Teamwork: Turck's FS+ flow sensors are installed on the inlet and outlet side of each cooling circuit line

Ice Cold Optimization

Turck's FS+ flow sensors ensure efficient cooling of industrial furnaces through real-time monitoring of flow and temperature

A well-known industrial company in China specializes in the research, development and production of high-tech materials and special industrial furnaces for various fields and applications. These include the production of ceramic composites, the heat treatment and compaction of workpieces in a vacuum, and waste incineration or disposal. The materials used, such as metals, ceramics, plastics or minerals, are processed in high-temperature and high-pressure furnaces under extreme temperatures of up to 2,600 °C and pressures of up to 25 MPa.

Closed industrial furnaces are more energy efficient and environmentally friendly compared to open furnaces. However, cooling a closed high-temperature and high-pressure furnace is challenging due to the higher combustion temperatures involved. To ensure the safe and efficient operation of the furnaces, the flow and temperature of the cooling water as well as the energy consumption must be constantly monitored and controlled. Turck's FS+ flow sensors are ideal for this application, as they can monitor the temperature of the cooling medium in addition to the flow.

FS+ all-in-one solution

Knowing exactly how much energy is consumed is the first priority in ensuring the cooling performance of the system and saving energy. This requires the monitoring of both the flow as well as the temperature of the cooling system. As the flow sensors of the FS+ series use the calorimetric principle to monitor liquid media, they also make it possible to continuously monitor the media temperature, in addition to monitoring the flow. Measurement and process data, as well as relevant diagnostic information, is transferred from the sensor to the controller via IO-Link. The FS+ flow sensors were installed at the inlet and outlet end of each line in order to check the performance of the cooling circuit.

With a temperature measurement range of up to 85 °C, a pressure resistance of up to 300 bar and the

QUICK READ

A Chinese industrial furnace manufacturer was faced with the challenge of reducing the energy consumption of closed industrial furnaces and at the same time complying with environmental requirements and improving the monitoring of the cooling circuit. It chose Turck's FS+ flow sensor from the Fluid+ sensor series, which detects both the temperature of a medium and the flow at the same time, and thus optimizes cooling efficiency in real time – while reducing energy consumption. Using IO-Link communication, the sensors ensure end-to-end data transparency, enabling predictive maintenance for the system.

Relevant process data and measured values are transmitted to the controller via Turck's IO-Link master

The sensor housing can be freely rotated by 340°, allowing convenient alignment of the display and electrical connection

ability to measure flow speeds of up to 3 m/s, the FS+ flow sensors meet all customer requirements for this application. The high IP6K7 and IP69K protection ratings of the devices also enable them to be used reliably in harsh environments with high temperatures and dust. Another benefit: The housing of the FS+ sensor can be rotated 340° so that the orientation of the display field and the electrical interface can be optimally adjusted when it is installed. This means that the user always has a good view of the displays in the field, regardless of the mounting situation.

Easy commissioning and handling
The Quick Teach and Delta Flow functionality the FS+ offers two functions that make commissioning easier. Delta Flow ensures that the teach-in is not performed until the temperature probe has fully warmed up and a constant flow is present. The sensor also offers a number of practical functions, such as a locking mechanism that prevents the user from accidentally operating the sensor. The user also benefits from an M18x1.5 adapter on the sensor body. Furthermore, the sensor can be adapted to different process connections with different threads. A wide

range of probe lengths are also available, depending on the pipe diameter.

Predictive maintenance with IO-Link
Processing process and diagnostic information directly in the field reduces the load on the higher-level control system, which improves system efficiency and thus reduces costs. The acquisition and analysis of process and diagnostic information provide the basis for predictive system maintenance so that problems are detected early.

Conclusion
The effective cooling and predictive maintenance of closed industrial furnaces require permanent monitoring of the cooling water including temperature and energy consumption. The FS+ flow sensor is the right solution for these tasks, as it offers the possibility of monitoring flow and temperature simultaneously and transmitting process data and other relevant information transparently to the controller via IO-Link. These benefits of the FS+ sensors and their user-friendly operation and installation concept also impressed the Chinese industrial furnace manufacturer.

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