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Servo pump for hydraulic glass presses

Energy consumption slashed by up to 50%, a significantly more compact design, and higher flexibility combined with higher yield are some of the advantages of the latest servo glass presses from Waltec.

The concept for the new model was to replace the conventional hydraulic design with a servo pump system. In this case, pressure and volume flow are no longer controlled in the hydraulic system using valves, but instead by the speed and torque of a servomotor. Energy is only supplied when it is actually required at the hydraulic cylinder, which drastically increases the energy efficiency. A comparatively small pressure accumulator replaces the oil tank of the conventional hydraulic system.

As a consequence, this compact system can be directly located at the machine. It sets itself apart as a result of the minimum pipe lengths and oil quantities, hardly any pulsations – and therefore the highest degree of stiffness and control quality.

Waltec's motivation

Waltec Maschinen GmbH based in Wilhelmsthal close to Kronach, Germany is one of the world's leading manufacturers of automatic, electronically controlled feeder, press, press-blowing and spinning machines for the glass industry. Its portfolio also includes laser cutting, grinding and polishing machines as well as transport systems. The

company, founded back in 1889, today offers everything from a single source, and when requested, can also implement turnkey glass production plants and systems. The task was to equip automatic glass press machines based on conventional valve-controlled hydraulics with an energy-saving servo pump system. Waltec's motivation was to comply with glass manufacturers' demands for significant energy savings.

Simple retrofit

For decades now, Siemens has supplied automation technology for practically all of the Waltec machines. The new servo-hydraulic presses are also controlled from a SIMATIC S7-300 and operated and monitored by a SIMATIC HMI device. The servo pump system is controlled by the Control Unit of a SINAMICS S120 inverter, which means that it can be very simply integrated into existing plant or system concepts. If an infeed unit with energy recovery capability is selected, then the energy released when the press ram brakes can be retrieved, thus further boosting the efficiency.

The servo pump solution in detail

The SIMOTICS synchronous servomotor – operated from the SINAMICS S120 – drives two oil pumps. These are located in tandem on the motor shaft and act in opposite directions. The motor rotation defines the direction in which the oil flows; this is the reason that direction control valves are not required. However the decisive advantage of a servo pump solution is, that the servomotor only delivers exactly the amount of energy, that is actually needed in the respective phase of the pressing process.

Waltec uses double rod cylinders, which is why the displacement volume of both pumps is identical. However, the solution is also designed to operate with differential cylinders: The pump sizes are then simply selected in the ratio of the cylinder surfaces. The compact pressure accumulator serves to compensate volume differences, and it continually maintains the system under pressure.

One thing's clear:

»The servo pump system delivers only the amount of energy, that is actually needed in the respective phase of the pressing process.«

Rainer Wagner, Head of Design and Purchasing for Waltec

The servo pump solution has already admirably proven itself

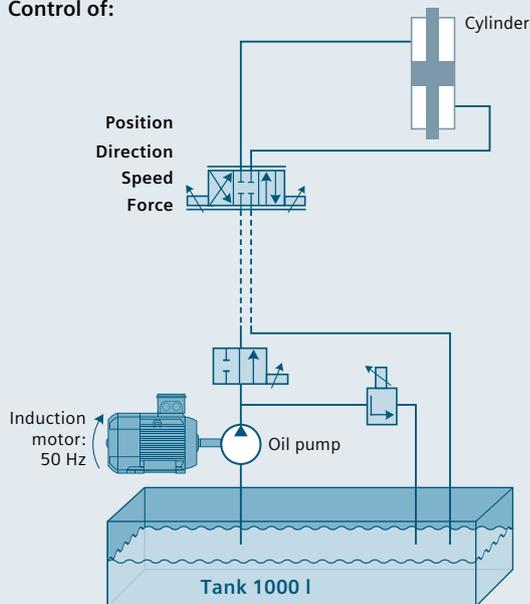
Waltec glass presses equipped with the energy-saving servo pump systems have been in use with renowned manufacturers worldwide since 2012 – and have proven their practicality and efficiency in harsh continuous duty. Initially, only single-piston machines were equipped, however in the meantime, the cost-effectiveness has also been verified for machines equipped with two and three pistons.

Advantages of the servo pump system

- High energy efficiency, as the pressure and volume flow are not controlled using valves, but by the torque and rotation speed of a servomotor
- Extremely compact system (only a small pressure accumulator is required)
- High dynamic performance as a result of a servo-motor with low moment of inertia of the rotor
- Short oil lines possible (and also recommended)
- Can be simply retrofitted to replace conventional hydraulic systems
- Quiet operation
- Cost-efficient solution
- Scalable: the servo pump can be dimensioned according to the required press force

Conventional hydraulics

Control of:



Servo pump at Waltec machines

Control of:

