Innovation

Festo Technology Plant: Processing machines communicate with air pollution control systems

Barely visible, but cutting-edge: Processing machines and air pollution control systems are interconnected, and transmit data to the company’s technical staff inside the production works at the new Festo technology plant. Continuous monitoring of multiple system parameters ensures optimal operation as well as far-sighted maintenance and servicing. Moreover, Festo acquired a new exhaust system and substantially improved their in-house air quality, achieving an investment in employee health.

Visitors to the new Festo technology plant in Scharnhausen, near Stuttgart, might initially be skeptical of the overall air quality inside a production plant where turning, drilling, milling and grinding processes occur.

Far-sighted concept – Industry 4.0
Festo is the innovative leader in electrical and pneumatic automation solutions. The family-owned company has also proven itself to be innovative with the design of their new 66,000 square meter technology plant – the leading manufacturer of valves, valve terminals and electronics. Their rationale: Internet-based interconnectivity between machines and staff yields increased system efficiency. In short: Industry 4.0. Their pioneering efforts have been successful, as evidenced in Scharnhausen.

Example: Extraction systems
A primary example is the completion of the extraction of the more than 100 processing machines. Coolant mist and dust are removed from the processing booth, and an air exchange at pre-determined frequency is provided to ensure the high-quality processing of components.

This air flow is reliably extracted by the separator. “Our processing machines communicate with the air pollution control system and stop if the extraction efficiency deviates from a pre-defined tolerance level”, informs Stefan Baizert, Project Manager of Technology Management. However, this shall never occur. “Our target is Zero hours of unscheduled downtime. An equipment malfunction could have far-reaching consequences for the entire production process, resulting in delivery problems, and incurring heavy financial losses.” Those manufacturers who desire 100% reliability frequently possess a dual assembly so that if the primary system breaks down, the second one can take over. “Unfortunately, this approach requires additional manufacturing space and increases maintenance costs”, argues Baizert.

Critical parameters are continuously monitored
Collaborating with Keller Lufttechnik’s experts, Festo designed an intelligent system. “We installed continuous monitoring of all our units. The system triggers an alarm if, e.g., differential pressure or fill levels decrease or exceed certain limit values”, explains Marcus Kraus of Keller Lufttechnik. Currently, the data is being accumulated at Festo. In the future, the system will be Internet-based, and thereby accessible to the specialists at Keller Lufttechnik. Maintenance and service can be optimally scheduled in advance. Stefan Baizert has another vision: “I foresee no longer warehousing spare parts. Our monitoring system will inform us in a timely manner so that we can obtain the necessary components when actually required, thereby saving on storage costs.”

Superior air quality inside the production plant
From an employee standpoint, the excellent air quality inside the production area is a major advantage. Although Festo had adhered to mandatory limit values inside the old plant, the air was permeated with the odor of coolants. Each processing machine was equipped with its own small separator utilizing a recirculating air operation.

The new extraction system significantly improves the air quality inside the plant

Not only machines and systems are well connected - the face-to-face communication is important as well and contributes to the success of the project.
Customer feedback regarding Keller Lufttechnik

Beneficial for employees
The design and completion of the required units was assigned by Festo to Keller Lufttechnik. „We wanted to locate a stable company with established efficiency credentials. Its proximity to our location also pointed to Keller Lufttechnik.” The end result was successful: „Our collaboration worked out well, the systems are operating smoothly, ultimately benefiting the well-being of our employees.”

„We wanted to locate a stable company with established efficiency credentials.”
Stefan Baizert, Project Manager of Technology Management at Festo

Plant possesses DGNB certification
Festo and Keller Lufttechnik installed twenty air pollution control systems which centrally extract ten to twelve machines and direct the filtered air outdoors. „We abandoned the idea of passing the warm exhaust air through a heat exchanger for heat recovery”, explains Baizert. „Our building which has been awarded the highest platinum certificate of the German Sustainable Building Control (DGNB e. V) and already produces a surplus of heat. Additional heat recovery from exhaust air is no longer necessary.”

New extraction design poses fresh challenges
The decision to switch the extraction operation to continuous exhaust air operation also presented some challenges. The planners at the new factory connected meters of ductwork from processing machines to the separators and directed them outdoors, while simultaneously not affecting the overall physical appearance. A new fire protection system was also required because fires can spread throughout the ductwork prompting an emergency. „Using team spirit, combined with a sense of humor, we worked out ultimate solutions”, remembers Baizert.

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Marcus Kraus and Stefan Baizert with their teams achieved the new extraction concept with team spirit and a sense of humor