

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

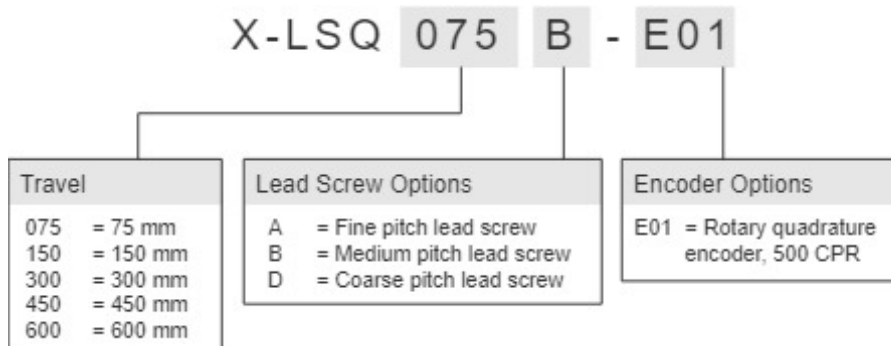
X-LSQ-E Series Overview

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>

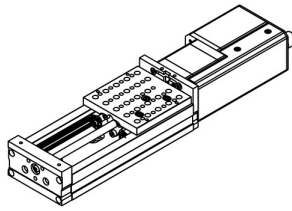
X-LSQ-E Series Part Numbering & Options



X-LSQ-E Series Drawings

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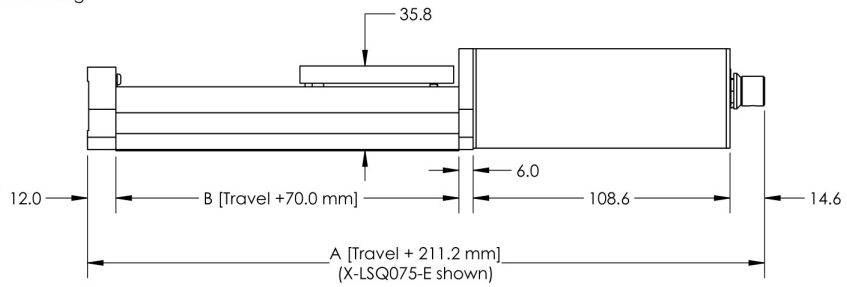
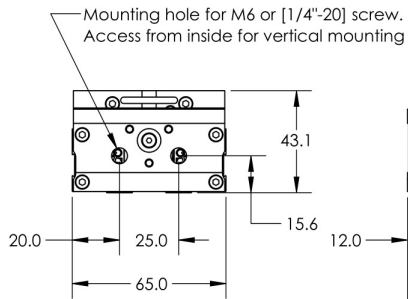
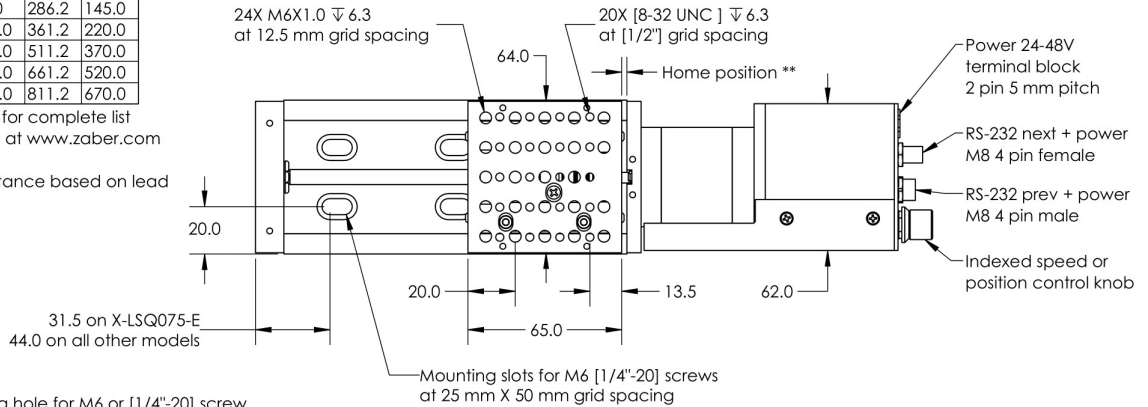
X-LSQ-E Motorized Linear Stage
dimensions in mm



Model Number*	Travel	A	B
X-LSQ075-E	75.0	286.2	145.0
X-LSQ150-E	150.0	361.2	220.0
X-LSQ300-E	300.0	511.2	370.0
X-LSQ450-E	450.0	661.2	520.0
X-LSQ600-E	600.0	811.2	670.0

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

**Home position distance based on lead screw pitch:
A - 2.0 +/- 0.4 mm
B - 2.2 +/- 0.4 mm
D - 2.8 +/- 0.4 mm



DWG-2012-801A

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 Cantilever Load	2000 N-cm (2832.2 oz-in)
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
Mounting Interface	M6 threaded holes and 8-32 threaded holes
Stage Parallelism	< 100 μm (< 0.003937")

Built-in Controller

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-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
	< 15 µm	53 mm/s	0.000061 mm/s	0.000061 mm/s

Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
X-LSQ075A-E01	(< 0.000591")	(2.087"/s)	(0.000002"/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)	(± 30%) 44 N (9.9 lb)	75 N (16.8 lb)	< 20 µm (< 0.000787")
X-LSQ075D-E01	35 N (7.8 lb)	(± 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")

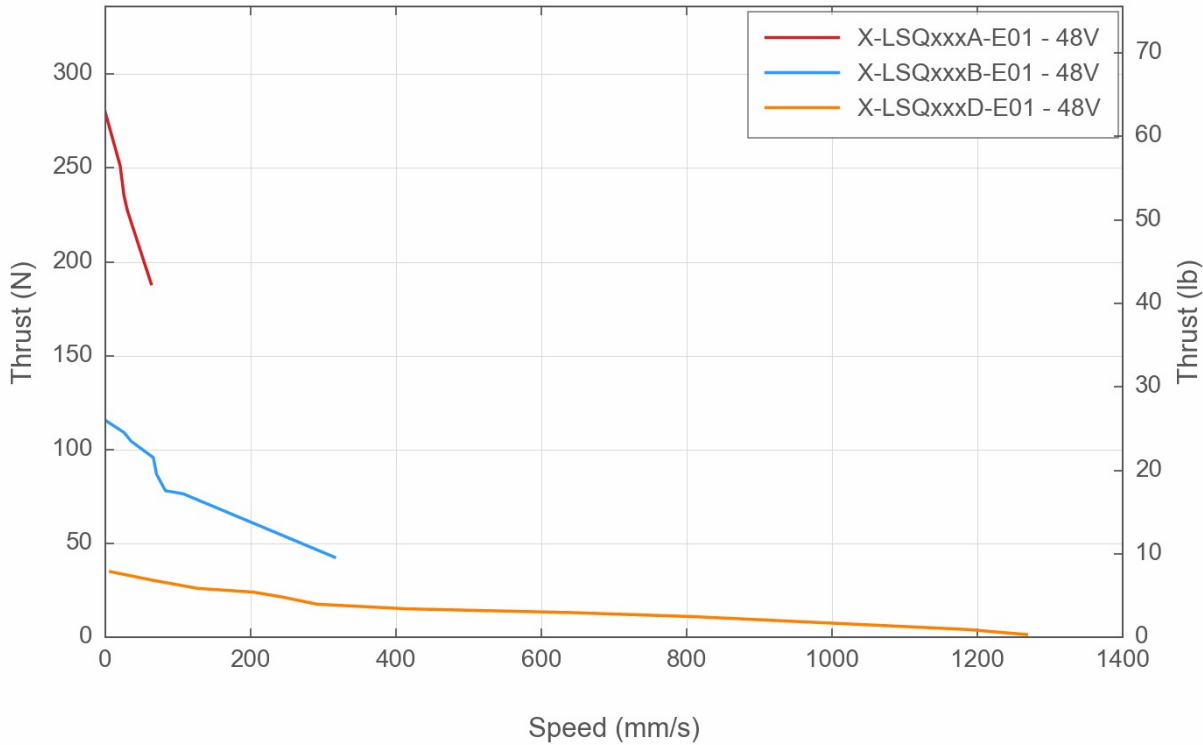
Part Number	Peak Thrust	Back-driving Force	Maximum Continuous Thrust	Horizontal Runout
X-LSQ150B-E01	120 N (26.9 lb)	(± 30%) 44 N (9.9 lb)	75 N (16.8 lb)	< 30 µm (< 0.001181")
X-LSQ150D-E01	35 N (7.8 lb)	(± 30%) 12 N (2.7 lb)	18 N (4.0 lb)	< 30 µm (< 0.001181")
X-LSQ300A-E01	275 N (61.7 lb)	Non-back-driving	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)

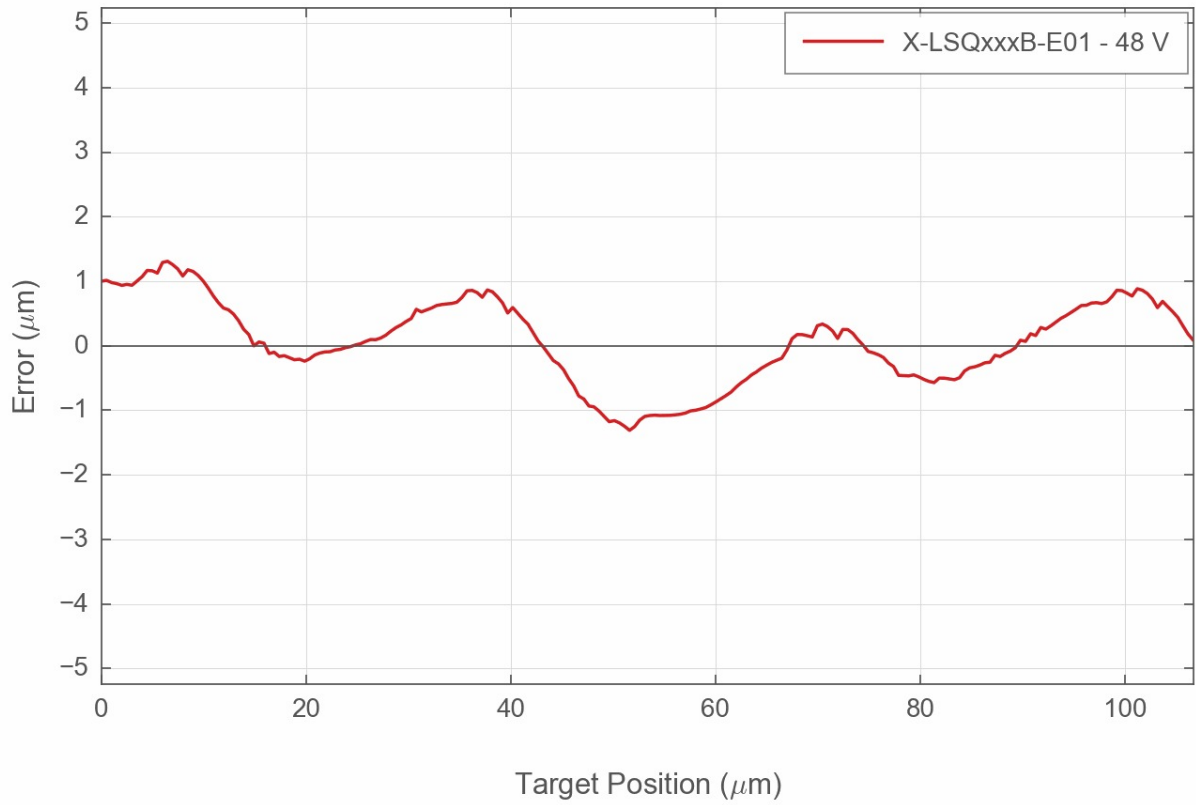
Part Number	Linear Motion Per Motor Rev	Weight
X-LSQ600B-E01	6.35 mm (0.250")	2.90 kg (6.393 lb)
X-LSQ600D-E01	25.4 mm (1.000")	2.90 kg (6.393 lb)

X-LSQ-E Series Charts

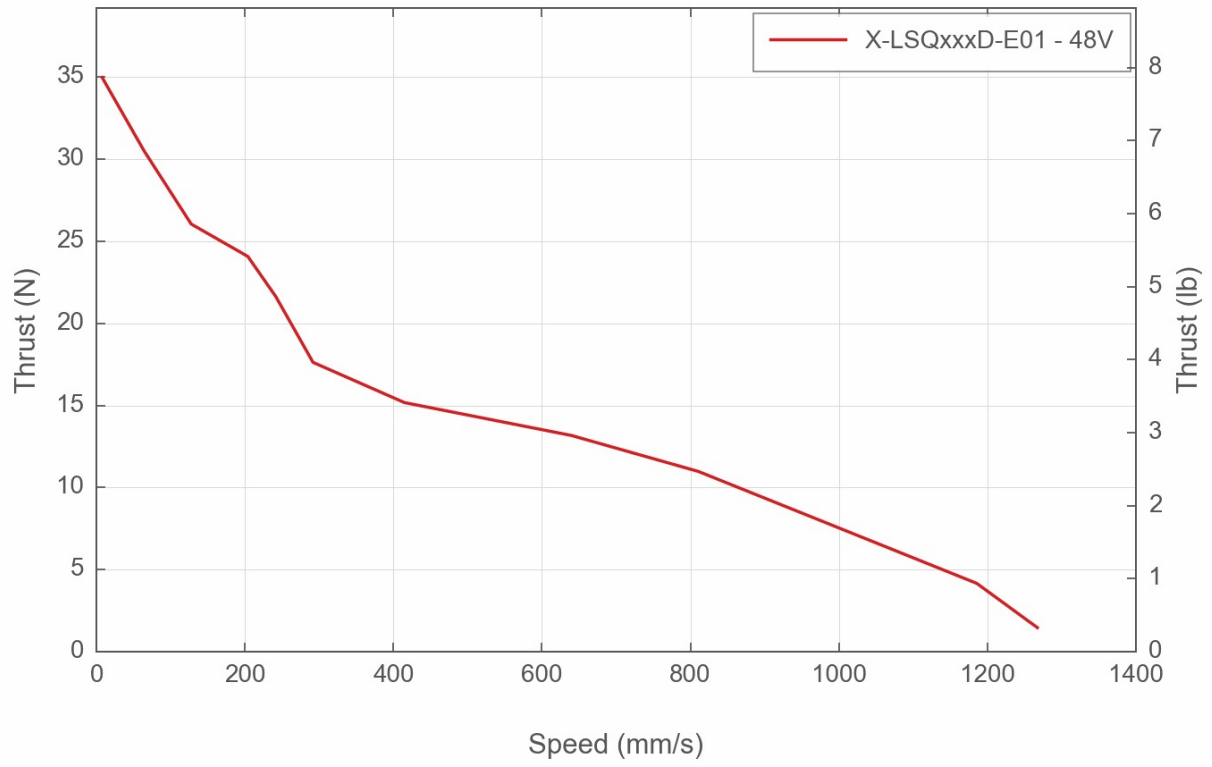
Thrust Speed Performance



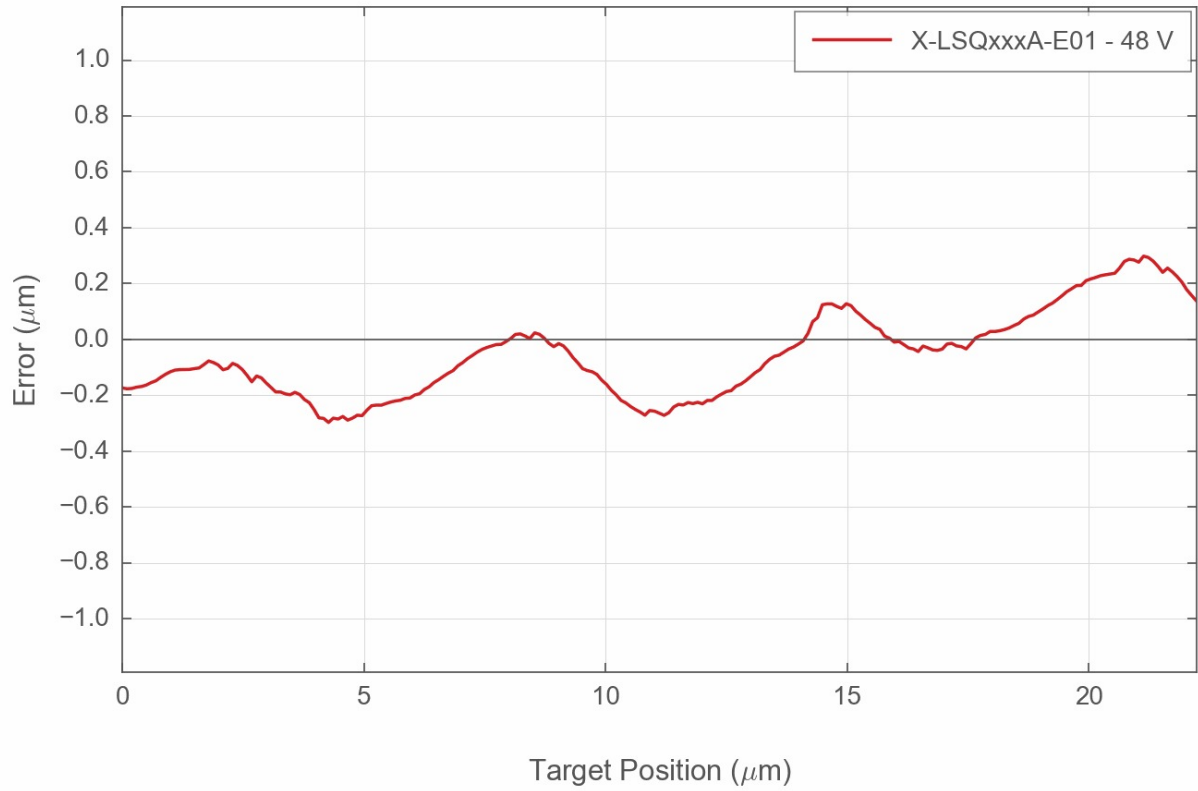
Typical Microstepping Accuracy



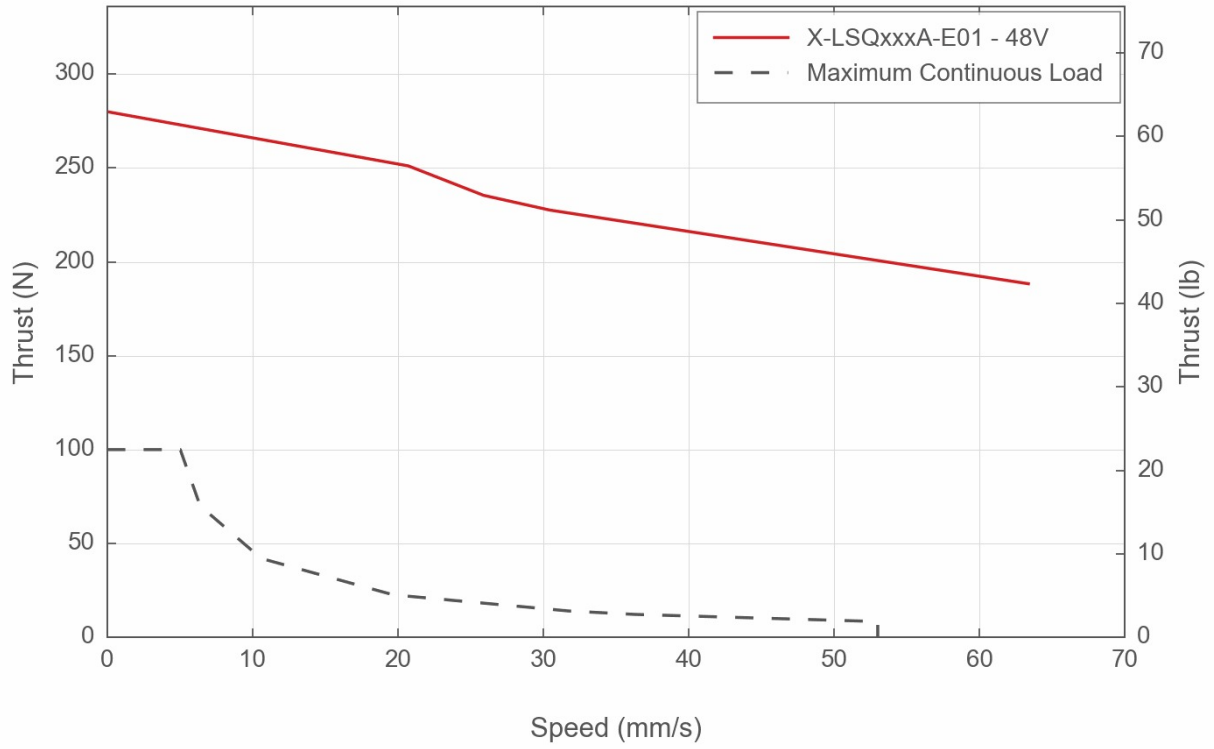
Thrust Speed Performance



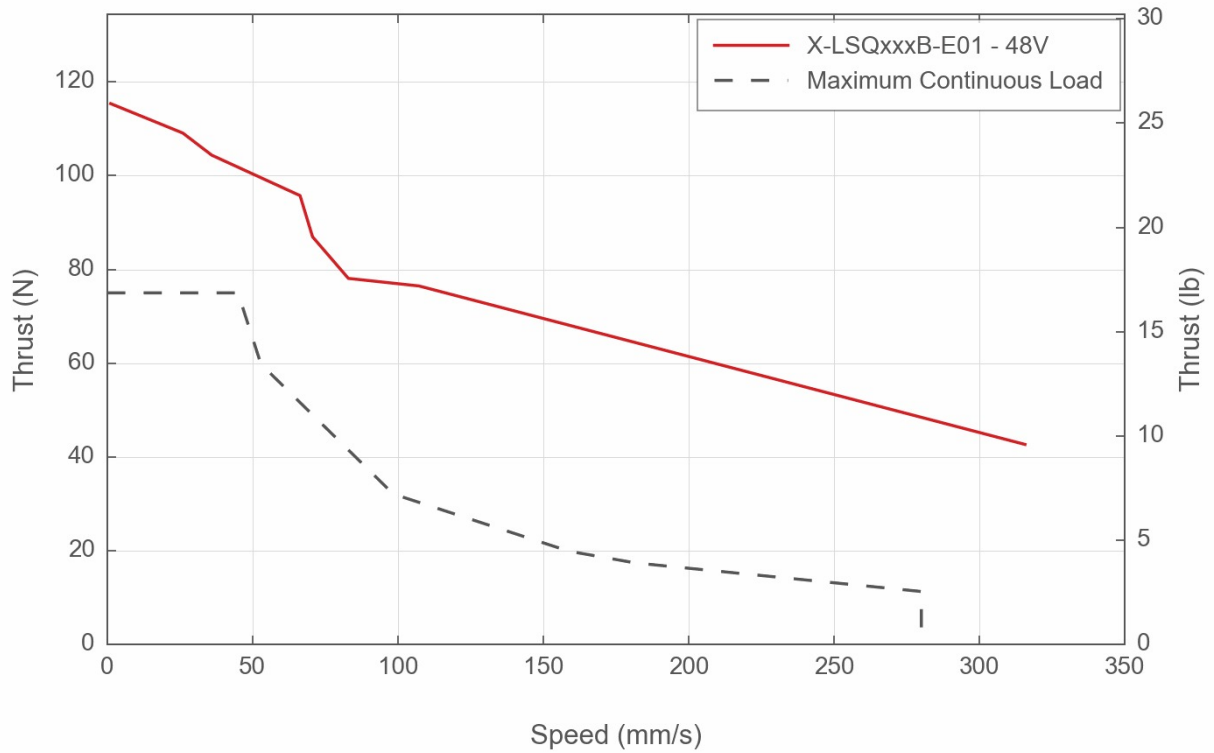
Typical Microstepping Accuracy



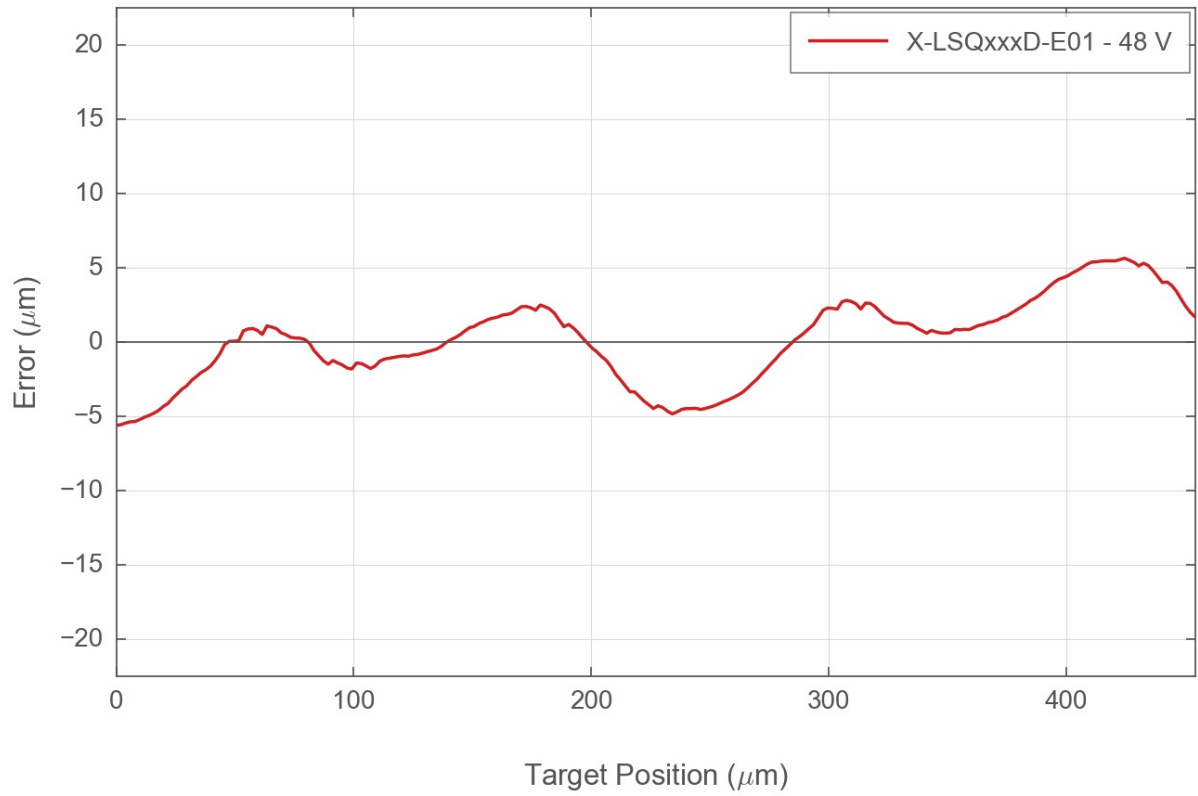
Thrust Speed Performance



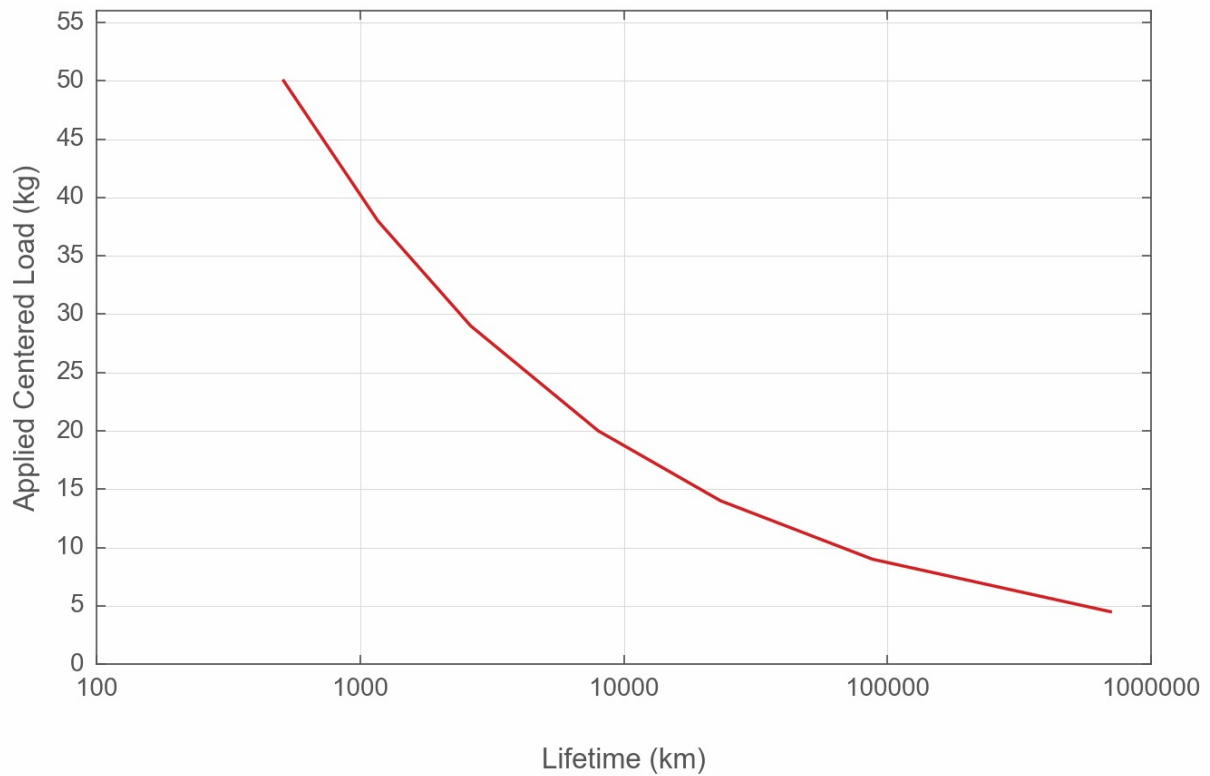
Thrust Speed Performance



Typical Microstepping Accuracy



LSQ Linear Bearing Lifetime



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