SAMSON in Solar Thermal Power Plants





Expertise in Control Valve Engineering



Global Presence with a Local Touch



Worldwide operation – SAMSON has enjoyed a successful history of growth for over a century since its foundation in 1907. From the beginning, the German company established partnerships with renowned companies in several European countries to efficiently market its products abroad. The formation of the Technical Sales Department in 1949 laid the foundation for the expansion of SAMSON's international sales and service network recognized for its expertise and efficiency. Local customer service – With 50 mostly independent subsidiaries and over 200 representatives and sales offices, SAMSON is on hand to provide local customer service all over the world. Each year, new offices are established to further strengthen SAMSON's local presence and to ensure faster service.

Economically viable – SAMSON's expertise in control valve engineering covers all processes in industrial plants. Extensive experience gained over the past years from the design, development, and manufacture of custom-engineered solutions serves as the basis for mastering new challenges. The wide range of products proven in practice can be customized in close cooperation with the customer to provide a commercially acceptable solution to meet the requirements of even the most complex applications. Therefore, SAMSON, with its sophisticated control valves, is the perfect answer to the demanding process requirements in solar thermal power generation. **Head office in Spain** - For more than eight decades, SAMSON has been delivering control valve technology to the Spanish industry. Initially, a business venture took charge of the local distribution. In 1982, after more than 25 years, SAMSON founded its own subsidiary at Sant Cugat del Vallès (Barcelona). In 2000, the head office moved to Rubí near Barcelona. SAMSON now has five branch offices on the peninsula.



Meeting the Challenge to Control a Solar Thermal Plant



The perfect solution - With our sophisticated control valves, SAMSON provides the perfect answer to the special process requirements that cannot be met by standard valve types. SAMSON's control valves are equipped with special components and accessories to satisfy the challenging requirements for high performance applications needed in solar thermal plants. SAMSON is dedicated to offering valves that are tailored to suit the specific requirements of special applications.



Clean energy - There are several ways to create electricity using the sun's energy. Two common methods are concentrating solar power and photovoltaic generation processes. These generate clean energy helping future energy needs.

Concentrating solar energy in combination with various storage methods is the most commonly used technique to generate solar power. Parabolic shaped mirrors concentrate the sunlight on solar collector tubes and heat the thermal oil to temperatures of approximately 400 °C. To produce electricity, the hot fluid transfers its heat energy to water, creating steam. This steam is then used to run conventional steam turbines.

Energy storage - When the sun's rays are at their strongest, large collector fields store excess energy to be used during times of lower energy collection. This energy storage system consists of collector tubes, hot oil systems, molten salt storage tanks, and the associated heat exchangers. The molten salt tanks are heated by

the excess energy from the hot oil collector tubes. These tanks are kept at different temperatures and their contents are pumped back and forth through a large heat exchanger, depending on whether the system is being charged (excess solar energy to storage tanks) or discharged (stored energy from tanks to hot oil system). Using this process, electricity can be generated from the sun's energy that was captured earlier in the day.

- 2 Hot fluid returns from the solar field. Heated transfer fluid is moved to the boiler or to the storage tank heat exchanger.
- **3** The hot fluid transfers its heat energy to water, creating steam.
- 5 Energy is stored in the hot and cold storage tanks.
- 6 The transfer fluid is recirculated to the collection field to absorb more solar energy.

- The above diagram shows a typical solar thermal power plant.
- 1 Parabolic mirrors gather energy for the heat transfer fluid.

4 Steam is used to drive a turbine, creating electricity.

Optimally Engineered Products



Product range – From rugged selfoperated regulators to highly specialized control valves, our broad product range meets the requirements needed in solar thermal plants.

Custom engineered – SAMSON control valves can be customized to individual applications and meet even the most challenging demands in any conditions. Materials, dimensions and flange styles conform to the major international standards, ensuring that SAMSON's products can be used worldwide. Practical valve accessories such as positioners with integral attachment contribute to plant safety.

V-port plug – The SAMSON valve design is easily and conveniently configured from modular valve components. One of the most essential components is the seat-guided V-port plug. Owing to its rugged guiding and its asymmetrical ports, the plug prevents mechanical vibrations and resonance oscillations. This design ensures safe operation especially under critical operating conditions such as high pressure drops, cavitation or flashing.

Tight shutoff – Key features required of these control valves, apart from the right flow capacity, low noise emission and excellent control quality, include tight shutoff and low fugitive emissions.

Packings – SAMSON has developed packings for its valve lines to incorporate all the features required for demanding applications. The maintenance-free, spring-loaded V-ring PTFE and carbon compound packing with special lubricant is suitable for practically all process media at temperatures ranging from –328 °F to 842 °F. The adjustable, cavity-free packing is designed especially for liquids that crystallize or polymerize. Packings for high-temperature steam applications incorporate rings made of pure graphite.

Bellows – The most effective sealing solution is the metal bellows, a groundbreaking invention originally developed by SAMSON. SAMSON's multi-layered bellows seal is recognized worldwide for its durability and long life. This design is well-suited for applications such as hot oil transfer fluid.

Heating jackets – SAMSON manufactures customized control valves with heating jackets to be used with media that tend to crystallize. Actuators – SAMSON's compact actuator design consists of rugged rolling diaphragms and multiple spring construction. Most actuators are designed for integral positioner attachment, eliminating the need for external piping. The NAMUR design provides easy, safe attachment of all other valve accessories.

Positioners – Our positioners set the standards with their reliability, accuracy and versatility. They communi-

cate in the field over universally used protocols and can easily be integrated into all common process control systems. A reliable data exchange is guaranteed by the smart field instruments to ensure the fast detection of any faults and malfunctions.

Innovative details – SAMSON's innovative, self-calibrating positioners are easy to operate. For example, their safe and fast integral attachment, convenient operation over just



one rotary pushbutton, automatic start-up and parameter optimizations, extensive valve diagnostics, high-resolution travel sensor and SAMSON-pioneered technology using pilot-controlled solenoid valves and the dynamic flapper-nozzle system, give SAMSON positioners unmatched accuracy and performance.

Control Valves for Any Application

SAMSON GROUP - The associated companies offer their standard products and accessories as well as tailored solutions for special control tasks and niche markets. As a Main Valve Vendor, SAMSON masters all areas of valve engineering.

Main Valve Vendor



AIR TORQUE

Manufacturing pneumatic rotary actuators for any kind of rotary control valve, AIR TORQUE has become the world leader in this special field. Technical features of the actuators include external adjustment of the end positions and their involute gearing, which continuously converts the travel movement into a rotary motion without any friction.

LEUSCH

The specialized manufacturer focuses on valves for pipe diameters up to three meters. LEUSCH's control and shut-off double and triple eccentric butterfly valves, ball valves and segmented ball valves are equipped with soft or metal seals, are suitable for both extremely low and extremely high temperatures from -196 °C to +1000 °C and can handle high pressure ratings up to PN 420 or Class 2500.

Pfeiffer

Elaborate production methods for high-quality PTFE linings are one of the key factors to Pfeiffer's success. In addition, Pfeiffer manufactures stainless steel ball and butterfly valves. Special materials such as tantalium, hastelloy, titanium, zirconium, etc. could be employed in their valves as an alternative.



Smaller turnkey systems and services in consulting, project management, manufacturing, commissioning and validation are the core business of SAMSOMATIC. Intrinsically safe solenoid valves with a low power consumption and limit switches to control and monitor actuators in hazardous areas as well as safety instrumented systems round off the product range.

High-quality ball valves of forged and cast materials working at pressures above 40 bar or in high temperatures are STARLINE's main area of expertise. The valves, which are particularly durable and certified for critical processes, are used in the oil and gas, the power generation and the pulp and paper industries.





The Maxifluss rotary plug valve universal design makes them suitable for use in both standard and critical applications. Thanks to the eccentric rotary plug, the plug touches the seat only when the valve is fully closed. This ensures exact control and a high rangeability. These valves are frequently found in sea in seawater desalination plants

Control Valve Applications in Solar Thermal Power Plant

Concepts for the Future





MOLTEN SALT – Thermal storage system

WATER STEAM – Power conversion unit



References in Spain

- Solar energy pilot plant (Almería)
- Barbastro pilot plant (Huesca)
- Andasol 1 power plant (Granada)
- Extresol 1 power plant (Badajoz)
- Extresol 2 power plant (Badajoz)
- La Risca power plant (Badajoz)
- Solnova 1 central tower in Sanlúcar la Mayor (Sevilla)

Logistics center – Due to the long corporate tradition and the group's constant growth, logistics have always been an important issue at SAMSON. SAMSON has made investments to remain a competent partner by building a new state-ofthe-art logistics center to ensure that the company is able to react quickly to demand. **Production and quality** – The ability to manufacture 5,000 control valves at the Frankfurt headquarters each month is achieved by keeping semifinished products and castings in stock to meet unscheduled demands. In addition, foresighted production of components and peripheral devices as well as the quick final assembly according to customer specifications take place on short routes under the watchful eye of an ISO 9001 certified quality assurance system.



Everything under one roof – The last stage that the control valves pass on their way through the logistics center is the sunlit final assembly hall. Here, the painted components are assembled, adjusted, and checked to make sure the final products comply with customer specifications. Modern test equipment, sufficient work space, efficient conveying and stacking systems as well as pleasant offices create a relaxed and friendly environment for the final inspection of SAMSON's high-quality control valves by the customer.

Sales and service network - The worldwide SAMSON sales and service network ensures that help is close at hand for customers who plan new installations or overhaul and expand existing plants. Relying on our vast valve expertise, we can assist customers in selecting and configuring the right equipment to suit their control task. Small orders as well as large projects are handled within the given deadlines, precisely scheduling production and on-time delivery of customized orders. If desired, our engineering staff supports our customers in lifecycle management all across the world, from installation and startup to maintenance and service.





SAMSON AG · MESS- UND REGELTECHNIK · Weismüllerstraße 3 · 60314 Frankfurt am Main · Germany Phone: +49 69 4009-0 · Fax: +49 69 4009-1507 · E-mail: samson@samson.de · Internet: www.samson.de