

Boos
High-pressure
cleaning systems



Simply safe and clean.

Cleaning system manufacturer Boos places its trust in ifm's fail-safe sensor technology. For good reasons.

90 °C showers at up to 400 bar?

Obviously not the most favourable conditions for us humans. But ideal for recycled beverage crates, beer kegs or other containers to ensure they are perfectly clean and ready for a new lease of life.

When it comes to a deposit return system, paramount importance is placed on hygiene, cleanliness and the safety of both the actual system and those who use it. An obvious task for ifm's fail-safe sensors.

German firm Boos Reinigungsanlagenbau GmbH specialises in the fabrication of such systems, including a unique crate system designed to clean up to 3,600 recyclable beverage crates per hour on a 42-metre-long cleaning line. The means of choice: The crates are scrubbed thoroughly by rotating high-pressure brushes and a powerful jet of water, complemented by immersion baths to effectively eliminate stubborn dirt.

The fully automatic high-pressure cleaning line cleans up to 3,600 beverage crates per hour.


To ensure the crates emerge from the system looking like new, it employs not only water but also an alkaline lye. Anti-static wetting agents are subsequently applied to the freshly cleaned plastic parts, ensuring they stay cleaner for longer. The entire cleaning system is a closed one. To facilitate full access for troubleshooting or maintenance purposes, the machine is equipped with doors on both sides. However, it must be ensured that the system stops immediately when one of the two doors is opened – given the aforesaid water temperatures and high pressure involved, failure to do so would pose a significant potential hazard to operators.

Switches, keys and locks are so yesterday.

To guarantee the safety of both individuals and the machine, fail-safe inductive sensors are employed to continuously monitor all the door positions. These sensors ensure the system comes to a prompt and safe stop whenever a door is opened. The system only resumes operation when all the doors and flaps have been closed securely. For many years, such safety requirements were met using the "switch-key-lock" principle. Disadvantage: Mechanical safety switches are prone to wear

and tear, while open systems are susceptible to contamination. Aggressive cleaning agents damage the contacts in the course of time. Often plastic rollers, which can get stuck, are still used. The safe functioning of the switch can no longer be ensured. A principle that can be readily described as outdated, considering the availability of more reliable and cutting-edge solutions.

” *Maximum safety: The electronics of the fail-safe sensor is designed to continuously monitor itself and the wires connected to the outputs for faults.*



A sensing range for stainless steel of between 7.5 and 15 millimetres offers ample mechanical clearance.

**Advantage of sensor technology:
No wear and tear and very robust**

For these reasons, Boos has been placing its trust in ifm's electronic fail-safe sensors for many years. These sensors monitor all the doors and flaps of the systems. Due to the inductive operating principle, the sensors do not require any mechanical parts. They are absolutely wear-free. A simple metal target is sufficient; a special target like a magnet or coded actuator is not necessary. The fail-safe inductive sensor detects metals such as VA or ST37, in other words materials that are used in the machine anyway. With a sensing range for stainless steel of between 7.5 and 15 millimetres, there is ample mechanical clearance for seamless integration of the door sensors. The encapsulated sensor housing features protection rating IP69K and is, therefore, resistant to almost all external influences. The sensor operates with an enable zone which is monitored for target position and dwell time. Therefore, the sensors are more or less tamper-proof and meet the strict safety directives.



The doors of the system are monitored by fail-safe inductive sensors.

And another advantage: Self-monitoring

No driver would deliberately drive into a brick wall to see if their airbag actually works. Here the principle of hope applies. This is different with safety-related components in machine construction.

Standard IEC 61508 specifies a regular check of the safety switches. Mechanical safety switches can only be checked by opening the door or flap being monitored. When the machine switches off, safe function is ensured. These checks involve a considerable amount of effort: Depending on the actual installation site, accessing the doors at the rear of the system might pose a challenge. Moreover, the machines that operate continuously around the clock need to be stopped to inspect correct functioning of the safety switches.

Here the electronic sensors play their biggest trump card:

The sensor's electronics is designed to monitor itself and the wires connected to the outputs for faults. This is yet another advantage over mechanical systems, which lack the capability for continuous self-monitoring. For instance, there is a risk of an unnoticed failure occurring a day after inspection due to a defect.

In contrast, continuous self-monitoring would promptly identify any defects and trigger a system shutdown or move it into a safe state. This ensures the utmost safety for the system operator, while providing the sensors with certification according to standards ISO 13849-1, Performance Level "e", and IEC 61508, SIL 3.

Transparent safety: Individual monitoring of doors

Back to Boos, where the signals from all 17 fail-safe sensors are transmitted separately to a central control system. This is where the condition of all the system components is visualised. The system operator can immediately localise an incoming alarm.

In theory, a conventional series connection would be feasible, but then the operator would only be able to identify that a door or flap is currently open without being able to determine which one exactly. In the event of a fault, the operator would then have to check all the doors within the monitoring chain. This would be a very time-consuming process, especially in difficult-to-access areas of the system.

Conclusion

With the dependable and transparent safeguarding provided by ifm's fail-safe sensors, the operator can confidently and securely operate the Boos crate cleaning system, efficiently cleaning any quantity of beverage crates without hesitation.