

VALVES

Digital hydraulic valves gaining momentum

Distributed control is driving adoption

NEWTON, MA—The trend toward de-centralized control on the factory floor, once considered an issue confined to electric drives and motors, is now gaining momentum in the hydraulic valve sector.

Engineers at Moog, Inc. (www.moog.com) say they are beginning to hear from machine builders in the U.S. and, to a greater extent, in Europe, who want to put intelligence into their hydraulic components. One customer in the paper industry recently applied Moog's D636 Digital Interface Valve to a paper processing machine, and others are discussing possibilities with the company.

"With digital valves, the savings on wiring and labor can be remarkable," notes Daniel Halloran, Control and Electronics Section head at Moog's Industrial

Controls Division. "On a paper machine, you might have as many as 50 valves, all located far from the main controller. If you use digital valves, you don't have to run wires back to the controller from every valve."

In contrast, a digital valve allows system integrators to employ a single bus connection, such as a CAN (controller area network) interface, which connects the valves to the controller via a single daisy-chained link.

For over a decade, many engineers have argued that such distributed architectures would certainly benefit machine builders of almost every type, which is why so many manufacturers of factory automation equipment have rolled out new lines of smart components.

Up to now, however, few hydraulic valves have incorporated on-board digital controls.

Moog introduced its Digital Interface Valve late in 2001 and

Bosch Rexroth AG (www.boschrexroth.com)

rolled out a series of digital high-response control valves with on-board electronics at last year's Hannover Fair in Germany. To date, however, digital valves still represent a tiny fraction of the overall market, maybe less than 1% according to some estimates.

Moog engineers, however, hope to change that small industry presence. The company's D636 Digital Interface Valve incorporates a reduced instruction set (RISC) PowerPC microprocessor and an Analog Devices digital signal processor (DSP). During operation, the

microprocessor executes the control loops, performs logic operations, and handles interfaces to databuses, such as CAN. The DSP, meanwhile, is used for fast, repetitive calculations. It does analog signal conditioning and PWM (pulse width modulation) control of current.



SMART STUFF:

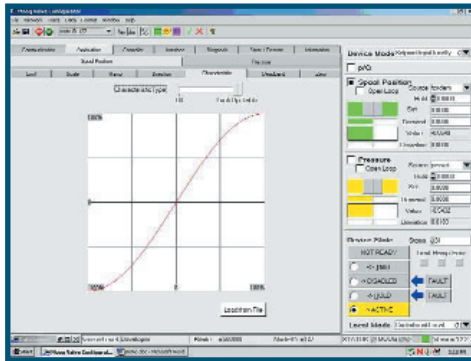
Moog's Digital Interface Valve incorporates on-board intelligence, including a PowerPC microprocessor and DSP.

The valve is seen as a potential attraction to automation customers because it offers such features as diagnostics and valve parameter modification. The spool's characteristics, for example, can be modified through software. In contrast, traditional spools can only be changed by removing the spool, then machining, fitting, and testing it.

"With a digital valve, the manufacturer can use a single part and configure it for multiple applications," says Elizabeth Gerwitz, mar-

keting manager at Moog. “That way, they only have to stock one part number.”

Bosch Rexroth offers a similar cadre of high-tech features, including on-board axis



EASY ALTERATIONS: Through software, users can change the valve spool's performance characteristics.

control algorithms, fieldbus communications, and bus-based diagnostics.

Engineers say that digital valves offer greater precision than analog valves, and are less susceptible to noise. “With a digital solution, you’re sending 16- and 32-bit commands,” Halloran says. “You can pretty much get any precision you need, and your ability to command the valve is much greater.”

For many machine builders, however, the valve’s key advantage may be its cost savings. Although digital valves tend to run about 10% more than their analog counterparts, Halloran and others contend that the extra initial cost is more than offset by the reduction in labor and

wiring. “When people put machines together, they lay the wiring in front of the machine, and it can become very complex,” Halloran says.

“It’s typically a two-man job and a huge investment in time. But when you use digital valves, you eliminate a lot of that time and labor.”

For reasons such as those, Moog plans to broaden its efforts in the digital valve arena. “We started with the D636, but in the future, we’re going to transition all of our valves over from analog to digital.”

As more manufacturers move to bus-based communications in their machines, Moog engineers expect acceptance of the technology to rise. “This is new to a lot of people,” Halloran concludes. “But they’re starting to see the advantages.”

MOOG

For more information, please contact Moog Industrial Controls Division at telephone: 888-551-MOOG (716-687-4954), fax: 716-655-1803, e-mail: sales.icd_hyd@moog.com or website: www.moog.com/industrial/contact.