

## LSQ-E Series Datasheet



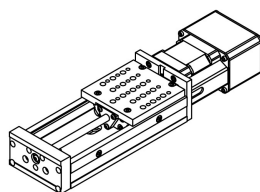
- 75, 150, 300, 450 and 600 mm travel
- 20 kg load capacity
- Up to 1 m/s speed and up to 100 N thrust
- Encoder position feedback with slip/stall detection and automatic recovery
- Designed for use with an X-MCB1 Series stepper motor controller or any 2-phase stepper motor controller
- Custom versions available

Zaber's LSQ-E Series products are computer-controlled, motorized linear stages with integrated stepper motors and motor encoders. These stages are capable of speeds up to 1 m/s and can easily be mounted in XY or XYZ configuration without additional hardware. The built-in motor encoder allows for closed-loop operation and slip/stall recovery features. The stages are designed to connect directly to our X-MCB1 Series stepper motor controller, or they can be used with any 2-phase stepper motor controller through the panel mount DB15 connector. When connected to our X-Series controllers, the stages are designed to be "plug and play" just like all of Zaber's other products.

## Drawings

# ZABER

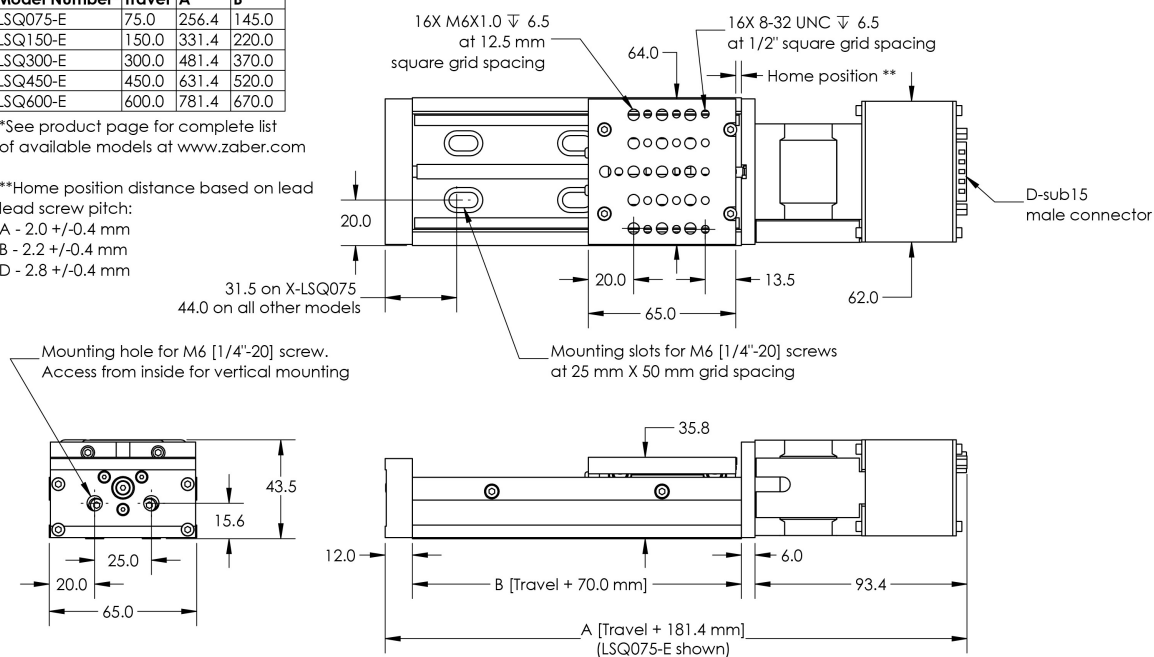
LSQ-E Motorized Linear Stage  
dimensions in mm



Model Number*	Travel	A	B
LSQ075-E	75.0	256.4	145.0
LSQ150-E	150.0	331.4	220.0
LSQ300-E	300.0	481.4	370.0
LSQ450-E	450.0	631.4	520.0
LSQ600-E	600.0	781.4	670.0

\*See product page for complete list of available models at [www.zaber.com](http://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 1180R01A

## Specifications

Specification	Value	Alternate Unit
Built-in Controller	No	
Recommended Controller	X-MCB1 (48 V) Recommended	
Encoder Resolution	500 CPR	2000 states/rev
Encoder Type	Rotary quadrature encoder	
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 $\mu\text{m}$	< 0.000945 "
Horizontal Runout	< 26 $\mu\text{m}$	< 0.001024 "
Pitch	0.075 °	1.309 mrad
Stiffness in Pitch	150 N-m/°	116 $\mu\text{rad/N-m}$
Roll	0.04 °	0.698 mrad
Stiffness in Roll	150 N-m/°	116 $\mu\text{rad/N-m}$
Yaw	0.03 °	0.523 mrad
Stiffness in Yaw	150 N-m/°	116 $\mu\text{rad/N-m}$
Motor Steps Per Rev	200	
Motor Type	Stepper (2 phase)	
Motor Rated Current	1250 mA/phase	
Inductance	2.8 mH/phase	
Motor Connection	D-sub 15	
Mechanical Drive System	Precision lead screw	
Limit or Home Sensing	Magnetic home sensor	
Axes of Motion	1	
Mounting Interface	M6 threaded holes and 8-32 threaded holes	
Vacuum Compatible	No	
Operating Temperature Range	0 to 50 °C	
Stage Parallelism	< 100 $\mu\text{m}$	< 0.003937 "
RoHS Compliant	Yes	
CE Compliant	Yes	

Part Number	Microstep Size (Default Resolution)	Travel Range	Accuracy (unidirectional)	Repeatability
LSQ075A-E01T3	0.09921875 µm	75 mm (2.953 ")	35 µm (0.001378 ")	< 2 µm (< 0.000079 ")
LSQ075B-E01T3	0.49609375 µm	75 mm (2.953 ")	45 µm (0.001772 ")	< 2 µm (< 0.000079 ")
LSQ075D-E01T3	1.984375 µm	75 mm (2.953 ")	80 µm (0.003150 ")	< 4 µm (< 0.000157 ")
LSQ150A-E01T3	0.09921875 µm	150 mm (5.905 ")	45 µm (0.001772 ")	< 2 µm (< 0.000079 ")
LSQ150B-E01T3	0.49609375 µm	150 mm (5.905 ")	50 µm (0.001968 ")	< 2 µm (< 0.000079 ")
LSQ150D-E01T3	1.984375 µm	150 mm (5.905 ")	100 µm (0.003937 ")	< 4 µm (< 0.000157 ")
LSQ300A-E01T3	0.09921875 µm	300 mm (11.811 ")	90 µm (0.003543 ")	< 2 µm (< 0.000079 ")
LSQ300B-E01T3	0.49609375 µm	300 mm (11.811 ")	65 µm (0.002559 ")	< 2 µm (< 0.000079 ")
LSQ300D-E01T3	1.984375 µm	300 mm (11.811 ")	145 µm (0.005709 ")	< 4 µm (< 0.000157 ")
LSQ450A-E01T3	0.09921875 µm	450 mm (17.716 ")	135 µm (0.005315 ")	< 2 µm (< 0.000079 ")
LSQ450B-E01T3	0.49609375 µm	450 mm (17.716 ")	75 µm (0.002953 ")	< 2 µm (< 0.000079 ")
LSQ450D-E01T3	1.984375 µm	450 mm (17.716 ")	185 µm (0.007283 ")	< 4 µm (< 0.000157 ")
LSQ600A-E01T3	0.09921875 µm	600 mm (23.622 ")	150 µm (0.005905 ")	< 2 µm (< 0.000079 ")
LSQ600B-E01T3	0.49609375 µm	600 mm (23.622 ")	90 µm (0.003543 ")	< 2 µm (< 0.000079 ")
LSQ600D-E01T3	1.984375 µm	600 mm (23.622 ")	230 µm (0.009055 ")	< 4 µm (< 0.000157 ")

Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
LSQ075A-E01T3	< 9 µm (< 0.000354 ")	53 mm/s (2.087 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
LSQ075B-E01T3	< 13 µm (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
LSQ075D-E01T3	< 73 µm (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)

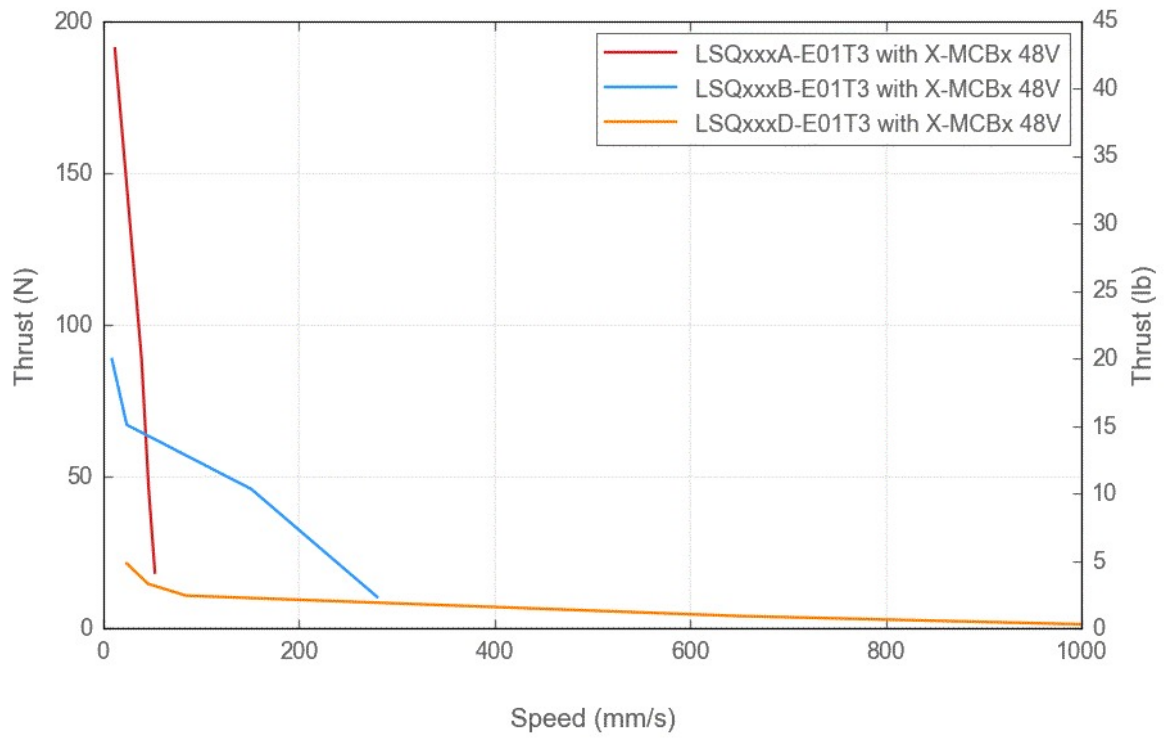
Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
LSQ150A-E01T3	< 9 $\mu\text{m}$ (< 0.000354 ")	53 mm/s (2.087 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
LSQ150B-E01T3	< 13 $\mu\text{m}$ (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
LSQ150D-E01T3	< 73 $\mu\text{m}$ (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)
LSQ300A-E01T3	< 9 $\mu\text{m}$ (< 0.000354 ")	53 mm/s (2.087 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
LSQ300B-E01T3	< 13 $\mu\text{m}$ (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
LSQ300D-E01T3	< 73 $\mu\text{m}$ (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)
LSQ450A-E01T3	< 9 $\mu\text{m}$ (< 0.000354 ")	53 mm/s (2.087 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
LSQ450B-E01T3	< 13 $\mu\text{m}$ (< 0.000512 ")	280 mm/s (11.024 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
LSQ450D-E01T3	< 73 $\mu\text{m}$ (< 0.002874 ")	1000 mm/s (39.370 "/s)	0.001211 mm/s (0.000048 "/s)	0.001211 mm/s (0.000048 "/s)
LSQ600A-E01T3	< 9 $\mu\text{m}$ (< 0.000354 ")	42 mm/s (1.654 "/s)	0.000061 mm/s (0.000002 "/s)	0.000061 mm/s (0.000002 "/s)
LSQ600B-E01T3	< 13 $\mu\text{m}$ (< 0.000512 ")	225 mm/s (8.858 "/s)	0.000303 mm/s (0.000012 "/s)	0.000303 mm/s (0.000012 "/s)
LSQ600D-E01T3	< 73 $\mu\text{m}$ (< 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
LSQ075A-E01T3	160 N (35.9 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	1.20 kg (2.646 lb)
LSQ075B-E01T3	80 N (17.9 lb)	80 N (17.9 lb)	6.35 mm (0.250 ")	1.20 kg (2.646 lb)
LSQ075D-E01T3	20 N (4.5 lb)	20 N (4.5 lb)	25.4 mm (1.000 ")	1.20 kg (2.646 lb)
LSQ150A-E01T3	160 N (35.9 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	1.40 kg (3.086 lb)
LSQ150B-E01T3	80 N (17.9 lb)	80 N (17.9 lb)	6.35 mm (0.250 ")	1.40 kg (3.086 lb)
LSQ150D-E01T3	20 N (4.5 lb)	20 N (4.5 lb)	25.4 mm (1.000 ")	1.40 kg (3.086 lb)

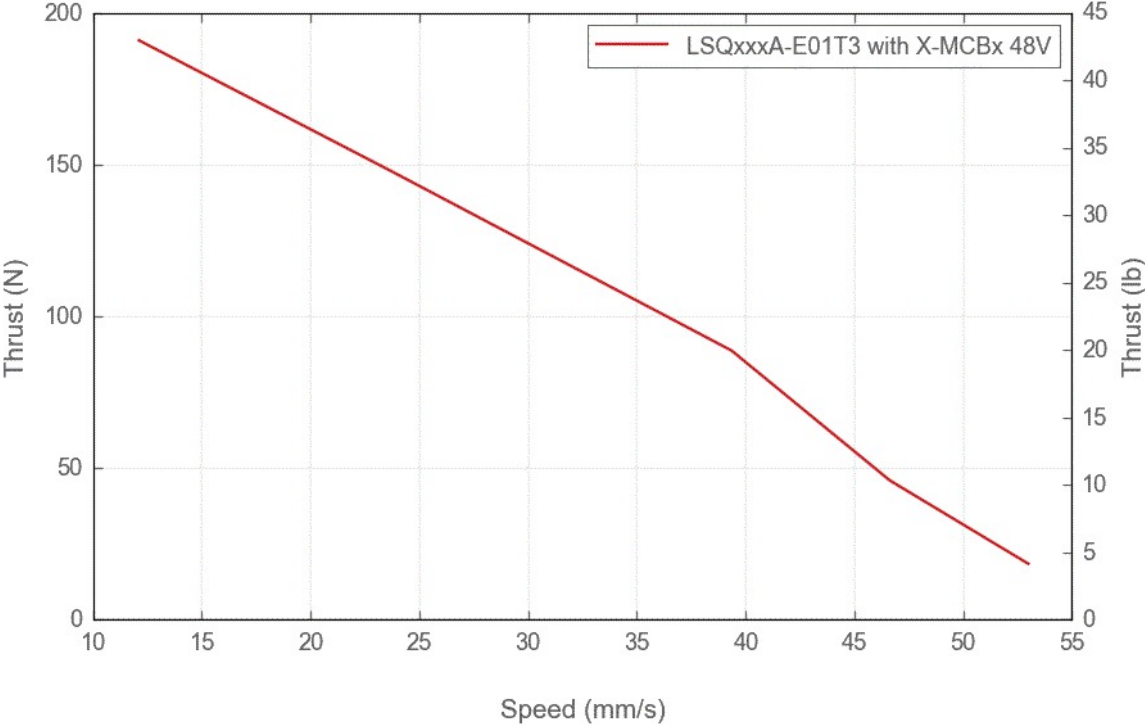
<b>Part Number</b>	<b>Peak Thrust</b>	<b>Maximum Continuous Thrust</b>	<b>Linear Motion Per Motor Rev</b>	<b>Weight</b>
LSQ300A-E01T3	160 N (35.9 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	1.80 kg (3.968 lb)
LSQ300B-E01T3	80 N (17.9 lb)	80 N (17.9 lb)	6.35 mm (0.250 ")	1.80 kg (3.968 lb)
LSQ300D-E01T3	20 N (4.5 lb)	20 N (4.5 lb)	25.4 mm (1.000 ")	1.80 kg (3.968 lb)
LSQ450A-E01T3	160 N (35.9 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	2.30 kg (5.071 lb)
LSQ450B-E01T3	80 N (17.9 lb)	80 N (17.9 lb)	6.35 mm (0.250 ")	2.30 kg (5.071 lb)
LSQ450D-E01T3	20 N (4.5 lb)	20 N (4.5 lb)	25.4 mm (1.000 ")	2.30 kg (5.071 lb)
LSQ600A-E01T3	147 N (33.0 lb)	100 N (22.4 lb)	1.27 mm (0.050 ")	2.9 kg (6.393 lb)
LSQ600B-E01T3	75 N (16.8 lb)	80 N (17.9 lb)	6.35 mm (0.250 ")	2.9 kg (6.393 lb)
LSQ600D-E01T3	18 N (4.0 lb)	20 N (4.5 lb)	25.4 mm (1.000 ")	2.9 kg (6.393 lb)

# Charts

## Thrust Speed Performance

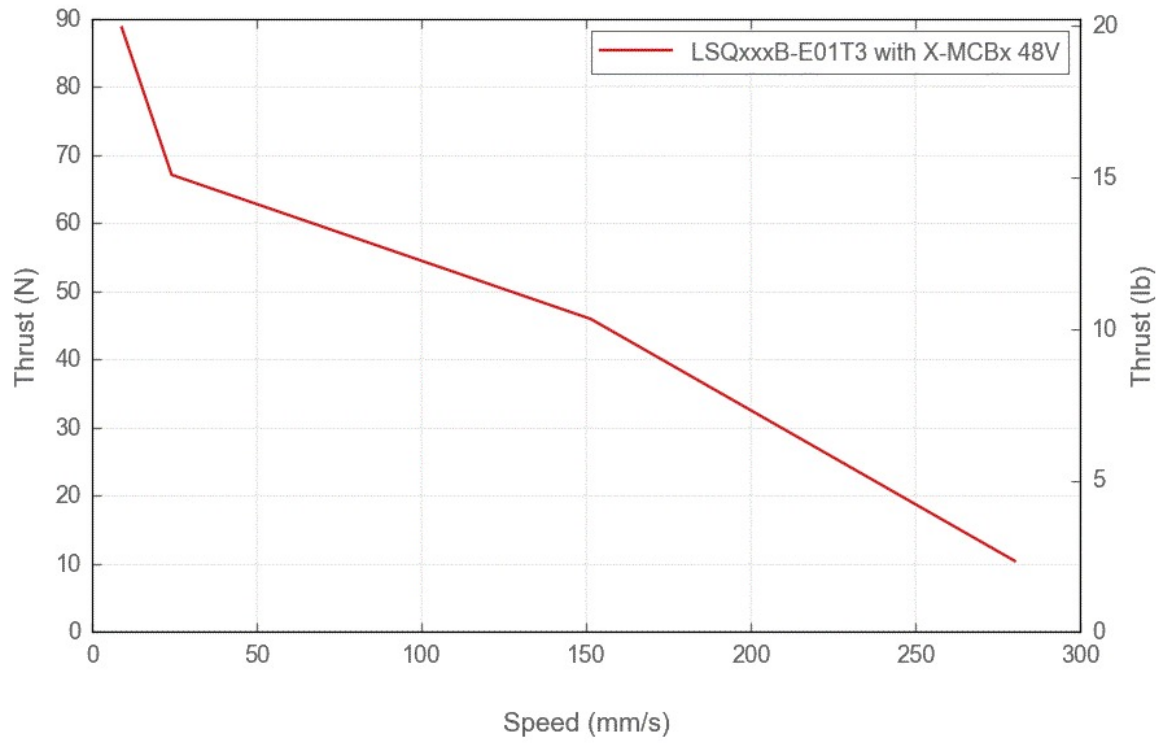


### Thrust Speed Performance

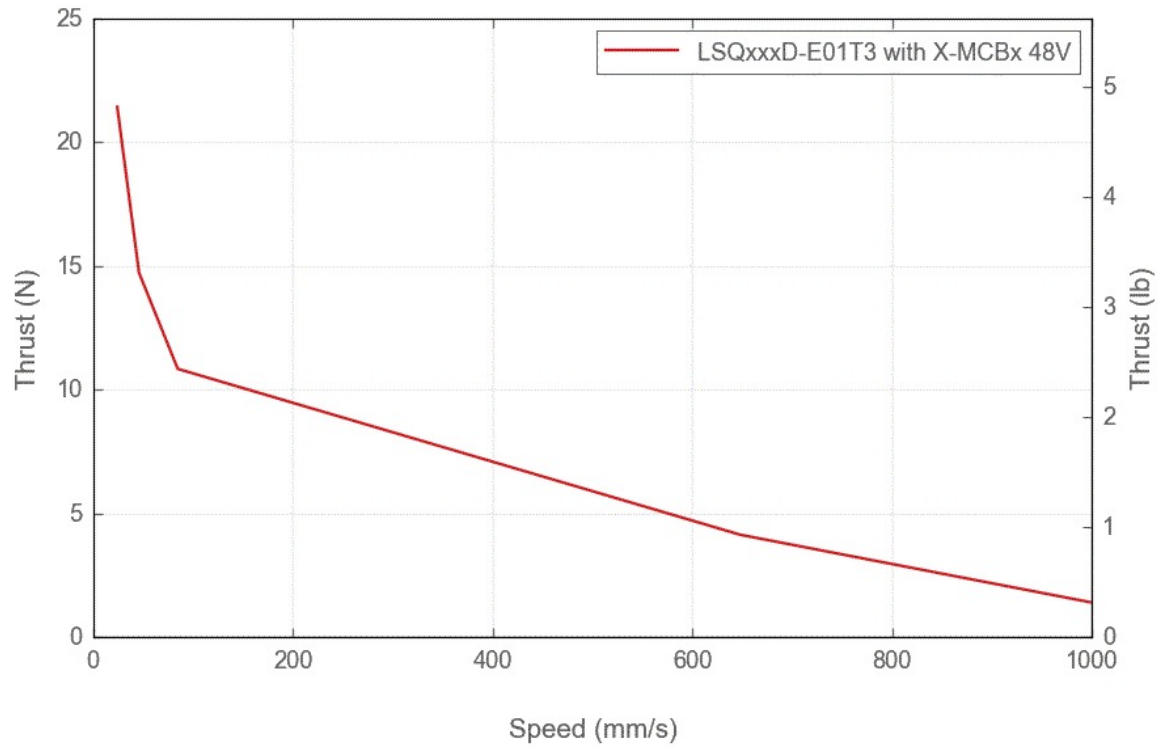




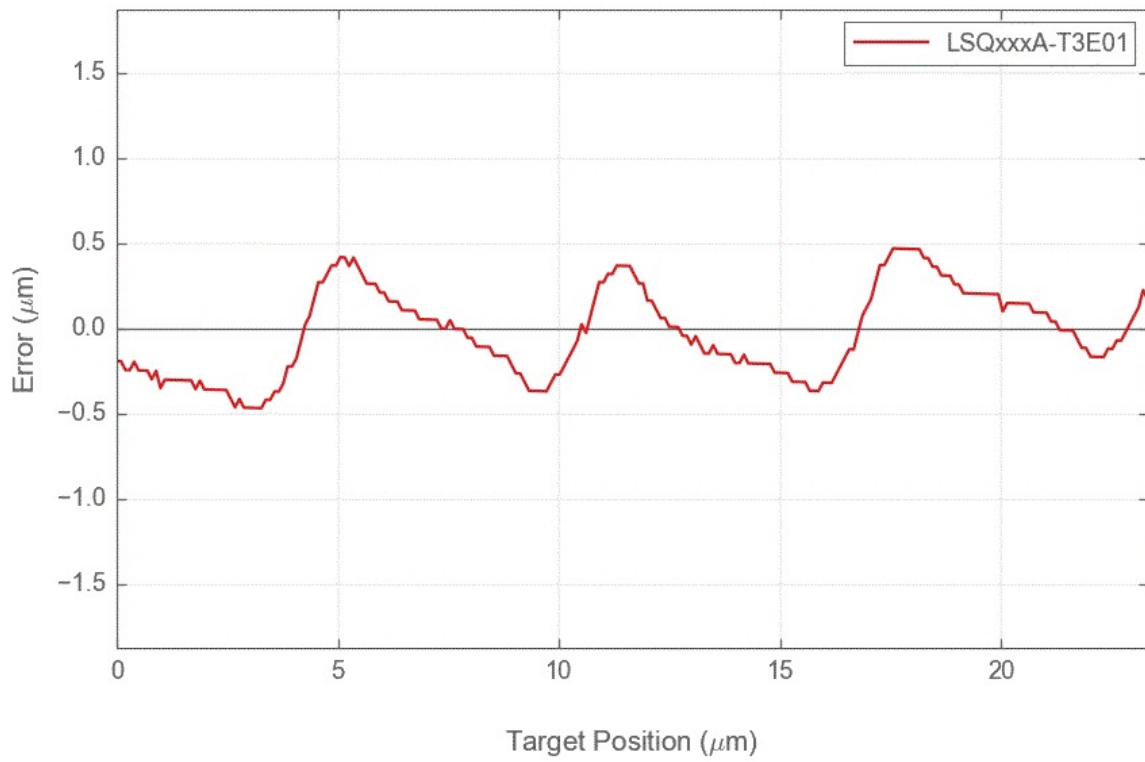
## Thrust Speed Performance



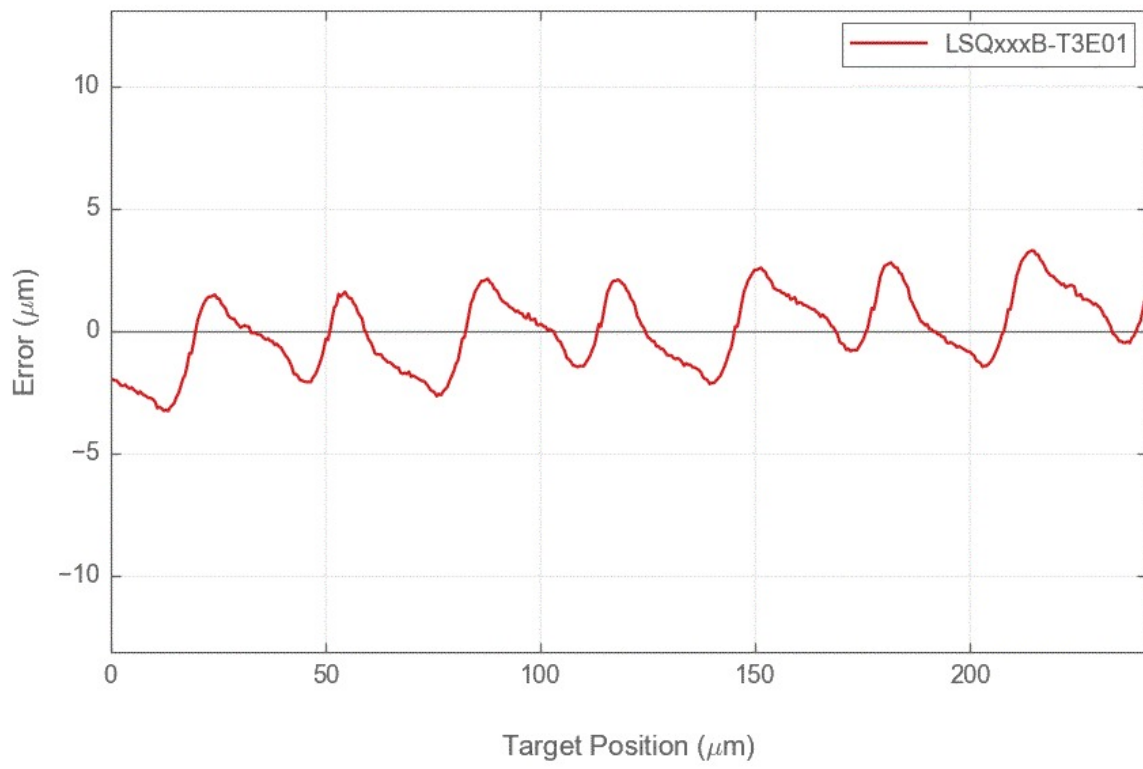
## Thrust Speed Performance



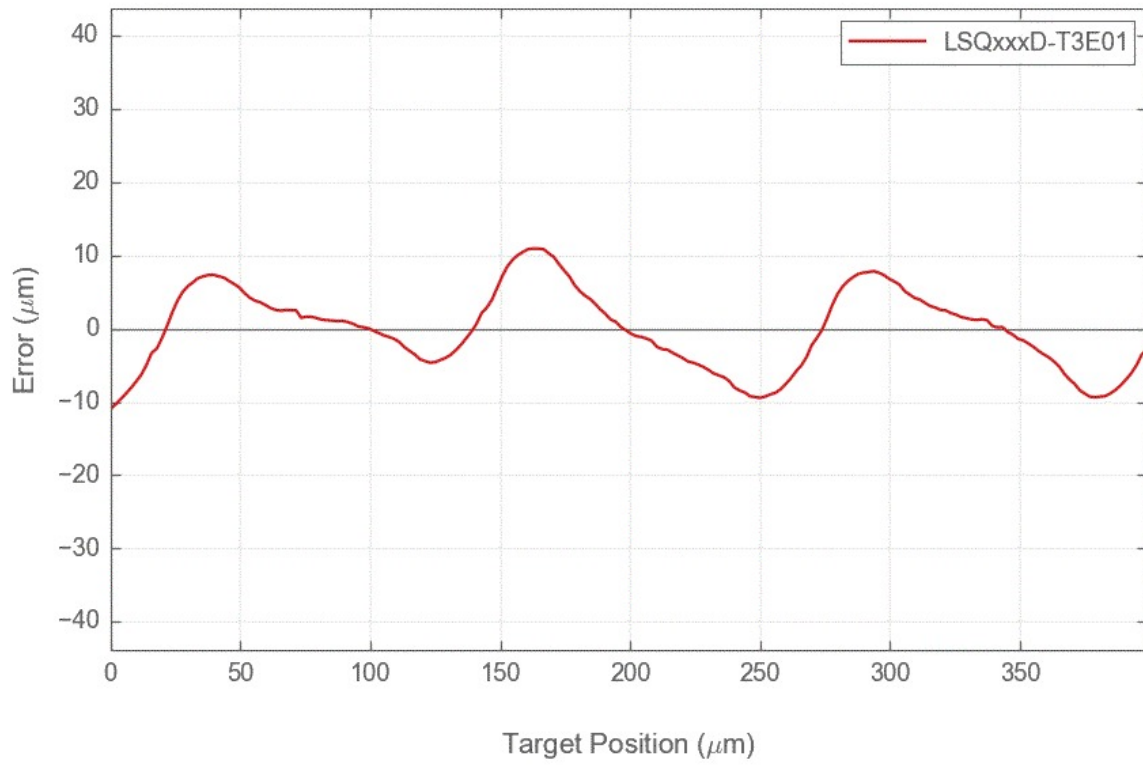
## Typical Microstepping Accuracy



## Typical Microstepping Accuracy



## Typical Microstepping Accuracy



LSQ Linear Bearing Lifetime

