**Productive Injection Molding with Inductive Rotary Encoders**

Machine designs for the injection molding of plastics increasingly depend on hybrid or even all-electric drive technology. High-efficiency electric drives close the mold, dose, inject and dispense as well as actuate the frequently coupled extraction robot. The goal is to continuously raise throughput rates to improve productivity of the cycle-controlled injection molding machines. Rugged feedback systems are indispensable for the required high-performance, dynamic drive control.

Inductive rotary encoders from the ECI/EBI/EQI 1100, ECI/EQI 1300 and ECI/EBI 100 series from HEIDENHAIN are the ideal solutions for such applications. They are available for small (1100) or large (1300) axis heights in servo motors and for hollow shaft applications (100). Singleturn encoders (ECI) and gear-based (EQI) or battery-buffered multiturn encoders (EBI) are also available. The units have a resolution of 524 288 positions per revolution. The EBI 1100 is an exception with a resolution of 262 144 positions per revolution. The measuring range of the gear-based multiturn rotary encoders is 4096 revolutions and that of the battery-buffered rotary encoders is 65 536 revolutions. All the series transfer the data through the purely serial EnDat 2.2 interface that is widespread in the market. This ensures EMC-reliable and rapid data transfer. It also meets the most exacting demands on control dynamics.

In addition to performance and connectivity, the inductive units also feature robustness and a high operating temperature range up to 115 °C. The inductive scanning principle means rotor bearings in the encoder can be dispensed with, thus decoupling the motor shaft from the rotary encoder stator. Mechanical loads on the motor shaft are not transferred to the rotary encoder stator. Despite their bearingless design, the inductive units can compete with bearing-equipped units in terms of operating and mounting tolerances. Rotary encoder versions are available with vibration strengths of up to 400 m/s² compliant to EN 60068-2-6 for drive axes with high vibration levels on the motor housings. Inductive rotary encoders from HEIDENHAIN therefore ensure high machine availability with high mechanical loads—meaning precisely when machines under load need to produce high quantities with high efficiency.

All rotary encoders are equipped with an internal temperature sensor, an electronic ID plate and an EEPROM memory for implementing automatic start-up. Further performance features are also available according to the series. These include support for functional safe drive axes, evaluation of an external temperature sensor and diagnostic parameters. Monitoring of the operating status in this way supports strategies for the predictive maintenance of individual drive axes.

Another advantage of the HEIDENHAIN rotary encoders is their mechanical design consistency. This is the key to injection molding machine technology aligned to productivity and availability. This in turn achieves mounting compatibility (with appropriate design of the motor mechanism) between the inductive rotary encoders and the optically scanned rotary encoders from the ECN/EQN 1100 and ECN/EQN 1300 series.

*For more information, visit:* [*www.heidenhain.de*](http://www.heidenhain.de/)

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*Convincing performance with injection molding machines for plastics: Inductive HEIDENHAIN rotary encoders from the ECI/EBI/EQI 1100 (right), ECI/EQI 1300 (center) and ECI/EBI 100 series (left).*