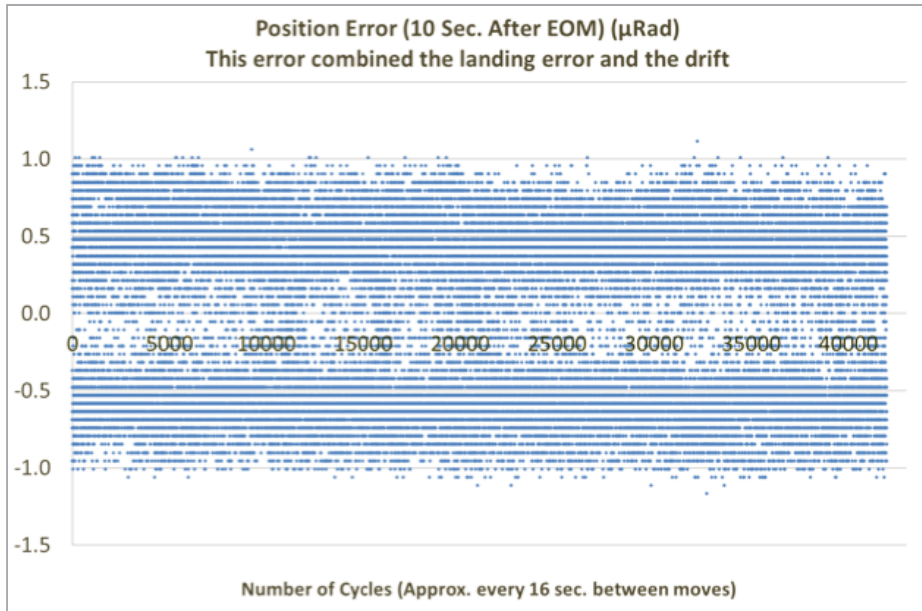


Position Repeatability and Accuracy In The Direction of Motion



The graph above represents a test, simulating 5 years of operation service, moving 90°, 180°, 270°, 360° and back to home.

Accuracy in our normal servo mode (AC) is to 1 μ Rad

Accuracy in our high resolution mode (DC) is to 0.1 μ Rad

Position repeatability is to +/- 1 μ Rad

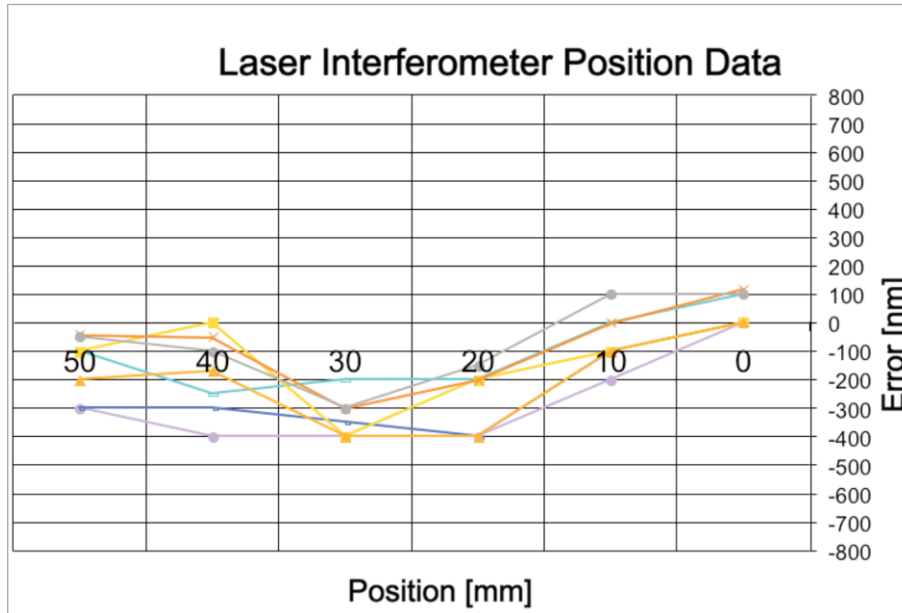
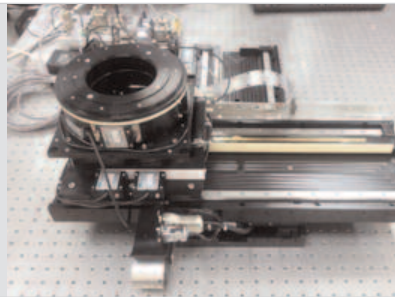
FB Series

Position Repeatability and Accuracy In The Direction of Motion

There are many design and component factors that impact the ability to achieve position repeatability and accuracy.

All Nanomotion motion systems are closed loop with a position sensor. The position sensors vary in the available resolution and the absolute accuracy. In addition to the position sensors, design considerations that impact the systems stiffness, materials (thermal expansion) and bearing selection are all key factors in determining the precision of motion.

Nanomotion has extensive experience in system configurations ranging from 0.5nm resolution to 1µm resolution. Ultimately the position resolution will be a key factor in determining the position repeatability, as most systems will be repeatable to < 5 encoder counts. Actual errors in the position sensor can be factored out based on measurements with a laser interferometer or auto collimator, yielding standard accuracy in the sub-micron level and achievable accuracy in nanometer level.



Nanomotion utilizes metrology tools such as laser interferometry and auto collimators to validate all aspects of motion performance.

The long travel stage to the right and the graph below reflect an absolute position accuracy of 12 microns over 306mm. The position repeatability is 2 microns with a 0.1µm resolution encoder.

Increasing the encoder resolution can improve position repeatability.

Laser error mapping can improve position accuracy by adding correction points.