

■ BSH Bosch und Siemens Hausgeräte GmbH, Germany

Savings through Retrofitting

The retrofitting of a fixed displacement pump with a servomotor on a hydraulic injection molding machine allowed the machine's power consumption to be reduced by more than 50 percent.

BSH Bosch und Siemens Hausgeräte GmbH manufactures approximately two million vacuum cleaners per year. Approximately 60 percent of the company's electrical power consumption is attributable to the manufacture of plastics. An energy efficiency analysis showed that the greatest potential for energy savings was with the hydraulic injection molding machine drives, particularly because these were largely operated at a constant speed until 2008.

Alternative drive concepts that could be easily retrofitted onto existing production machines were particularly in demand. A solution was found at the Siemens Application Center in Erlangen, Germany. A system with servomotor drives and a fixed displacement pump was already in operation there. In contrast to traditional drives, the motor rotates only when loads are being moved on the machine.

For a joint field trial, the Demag D60 NC3-P 600-182 from 1991 was chosen. It can produce a polyamide four-impression mold at a machine load of 60 percent. Because a technical automation refurbishment had already been carried out on the machine with the IMH 3300 solution based on Simatic S7, short reaction times were ensured during the test phase. The drive consisted of a controllable vane pump with a flow rate of 65 liters per minute and a fixed displacement motor with a drive capacity of 15 kW.

BSH decided to use a Sinamics S120 with a Voith fixed displacement pump. To integrate the hydraulic system, all that was needed was a pressure transducer, a pressure-limiting valve, the intake line from the hydraulic tank, and the pressure line. The servo-drive and the associated switch cabinet were connected to the Simatic controller and the converter. The setting of drive parameters and the signal exchange between the injection molding machine and drive controller followed. Production began with the previous setting parameters in order to



The retrofit allowed the electricity consumption of the Demag D60 NC3-P 600-182 to be reduced from 15 to 6 kilowatt-hours over an observation period of two weeks

draw conclusions about the control behavior of the servo hydraulics.

Amortization within a year and a half

The retrofit reduced the power consumption of the machine from 15 to 6 kW in an observation period of two weeks. The noise level of the servo hydraulics was barely perceptible. Since hydraulic oil is pumped only when required, an oil cooler could be omitted for this application – which meant that even more energy could be saved.

If operated for 6,000 hours annually, the machine saves 54,000 kWh of electricity, which corresponds to an annual savings of 6,500 euros. Comparisons show that this solution can achieve almost the same level of energy efficiency as a fully electric injection molding machine. ■

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