

## NEW WINDING FOR SMOOTHER, QUIETER OPERATION OF STEP MOTORS

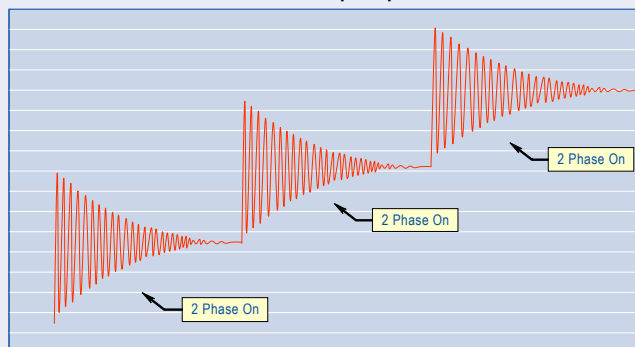
Most step motor users are familiar with Series and Parallel connections and the T-Connection, which Lin Engineering released in 2003. The T-Connection gives the user the flexibility to maximize torque and minimize resonance at mid-range speeds. Now, the R-Winding has been developed to reduce noise and vibration for lower-torque applications.

Traditional half-stepping allows the motor to stop at one-phase ON and two-phase ON positions alternatively. The settling time characteristics of the motor are different at one-phase ON and two-phase ON. The step time profile from every controller assumes that the settling time characteristic of each step is the same. Erratic motion occurs when the step time is not synchronous with the rotor position. In addition, the different magnetic fluxes under one-phase ON and two-phase ON develop a step hysteresis.

The R-Winding was created to eliminate the one-phase ON position and to maintain the same magnetic path through the entire range of half-stepping. The rotor position will be at two-phase ON at all times during half-stepping. The phase angle for each position will be  $22.5^\circ$ ,  $67.5^\circ$ ,  $112.5^\circ$ ,  $157.5^\circ$ ,  $202.5^\circ$ ,  $247.5^\circ$ ,  $292.5^\circ$ ,  $337.5^\circ$  and back to  $22.5^\circ$ . Thus, the settling time characteristic and the holding torque of each step are now identical.

For more information about Lin Engineering's R-Winding, please contact your local sales rep.

R-Connection Step Response



Traditional Step Response

