AQUACHEM

Fully automatic filter presses

Cleanly pressed!

Sensor technology on the automatic filter unit ensures fully automatic 24/7 operation

James Babbé,
Managing Director of AQUACHEM:
"The presence of an operator is not required as we can guarantee machine availability of up to 98 percent."

For almost 30 years, the company AQUACHEM GmbH Separationstechnik from Senden near Ulm in Southern Germany has specialised in the manufacture of fully automatically operated membrane filter presses. With the help of these filter presses, filter ash containing heavy metals from industrial plants is pressed into recyclable filter cakes. AQUACHEM relies on sensor technology from ifm for reliable operation of the fully automatic plants.

Chiresa AG uses no less than four of these AF1200 membrane filter presses in Switzerland. They specialise in the ecological and economic recycling of hazardous waste as it arises in industry, trade, commerce and municipalities in a wide variety of forms. Approximately 95,500 tonnes of suspension are conveyed through the four filter presses every year. That is almost 37 tankers per day.

On the automatic filter unit, numerous ifm sensors support both the optimum process flow and the energy management.

A pressure sensor of the PQ series monitors the compressed air needed to switch the valves.

"The filter presses used at Chiresa AG produce and empty compact filter cakes continuously, literally around the clock," says **James Babbé,** Managing Director of AQUACHEM. "The presence of an operator is not required as we can guarantee up to 98 percent machine availability. By using chamber and membrane plates the operating parameters can be optimally set to cover the span between economic efficiency and ecological requirements. The system also helps us to prevent the suspension from leaking during the filter cycle as all filter presses in our portfolio are completely sealed. We are very proud of these features."

Chiresa AG uses filter systems to process filter ash containing heavy metals from incineration plants in Switzerland. For this purpose, it is first dissolved in hydrochloric acid. With the subsequent so-called precipitation reaction, the dissolved components are separated into water and settling hydroxide sludge. The sludge is neutralised and then either disposed of or recycled as a solid filter cake using fully automatic filter presses from Aquachem. The water collected from filtration is then returned to the cycle.

Capacitive sensors from ifm detect various limit levels on the tanks without being affected by the medium.

Process monitoring by means of sensors

On the automatic filter unit, numerous ifm sensors support both the optimum process flow and the energy management. The inductive sensors monitor, for example, the end position of the filter press. This means that when the panel pack is approached, the motor is operated until the preset end position is reached.

Chiresa AG in Switzerland uses the plants for ecological and economical processing of filter ash containing heavy metals.

An adjustable rocker beneath the filter press makes sure that the container is filled evenly.

AQUACHEM relies on sensor technology from ifm for reliable operation of the fully automatic plants.

Capacitive sensors

Capacitive sensors, on the other hand, are used for limit value monitoring at the washing and rinsing station. The 700-litre rinsing station is used to clean the filter press. Filling it with acid dissolves suspension residues, regenerates the filter cloths and thus increases their service life. Two sensors for limit level monitoring and one sensor for fill level monitoring are installed on the rinsing station. The sensor at the bottom of the tank prevents the pump from running dry if it is underfilled. Overflowing of the acid in the tank is prevented by an additional sensor at the top of the tank. If the level falls below or exceeds the respective limits, a signal is sent to the control station. Normal filling is monitored with a third sensor.
The washing station with a volume of 3,000 litres is used for cake washing and cleaning the press from acid residues. Cake washing takes place after filtration to wash out the chlorides contained in the filter cake before it is sent to landfill. After acidification, water is used to rinse all acid residues out of the filter press. Thus the press is neutralised and the filter cycle can start again. Only two sensors are installed on the washing station to monitor the minimum and maximum levels.
In addition, the entire rinsing and washing station is located in a tub which is also equipped with an ifm leakage sensor. This immediately indicates if the tanks are leaking or if there are any faults in the two feed pumps.

PQ pressure sensor

In addition to an analogue pressure sensor that detects the closing pressure (up to 350 bar) of the hydraulics, another digital pressure sensor monitors the compressed air supply within the filter press to ensure functional and safety-relevant operation. This ensures that the air supply is within the specifications and that the valves installed on the filter press also switch correctly. The so-called pressure switches are installed both on the rinsing and washing station and on each individual filter press. The air flow sensor type SD6500 measures the current air flow as well as the total consumed air flow, temperature and pressure. This enables the sensor to undertake several tasks at once: Documenting the air consumption benefits energy management. In addition, the sensor can also be used to determine the level of the filter chambers and thus contributes, among other things, to the longevity of the filter plates.

As part of the energy management, the SD6500 monitors the compressed air consumption and provides the plant controller with important process-relevant information.

A robust ifm inclination sensor detects the angle of the rocker.

Controlling and monitoring the filling process of the container

Below the filter presses there are platforms for two containers in which the filter cakes are collected for removal. Laser distance and inclination sensors support an angle-adjustable rocker that ensures that the container is filled evenly.
Five laser sensors are installed on each container. Two are used to ensure that a container is available for filling. The other three sensors monitor the level to optimally align the rocker. In addition, an IO-Link master with Modbus interface was installed via which the parameter setting of the laser sensors can be carried out. Especially during commissioning and later remote maintenance or troubleshooting, these masters are fundamentally helpful.

Cooperation between AQUACHEM and ifm

AQUACHEM and ifm have been working together as partners for many years. AQUACHEM supports a wide variety of customers with different requirements. A special challenge in the project implemented for Chiresa AG was to establish the cake discharge by means of a rocker, and to safeguard the container room in order to avoid endangering the employees at all costs. AQUACHEM has been represented with its filter presses in flue gas scrubbing for many years and supports a large number of waste incineration plants. Setting the ideal positions, both of the rocker and the containers, was a task they were happy to solve. In cooperation with ifm and its sensors, AQUACHEM was able to master the challenge.

IO-Link master AL1940 with Modbus TCP interface for space-saving mounting in the control cabinet.