Hydraulic equipment is popularly used for driving various industrial machines, as it provides intense power using a small driving force, thus delivering “high output density”.

Previously, however, precise control on a par with electrically-driven equipment was impossible. To resolve the drawback and achieve a system that offers both the ease of control of electrically-powered equipment and the power of hydraulic products, Kawasaki developed an electro-hydraulic hybrid system, the KAWASAKI ECO SERVO.

Unlike a conventional hydraulic pump, which is driven by a conventional motor and discharges a fixed amount of oil, ECO SERVO controls the variable-speed motor for the hydraulic pump in a precise manner and optimizes the volume of oil discharged according to the type of operation the industrial machine is performing.

By controlling the motor and employing a simplified hydraulic circuit, ECO SERVO achieves a 60 to 80% energy savings. A reduction in the number of control valves on the circuit also makes the configuration much simpler, resulting in reduced heating volume and a more compact oil tank. The resulting ease of maintenance is an additional benefit of the system. In some cases, needed installation space was reduced by two thirds, and the volume of hydraulic oil used to one-twentieth that of conventional systems.

ECO SERVO made its debut in 1999. Because the concept that motors could be controlled was totally new at that time, ECO SERVO was a revolutionary invention. Since then, the system has evolved and Kawasaki now offers a wide range of models, including a high-pressure, large-displacement type that achieves a continuous rated pressure of 32 MPa and a maximum pump displacement of 500 cm³.

ECO SERVO is being utilized with a diverse range of industrial equipment, such as large press machines and injection molding machines. Not only that, but it is also being used in applications closer to our everyday lives, such as adjustment systems for variable pitch blades of ventilators installed in highway tunnels and for laundry dewatering presses.

ECO SERVO is a hydraulic hybrid system that renders high-density power along with the precise controllability of an electrically-driven system. In a conventional hydraulic system, the motor is constantly running and consuming power even when the machine is not in operation. ECO SERVO, on the other hand, controls the motor speed and drives the pumps only when they are needed, achieving a dramatic reduction in power consumption, which in some cases goes as high as 80%.

System

Pump + motor + control device
Proprietary mechanism
achieves a minimal-noise operation

This system is comprised of a pump, a motor, and a control device. The control device, with the help of sensors, offers highly precise, energy-efficient, highly reactive, and significantly quieter operation. In addition to combining a hydraulic pump with electrical equipment, the system uses a high-rigidity bracket and a resilient support structure for the pump, which reduces vibrations transmitted from the pump. The low operational noise is attributable to the control motor speed, which may be kept as low as possible.

Variable displacement pump

Displacement produced by the pump is automatically determined by reducing the displacement during high-pressure state, the torque can be lowered, which allows the capacity of the motor to be minimized.

Suction valve plate

A highly-effective suction valve allows the approximate seal to be closed and suction characteristics significantly improved. Pressure pulsation at low speed rotation-compress pressure control, thus offers improved performance and reduced noise.

Combining the best of hydraulic and electrical systems

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