

Hybrid Technology for Plastic Injection Molding Machines

by

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As many plastic injection machine manufacturers move towards modern all electric designs, there remains one very important part of the machine that continues to use circa 1970's technology. This important part of the process is called a "core pull/set" system. Approximately 30% of all molds will use a core pull/set in the mold to achieve the desired cavity details. As the industry has accepted the new "all electric" movement, the core pull system is sometimes an afterthought. Most core pull systems use a traditional hydraulic pumping unit that is either dedicated to the machine or sometimes is portable for use on any machine in the shop where the need for a core pull exists. These units usually require cooling water and a heat exchanger to keep the hydraulic fluid at an acceptable temperature. The core pull unit only operates for 2-4 seconds per cycle, during the idle time the electric motor continues to operate at full RPM even though the pump may be vented or of a pressure compensated design. The motor always operates at full speed keeping the mass (pump and motor) rotating. This requires energy, which can sometimes equate to as much as 40% of full load current. Besides wasting valuable energy, there is also a significant amount of noise associated with this design.

All World Machinery Supply (Harvard, Illinois) is the North American partner for Daikin Hydraulics and is well versed in the new "hybrid hydraulic" technology. The basis of the technology is that the motor is inverter controlled and only rotates to meet the system demand. During an idle situation the motor will automatically slow down to below 400 RPM and maintain the desired pressure. Once a demand is sensed (on board pressure transducer) the motor spins to full RPM in .1second. This is accomplished using Daikin's patented motor design.

These systems were originally designed for the Machine Tool Industry more than 7 years ago. Many Asian manufacturers of CNC machinery are using this technology today with great success. As the product line evolved, larger units were designed for use in industrial hydraulic applications. One such application which has proven to be a perfect fit is "core pull/set" systems on Plastic Injection machines.

Using Hybrid Technology, the systems do not require cooling water, will save a measurable amount of energy, operate at 60-70dba noise level and are priced comparable to traditional hydraulic systems. Several plastic injection machine manufacturers have accepted this technology and offer the Daikin Hybrid systems for core/pull set applications to their customers today. Daikin Hybrid systems can deliver up to 22 gpm and are rated at 3,000 psi maximum.



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