



OPTIMIZING PLEASURE, MINIMIZING USAGE

Energy-efficient module decreases compressed air consumption

Unilever, a global corporation known for its commitment to energy-saving practices, is taking significant steps to reduce compressed air usage in the production of Magnum ice creams. By implementing the innovative energy efficiency module MSE6-E2M, the company aims to uphold its philosophy of maximum pleasure with minimal consumption.

While ice cream is renowned for its refreshing qualities and energizing blend of proteins and carbohydrates, the process of creating this delectable treat requires substantial energy. From mixing milk, dairy chocolate, sugar, and vanilla beans to deep-freezing at -25°C , dipping in various chocolate coatings, and final packaging, electricity and compressed air are vital for the thermal and kinetic processes involved. Unilever recognizes the importance of energy efficiency and has made it a top priority. Through the Unilever Sustainable Living Plan, the company has already achieved over 150 million euros in energy cost savings through production efficiency enhancements since 2008.

In the realm of pneumatics, Unilever acknowledges the potential for energy conservation and cost reduction through innovative advancements. Recently, at the Unilever plant in Heppenheim, the MSE6-E2M energy efficiency module was successfully implemented to decrease the compressed air consumption in the production of Magnum ice creams. The collaboration between Unilever and Festo in bringing this energy efficiency module from prototype to production also highlighted the notion that less is more, not only in terms of energy consumption but also in other aspects of the process.



Perfect portions: The extruder outputs one Magnum core per second. The stick is inserted in the ice cream during extrusion.

Sustainability throughout the entire process

Unilever's Heppenheim factory serves as a major production hub for ice cream, including popular products from the Heartbrand line such as Magnum, Feast, Viennetta, and Carte d'Or. The factory's ability to produce high quantities is essential for meeting the demand in various parts of the European market. However, this level of production requires a significant amount of energy.

Unilever recognized the importance of reducing compressed air consumption in pneumatic components to enhance sustainability. The challenge lied in visualizing and measuring the compressed air usage, as the individual production lines' consumption had not been previously determined. Alexander Hemmerich, an Automation Engineer at the Unilever Plant in Heppenheim, stated, "Until then we were just unaware. Air is not visible, so it is not immediately obvious if consumption is too high." Under the Unilever Sustainable Living Plan, the Heppenheim plant had already achieved success in other areas. They replaced energy-intensive geared motors with more efficient alternatives, resulting in energy savings of up to 60 percent.

Additionally, they converted numerous 18 kW ventilators in the cooling tunnels to frequency converters with quadratic torque. This conversion led to a reduction in energy consumption by approximately 40 percent for the ventilators. By prioritizing sustainability along the entire line of production, Unilever is taking significant steps to minimize its environmental impact and promote responsible manufacturing practices.





“The Festo energy efficiency module has enabled us to reduce our air consumption on the Magnum production line step by step.”

Alexander Hemmerich

Automation Engineer at Unilever Plant Heppenheim

Energy consumption made visible

Energy consumption becomes visible through the implementation of the energy efficiency module MSE6-E2M by Festo, a significant step taken by Hemmerich and his team to reduce compressed air usage. Hemmerich explained that



the module provided them with the ability to monitor the amount of compressed air being used during the operation of a production line.



By switching off individual consumers, they could identify changes in compressed air requirements, locate leaks, and eliminate unnecessary consumption.

The MSE6-E2M's automatic shutdown feature in standby mode allowed them to determine how quickly the system emptied, while also preventing additional compressed air consumption when the system was not in operation. The module promptly notified the system controller of any unusually rapid pressure drops. Moreover, the MSE6-E2M possessed onboard intelligence and a specific model for

operating compressed air systems, enabling it to independently recognize when a system was in production or at a standstill. However, at Unilever, the MSE6-E2M was operated through the system controller to consolidate all information centrally.

Significantly reduced energy consumption

By implementing condition monitoring for the pneumatic components of the Magnum machine, Alexander Hemmerich gained access to continuous process-relevant data. The MSE6-E2M regularly communicated essential measurement parameters such as flow, pressure, and consumption with the machine controller via Profibus. Operating the module was convenient through the control panel. Hemmerich highlighted that the Festo energy efficiency module allowed them to gradually reduce air consumption on the Magnum production line. Additionally, the Profibus connection eliminated the need for extra cables when converting existing systems. As a result, the Magnum line witnessed a reduction of over 500 euros per year in compressed air consumption costs.

Focusing on the Essentials: The MSE6-E2M Energy Efficiency Module

The MSE6-E2M prototype underwent field testing in the Magnum line at Unilever, providing an ideal setting for evaluation. Close collaboration with Festo developers and its pilot use in the Heppenheim plant unveiled crucial operational requirements. As a result, the final version of the energy efficiency module, MSE6-E2M, was refined to better suit daily operations.

In response to limited installation space in existing systems, the MSE6-E2M was designed to be compact, prioritizing energy efficiency. Consequently, the initial version's I/O slots were replaced with a Profibus interface. Additionally, the exhaust valve, present in the first-generation product, was eliminated. These modifications allowed the MSE6-E2M to be developed as a combination of a pressure and flow sensor, a shut-off valve, and a fieldbus node.

Now available as a commercial product, the MSE6-E2M is approximately half the size of the prototype, making it perfectly suited for machine operators and builders. It simplifies and enhances energy monitoring, supporting companies like Unilever in their efforts to increase sustainability effectively.

The MSE6-E2M energy efficiency module functions autonomously, monitoring and regulating the supply of compressed air in both new and existing systems. Similar to a start-stop system in a car, this intelligent module detects standby modes and automatically shuts off the compressed air supply. As a result, compressed air consumption is reduced to zero during system downtimes and breaks. Furthermore, the MSE6-E2M enables leak detection by alerting system operators if the pressure drops too quickly during downtimes. Additionally, it continuously provides essential process data such as flow, pressure, and consumption, which it transmits to the machine controller via Profibus.



The first generation of the energy efficiency module MSE6-E2M is currently in continuous operation at Unilever. The market-ready module is around 50 percent more compact.