



Photos: Electrolux

■ **Electrolux Group, Italy**

## Perfect (Retro)Fit

**Modernizing automation technology for injection molding machines significantly reduces maintenance costs and dramatically increases the reproducibility of the plastic products.**

**T**he Electrolux Group in Porcia, Italy, produces around 1.5 million upper-midrange washing machines annually. One of the most important components in a washing machine is the washing unit with the tub and drum. The Electrolux plant comprises around 20 large-scale injection molding machines that produce the tubs from carboran, a highly refined and fully recyclable plastic. As the injection molding lines are in operation around the clock, any unforeseen machine downtime has significant consequences for the continuity of the overall production cycle.

### Modernization aids risk prevention

In collaboration with Siemens, Electrolux has initiated a project that minimizes the risk of unwanted machine downtime and that should reduce the maintenance costs of the injection molding machines. "In the injection molding sector we use numerous large-scale machines that are still performing extremely well despite being 15 to 18 years

of age. The disadvantage lies in the manufacturer-specific programmable logic controllers (PLCs), which require a lot of effort to maintain and adapt to new production requirements," explains Andrea Stival, maintenance manager at Electrolux. "We therefore came to the decision to modernize the automation technology for these machines." In the search for a suitable solution, Electrolux turned to the Siemens center of excellence for the automation of injection molding equipment, and its extremely competent expert in this area, external solution partner Jürgen Lenz. Stival confirms: "This was the start of an outstanding partnership. The results have far exceeded our expectations."

### Flexible and high-performance control architecture

The first modernization project was carried out on a mechanical/hydraulic injection molding machine with 1,300 t clamping force. Its original control system was replaced with the IMH 3300 automation

solution based on a Siject CI 16iP controller for hydraulic injection molding machines. During this project, tried and tested standard products from the Simatic line, including PLC peripherals, communications buses, and standard user interfaces, were employed. Lenz designed the wiring diagram and automation, while the Electrolux maintenance department carried out the installation of the hardware and the cabling.

Due to the optimum results, this project was immediately followed by the next IMH 3300 upgrade, this time on a 1,000-t hydraulic injection molding machine. In this case, a Simatic S7-300 (CPU 319-3 PN/DP), with integrated Profibus and Profinet interfaces, controls and regulates the movement of the injection molding cylinder (by controlling the oil pressure and quantity) and all machine movements, including the temperatures of the injection molding cylinder and the additional 64 heating and cooling zones in the tool temperature regulator. The peripherals (Simotion E510 and Simatic ET 200S), control panel (Simatic MP377 Multi Panel with touchscreen display), and temperature regulator are connected to the PLC via Profinet. "This solution not only met our goals in terms of compact design, ease of maintenance, and expandability," enthuses maintenance technician Claudio Maranzana, "but the speed and precision of the mold heating and cooling control processes has also dramatically improved."

The result is a distinct quality improvement, particularly in terms of the reproducibility of the injection molded products, which has made quality control

**Graphical display via a Simatic MP377 panel with matching control keypad for injection molding machines**



The injection molding lines in Porcia produce 1.5 million tubs per year

and process engineering considerably easier. Remote control and connection of the injection molding machinery to the plant's monitoring systems were also completed smoothly. Thanks to the integrated Profinet connection, only a single cable connection is required to link the machinery to the network.

**»For us maintenance managers, it is reassuring to know that the first thing we have to do is look for the keys to the control cabinets, as this means we really can stay in control!«**

Andrea Stival, Maintenance Manager, Electrolux

An almost identical automation solution was also implemented on an electrically driven injection molding machine with 165 t of clamping force.

### Increased competitiveness

The results have prompted Electrolux to choose the Siemens control architecture for future conversions of the machinery in its injection molding plant.

Stival sums up: "A great benefit of the selected automation solution is the openness of the system. The Simatic Step 7 programming language allows us to carry out any adjustments ourselves, thereby enabling us to respond much more quickly than previously. This is one of the reasons for the considerable increase in our competitiveness. Another reason is the level of reliability achieved with the new automation systems. The risk of unforeseen operating failures has also been dramatically reduced. For us maintenance managers, it is reassuring to know that the first thing we have to do is look for the keys to the control cabinets, as this means we really can stay in control!" ■

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