X-LSM-E Series Datasheet

- 25, 50, 100, 150, 200 mm travel
- Up to 104 mm/s speed and up to 55 N thrust
- Recirculating ball bearing design for high load (25 kg) and long lifetime
- Built-in controller; daisy-chains with other Zaber products
- Integrated, 200 CPR, motor mounted encoder provides slip/stall detection and recovery
- Custom versions available

X-LSM-E Series Overview

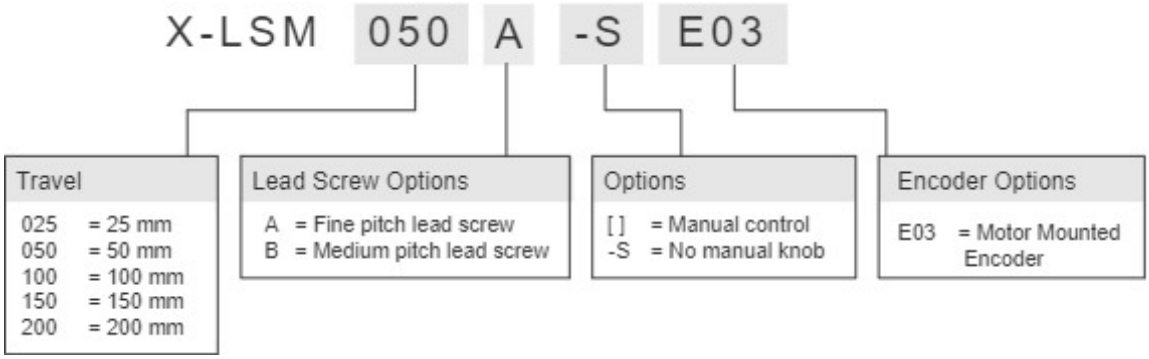
Zaber's X-LSM-E Series devices are computer-controlled, motorized linear stages with high thrust and speed capabilities and a compact size. They are stand-alone units requiring only a standard 24 V or 48 V power supply. The built-in motor encoder allows closed-loop operation and slip/stall recovery features. 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 25 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.

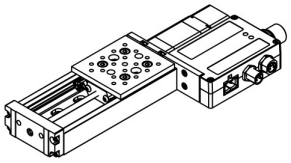
For more information visit: https://www.zaber.comproducts/linear-stages/X-LSM-E

X-LSM-E Series Part Numbering & Options



X-LSM-E Series Drawings

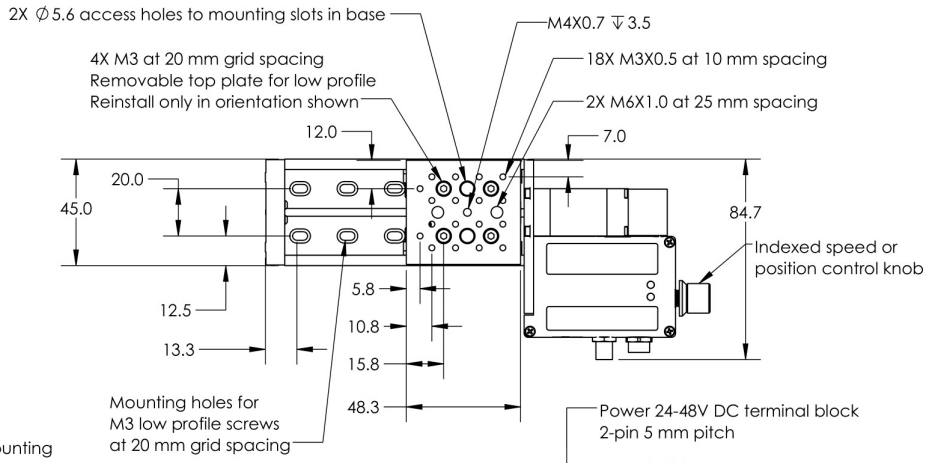
X-LSM-E Miniature Motorized Linear Stage
dimensions in mm

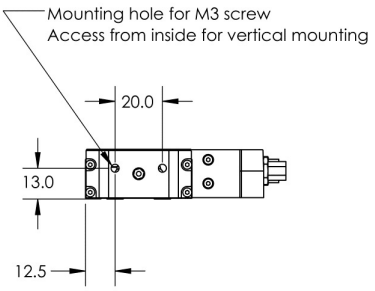


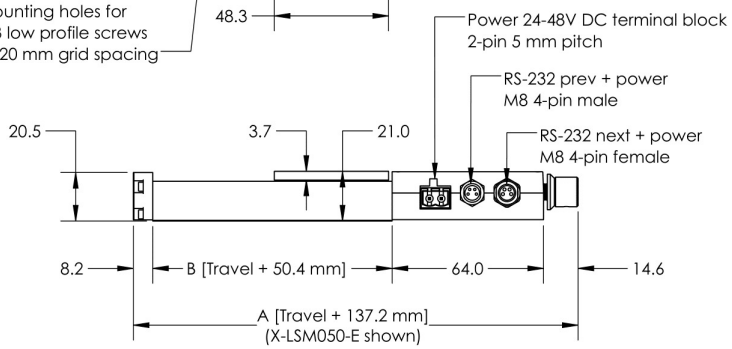
Model Number*	Travel	A **	B
X-LSM025	25.4	162.6	75.8
X-LSM050	50.8	188.0	101.2
X-LSM100	101.6	238.8	152.0
X-LSM150	152.4	289.6	202.8
X-LSM200	203.2	340.4	253.6

*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







DWG 3429 R01

X-LSM-E Series Specifications

Built-in Controller	
Encoder Resolution	200 CPR (800 states/rev)
Encoder Type	Rotary quadrature encoder
Maximum Continuous Thrust	25 N (5.6 lb)
Communication Interface	RS-232
Communication Protocol	Zaber ASCII (Default), Zaber Binary
Data Cable Connection	Locking 4-pin M8
Maximum Centered Load	250 N (56.1 lb)
Maximum Cantilever Load	10 N-m (7.4 ft-lb)
Guide Type	Recirculating ball bearing
Stiffness in Pitch	150 N-m/° (116 µrad/N-m)
Stiffness in Roll	150 N-m/° (116 µrad/N-m)
Stiffness in Yaw	150 N-m/° (116 µrad/N-m)
Power Supply	24-48 VDC
Power Plug	2-pin Screw Terminal
Maximum Current Draw	350 mA
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
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
Stage Parallelism	< 25 µm (< 0.000984")
Operating Temperature Range	0 to 50 °C
RoHS Compliant	Yes
CE Compliant	Yes
Vacuum Compatible	No

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")

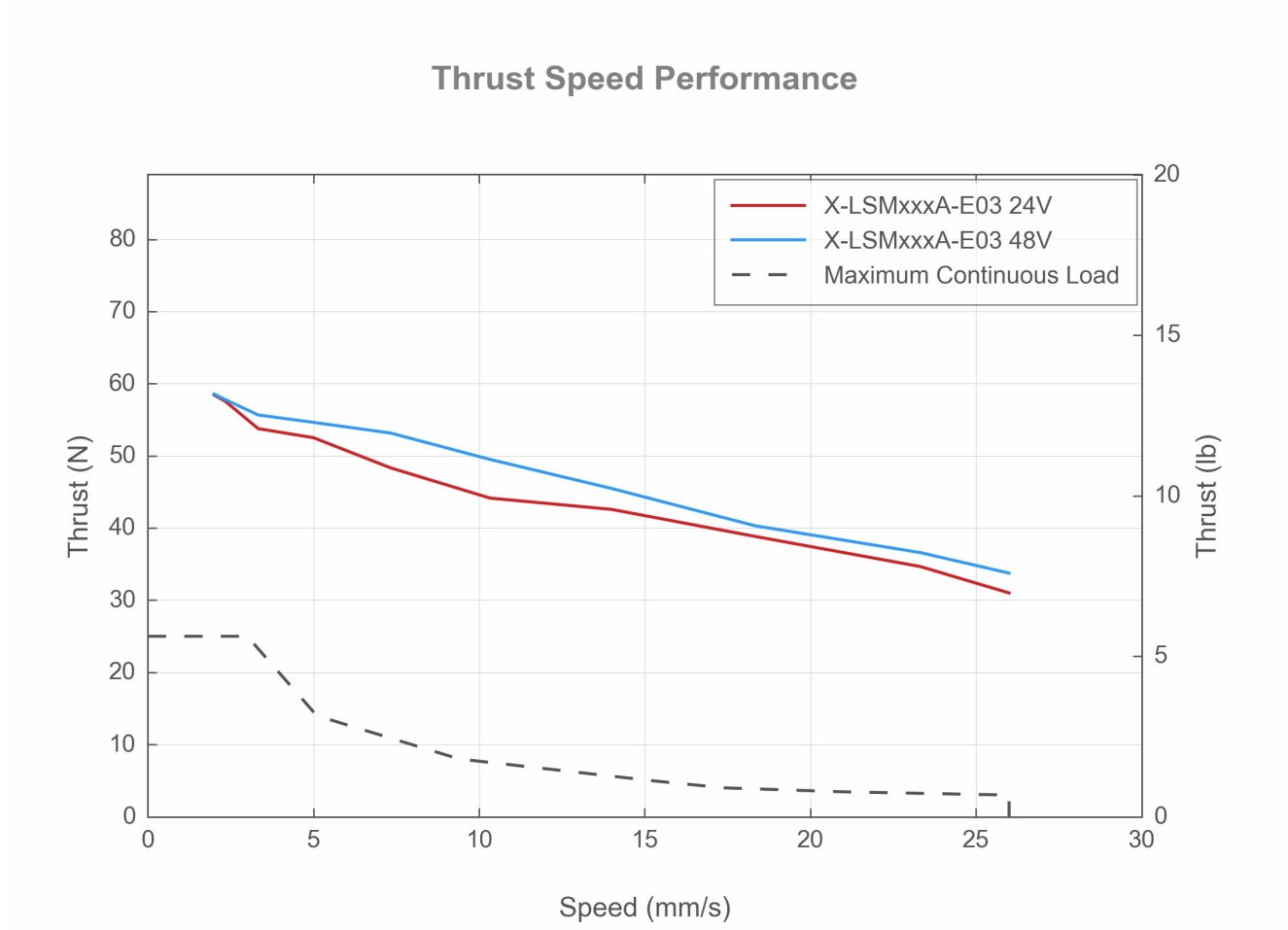
Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
X-LSM025A-E03	< 12 µm (< 0.000472")	26 mm/s (1.024"/s)	0.000029 mm/s (0.000001"/s)	0.000029 mm/s (0.000001"/s)
X-LSM025A-SE03	< 12 µm (< 0.000472")	26 mm/s (1.024"/s)	0.000029 mm/s (0.000001"/s)	0.000029 mm/s (0.000001"/s)
X-LSM025B-E03	< 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	Back-driving Force	Vertical Runout	Horizontal Runout
X-LSM025A-E03	55 N (12.3 lb)	Non-back-driving	< 8 µm (< 0.000315")	< 12 µm (< 0.000472")
X-LSM025A-SE03	55 N (12.3 lb)	Non-back-driving	< 8 µm (< 0.000315")	< 12 µm (< 0.000472")
X-LSM025B-E03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 8 µm (< 0.000315")	< 12 µm (< 0.000472")
X-LSM025B-SE03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 8 µm (< 0.000315")	< 12 µm (< 0.000472")
X-LSM050A-E03	55 N (12.3 lb)	Non-back-driving	< 11 µm (< 0.000433")	< 14 µm (< 0.000551")
X-LSM050A-SE03	55 N (12.3 lb)	Non-back-driving	< 11 µm (< 0.000433")	< 14 µm (< 0.000551")
X-LSM050B-E03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 11 µm (< 0.000433")	< 14 µm (< 0.000551")
X-LSM050B-SE03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 11 µm (< 0.000433")	< 14 µm (< 0.000551")
X-LSM100A-E03	55 N (12.3 lb)	Non-back-driving	< 18 µm (< 0.000709")	< 18 µm (< 0.000709")
X-LSM100A-SE03	55 N (12.3 lb)	Non-back-driving	< 18 µm (< 0.000709")	< 18 µm (< 0.000709")
X-LSM100B-E03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 18 µm (< 0.000709")	< 18 µm (< 0.000709")
X-LSM100B-SE03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 18 µm (< 0.000709")	< 18 µm (< 0.000709")
X-LSM150A-E03	55 N (12.3 lb)	Non-back-driving	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")
X-LSM150A-SE03	55 N (12.3 lb)	Non-back-driving	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")
X-LSM150B-E03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")
X-LSM150B-SE03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")
X-LSM200A-E03	55 N (12.3 lb)	Non-back-driving	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")
X-LSM200A-SE03	55 N (12.3 lb)	Non-back-driving	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")
X-LSM200B-E03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")
X-LSM200B-SE03	25 N (5.6 lb)	(± 30%) 24 N (5.4 lb)	< 20 µm (< 0.000787")	< 20 µm (< 0.000787")

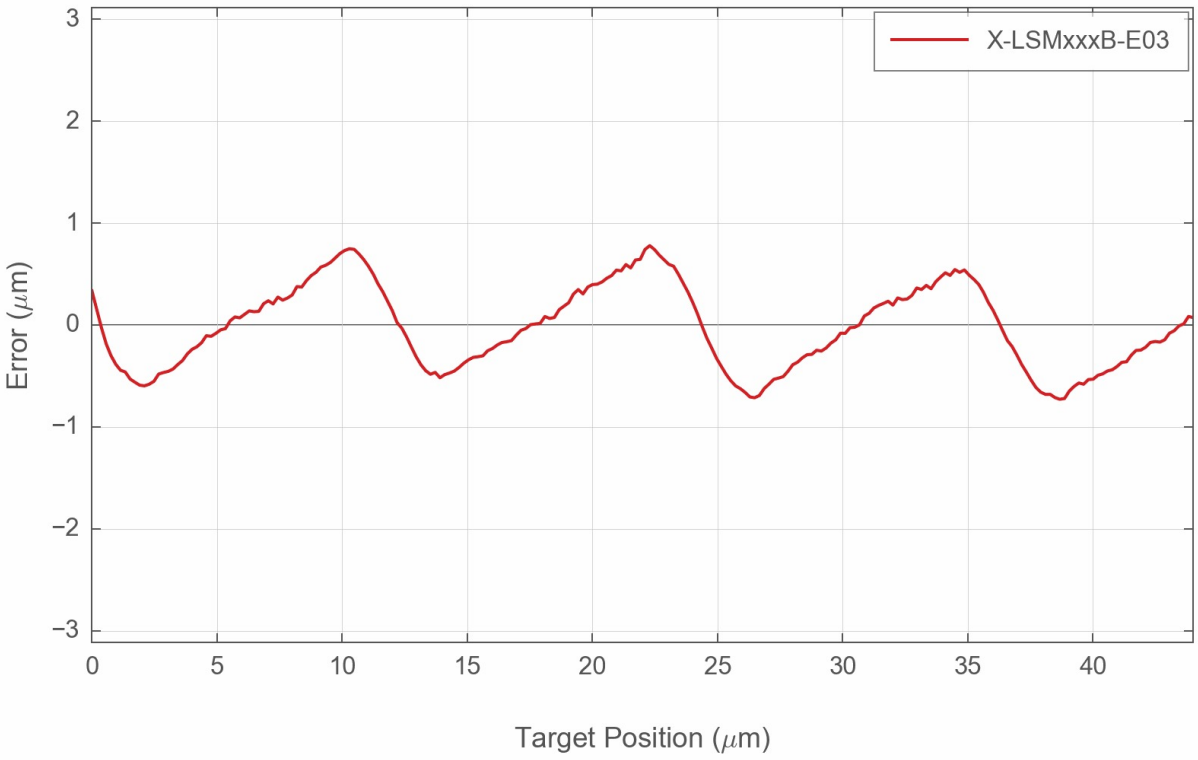
Part Number	Pitch	Roll	Yaw	Linear Motion Per Motor Rev
X-LSM025A-E03	0.02° (0.349 mrad)	0.02° (0.349 mrad)	0.03° (0.523 mrad)	0.6096 mm (0.024")
X-LSM025A-SE03	0.02° (0.349 mrad)	0.02° (0.349 mrad)	0.03° (0.523 mrad)	0.6096 mm (0.024")
X-LSM025B-E03	0.02° (0.349 mrad)	0.02° (0.349 mrad)	0.03° (0.523 mrad)	2.4384 mm (0.096")
X-LSM025B-SE03	0.02° (0.349 mrad)	0.02° (0.349 mrad)	0.03° (0.523 mrad)	2.4384 mm (0.096")
X-LSM050A-E03	0.03° (0.523 mrad)	0.03° (0.523 mrad)	0.03° (0.523 mrad)	0.6096 mm (0.024")
X-LSM050A-SE03	0.03° (0.523 mrad)	0.03° (0.523 mrad)	0.03° (0.523 mrad)	0.6096 mm (0.024")
X-LSM050B-E03	0.03° (0.523 mrad)	0.03° (0.523 mrad)	0.03° (0.523 mrad)	2.4384 mm (0.096")
X-LSM050B-SE03	0.03° (0.523 mrad)	0.03° (0.523 mrad)	0.03° (0.523 mrad)	2.4384 mm (0.096")
X-LSM100A-E03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.04° (0.698 mrad)	0.6096 mm (0.024")
X-LSM100A-SE03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.04° (0.698 mrad)	0.6096 mm (0.024")
X-LSM100B-E03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.04° (0.698 mrad)	2.4384 mm (0.096")
X-LSM100B-SE03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.04° (0.698 mrad)	2.4384 mm (0.096")
X-LSM150A-E03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	0.6096 mm (0.024")
X-LSM150A-SE03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	0.6096 mm (0.024")
X-LSM150B-E03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	2.4384 mm (0.096")
X-LSM150B-SE03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	2.4384 mm (0.096")
X-LSM200A-E03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	0.6096 mm (0.024")
X-LSM200A-SE03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	0.6096 mm (0.024")
X-LSM200B-E03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	2.4384 mm (0.096")
X-LSM200B-SE03	0.035° (0.611 mrad)	0.035° (0.611 mrad)	0.045° (0.785 mrad)	2.4384 mm (0.096")

Part Number	Manual Control	Weight
X-LSM025A-E03	Yes	0.35 kg (0.772 lb)
X-LSM025A-SE03	No	0.35 kg (0.772 lb)
X-LSM025B-E03	Yes	0.35 kg (0.772 lb)
X-LSM025B-SE03	No	0.35 kg (0.772 lb)
X-LSM050A-E03	Yes	0.36 kg (0.794 lb)
X-LSM050A-SE03	No	0.36 kg (0.794 lb)
X-LSM050B-E03	Yes	0.36 kg (0.794 lb)
X-LSM050B-SE03	No	0.36 kg (0.794 lb)
X-LSM100A-E03	Yes	0.39 kg (0.860 lb)
X-LSM100A-SE03	No	0.39 kg (0.860 lb)
X-LSM100B-E03	Yes	0.39 kg (0.860 lb)
X-LSM100B-SE03	No	0.39 kg (0.860 lb)
X-LSM150A-E03	Yes	0.43 kg (0.948 lb)
X-LSM150A-SE03	No	0.43 kg (0.948 lb)
X-LSM150B-E03	Yes	0.43 kg (0.948 lb)
X-LSM150B-SE03	No	0.43 kg (0.948 lb)
X-LSM200A-E03	Yes	0.46 kg (1.014 lb)
X-LSM200A-SE03	No	0.46 kg (1.014 lb)
X-LSM200B-E03	Yes	0.46 kg (1.014 lb)
X-LSM200B-SE03	No	0.46 kg (1.014 lb)

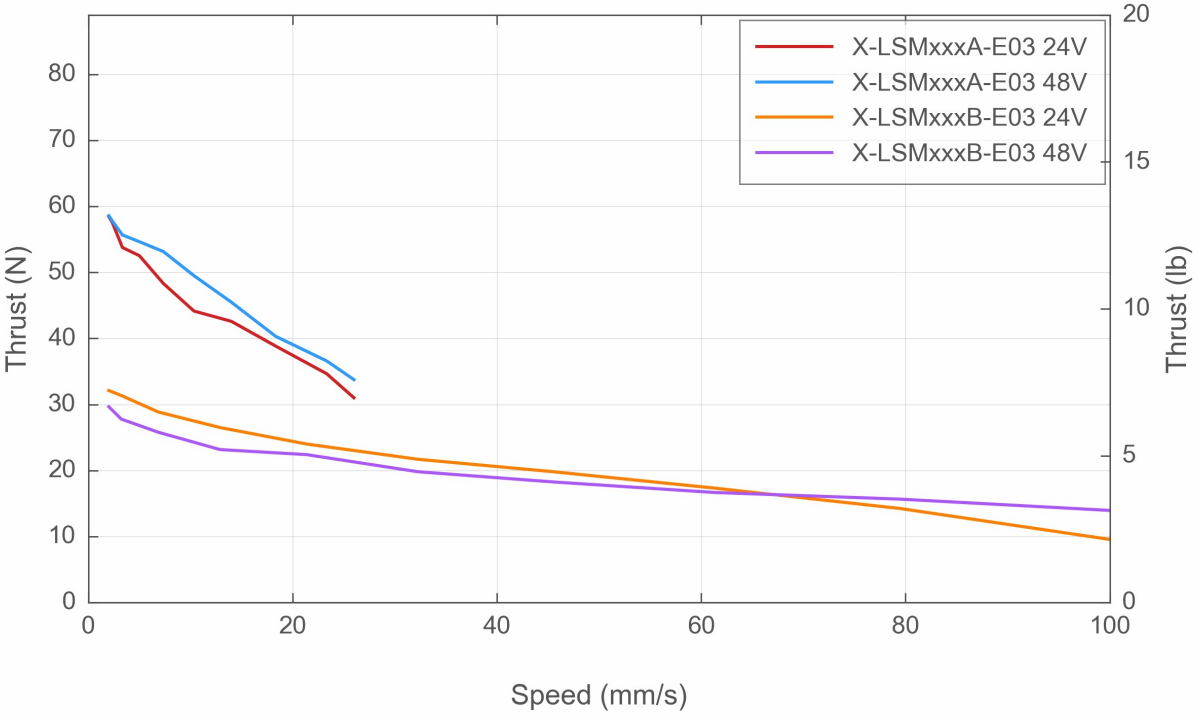
X-LSM-E Series Charts

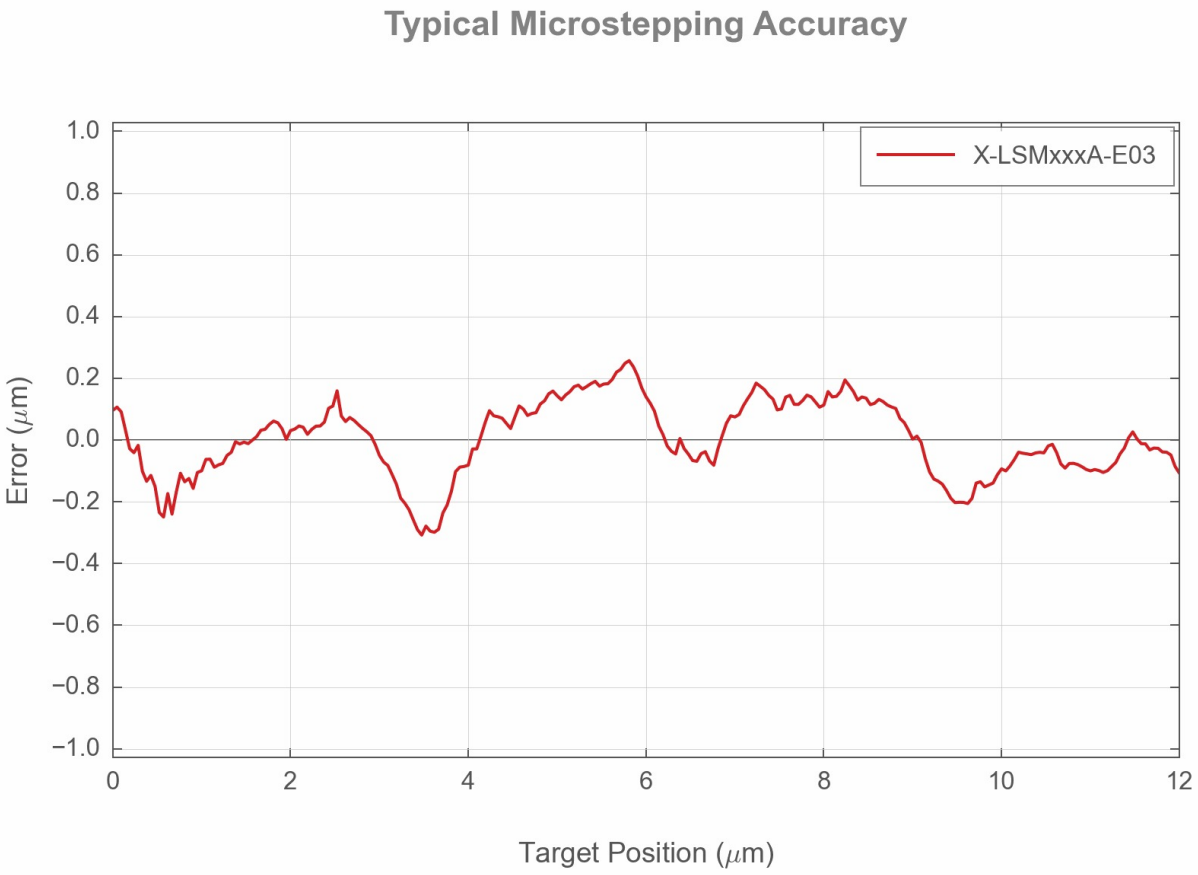


Typical Microstepping Accuracy

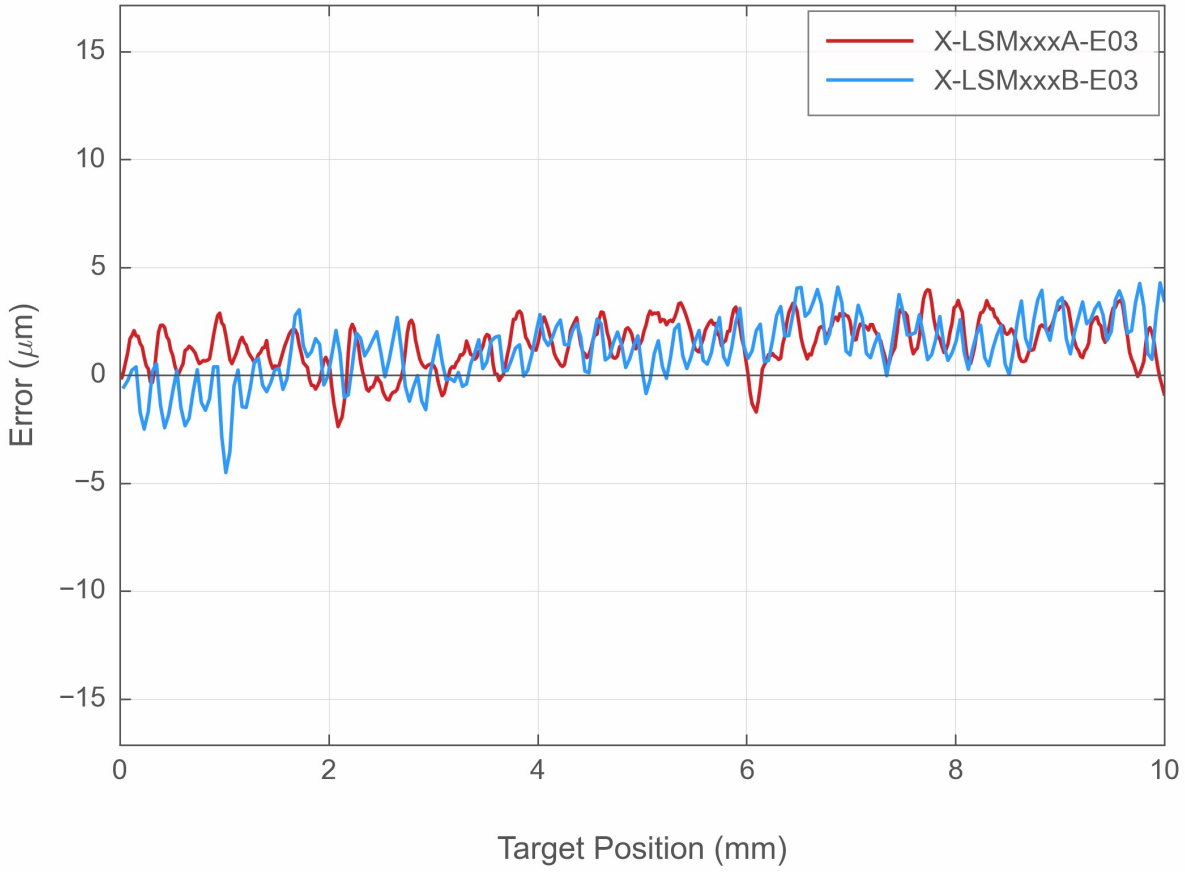


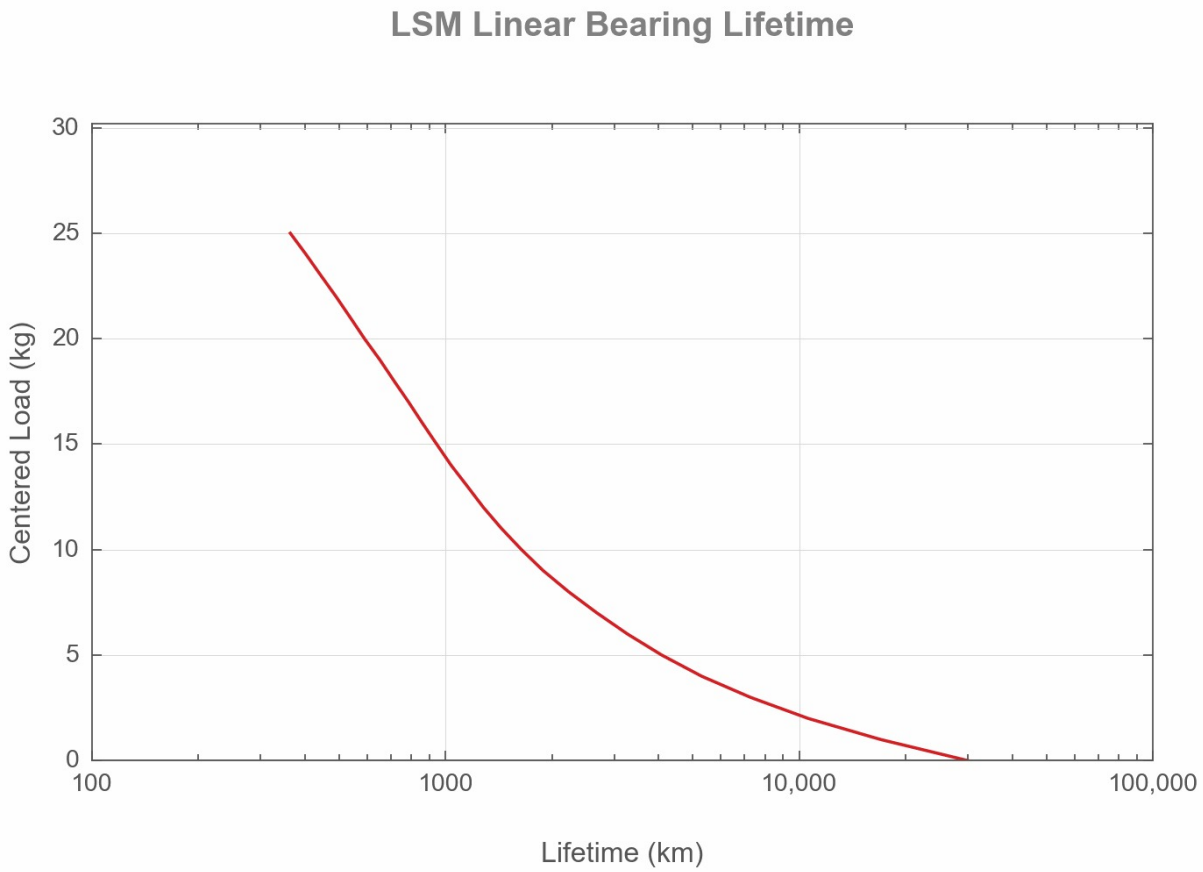
Thrust Speed Performance

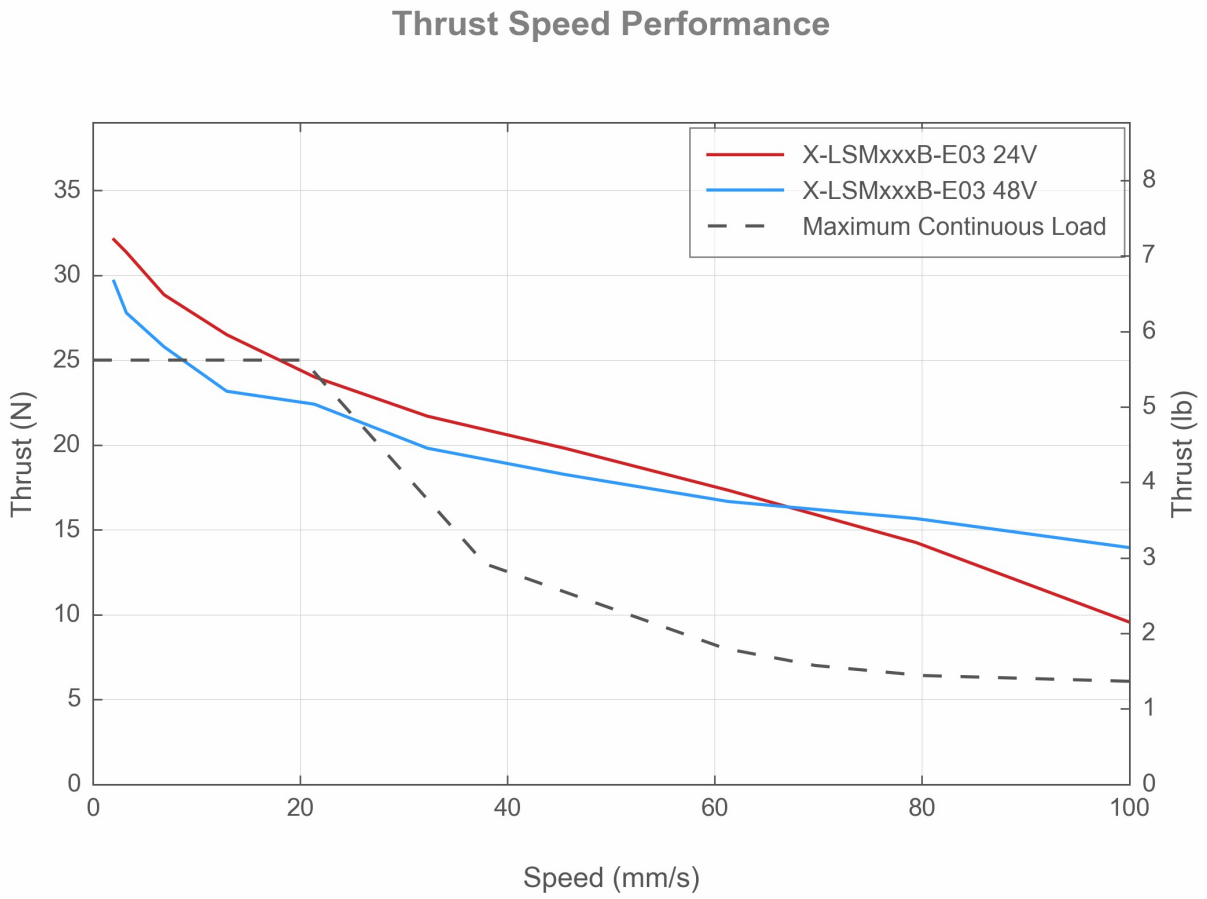



Typical Microstepping Accuracy
X-LSMxxxA-E03
Error (μm)
Target Position (μm)
1.0
0.8
0.6
0.4
0.2
0.0
−0.2
−0.4
−0.6
−0.8
−1.0
0
2
4
6
8
10
12

Typical Accuracy




LSM Linear Bearing Lifetime
Centered Load (kg)
30
25
20
15
10
5
0
100
1000
10,000
100,000
Lifetime (km)



Contact

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