

X-LSQ-E Series Datasheet



- 75, 150, 300, 450 and 600 mm travel
- 50 kg load capacity
- Up to 1 m/s speed and up to 100 N thrust
- Integrated recirculating ball bearing guide provides exceptional lifetime
- Encoder position feedback with slip/stall detection and automatic recovery
- Built-in controller; daisy-chains with any other Zaber products
- Custom versions available

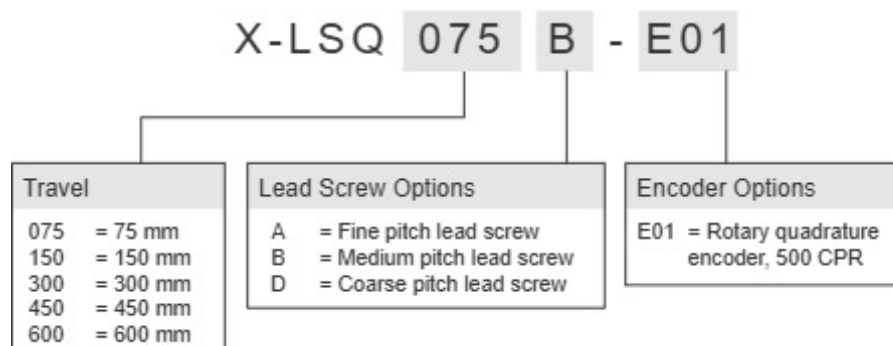
X-LSQ-E Series Overview

Zaber's X-LSQ-E Series products are computer controlled, motorized linear stages with a variety of lead screw pitches and travels. The built-in motor encoder allows closed-loop operation and slip/stall recovery features. They are stand-alone units requiring only a 48 V power supply, included with the kit version. An indexed knob provides convenient manual control for versatile operation even without a computer - press and hold to switch between velocity mode and position mode and push to stop.

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 devices.

For more information visit: <https://www.zaber.com/products/linear-stages/X-LSQ-E>

X-LSQ-E Series Part Numbering & Options



X-LSQ-E Series Drawings

- [X-LSQ-E.png \(Drawing for the X-LSQ-E\)](#)

X-LSQ-E Series Specifications

Built-in Controller	
Encoder Resolution	500 CPR (2000 states/rev)
Encoder Type	Rotary quadrature encoder
Communication Interface	RS-232
Communication Protocol	Zaber ASCII (Default), Zaber Binary
Data Cable Connection	Locking 4-pin M8
Maximum Centered Load	500 N (112.1 lb)
Maximum Moment (Roll)	20 N-m (14.8 ft-lb)
Maximum Moment (Pitch)	6 N-m (4.4 ft-lb)
Maximum Moment (Yaw)	6 N-m (4.4 ft-lb)
Guide Type	Recirculating Ball Linear Guide
Vertical Runout	< 30 μm (< 0.001181")
Pitch	0.06° (1.047 mrad)
Roll	0.03° (0.523 mrad)
Yaw	0.03° (0.523 mrad)
Stiffness in Pitch	150 N-m/° (116 $\mu\text{rad/N-m}$)
Stiffness in Roll	225 N-m/° (78 $\mu\text{rad/N-m}$)
Stiffness in Yaw	150 N-m/° (116 $\mu\text{rad/N-m}$)
Power Supply	24-48 VDC
Power Plug	2-pin Screw Terminal
Maximum Current Draw	1450 mA
Motor Steps Per Rev	200
Motor Type	Stepper (2 phase)
Motor Rated Current	2300 mA/phase
Inductance	2.2 mH/phase
Default Resolution	1/64 of a step
Mechanical Drive System	Precision lead screw
Limit or Home Sensing	Magnetic home sensor
Manual Control	Indexed knob with push switch
Axes of Motion	1
LED Indicators	Yes

Built-in Controller	
Mounting Interface	M6 threaded holes and 8-32 threaded holes
Stage Parallelism	< 100 μm (< 0.003937")
Operating Temperature Range	0 to 50 $^{\circ}\text{C}$
CE Compliant	Yes
Vacuum Compatible	No

Part Number	Microstep Size (Default Resolution)	Travel Range	Accuracy (unidirectional)	Repeatability
X-LSQ075A-E01	0.09921875 μm	75 mm (2.953")	35 μm (0.001378")	< 2 μm (< 0.000079")
X-LSQ075B-E01	0.49609375 μm	75 mm (2.953")	45 μm (0.001772")	< 3 μm (< 0.000118")
X-LSQ075D-E01	1.984375 μm	75 mm (2.953")	80 μm (0.003150")	< 10 μm (< 0.000394")
X-LSQ150A-E01	0.09921875 μm	150 mm (5.905")	45 μm (0.001772")	< 2 μm (< 0.000079")
X-LSQ150B-E01	0.49609375 μm	150 mm (5.905")	50 μm (0.001968")	< 3 μm (< 0.000118")
X-LSQ150D-E01	1.984375 μm	150 mm (5.905")	100 μm (0.003937")	< 10 μm (< 0.000394")
X-LSQ300A-E01	0.09921875 μm	300 mm (11.811")	90 μm (0.003543")	< 2 μm (< 0.000079")
X-LSQ300B-E01	0.49609375 μm	300 mm (11.811")	65 μm (0.002559")	< 3 μm (< 0.000118")
X-LSQ300D-E01	1.984375 μm	300 mm (11.811")	145 μm (0.005709")	< 10 μm (< 0.000394")
X-LSQ450A-E01	0.09921875 μm	450 mm (17.716")	135 μm (0.005315")	< 2 μm (< 0.000079")
X-LSQ450B-E01	0.49609375 μm	450 mm (17.716")	75 μm (0.002953")	< 3 μm (< 0.000118")
X-LSQ450D-E01	1.984375 μm	450 mm (17.716")	185 μm (0.007283")	< 10 μm (< 0.000394")
X-LSQ600A-E01	0.09921875 μm	600 mm (23.622")	180 μm (0.007087")	< 2 μm (< 0.000079")
X-LSQ600B-E01	0.49609375 μm	600 mm (23.622")	100 μm (0.003937")	< 3 μm (< 0.000118")
X-LSQ600D-E01	1.984375 μm	600 mm (23.622")	230 μm (0.009055")	< 10 μm (< 0.000394")

Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
X-LSQ075A-E01	< 15 μm (< 0.000591")	53 mm/s (2.087"/s)	0.000061 mm/s (0.000002"/s)	0.000061 mm/s (0.000002"/s)
X-LSQ075B-E01	< 18 μm (< 0.000709")	280 mm/s (11.024"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
X-LSQ075D-E01	< 75 μm (< 0.002953")	1000 mm/s (39.370"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
X-LSQ150A-E01	< 15 μm (< 0.000591")	53 mm/s (2.087"/s)	0.000061 mm/s (0.000002"/s)	0.000061 mm/s (0.000002"/s)
X-LSQ150B-E01	< 18 μm (< 0.000709")	280 mm/s (11.024"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
X-LSQ150D-E01	< 75 μm (< 0.002953")	1000 mm/s (39.370"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
X-LSQ300A-E01	< 15 μm (< 0.000591")	53 mm/s (2.087"/s)	0.000061 mm/s (0.000002"/s)	0.000061 mm/s (0.000002"/s)
X-LSQ300B-E01	< 18 μm (< 0.000709")	280 mm/s (11.024"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
X-LSQ300D-E01	< 75 μm (< 0.002953")	1000 mm/s (39.370"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
X-LSQ450A-E01	< 15 μm (< 0.000591")	46 mm/s (1.811"/s)	0.000061 mm/s (0.000002"/s)	0.000061 mm/s (0.000002"/s)
X-LSQ450B-E01	< 18 μm (< 0.000709")	240 mm/s (9.449"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
X-LSQ450D-E01	< 75 μm (< 0.002953")	1000 mm/s (39.370"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
X-LSQ600A-E01	< 15 μm (< 0.000591")	28 mm/s (1.102"/s)	0.000061 mm/s (0.000002"/s)	0.000061 mm/s (0.000002"/s)
X-LSQ600B-E01	< 18 μm (< 0.000709")	144 mm/s (5.669"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
X-LSQ600D-E01	< 75 μm (< 0.002953")	700 mm/s (27.559"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)

Part Number	Peak Thrust	Back-driving Force*	Maximum Continuous Thrust	Horizontal Runout
X-LSQ075A-E01	275 N (61.7 lb)	Non-back-driving	100 N (22.4 lb)	< 20 μm (< 0.000787")
X-LSQ075B-E01	120 N (26.9 lb)	($\pm$ 30%) 44 N (9.9 lb)	75 N (16.8 lb)	< 20 μm (< 0.000787")
X-LSQ075D-E01	35 N (7.8 lb)	($\pm$ 30%) 12 N (2.7 lb)	18 N (4.0 lb)	< 20 μm (< 0.000787")
X-LSQ150A-E01	275 N (61.7 lb)	Non-back-driving	100 N (22.4 lb)	< 30 μm (< 0.001181")
		($\pm$ 30%) 44 N		< 30 μm

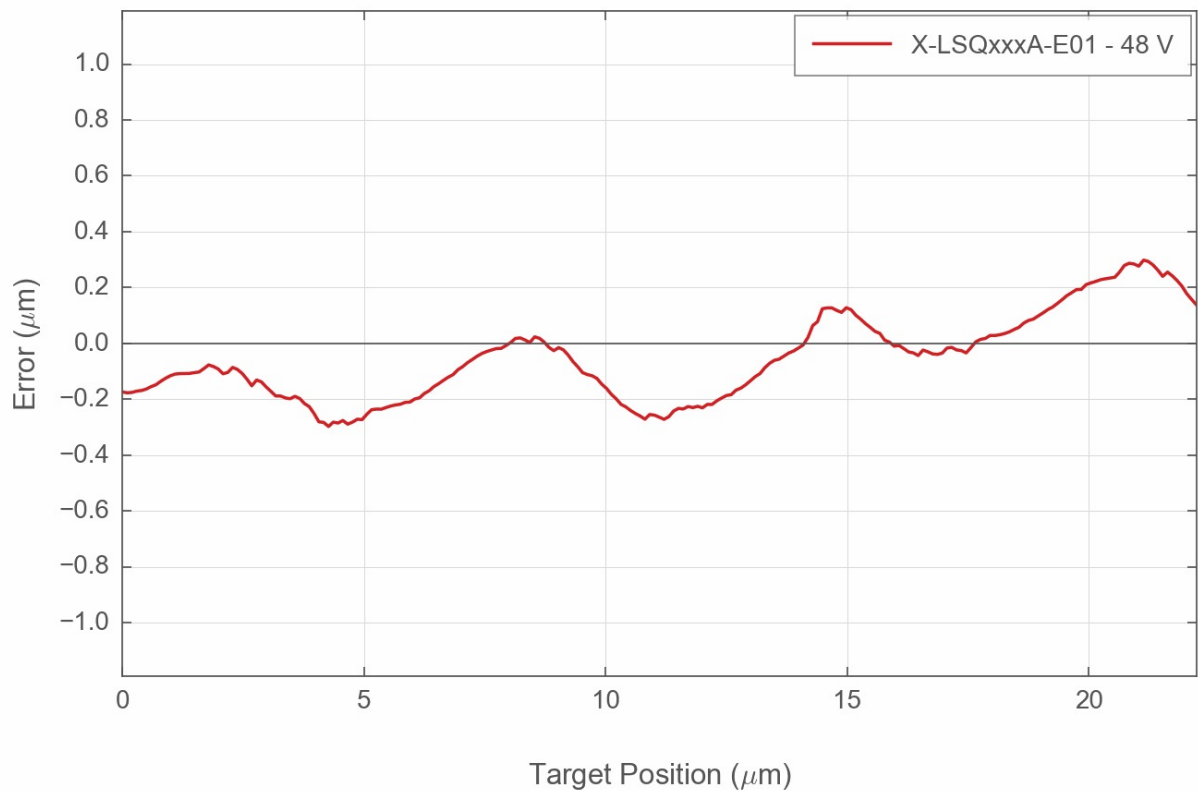
Part Number	Peak Thrust	Back-driving Force*	Maximum Continuous Thrust	Horizontal Runout
X-LSQ150B-E01	120 N (26.9 lb)	(9.9 lb)	75 N (16.8 lb)	(< 0.001181")
X-LSQ150D-E01	35 N (7.8 lb)	(± 30%) 12 N (2.7 lb)	18 N (4.0 lb)	< 30 µm (< 0.001181")
X-LSQ300A-E01	275 N (61.7 lb)	Non-back-driving	100 N (22.4 lb)	< 35 µm (< 0.001378")
X-LSQ300B-E01	120 N (26.9 lb)	(± 30%) 44 N (9.9 lb)	75 N (16.8 lb)	< 35 µm (< 0.001378")
X-LSQ300D-E01	35 N (7.8 lb)	(± 30%) 12 N (2.7 lb)	18 N (4.0 lb)	< 35 µm (< 0.001378")
X-LSQ450A-E01	275 N (61.7 lb)	Non-back-driving	100 N (22.4 lb)	< 40 µm (< 0.001575")
X-LSQ450B-E01	120 N (26.9 lb)	(± 30%) 44 N (9.9 lb)	75 N (16.8 lb)	< 40 µm (< 0.001575")
X-LSQ450D-E01	35 N (7.8 lb)	(± 30%) 12 N (2.7 lb)	18 N (4.0 lb)	< 40 µm (< 0.001575")
X-LSQ600A-E01	275 N (61.7 lb)	Non-back-driving	100 N (22.4 lb)	< 60 µm (< 0.002362")
X-LSQ600B-E01	120 N (26.9 lb)	(± 30%) 44 N (9.9 lb)	75 N (16.8 lb)	< 60 µm (< 0.002362")
X-LSQ600D-E01	35 N (7.8 lb)	(± 30%) 12 N (2.7 lb)	18 N (4.0 lb)	< 60 µm (< 0.002362")

Part Number	Linear Motion Per Motor Rev	Weight
X-LSQ075A-E01	1.27 mm (0.050")	1.20 kg (2.646 lb)
X-LSQ075B-E01	6.35 mm (0.250")	1.20 kg (2.646 lb)
X-LSQ075D-E01	25.4 mm (1.000")	1.20 kg (2.646 lb)
X-LSQ150A-E01	1.27 mm (0.050")	1.40 kg (3.086 lb)
X-LSQ150B-E01	6.35 mm (0.250")	1.40 kg (3.086 lb)
X-LSQ150D-E01	25.4 mm (1.000")	1.40 kg (3.086 lb)
X-LSQ300A-E01	1.27 mm (0.050")	1.80 kg (3.968 lb)
X-LSQ300B-E01	6.35 mm (0.250")	1.80 kg (3.968 lb)
X-LSQ300D-E01	25.4 mm (1.000")	1.80 kg (3.968 lb)
X-LSQ450A-E01	1.27 mm (0.050")	2.30 kg (5.071 lb)
X-LSQ450B-E01	6.35 mm (0.250")	2.30 kg (5.071 lb)
X-LSQ450D-E01	25.4 mm (1.000")	2.30 kg (5.071 lb)
X-LSQ600A-E01	1.27 mm (0.050")	2.90 kg (6.393 lb)

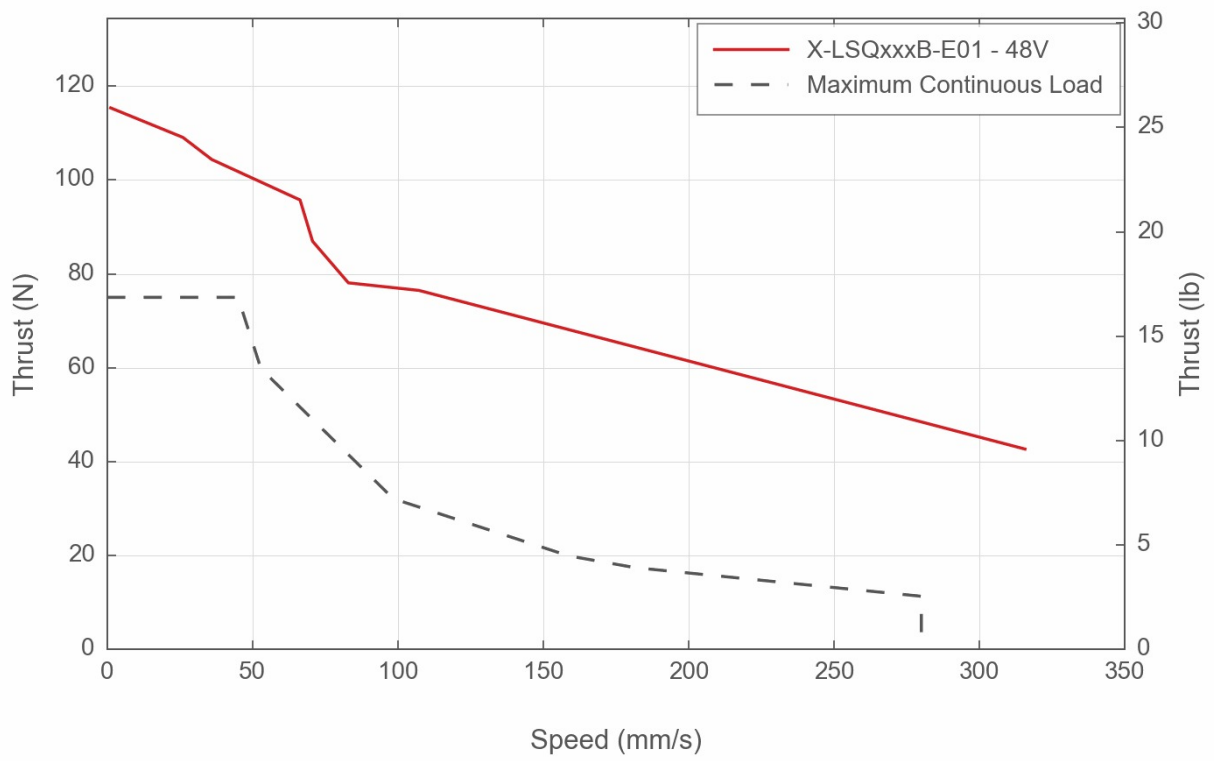
Part Number	Linear Motion Per Motor Rev	Weight
X-LSQ600B-E01	6.35 mm (0.250")	2.90 kg (6.393 lb)
X-LSQ600D-E01	25.4 mm (1.000")	2.90 kg (6.393 lb)

X-LSQ-E Series Charts

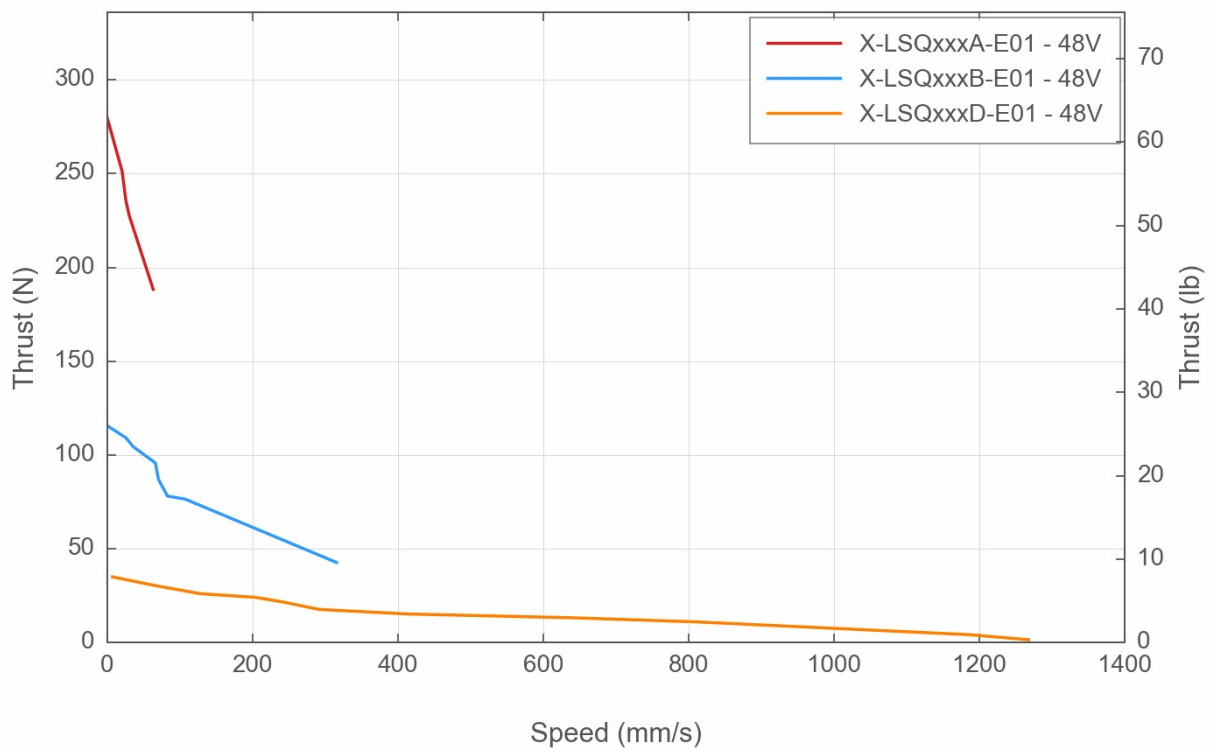
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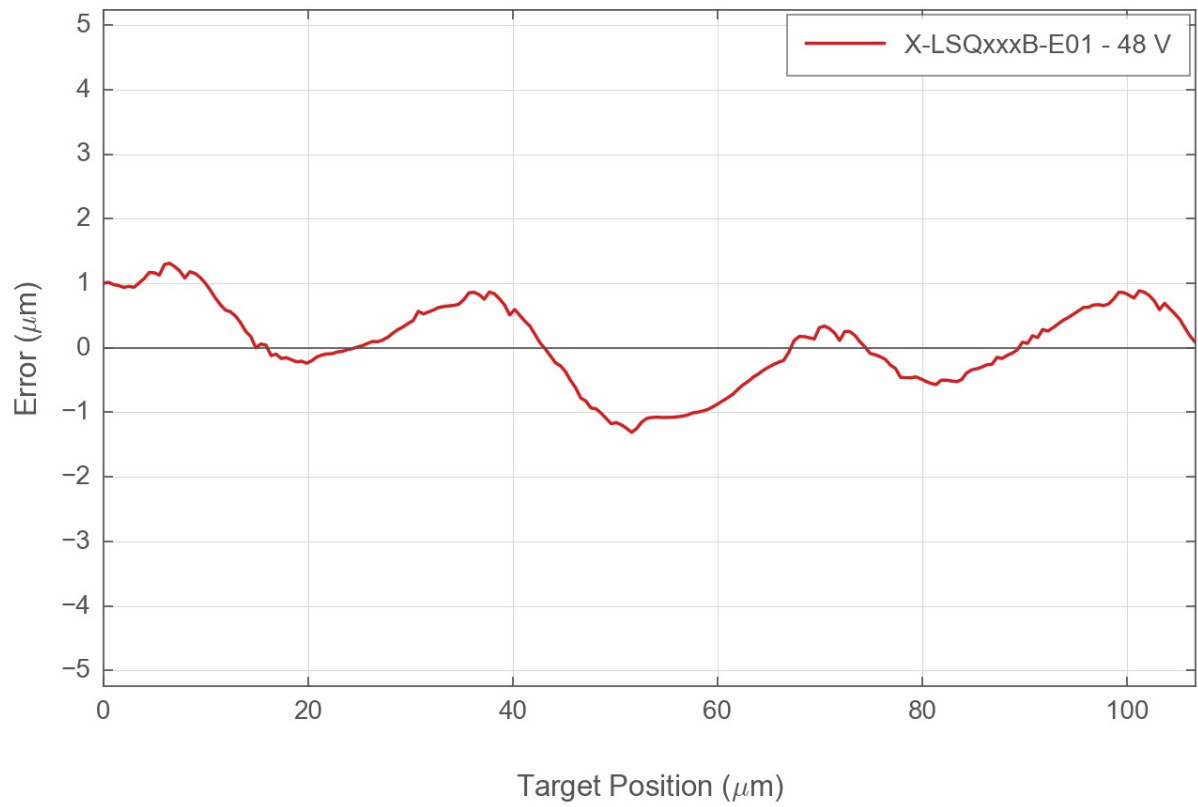
Thrust Speed Performance



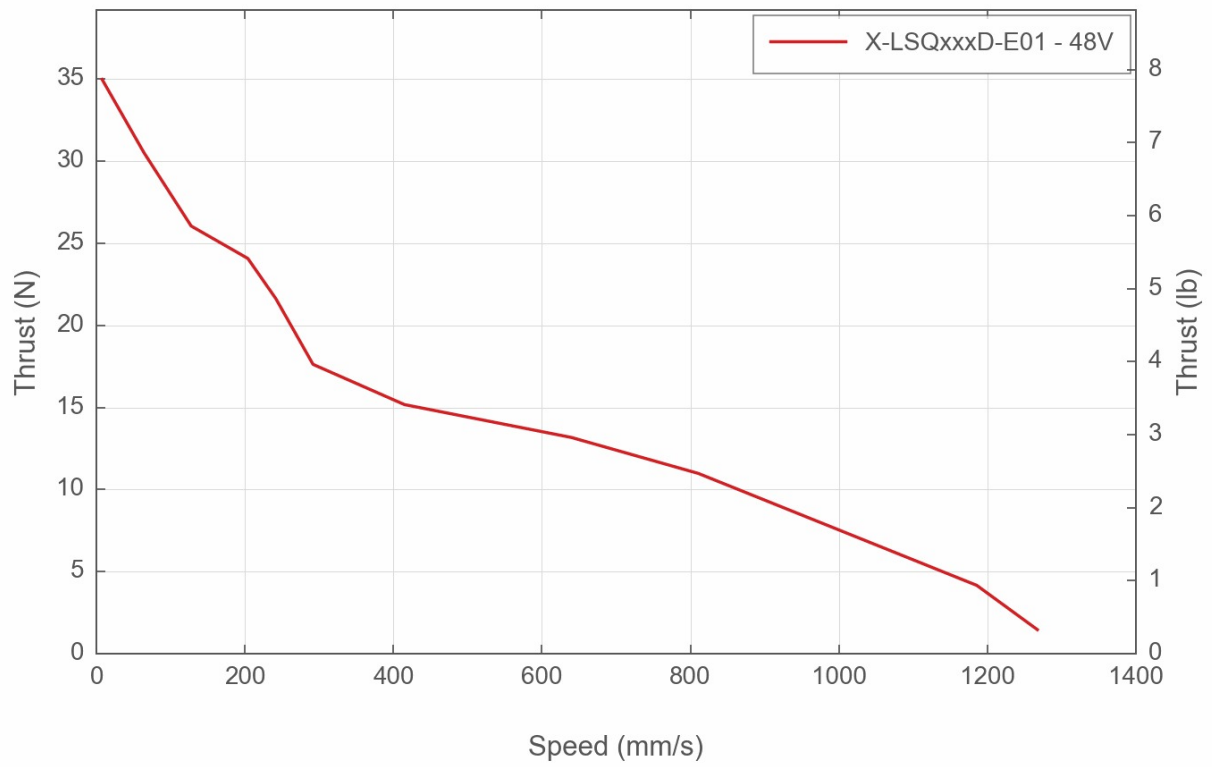
Thrust Speed Performance



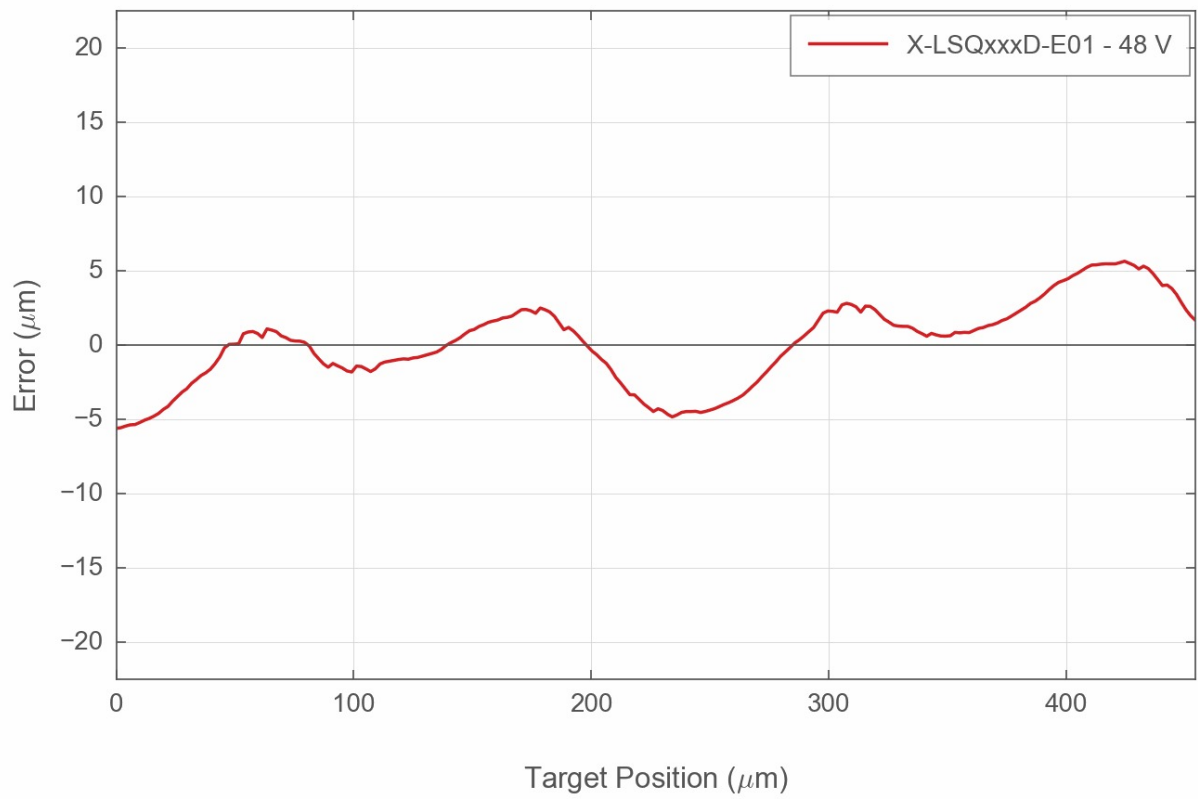
Typical Microstepping Accuracy



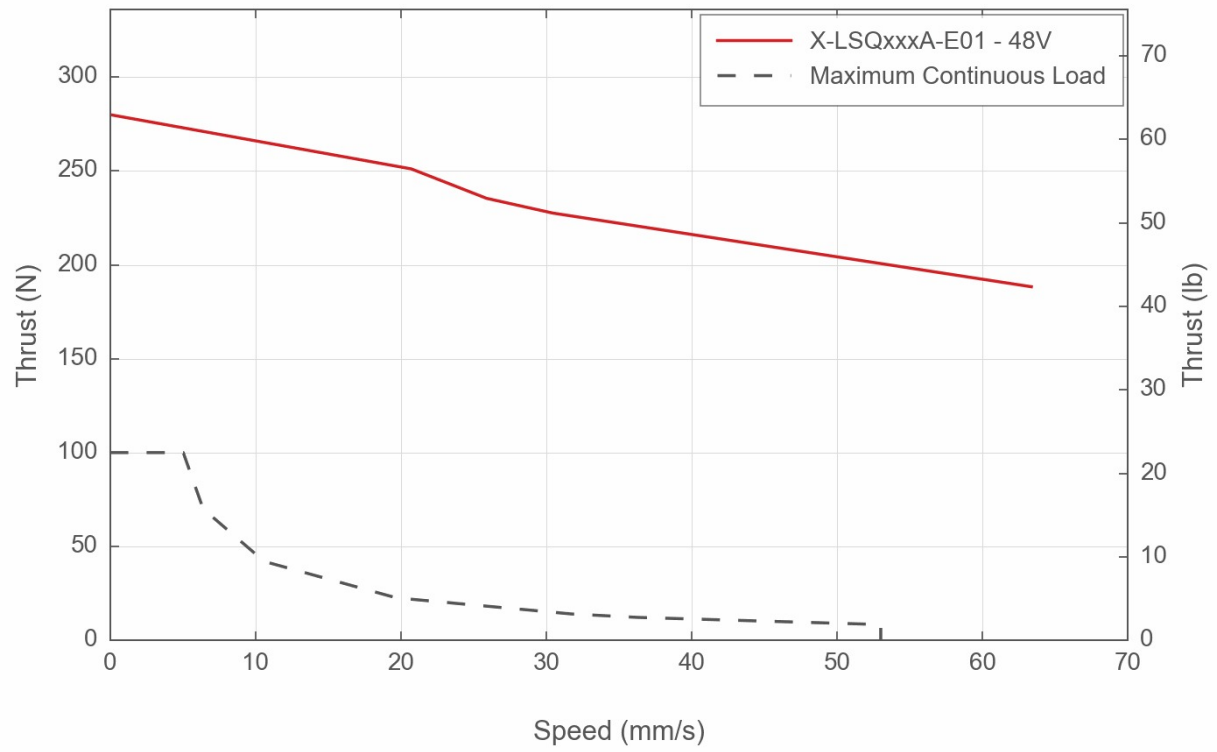
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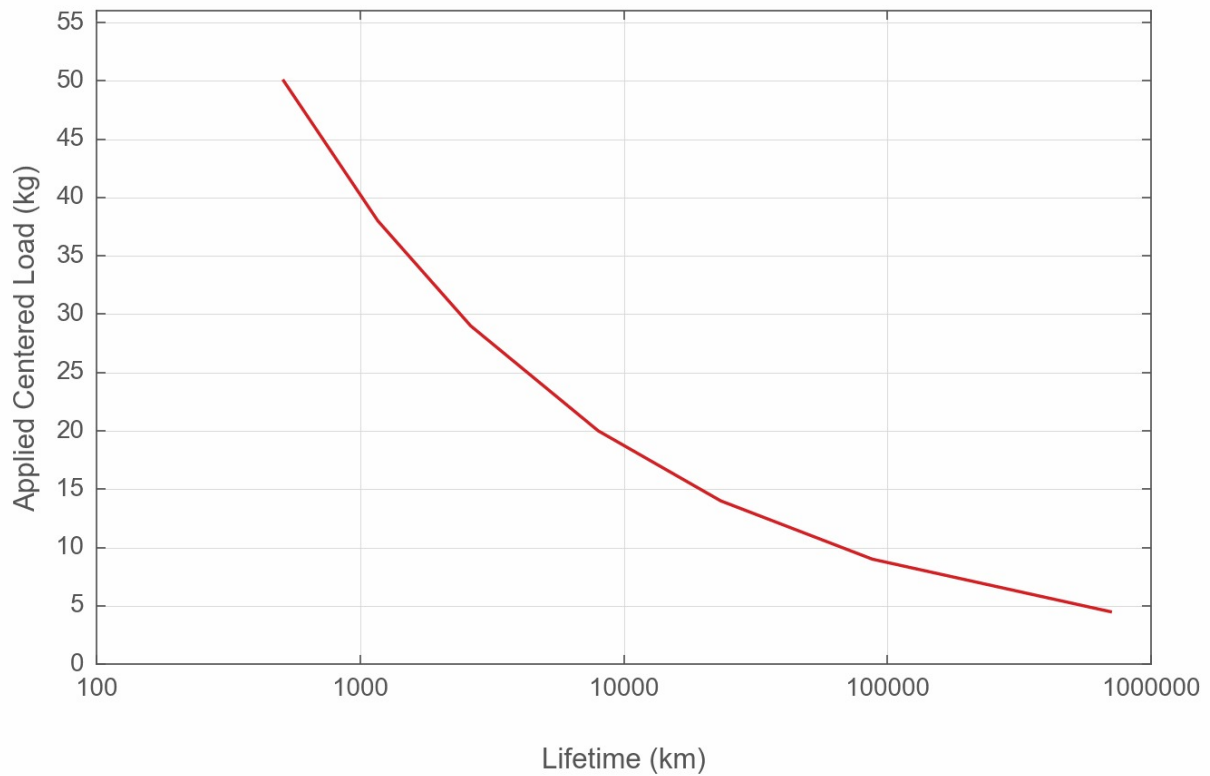
Typical Microstepping Accuracy



Thrust Speed Performance



LSQ Linear Bearing Lifetime



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