

Encoders for Brushless Motor Commutation



The process of steering current through the appropriate motor windings in order to produce an output torque is called commutation. In brush motors, commutation is accomplished electro-mechanically via brushes and the commutator. In brushless motors, commutation is performed by electronically steering the motor current to the appropriate winding. To do this, the rotor position must be determined. Figure 1 shows a typical method of determining rotor position using Hall Switches. A circuit board containing the Hall devices is aligned with a magnet on the rotor so that the relationship shown between the Hall outputs and the motor back EMF can be established.

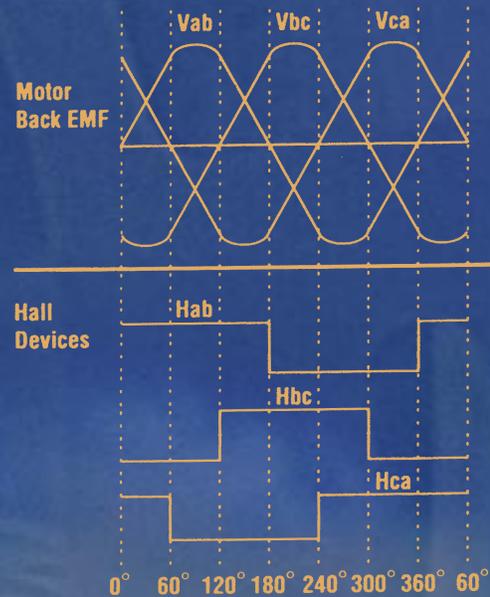


Figure 1



Figure 2

When a brushless motor is used in a servo application requiring position feedback, room must be made for both the commutation circuit board as well as the encoder. This generally adds both cost and complexity to the motor package. For these applications, RENCO now provides encoders with integrated commutation outputs equivalent to those produced by Hall devices. The result is a more compact system, reduced alignment time, and superior switching accuracy due to the much lower hysteresis of the encoder when compared to a Hall device. The commutation outputs are provided by adding additional data tracks to the encoder disk, as shown in Figure 2. The commutation signals can be generated for motors of any configuration or number of pole-pairs.