

X-LSM-E Series Datasheet



- * 25, 50, 100, 150, 200 mm travel
- * 10 kg load capacity
- * Up to 104 mm/s speed and up to 55 N thrust
- * Built-in controller; daisy-chains with other Zaber products
- * Integrated, 200 CPR, motor mounted encoder provides slip/stall detection and recovery
- * Custom versions available

Zaber's X-LSM-E Series devices are computer-controlled, motorized linear stages with high thrust and speed capabilities and a compact size. They are stand-alone units requiring only a standard 24 V or 48 V power supply. The built-in motor encoder allows closed-loop operation and slip/stall recovery features. An optional indexed knob provides convenient manual control for versatile operation even without a computer.

These stages connect to the RS-232 port or USB port of any computer, and they can be daisy-chained with any other Zaber products. The daisy-chain also shares power, making it possible for multiple X-Series products to share a single power supply. Convenient locking, 4-pin, M8 connectors on the unit allow for

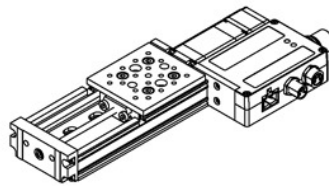
secure connection between units.

At only 21 mm high, these miniature stages are excellent for applications where a small profile is required. The X-LSM-E's innovative design allows speeds up to 104 mm/s and loads up to 10 kg. Like all of Zaber's products, the X-LSM-E Series is designed to be 'plug and play' and very easy to set up and operate. If you are considering a multi-axis system, in the XY configuration, these stages make excellent microscope stages. Adding an X-JOY3 joystick controller allows manual control of both X and Y or XYZ axes from a single interface as well as allowing microscope stage positions to be saved and recalled at the touch of a button.

Drawings

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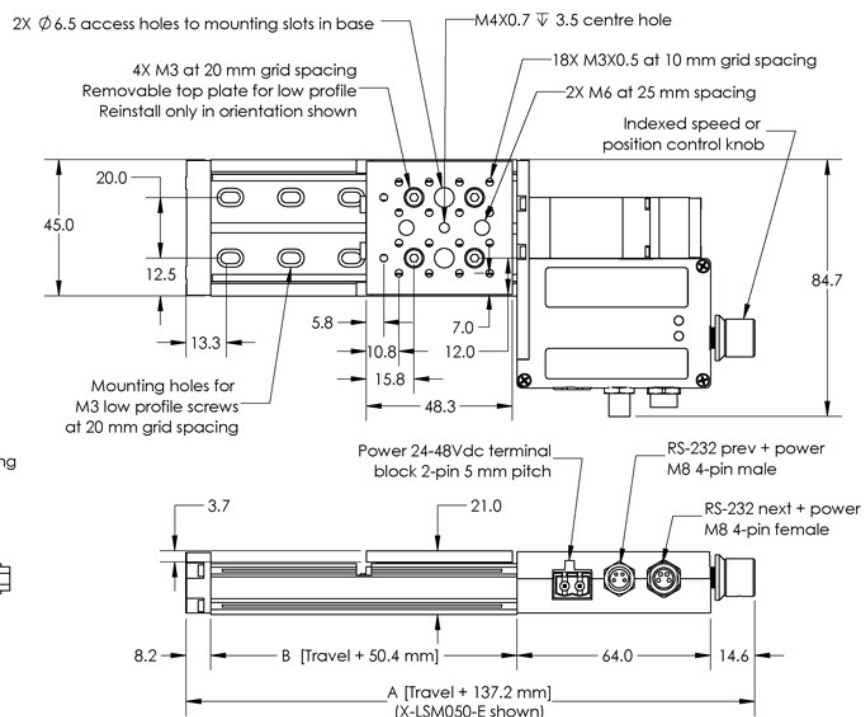
X-LSM-E Miniature Motorized Linear Stage
dimensions in mm



Model Number*	Travel	A**	B
X-LSM025-E	25.4	162.6	75.8
X-LSM050-E	50.8	188.0	101.2
X-LSM100-E	101.6	238.8	152.0
X-LSM150-E	152.4	289.6	202.8
X-LSM200-E	203.2	340.4	253.6

*See product page for complete list of available models at www.zaber.com

**Subtract 13.1 mm knob length from 'A' for -S versions without manual control



01610 1000 R02

Specifications

Specification	Value	Alternate Unit
Built-in Controller	Yes	
Encoder Resolution	200 CPR	800 states/rev
Encoder Type	Rotary quadrature encoder	

Specification	Value	Alternate Unit
Maximum Continuous Thrust	25 N	5.6 lb
Communication Interface	RS-232	
Communication Protocol	Zaber ASCII (Default), Zaber Binary	
Maximum Centered Load	100 N	22.4 lb
Maximum Cantilever Load	300 N-cm	424.8 oz-in
Guide Type	Needle roller bearing	
Vertical Runout	< 8 μm	< 0.000315 "
Horizontal Runout	< 12 μm	< 0.000472 "
Stiffness in Pitch	55 N-m/ $^{\circ}$	317 $\mu\text{rad/N-m}$
Stiffness in Roll	52.5 N-m/ $^{\circ}$	332 $\mu\text{rad/N-m}$
Stiffness in Yaw	85 N-m/ $^{\circ}$	205 $\mu\text{rad/N-m}$
Maximum Current Draw	350 mA	
Power Supply	24-48 VDC	
Power Plug	2-pin Screw Terminal	
Motor Steps Per Rev	200	
Motor Type	Stepper (2 phase)	
Motor Rated Current	600 mA/phase	
Inductance	3.5 mH/phase	
Default Resolution	1/64 of a step	
Data Cable Connection	Locking 4-pin M8	
Mechanical Drive System	Precision lead screw	
Limit or Home Sensing	Magnetic hall sensor	
Axes of Motion	1	
LED Indicators	Yes	
Mounting Interface	M3 and M6 threaded holes and M4 threaded centre hole	
Vacuum Compatible	No	
Operating Temperature Range	0 to 50 $^{\circ}\text{C}$	
Stage Parallelism	< 25 μm	< 0.000984 "
RoHS Compliant	Yes	
CE Compliant	Yes	

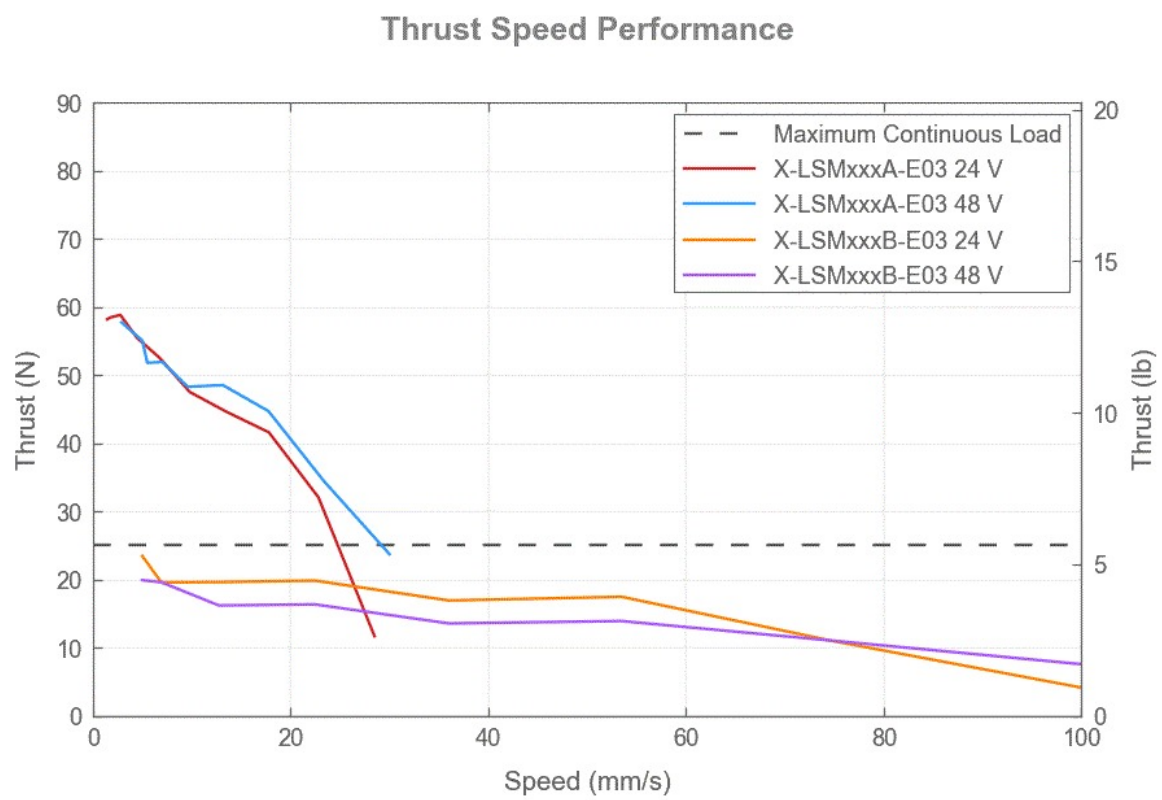
Part Number	Microstep Size (Default Resolution)	Travel Range	Accuracy (unidirectional)	Repeatability
X-LSM025A-E03	0.047625 µm	25.4 mm (1.000 ")	15 µm (0.000591 ")	< 3 µm (< 0.000118 ")
X-LSM025A-SE03	0.047625 µm	25.4 mm (1.000 ")	15 µm (0.000591 ")	< 3 µm (< 0.000118 ")
X-LSM025B-E03	0.1905 µm	25.4 mm (1.000 ")	15 µm (0.000591 ")	< 6 µm (< 0.000236 ")
X-LSM025B-SE03	0.1905 µm	25.4 mm (1.000 ")	15 µm (0.000591 ")	< 6 µm (< 0.000236 ")
X-LSM050A-E03	0.047625 µm	50.8 mm (2.000 ")	20 µm (0.000787 ")	< 3 µm (< 0.000118 ")
X-LSM050A-SE03	0.047625 µm	50.8 mm (2.000 ")	20 µm (0.000787 ")	< 3 µm (< 0.000118 ")
X-LSM050B-E03	0.1905 µm	50.8 mm (2.000 ")	25 µm (0.000984 ")	< 6 µm (< 0.000236 ")
X-LSM050B-SE03	0.1905 µm	50.8 mm (2.000 ")	25 µm (0.000984 ")	< 6 µm (< 0.000236 ")
X-LSM100A-E03	0.047625 µm	101.6 mm (4.000 ")	35 µm (0.001378 ")	< 3 µm (< 0.000118 ")
X-LSM100A-SE03	0.047625 µm	101.6 mm (4.000 ")	35 µm (0.001378 ")	< 3 µm (< 0.000118 ")
X-LSM100B-E03	0.1905 µm	101.6 mm (4.000 ")	45 µm (0.001772 ")	< 6 µm (< 0.000236 ")
X-LSM100B-SE03	0.1905 µm	101.6 mm (4.000 ")	45 µm (0.001772 ")	< 6 µm (< 0.000236 ")
X-LSM150A-E03	0.047625 µm	152.4 mm (6.000 ")	50 µm (0.001968 ")	< 3 µm (< 0.000118 ")
X-LSM150A-SE03	0.047625 µm	152.4 mm (6.000 ")	50 µm (0.001968 ")	< 3 µm (< 0.000118 ")
X-LSM150B-E03	0.1905 µm	152.4 mm (6.000 ")	65 µm (0.002559 ")	< 6 µm (< 0.000236 ")
X-LSM150B-SE03	0.1905 µm	152.4 mm (6.000 ")	65 µm (0.002559 ")	< 6 µm (< 0.000236 ")
X-LSM200A-E03	0.047625 µm	203.2 mm (8.000 ")	60 µm (0.002362 ")	< 3 µm (< 0.000118 ")
X-LSM200A-SE03	0.047625 µm	203.2 mm (8.000 ")	60 µm (0.002362 ")	< 3 µm (< 0.000118 ")
X-LSM200B-E03	0.1905 µm	203.2 mm (8.000 ")	85 µm (0.003346 ")	< 6 µm (< 0.000236 ")
X-LSM200B-SE03	0.1905 µm	203.2 mm (8.000 ")	85 µm (0.003346 ")	< 6 µm (< 0.000236 ")

Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
X-LSM025A-E03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM025A-SE03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM025B-E03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM025B-SE03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM050A-E03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM050A-SE03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM050B-E03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM050B-SE03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM100A-E03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM100A-SE03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM100B-E03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM100B-SE03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM150A-E03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM150A-SE03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM150B-E03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM150B-SE03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM200A-E03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM200A-SE03	< 12 µm (< 0.000472 ")	26 mm/s (1.024 "/s)	0.000029 mm/s (0.000001 "/s)	0.000029 mm/s (0.000001 "/s)
X-LSM200B-E03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)
X-LSM200B-SE03	< 16 µm (< 0.000630 ")	104 mm/s (4.094 "/s)	0.000116 mm/s (0.000005 "/s)	0.000116 mm/s (0.000005 "/s)

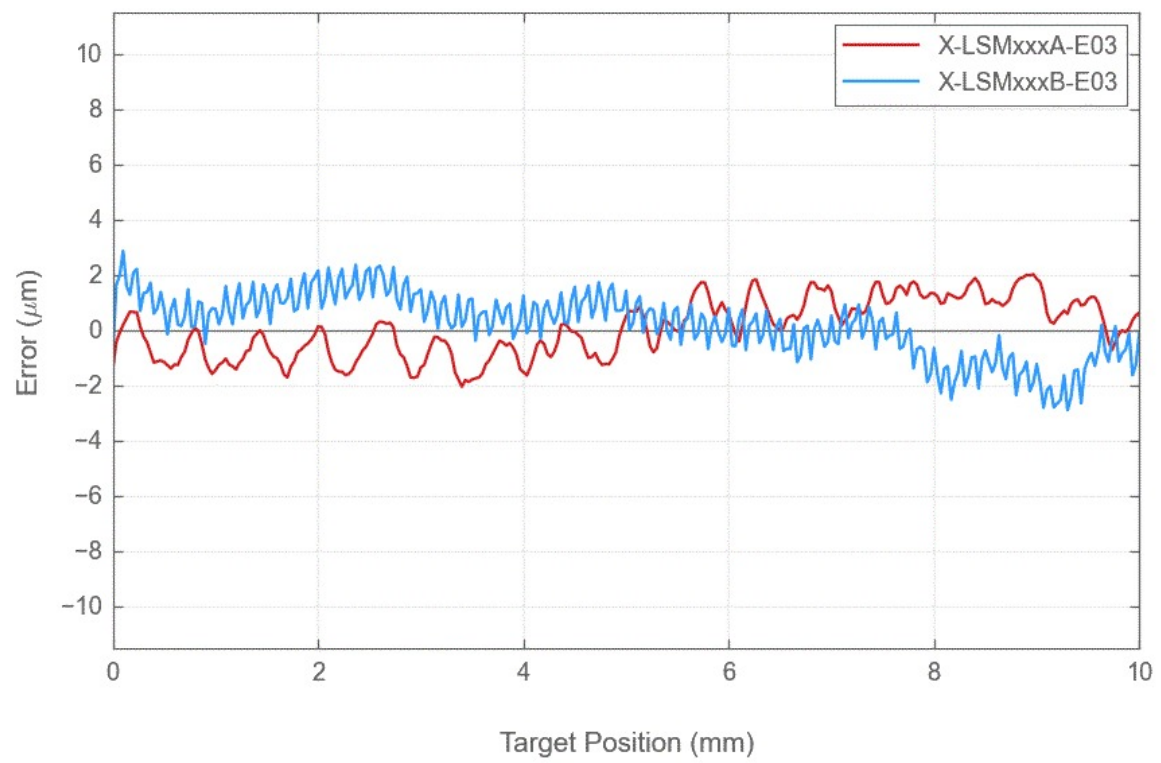
Part Number	Peak Thrust	Pitch	Roll	Yaw
X-LSM025A-E03	55 N (12.3 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM025A-SE03	55 N (12.3 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM025B-E03	25 N (5.6 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM025B-SE03	25 N (5.6 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM050A-E03	55 N (12.3 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM050A-SE03	55 N (12.3 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM050B-E03	25 N (5.6 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM050B-SE03	25 N (5.6 lb)	0.02 ° (0.349 mrad)	0.005 ° (0.087 mrad)	0.02 ° (0.349 mrad)
X-LSM100A-E03	55 N (12.3 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM100A-SE03	55 N (12.3 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM100B-E03	25 N (5.6 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM100B-SE03	25 N (5.6 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM150A-E03	55 N (12.3 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM150A-SE03	55 N (12.3 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM150B-E03	25 N (5.6 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM150B-SE03	25 N (5.6 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM200A-E03	55 N (12.3 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM200A-SE03	55 N (12.3 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM200B-E03	25 N (5.6 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)
X-LSM200B-SE03	25 N (5.6 lb)	0.04 ° (0.698 mrad)	0.02 ° (0.349 mrad)	0.03 ° (0.523 mrad)

Part Number	Linear Motion Per Motor Rev	Manual Control	Weight
X-LSM025A-E03	0.6096 mm (0.024 ")	Yes	0.35 kg (0.772 lb)
X-LSM025A-SE03	0.6096 mm (0.024 ")	No	0.35 kg (0.772 lb)
X-LSM025B-E03	2.4384 mm (0.096 ")	Yes	0.35 kg (0.772 lb)
X-LSM025B-SE03	2.4384 mm (0.096 ")	No	0.35 kg (0.772 lb)
X-LSM050A-E03	0.6096 mm (0.024 ")	Yes	0.36 kg (0.794 lb)
X-LSM050A-SE03	0.6096 mm (0.024 ")	No	0.36 kg (0.794 lb)
X-LSM050B-E03	2.4384 mm (0.096 ")	Yes	0.36 kg (0.794 lb)
X-LSM050B-SE03	2.4384 mm (0.096 ")	No	0.36 kg (0.794 lb)
X-LSM100A-E03	0.6096 mm (0.024 ")	Yes	0.39 kg (0.860 lb)
X-LSM100A-SE03	0.6096 mm (0.024 ")	No	0.39 kg (0.860 lb)
X-LSM100B-E03	2.4384 mm (0.096 ")	Yes	0.39 kg (0.860 lb)
X-LSM100B-SE03	2.4384 mm (0.096 ")	No	0.39 kg (0.860 lb)
X-LSM150A-E03	0.6096 mm (0.024 ")	Yes	0.43 kg (0.948 lb)
X-LSM150A-SE03	0.6096 mm (0.024 ")	No	0.43 kg (0.948 lb)
X-LSM150B-E03	2.4384 mm (0.096 ")	Yes	0.43 kg (0.948 lb)
X-LSM150B-SE03	2.4384 mm (0.096 ")	No	0.43 kg (0.948 lb)
X-LSM200A-E03	0.6096 mm (0.024 ")	Yes	0.46 kg (1.014 lb)
X-LSM200A-SE03	0.6096 mm (0.024 ")	No	0.46 kg (1.014 lb)
X-LSM200B-E03	2.4384 mm (0.096 ")	Yes	0.46 kg (1.014 lb)
X-LSM200B-SE03	2.4384 mm (0.096 ")	No	0.46 kg (1.014 lb)

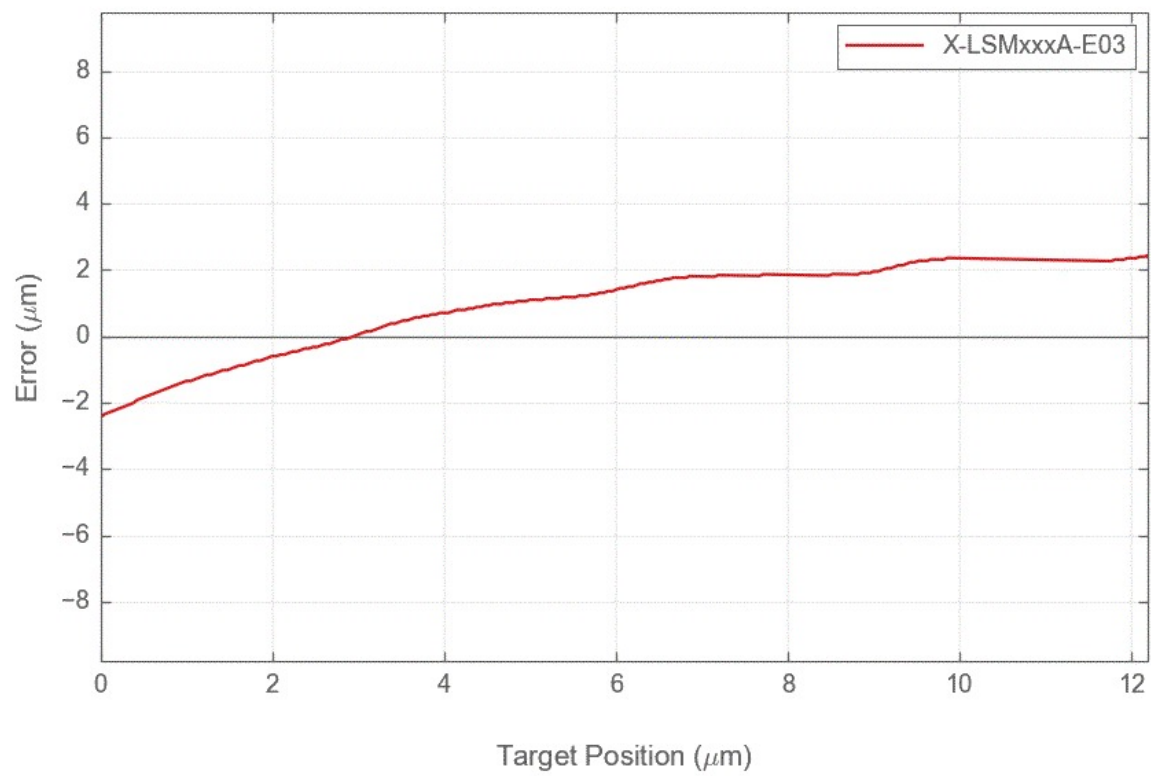
Charts



Typical Accuracy



Typical Microstepping Accuracy



Typical Microstepping Accuracy

