Recording Temperature in a Glass Furnace

JUMO Engineering supervises a project for the company Ardagh Glass GmbH

The industrial manufacturing of glassware is an impressive process. At Ardagh Glass GmbH in Germerseheim, Germany, around 1.6 million beer, wine, and sparkling wine bottles are produced every day. The company uses JUMO products to monitor the temperature inside the glass furnaces and also turned to the services of JUMO Engineering for implementation.

At the beginning of the production process is a melting process inside a special furnace. The raw materials out of glass are continuously added to the furnace and melted. The liquid glass is then sent to processing machines capable of producing up to 600 bottles per minute. Melting furnaces are made from fire-resistant materials consisting of alumina and other ceramic materials. To save energy, the combustion air is pre-heated in the regenerative system. The exhaust gases are directed through a lattice-work made of stones which thereby become heated. After this heating-up period which usually lasts 30 minutes, the exhaust gas flow is reversed and fresh air flows through the hot chamber and is thereby heated up. The exhaust gases from the combustion escape to the other chamber.

In large industrial plants, the entire process often lasts several days so that the glass furnace needs to be operated around the clock. The furnaces can have a capacity of over 2,000 tonnes. The temperature in the furnace can reach up to +1,300 °C. To ensure a consistently high quality of the end product, the temperature of the liquid glass in the furnace must be permanently monitored. For this task, Ardagh Glass GmbH relies on temperature sensors and an automation system from JUMO. The project planning and startup of the plant was carried out by the JUMO Engineering team.

As a specialist in industrial measurement, control, and automation technology, JUMO has several decades of project experience in all kinds of industries. By pooling these skills in its "JUMO Engineering" range of services, the company is taking another step forward in its evolution from a component supplier to a provider of complete solutions.

The Engineering team develops tailored applications for a wide range of industries. These include food, water and wastewater engineering, pharmaceutical, heating and air-conditioning, chemical, and the rapidly expanding area of renewable energy.
The portfolio is extensive. The versatile services include running basic feasibility studies and providing workshops, drawing up requirement and system specifications, and end-to-end project management. The team has extensive experience in PLC programming, visualization, and network technology. This means that efficient solutions that are optimally aligned with each other can be created – and all from one service provider.

The task at Ardagh Glass GmbH was to record the temperature of a glass furnace with 64 measuring points. JUMO thermocouples are used as the sensors. The JUMO mTRON T is used to monitor the modular measuring, control, and automation system. JUMO mTRON T with its modular design uses an Ethernet-based system bus and an integrated PLC. The heart of JUMO mTRON T is the central processing unit with a process map for up to 30 input/output modules. The CPU contains superior communication interfaces including a web server. For individual control applications the system has a PLC (CODESYS V3), program generator and limit value monitoring functions, and math/logic modules. The available input/output modules include a multichannel controller module, analog input modules with 4 and 8 channels, a four-channel relay module, and the configurable digital input/output module with 12 channels. At Ardagh Glass GmbH the connection of the sensors takes place using a total of 16 four-channel analog input modules.

The recorded temperature distribution of all 64 measuring points is transferred to a superior control system via a PROFIBUS interface card. This ensures that the measured values are constantly available. The superior control system then presents a visualization of the melting furnace with the individual temperatures. Furthermore, users can use the web server function of the JUMO mTRON T to display the current measured values of the temperatures as a table in a web browser and then control these. This web server can be accessed not only from standard PCs, but also via mobile devices.

Contact:
Harald Schöppner
JUMO Engineering
harald.schoepner@jumo.net
www.jumo.net
Fig. 1: Visualization of the 64 measuring points

Fig. 2: Installation situation of the JUMO mTRON T
Fig. 3: Decorative picture bottle manufacturing

Fig. 4: Decorative picture melting furnace