system. This option can also be used to create a closed-loop circuit in the valve.

**Flexibility**

Another key component is Nimco Controls' EasyProg software, which has user-friendly menus that allow even an inexperienced user to program the required functions.

EasyProg is PC-based and uses menus that allow the modular setting of as many in/out signals from any of the company's joysticks, sensors or indicators, as well as reading the current to the solenoids as needed. As the user builds a number of functions in the software, the system can then be matched with available electrical hardware by adding modular components. It is also easy to change existing functions or add new ones after installation.

The fine-tuning of each hydraulic component, the

ability to set certain components limits in relation to others, and the renowned Nimco spool technology allows optimal controllability of the system and maximised fuel efficiency.

EasyProg also has built-in functions to continuously monitor the position of any mechanical part such as a spool and so can have a number of safety solutions integrated into it. It can also be used to supervise other functions in a machine that are not part of the hydraulic system, but have an effect on efficiency. This could be control of the torque or speed of a diesel engine, which would contribute to minimising fuel consumption and can be carried out by interfacing with the CANbus control system.

**Serviceability**

In most other systems it is only possible to undertake system diagnostics and program upgrades by visiting the machine in the field or by bringing it in to a local service station. To solve this potentially costly issue of diagnosis and upgrade, EasyProg allows service staff to connect remotely to any machine via a mobile phone connected to a PC or handheld device and run the diagnostics program.

It is also possible for the service engineer to see the general status of the machine, read the usage pattern and



The EPC700 is a heavy-duty joystick

collect other statistics, change/adjust any parameters to suit a customer's specific request and see how it performs – all remotely. This service saves money for the user by allowing the machine to be operated while the diagnostics are being performed, and for the machine builder by only having to send service personnel when actually needed.

The data collection aspect also protects the machine builder from any incorrect warranty claims that might otherwise arise due to unclear information from the customer, as well as collecting data for improvement of future models.

The CV 2000 LS valve and EasyProg software allows the machine builder and its service personnel maximum flexibility in designing optimal machine load control and servicing the hydraulic systems of its machines. It allows for maximising energy-saving functions with no detriment to machine performance and productivity and can be used in both open-centre and load-sensing circuits. **ivt**  
 ⚡ Torbjörn Nord is founder and CEO of the Nimco Controls Group



The EPC600 is a programmable CANbus joystick with integrated display

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