Not Your Father's Valve

The Old Iron Workhorse Gets a Makeover

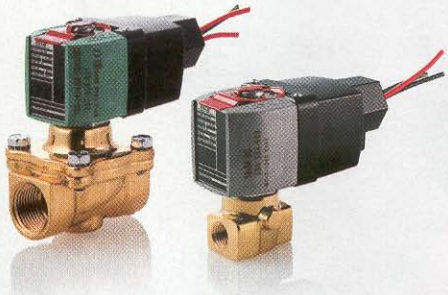
by Matt Migliore

The valve industry, like most industrial equipment markets, is in the midst of a tremendous growth spurt, which figures to continue through 2010. Driven by strong project activity, the worldwide control valve segment experienced a double-digit surge in 2005 and is expected to rise at a compounded annual growth rate (CAGR) exceeding 5.5 percent over the next five years, according to research by ARC Advisory Group (*www.arcweb.com*). The market, roughly $3.5 billion in 2005, is forecasted to exceed $4.5 billion in 2010.

Likewise, activity on the technology end of the valve industry is heating up. Advances in microprocessors are enabling the development of smaller and faster digital valves. Moreover, with microprocessor prices continuing to fall, digital valves are getting more and more cost effective for the end-user.

Advances in Electronics

Nick Buccheri, vice president of marketing for ASCO Valve (*www.ascovalve.com*), says the evolution of microprocessor technology is giving manufacturers more flexibility to develop valves that provide significant performance improvement over their predecessors. For example, Buccheri says ASCO's RedHat Next Generation solenoid valves use advanced electronics to provide as much as an 88 percent reduction in the power requirement over conventional devices. According to Buccheri, the RedHat solenoid draws only two watts of power where a conventional solenoid with the same performance would draw as much as 17 watts of power. As a result, in addition to saving power, the valve runs cooler, enabling it to better support higher temperature environments.



ASCO Valve's RedHat Next Generation line of solenoid valves uses advanced electronics to provide as much as an 88 percent reduction in the power requirement over conventional devices.

Advanced electronics also enable the RedHat valves to provide a more feature-rich offering to end-users, including support for both AC and DC voltages in the same device, coils in three voltage ranges (100-240/AC or DC, 24-99/AC or DC, or 12-24/DC) with built-in surge suppression, and inherent support for bus technologies (FOUNDATION Fieldbus, DeviceNet, and AS-Interface).

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Matching the Valve to the Application

Regardless of how advanced the technology is, no valve can overcome improper specification. When specifying valves for an application, Buccheri says users don't always have all of the information they need to make the right choice. "They typically know the pipe size, the voltage, and the pressure," he says. "But they don't always know other important parameters of the environment that the valve is going to be in and the materials that the valve is going to come into contact with."

Some other important considerations Buccheri recommends users take into account include media compatibility, ambient and temperature extremes, and the pressure differential required to effectively open and close the valve. Buccheri says identifying the appropriate pressure differential is particularly important, as this will ultimately determine if the valve effectively performs its primary function (i.e., opening and closing) in a given application.

Buccheri says most of the problems users have with valves are typically due to improper selection, improper installation, or improper maintenance. Ultimately, he says "The vast amount of problems that people bring to us are matching the valve to the application, not problems with the valve itself."

Valves Get Smart

As valve manufacturers continue to adopt advanced electronics, intelligence figures to become a more significant factor in the valve industry going forward. According to Dave Clayton, a senior analyst with ARC Advisory Group, intelligence, particularly at the digital positioner level, is becoming more prevalent in the valve industry. He says market share worldwide for digital positioners with intelligence capability grew from 21 percent in 2000 to 51 percent in 2005. Clayton says this trend translates into more asset management and diagnostic communication capability, as well as improved control for the end-user.

When compared to some other technology segments — including pressure transmitters, flowmeters, and variable-speed drives — the valve industry has been somewhat slow to warm to digital intelligence. Clayton attributes this to the mechanical nature of the valve itself, as well as the way users perceive valves in the overall process architecture. He says, whereas flowmeters, for example, are a measurement-based technology where the link to intelligence is pretty straightforward, valves have traditionally been viewed as "the iron workhorse of the plant."

Despite this notion, Clayton says valves are a natural fit for digital intelligence and, in fact, may very well be one of the most important elements of a successful plant asset management strategy. In particular, he says valves are strategically important because they are often exposed to rugged environments where the likelihood of failure is elevated. With more intelligent valves, Clayton says end-users can, in theory, diagnose and repair a problem prior to failure.

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However, intelligence is not an end-all-be-all solution, "There is still a lot of end-user confusion out there," says Clayton. "There's confusion on how to choose the right product; how to integrate it into plant asset management systems; how to pick the application; and how to identify which applications have the most impact in the case of failure."

At this point in the evolution of plant asset management technology, Clayton says most users are dealing with a lot of alarms that don't provide the added intelligence of alarm management and recommendations to avoid failure. As such, he says users must work to identify a way to prioritize the alarms they are receiving and tie those alarms to intelligence that provides information that can help determine the appropriate response.

Intelligence that Make Sense

One example of how ASCO is trying to effectively integrate valve technology with intelligence is in its redundant valve offering. ASCO has developed a redundant system based on a duplicate pilot-valve design, which offers some diagnostic features. The system provides the capability to check each valve against an SIL (safety integrity level) and perform statistical analysis to determine the likelihood of downtime. The system also supports partial-stroke testing of the valves to determine if stiction (failure to shift) is a problem. If a valve fails or needs maintenance, the backup valve can be automatically put into service to avoid downtime.

Buccheri believes redundant systems will become more prevalent in the valve industry going forward, providing users a "suspenders and belt" method of improving uptime. By including diagnostics on top of a redundant system, Buccheri says users can logically employ intelligence to identify when a failure occurs so they can make a repair while the system remains is service.

The Digital Divide

Even though intelligent systems have proven performance advantages over traditional devices, Clayton says digital technology is not yet a standard requirement for new purchases. For example, He says only 50 percent of the valve positioners shipped worldwide in 2005 provided some level of intelligence, which means there are still a lot of traditional positioners being purchased.

Clayton attributes the slow uptake of digital positioners primarily to cost. He says pneumatic positioners cost about 50 percent less than a comparable digital positioners today. Still, he says the price of digital positioners has dropped in recent years, and he expects that trend to continue, making the notion of adding intelligence to valves more and more attractive to users.

Clayton also believes the slow uptake of digital positioners may be tied to that old iron-workhorse mentality. But with the Baby Boomer generation retiring, he believes it's only a matter of time before digital positioners become the status quo. "In the near future there is going to be a big turnover in people operating these plants," Clayton says. "So if it doesn't happen before then, I think this will provide the necessary impetus to make the specification of digital positioners standard practice."

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