

We compared the accuracy and torque performance between Lin's 2-phase motor versus a competitor's 5-phase motor. The 2-phase motor resulted in better accuracy and more torque. Let's see how the tests were conducted and understand the results.

2-PHASE VS. 5-PHASE STEP ACCURACY COMPARISON

To compare these two mechanically different step motors, we were able to run both motors at a step resolution such that each microstep was the equivalent of 0.018°.

2-Phase: 0.9° Motor / 50x microstepping = 0.018°

5-Phase: 0.72° Motor / 40x microstepping = 0.018°

SPECIFICATIONS OF BOTH MOTORS

Input Voltage of 24VDC

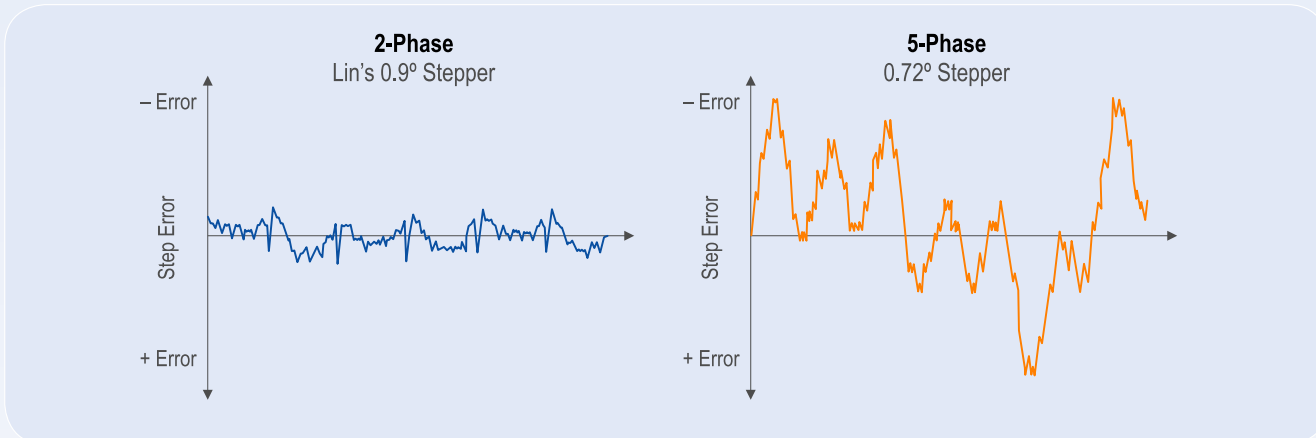
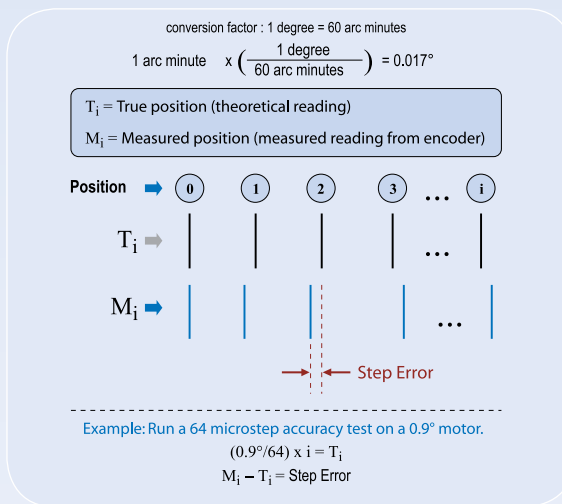
Output Current set to motor's rated current

2-Phase: 0.6 Amps/Phase

5-Phase: 0.75 Amps/Phase

MEASURING STEP ACCURACY

How does step accuracy work? Step error is measured in arc minutes. Arc minutes are:



ADDED BENEFIT OF 2-PHASE OVER 5-PHASE: MORE TORQUE

Not only are 0.9° 2-Phase step motors more accurate than 0.72° 5-Phase step motors, they also produce more torque as well. In a 0.72° 5-Phase step motor, there are 50 rotor teeth. A rotor and stator must be offset from each other; therefore, the maximum number of stator teeth must be less than 50 in order to create the offset spacing. Since 5-Phase steppers contain 10 poles, the maximum number of teeth per pole is 4 which will result in 40 stator teeth.

However, on a typical 0.9° 2-Phase step motor, there are 100 rotor teeth and 16 stator poles. Therefore, the maximum number of teeth allowable on each pole is 5, resulting in a total of 80 teeth on the stator. The more stator teeth, the more output torque.

