

The SAMSON logo consists of the word "SAMSON" in a bold, white, sans-serif font, centered within a solid black circle. This circle is itself centered within a white square frame.

# SPECIAL PRINT

## Compact Control Unit to Ensure Controlled Cooling Water Supply

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**SMART IN FLOW CONTROL**

## Compact Control Unit to Ensure Controlled Cooling Water Supply



In many industrial cooling processes, water is used as the cooling medium, for example to cool down heat exchangers, motors, gearings, hydraulic systems, tools and machinery parts. If these processes are controlled efficiently, they can help reduce the cost of operation and save resources, such as water and energy. Different process control approaches can be taken in these applications. With the unit that combines an electric control valve and an integrated process controller, SAMSON offers a compact process node with IIoT capabilities to meet the highest demands on control accuracy.

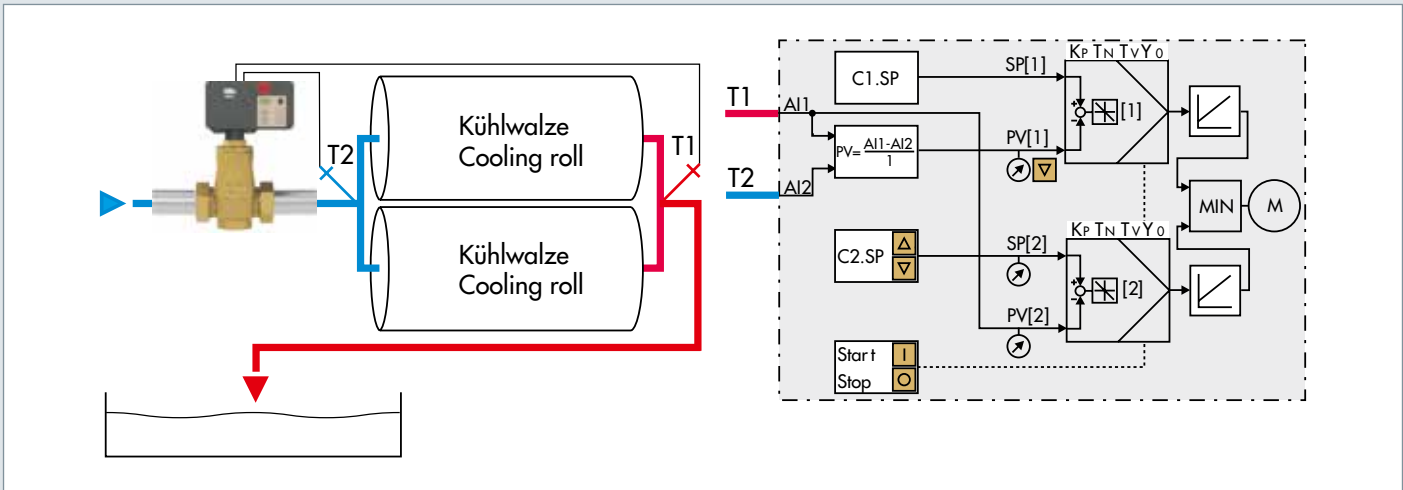
### **Electric actuator with process controller: one unit, two functions**

The control unit mainly is an electric control valve, i.e. a valve with electric actuator. All features of an industrial process controller are integrated into the actuator. This setup makes it unnecessary to install complex wiring to external process controllers mounted in remote switching cabinets. SAMSON refers to these combined units as electric actuators with process controller. Initially, they were designed for simple control loops in building au-

tomation, particularly in cooling and heating processes as well as DHW applications. Gradually, SAMSON added to its product portfolio electric actuators with process controller and extended functionality suitable for use in industrial cooling and heating processes. System code numbers ready configured with the settings for specific control tasks are included for easy start-up. Additionally, already connected Pt 1000 temperature sensors reduce the time required for start-up to a minimum.

### **Positive track record: electric actuators with process controller in industrial applications**

The development process was accelerated by the requirements stipulated by Continental, one of SAMSON's customers. At its site in Northeim, Germany, Continental manufactures rubber and plastic products for acoustic and thermal insulation for different sectors of industry. After an in-depth energy analysis of the site, the people in charge decided that the cooling water consumption at the cooling rolls had to be reduced in the future. To achieve this goal, the cooling water supply was to be changed from continuous supply to on-demand control of the cooling water



flow rates provided. The task was to develop a compact control unit with a sufficient level of control accuracy to fulfil two assignments: control the cooling water's differential temperature upstream and downstream of the rolls to between 2 and 4 Kelvin and control the cooling water's return flow temperature to a maximum value. Such a solution was not available on the market off the rack. Consequently,

SAMSON suggested different control approaches to Continental, for example to use two self-operated regulators, to implement a classical electric control setup involving one process controller that supplies the electric actuator in the control valve with a control signal, or to install the mentioned unit comprising a control valve and integrated process controller. The suitability of all approaches was tested

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in trial loops, which included an initial prototype of the electric actuator with process controller for industrial applications. Once the trial period had been completed, Continental decided in favor of the combined unit.

The electric actuator with process controller and two integrated PID modules, which is mainly suited for thermal processes, is capable of controlling the differential pressure at the cooling rolls as well as the return flow temperature of the cooling water at the same time. Consequently, the combined unit comprising control valve and electric actuator with process controller fulfilled the previously defined requirements regarding the levels of compactness and control accuracy.

During the start-up phase, however, the unit did not show the desired behavior. Due to standing water at the beginning of the control procedure, the flow temperature was higher than the return flow temperature, which resulted in negative differential temperatures. As a result, a start/stop control sequence for start-up was added: during this sequence, the valve is moved to a predefined valve travel position for a defined delay time. Control operation starts from this position when the delay has expired. Today,

the former prototype of the electric actuator with process controller and start/stop control sequence developed for the Continental site has become a regular fixture in the SAMSON product portfolio. Mounted on globe valves in sizes DN 32 and DN 50, the actuator ensures that the customer's goal is achieved: considerable amounts of cooling water are saved on the cooling rolls used in production. The investment made in the new control units has paid off after no more than one year already.

Similarly positive experience has been gained at another customer. In a subprocess at a car maker, motor crankshafts are quenched after hardening. In an effort to improve process efficiency, the car maker fitted four of its cooling water circuits with the control valve with integrated process controller in 2018. The setup includes globe valves in sizes DN 80 to 200, combined with electric actuators with process controller and integrated PID module. When the cooling water circuits had been started up successfully, the average water consumption could be reduced from 80 m<sup>3</sup>/h to now 25 m<sup>3</sup>/h while the control dynamics were improved as well. Encouraged by this result, the car maker plans to install the SAMSON control units also in its other plants.



### Continuous evolution for a digital future

Electric actuators with process controller have become an established solution in the SAMSON portfolio for the process industry. Numerous configurations with one or two PID modules and actuator thrusts up to 12.5 kN make it possible to optimize the actuators for the specific control task at hand. The units continue to be developed further to meet the growing demand for innovative control solutions, ease of operation and digitalization. All electric actuators with process controller can be started up in plug-and-play mode. The TROVIS-VIEW Software is available free of charge for parameter configuration and operation. Newer actuator versions come with an RS-485 interface for data exchange over Modbus. When connected to a gateway, the control unit can also be integrated into the cloud-based SAM DIGITAL asset management system. This turns the electric control valve into a unit suitable for IIoT and Industry 4.0 environments: a digital process node.

### Easy ways to improve energy efficiency in cooling processes

Since their development, the electric actuators with process controller have proven their suitability for universal use. In most cases, they turned out to be straightforward solutions to achieve true improvements in energy efficiency. The cost of investment to be spent on implementing control based on electric actuators with process controller is lower than for conventional control setups. Thanks to their low energy consumption, the maintenance-free units additionally account for low cost of operation. Electric actuators with process controller are capable of fulfilling complex process control tasks without impairing the control response, without sacrificing any ease of operation and ready for digitalized IIoT and Industry 4.0 environments.

# SAMSON AT A GLANCE



## STAFF

- Worldwide 4,500
- Europe 3,700
- Asia 600
- Americas 200
- Frankfurt am Main, Germany 2,000

## INDUSTRIES AND APPLICATIONS

- Chemicals and petrochemicals
- Food and beverages
- Pharmaceuticals and biotechnology
- Oil and gas
- Liquefied Natural Gas (LNG)
- Marine equipment
- Power and energy
- Industrial gases
- Cryogenic applications
- District energy and building automation
- Metallurgy and mining
- Pulp and paper
- Water technology
- Other industries

## PRODUCTS

- Valves
- Self-operated regulators
- Actuators
- Positioners and valve accessories
- Signal converters
- Controllers and automation systems
- Sensors and thermostats
- Digital solutions

## SALES SITES

- More than 50 subsidiaries  
in over 40 countries
- More than 200 representatives

## PRODUCTION SITES

- SAMSON Germany, Frankfurt, established in 1916  
Total plot and production area: 150,000 m<sup>2</sup>
- SAMSON France, Lyon, established in 1962  
Total plot and production area: 23,400 m<sup>2</sup>
- SAMSON Turkey, Istanbul established in 1984  
Total plot and production area: 11,053 m<sup>2</sup>
- SAMSON USA, Baytown, TX, established in 1992  
Total plot and production area: 9,200 m<sup>2</sup>
- SAMSON China, Beijing, established in 1998  
Total plot and production area: 10,138 m<sup>2</sup>
- SAMSON India, Pune district, established in 1999  
Total plot and production area: 18,000 m<sup>2</sup>
- SAMSON Russia, Rostov-on-Don, established in 2015  
Total plot and production area: 5,000 m<sup>2</sup>
- SAMSON AIR TORQUE, Bergamo, Italy  
Total plot and production area: 27,684 m<sup>2</sup>
- SAMSON CERA SYSTEM, Hermsdorf, Germany  
Total plot and production area: 14,700 m<sup>2</sup>
- SAMSON KT-ELEKTRONIK, Berlin, Germany  
Total plot and production area: 1,060 m<sup>2</sup>
- SAMSON LEUSCH, Neuss, Germany  
Total plot and production area: 18,400 m<sup>2</sup>
- SAMSON PFEIFFER, Kempen, Germany  
Total plot and production area: 35,400 m<sup>2</sup>
- SAMSON RINGO, Zaragoza, Spain  
Total plot and production area: 18,270 m<sup>2</sup>
- SAMSON SED, Bad Rappenau, Germany  
Total plot and production area: 10,370 m<sup>2</sup>
- SAMSON STARLINE, Bergamo, Italy  
Total plot and production area: 26,409 m<sup>2</sup>
- SAMSON VDH PRODUCTS, the Netherlands  
Total plot and production area: 12,000 m<sup>2</sup>
- SAMSON VETEC, Speyer, Germany  
Total plot and production area: 27,090 m<sup>2</sup>

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