AVA Technical Report (01/2024)

Valve Automation Quickly and Accurately Implemented

As a complete provider of automated and manually operated valves for the shutoff of process media, Armaturen Vertrieb Alms GmbH (AVA) offers tailored solutions for industrial plant operators. The family-owned company's high storage capacities and in-house production ensure short delivery times and high procurement security for customers.

When it comes to reliably controlling the flow of process media, such as in chemical or petrochemical processes, shutoff valves like ball valves and plug valves, as well as butterfly valves, continue to play a crucial role. The automated actuation of these valves—often referred to as quarter-turn valves—via electric and especially pneumatic drives offers many advantages for plant operators: The valves can be opened and closed remotely, and their current position can be checked at any time via the plant control system without direct access. This saves working time, especially in hard-to-reach or large, complex installations.

Remote control also provides more safety for operators in hazardous areas. Additionally, actuation is generally faster than manual operation via handwheel or lever. In emergency situations, the valve can automatically assume a safety position.

High Storage Capacity for Quick and Secure Service

The demand for automation solutions is correspondingly growing at suppliers like AVA. As Europe's leading wholesaler of industrial valves according to DIN and ASME standards, AVA often combines components from various manufacturers to create a suitable overall package. "Automated shutoff valves are an optimal addition to our extensive portfolio of manual valves in many process applications," explains Frank Alms, Managing Director of the family business. "Our customers benefit from short delivery times, which we achieve thanks to very large stocks of standard components." In 2023, AVA invested in expanding its warehouse capacity to 11,000 square meters—more than double the previous size—at its German headquarters in Ratingen. Also, due to close partnerships with relevant drive manufacturers, supplier parts are always available quickly and securely. This allows AVA to provide rapid replacements for failed plant components and helps to quickly restart operations, effectively reducing production interruptions.

The production of ready-to-install valves is ISO 9001, ISO 14001, and ISO 45001 certified. Technical customer specifications set the tone for a precise design that integrates seamlessly into existing industrial environments and control systems. Based on specifications for line diameter, control pressure, connection standards, and possible explosion protection requirements, the assemblies of valve, drive, solenoid valve, and sensor technology are fully designed, constructed, and assembled in-house.

Automation for Safety-Relevant Applications

The vast majority of automated shutoff valves manufactured by AVA are equipped with pneumatic drives for opening and closing. "Single and double-acting double-piston rotary actuators offer a very efficient and safe solution for automated actuation," explains Martin Klug, Head of Automation at AVA. "Since our valves are mostly used in safety-relevant applications in the chemical or petrochemical industry, we primarily install drives that immediately assume a predefined safety position in the event of a control pressure or power failure." Whether this position is open or closed

depends entirely on the specific application. "The key is to build a safety system that safely interrupts the process in the event of a control pressure drop or loss of electrical power," says the expert. For example, the filling process of a tank or reactor can be automatically stopped—safety position "closed"—or a pressure relief can be initiated—safety position "open".

In both cases, single-acting actuators are used. They are driven in one direction by control air or a neutral, inert gas. In the opposite direction, they are moved by spring force. The end stop of the spring-force direction then defines the safety position. In some applications, the actuator even permanently holds the valve in this position. Only when the control air fails does the actuator immediately move to the safety position.

Reliable in any Environment

With double-acting actuators, both opening and closing are driven by compressed air. Then the actuator remains in its current position in the event of a power failure. Regardless of the design, solenoid valves control the compressed air and thus the movement direction of the actuator and valve. Depending on the application, they are either mounted directly on the actuator as NAMUR solenoid valves or externally installed and connected by piping. Their electrical control is carried out via the PLC of the entire plant. In corrosive environments—such as in marine climates or in a chlorine-containing atmosphere—where the ingress of ambient air into the actuator must be prevented, a pressure equalization of the spring chamber with exhaust air from the solenoid valve can also be carried out. If necessary, the incoming control pressure is adjusted by a pressure reducer. A limit switch box on top of the assembly houses the sensors for detecting the current position of the actuator and valve. From there, the signal is transmitted to the control system of the entire plant.

Each delivered unit is, of course, comprehensively documented and subjected to an internal independent functional test. As proof of quality assurance, the customer receives a detailed, individual function test report. This report documents all relevant specifications, such as safe functionality at the specified control pressure, flawless end position signaling, or the correctness of the safety position.

AVA also offers gate valves and globe valves—valves with linear movement. Their automation is handled within the company group by ASA Armaturen Service Alms GmbH. Specialized in the modification and repair of industrial valves, spindle-operated gate and globe valves are equipped with electric multiturn actuators at the ASA site in Gelsenkirchen—according to the same quality and performance standards as at the headquarters.

For further questions, our automation expert Martin Klug is at your disposal.

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Martin Klug, Head of Automation at Alms Armaturen Vertrieb, and his colleague carefully check the function and safety of every automated shut-off valve before it is delivered.

AVA primarily uses pneumatic double-piston quarter-turn actuators for the automation of shut-off valves. In the picture: a ball valve in DN150 from BAC with Hytork actuator and ED-08 end cushioning, Parker solenoid valve and Westlock limit switch box.

Production takes place entirely at the family company's headquarters in Ratingen near Düsseldorf. In this picture: a ball valve in DN150 from the manufacturer Kingdom with Airpower actuator, limit switch box and control unit with attachment to the NAMUR connection of the actuator with Sitecna filter regulator and bifold solenoid valve