X-LSQ Series Datasheet

* 75, 150, 300, 450 and 600 mm travel
* 20 kg load capacity
* Up to 1 m/s speed and up to 100 N thrust
* Built-in controller; daisy-chains with other Zaber products
* Custom versions available

Zaber's X-LSQ Series products are computer controlled, motorized linear stages with a variety of lead screw pitches and travels. They are stand-alone units requiring only a 48 V power supply, included with the kit version.

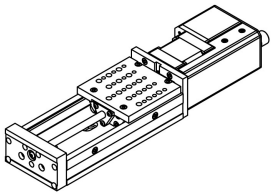
An indexed knob provides convenient manual control for versatile operation even without a computer. The stages connect to the USB 2.0 or RS-232 port of any computer and can be daisy-chained with up to 254 Zaber products per chain. Convenient locking, 4-pin, M8 connectors on the unit allow for secure connection between units. The chain also shares power, so multiple X-Series products can use a single power supply.

Drawings

ZABER

X-LSQ Motorized Linear Stage

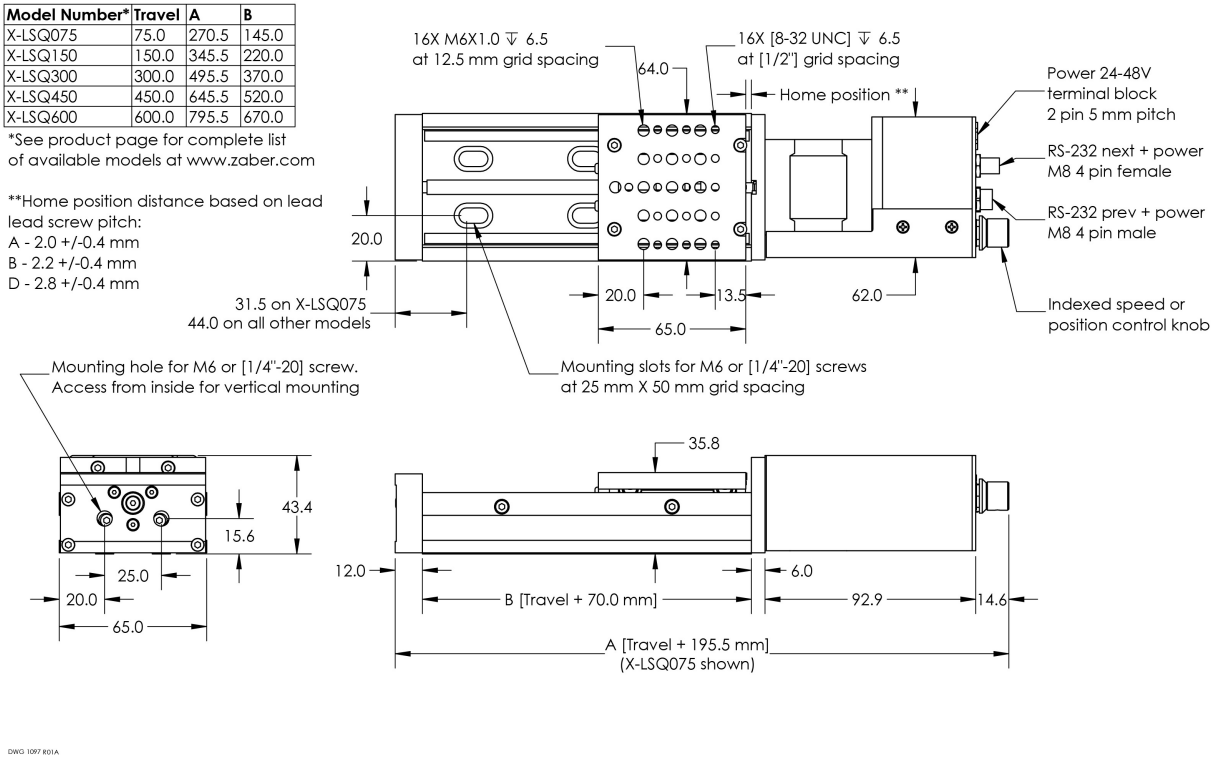
dimensions in mm



Model Number*	Travel	A	B
X-LSQ075	75.0	270.5	145.0
X-LSQ150	150.0	345.5	220.0
X-LSQ300	300.0	495.5	370.0
X-LSQ450	450.0	645.5	520.0
X-LSQ600	600.0	795.5	670.0

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

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



DWG 1097 R01A

Specifications

Specification	Value	Alternate Unit
Built-in Controller	Yes	
Encoder Type	None	
Communication Interface	RS-232	
Communication Protocol	Zaber ASCII (Default), Zaber Binary	
Maximum Centered Load	200 N	44.9 lb
Maximum Cantilever Load	800 N-cm	1132.9 oz-in
Guide Type	Roller bearing	
Vertical Runout	< 24 µm	< 0.000945 "
Horizontal Runout	< 26 µm	< 0.001024 "
Pitch	0.075 °	1.309 mrad
Stiffness in Pitch	150 N-m/°	116 µrad/N-m
Roll	0.04 °	0.698 mrad

Specification	Value	Alternate Unit
Stiffness in Roll	150 N-m/°	116 µrad/N-m
Yaw	0.03 °	0.523 mrad
Stiffness in Yaw	150 N-m/°	116 µrad/N-m
Maximum Current Draw	810 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	1250 mA/phase	
Inductance	2.8 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 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	
Vacuum Compatible	No	
Operating Temperature Range	0 to 50 °C	
Stage Parallelism	< 100 µm	< 0.003937 "
RoHS Compliant	Yes	
CE Compliant	Yes	

Part Number	Microstep Size (Default Resolution)	Travel Range	Accuracy (unidirectional)	Repeatability
X-LSQ075A	0.09921875 µm	75 mm (2.953 ")	35 µm (0.001378 ")	< 2 µm (< 0.000079 ")
X-LSQ075B	0.49609375 µm	75 mm (2.953 ")	45 µm (0.001772 ")	< 2 µm (< 0.000079 ")
X-LSQ075D	1.984375 µm	75 mm (2.953 ")	80 µm (0.003150 ")	< 4 µm (< 0.000157 ")

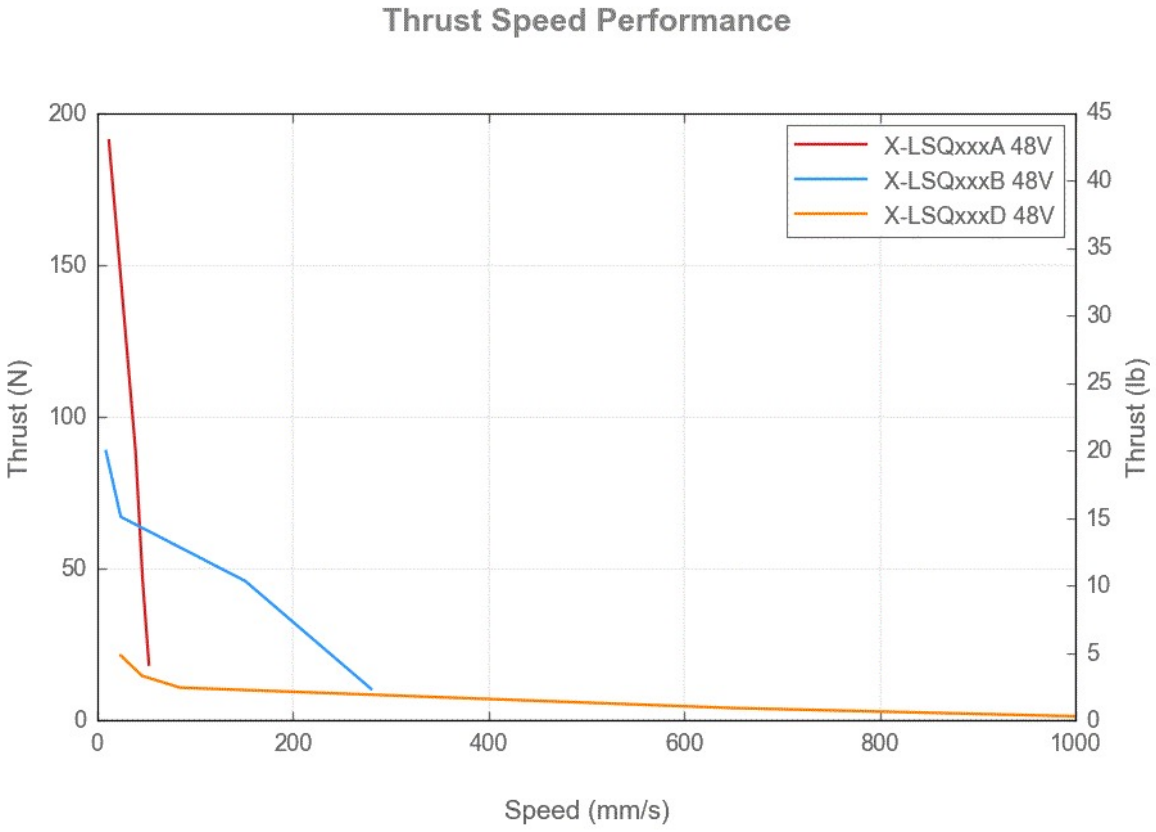
Part Number	Microstep Size (Default Resolution)	Travel Range	Accuracy (unidirectional)	Repeatability
X-LSQ150A	0.09921875 µm	150 mm (5.905 ")	45 µm (0.001772 ")	< 2 µm (< 0.000079 ")
X-LSQ150B	0.49609375 µm	150 mm (5.905 ")	50 µm (0.001968 ")	< 2 µm (< 0.000079 ")
X-LSQ150D	1.984375 µm	150 mm (5.905 ")	100 µm (0.003937 ")	< 4 µm (< 0.000157 ")
X-LSQ300A	0.09921875 µm	300 mm (11.811 ")	90 µm (0.003543 ")	< 2 µm (< 0.000079 ")
X-LSQ300B	0.49609375 µm	300 mm (11.811 ")	65 µm (0.002559 ")	< 2 µm (< 0.000079 ")
X-LSQ300D	1.984375 µm	300 mm (11.811 ")	145 µm (0.005709 ")	< 4 µm (< 0.000157 ")
X-LSQ450A	0.09921875 µm	450 mm (17.716 ")	135 µm (0.005315 ")	< 2 µm (< 0.000079 ")
X-LSQ450B	0.49609375 µm	450 mm (17.716 ")	75 µm (0.002953 ")	< 2 µm (< 0.000079 ")
X-LSQ450D	1.984375 µm	450 mm (17.716 ")	185 µm (0.007283 ")	< 4 µm (< 0.000157 ")
X-LSQ600A	0.09921875 µm	600 mm (23.622 ")	150 µm (0.005905 ")	< 2 µm (< 0.000079 ")
X-LSQ600B	0.49609375 µm	600 mm (23.622 ")	90 µm (0.003543 ")	< 2 µm (< 0.000079 ")
X-LSQ600D	1.984375 µm	600 mm (23.622 ")	230 µm (0.009055 ")	< 4 µm (< 0.000157 ")

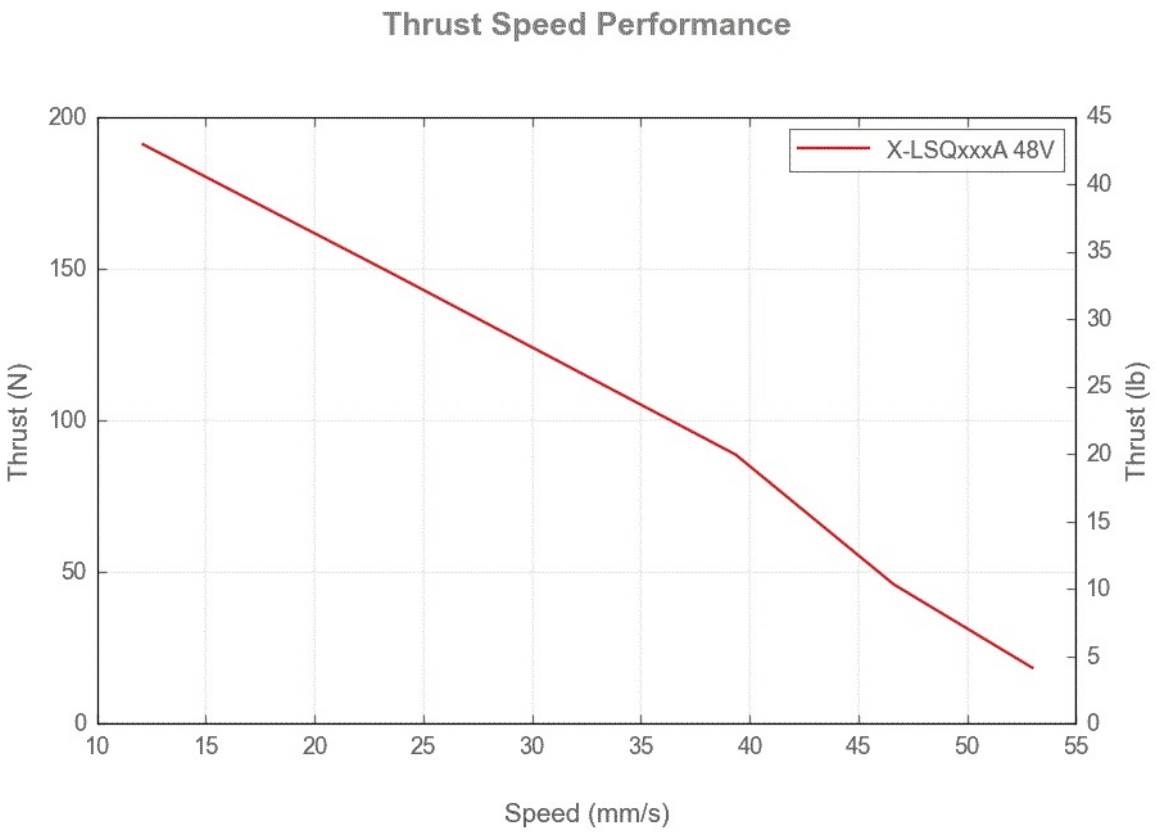
Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
X-LSQ075A	< 9 µm (< 0.000354 ")	53 mm/s (2.087 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
X-LSQ075B	< 13 µm (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
X-LSQ075D	< 73 µm (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)
X-LSQ150A	< 9 µm (< 0.000354 ")	53 mm/s (2.087 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
X-LSQ150B	< 13 µm (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
X-LSQ150D	< 73 µm (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)
X-LSQ300A	< 9 µm	53 mm/s	0.000061 mm/s	0.000061 mm/s

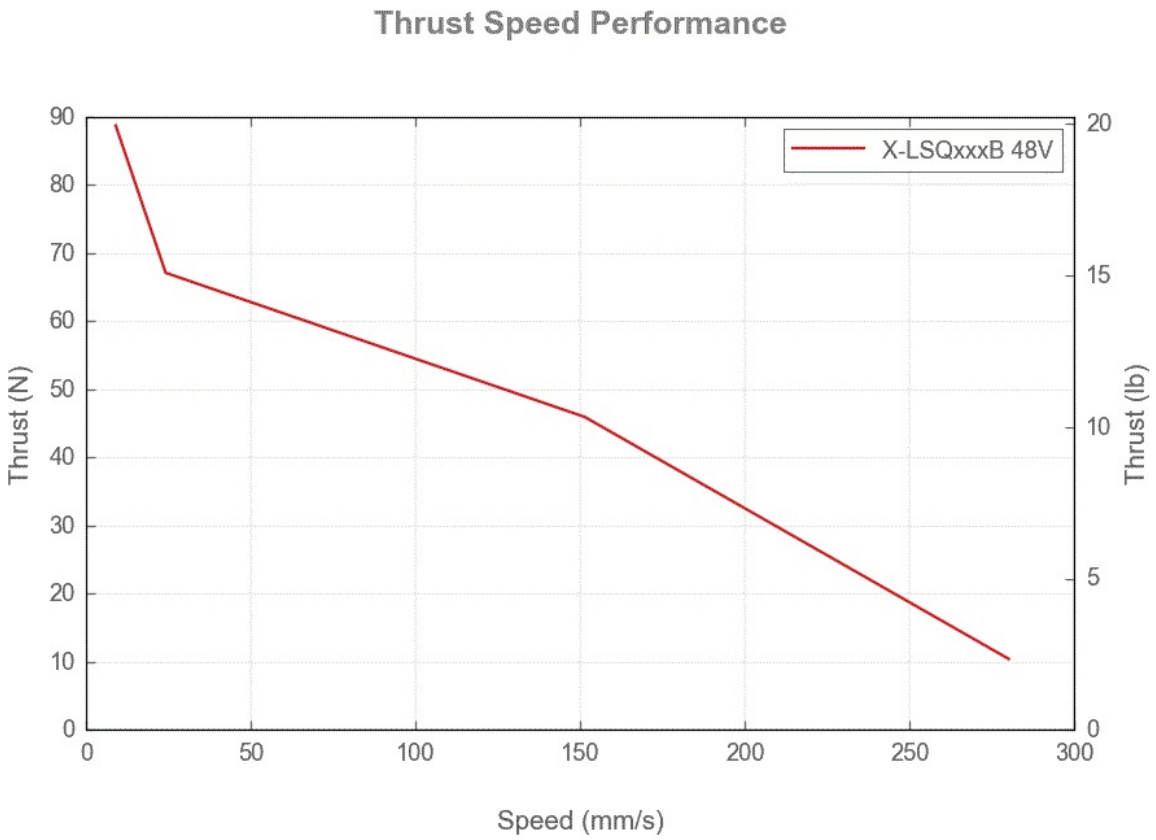
Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
	(< 0.000354 ")	(2.087 "/s)	(0.000002 "/s)	(0.000002 "/s)
X-LSQ300B	< 13 µm (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
X-LSQ300D	< 73 µm (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)
X-LSQ450A	< 9 µm (< 0.000354 ")	53 mm/s (2.087 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
X-LSQ450B	< 13 µm (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
X-LSQ450D	< 73 µm (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)
X-LSQ600A	< 9 µm (< 0.000354 ")	42 mm/s (1.654 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
X-LSQ600B	< 13 µm (< 0.000512 ")	225 mm/s (8.858 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
X-LSQ600D	< 73 µm (< 0.002874 ")	800 mm/s (31.496 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)

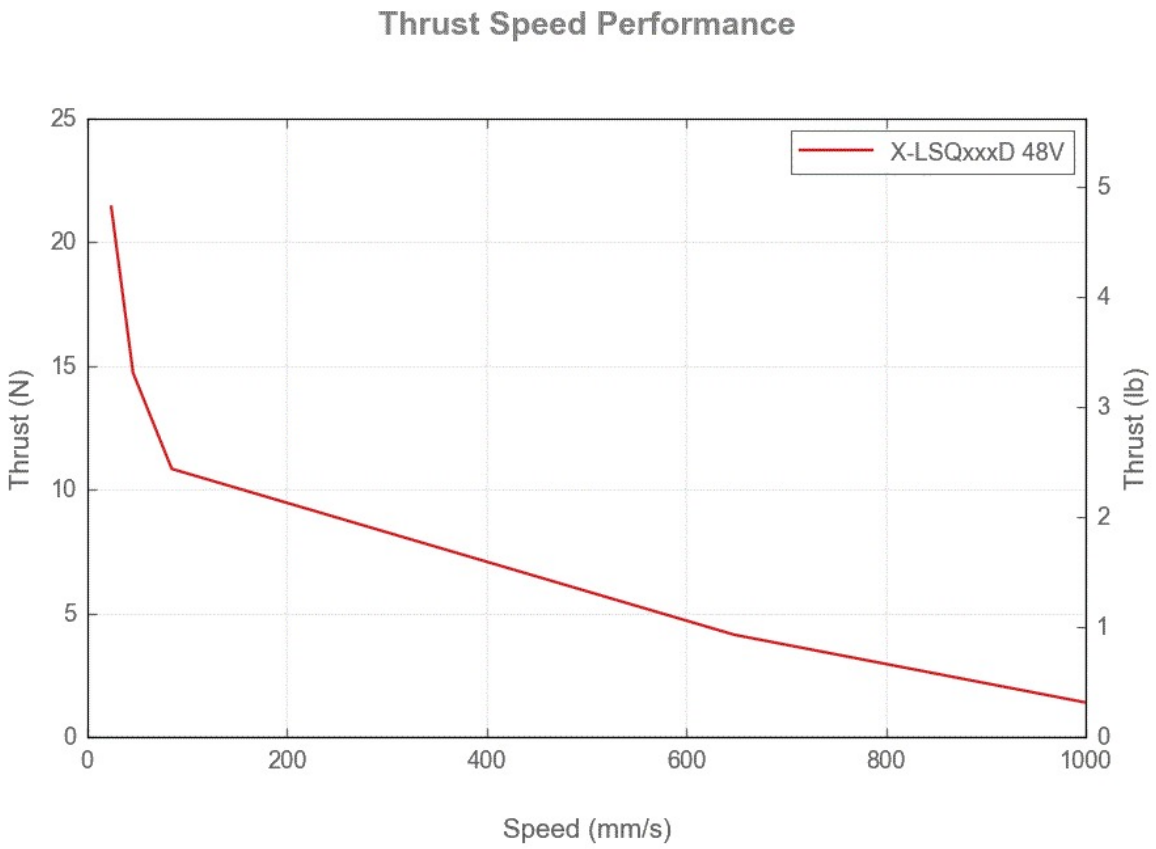
Part Number	Peak Thrust	Maximum Continuous Thrust	Linear Motion Per Motor Rev	Weight
X-LSQ075A	147 N (33.0 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	1.20 kg (2.646 lb)
X-LSQ075B	75 N (16.8 lb)	75 N (16.8 lb)	6.35 mm (0.250 ")	1.20 kg (2.646 lb)
X-LSQ075D	18 N (4.0 lb)	18 N (4.0 lb)	25.4 mm (1.000 ")	1.20 kg (2.646 lb)
X-LSQ150A	147 N (33.0 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	1.40 kg (3.086 lb)
X-LSQ150B	75 N (16.8 lb)	75 N (16.8 lb)	6.35 mm (0.250 ")	1.40 kg (3.086 lb)
X-LSQ150D	18 N (4.0 lb)	18 N (4.0 lb)	25.4 mm (1.000 ")	1.40 kg (3.086 lb)
X-LSQ300A	147 N (33.0 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	1.80 kg (3.968 lb)
X-LSQ300B	75 N (16.8 lb)	75 N (16.8 lb)	6.35 mm (0.250 ")	1.80 kg (3.968 lb)
X-LSQ300D	18 N (4.0 lb)	18 N (4.0 lb)	25.4 mm (1.000 ")	1.80 kg (3.968 lb)
X-LSQ450A	147 N (33.0 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	2.30 kg (5.071 lb)
X-LSQ450B	75 N (16.8 lb)	75 N (16.8 lb)	6.35 mm (0.250 ")	2.30 kg (5.071 lb)
X-LSQ450D	18 N (4.0 lb)	18 N (4.0 lb)	25.4 mm (1.000 ")	2.30 kg (5.071 lb)
X-LSQ600A	147 N (33.0 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	2.90 kg (6.393 lb)
X-LSQ600B	75 N (16.8 lb)	75 N (16.8 lb)	6.35 mm (0.250 ")	2.90 kg (6.393 lb)
X-LSQ600D	18 N (4.0 lb)	18 N (4.0 lb)	25.4 mm (1.000 ")	2.90 kg (6.393 lb)

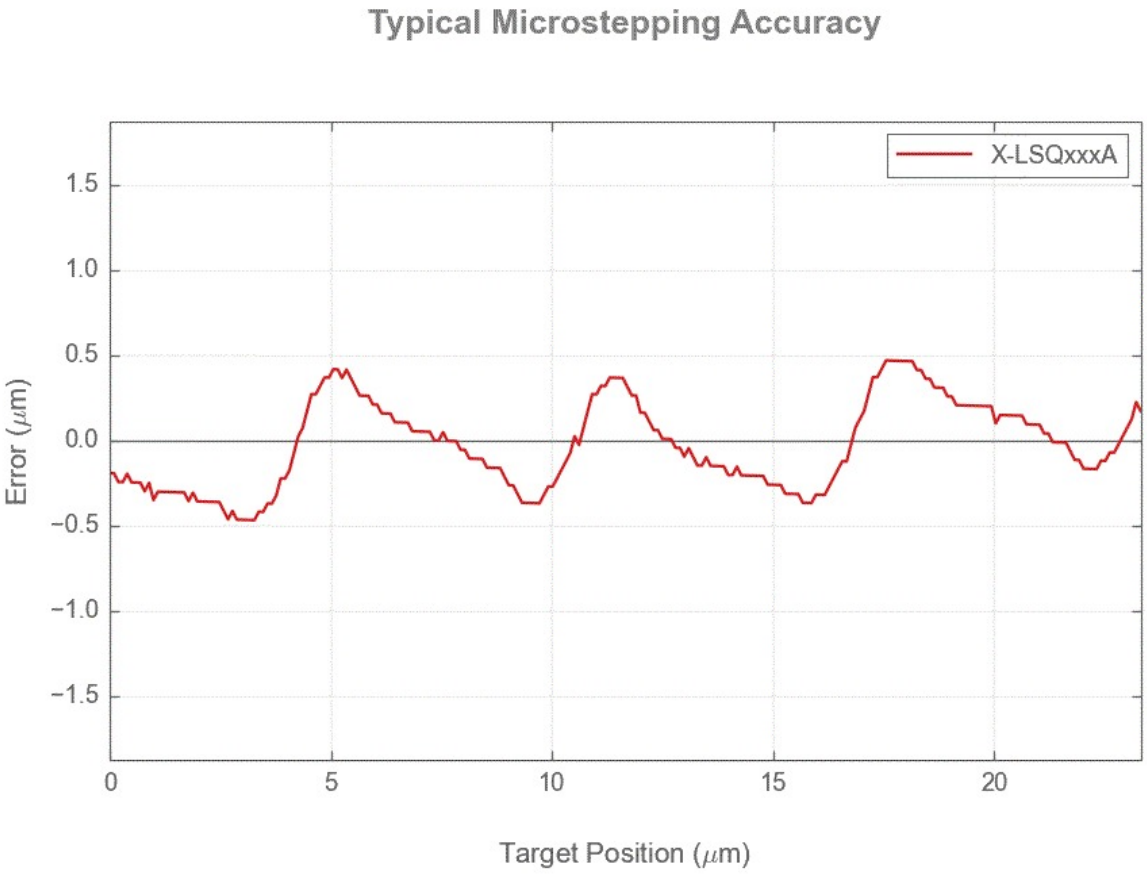
Charts

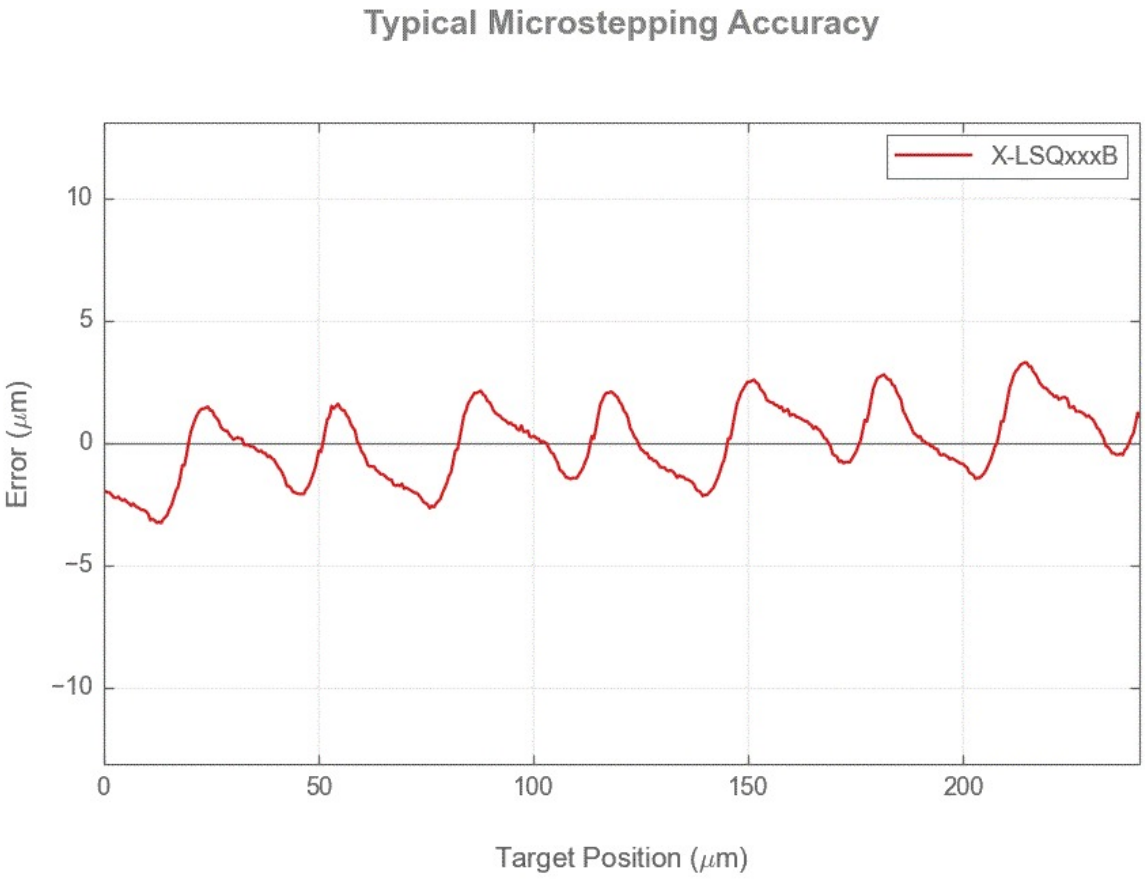

Thrust Speed Performance
X-LSQxxxA 48V
X-LSQxxxB 48V
X-LSQxxxD 48V
Thrust (N)
Thrust (lb)
Speed (mm/s)
0
50
100
150
200
0
5
10
15
20
25
30
35
40
45
0
200
400
600
800
1000

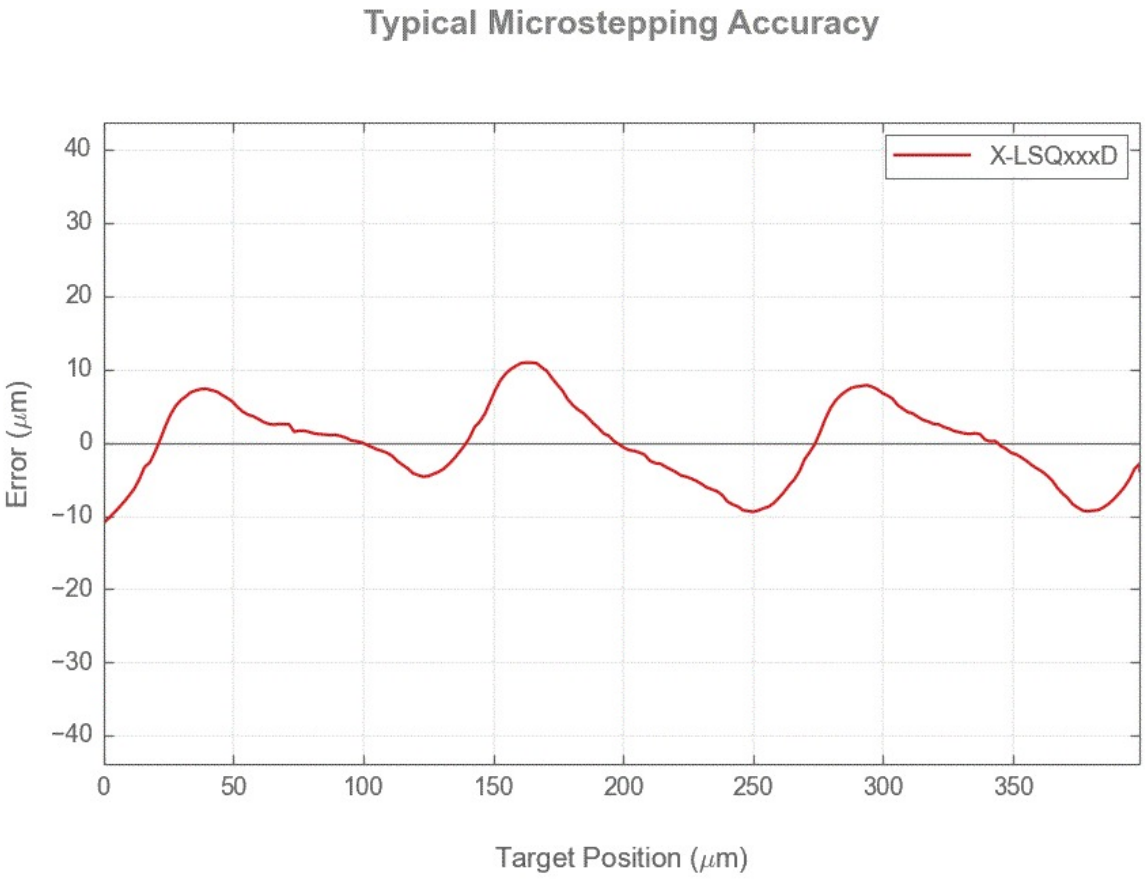

Thrust Speed Performance
X-LSQxxxA 48V
Thrust (N)
Thrust (lb)
Speed (mm/s)
200
150
100
50
0
45
40
35
30
25
20
15
10
5
0
10
15
20
25
30
35
40
45
50
55

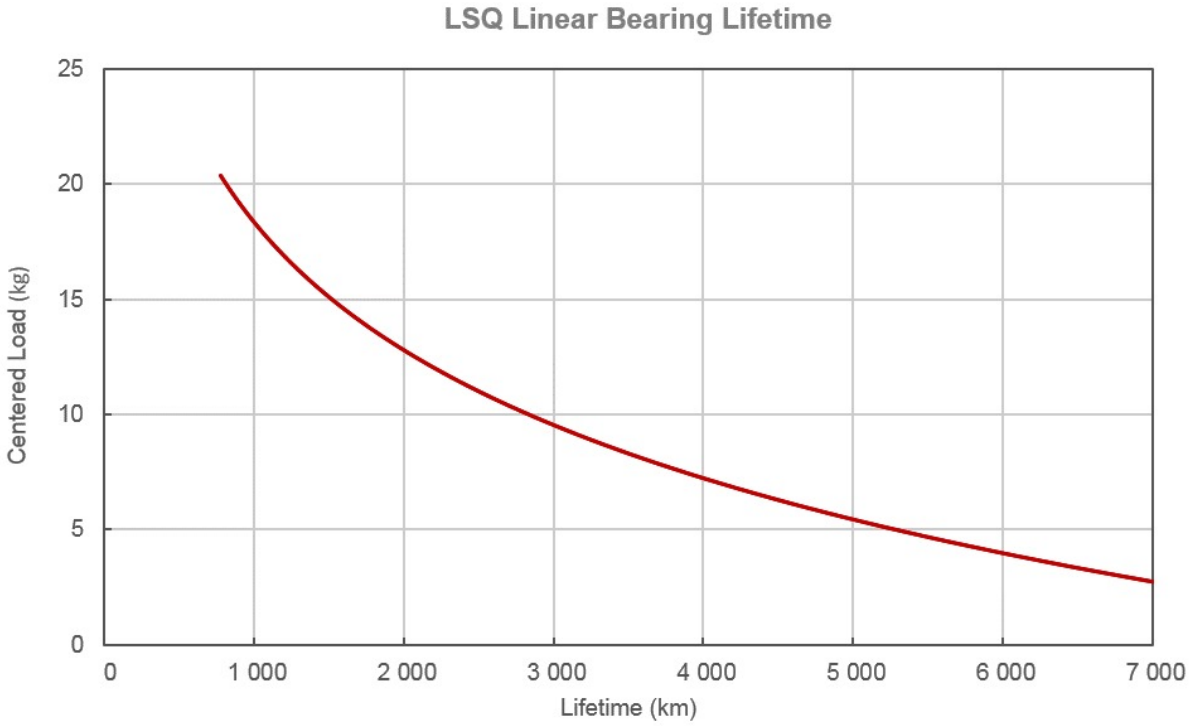

Thrust Speed Performance
X-LSQxxxB 48V
Thrust (N)
Thrust (lb)
Speed (mm/s)
0
10
20
30
40
50
60
70
80
90
0
5
10
15
20
0
50
100
150
200
250
300


Thrust Speed Performance
X-LSQxxxD 48V
Thrust (N)
Thrust (lb)
Speed (mm/s)
0
5
10
15
20
25
0
1
2
3
4
5
0
200
400
600
800
1000


Typical Microstepping Accuracy
X-LSQxxxA
1.5
1.0
0.5
0.0
−0.5
−1.0
−1.5
Error (μm)
0
5
10
15
20
Target Position (μm)


Typical Microstepping Accuracy
X-LSQxxxB
10
5
0
−5
−10
Error (μm)
0
50
100
150
200
Target Position (μm)


Typical Microstepping Accuracy
X-LSQxxxD
40
30
20
10
0
−10
−20
−30
−40
Error (μm)
0
50
100
150
200
250
300
350
Target Position (μm)


LSQ Linear Bearing Lifetime
Centered Load (kg)
25
20
15
10
5
0
0
1 000
2 000
3 000
4 000
5 000
6 000
7 000
Lifetime (km)