

## LSM Series Datasheet

Applies to devices sold prior October 2021



- 25, 50, 100, 150 and 200 mm travel
- 10 kg load capacity and up to 104 mm/s speed
- Very low profile at only 21 mm stage height
- Can be mounted in XY and XYZ configurations
- Designed for use with an X-MCC Series stepper motor controller or any 2-phase stepper motor controller
- With AutoDetect, the X-MCC controller configures its settings automatically for the connected peripheral
- Custom versions available

## LSM Series Overview

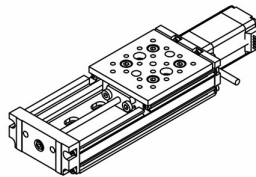
Zaber's LSM Series devices are motorized linear stages with high thrust and speed capabilities and a very compact size. They are designed to interface with our X-MCC Series universal motor controllers, offering high resolution daisy-chainable operation. Set up is easy with AutoDetect. Once connected, the X-MCC controller will automatically detect and configure the LSM.

At only 21 mm high, these miniature stages are excellent for applications where a small profile is required. The LSM's innovative design allows speeds up to 104 mm/s and loads up to 10 kg. The stages can be mounted in XY and XYZ configurations with no additional hardware.

## LSM Series Drawings

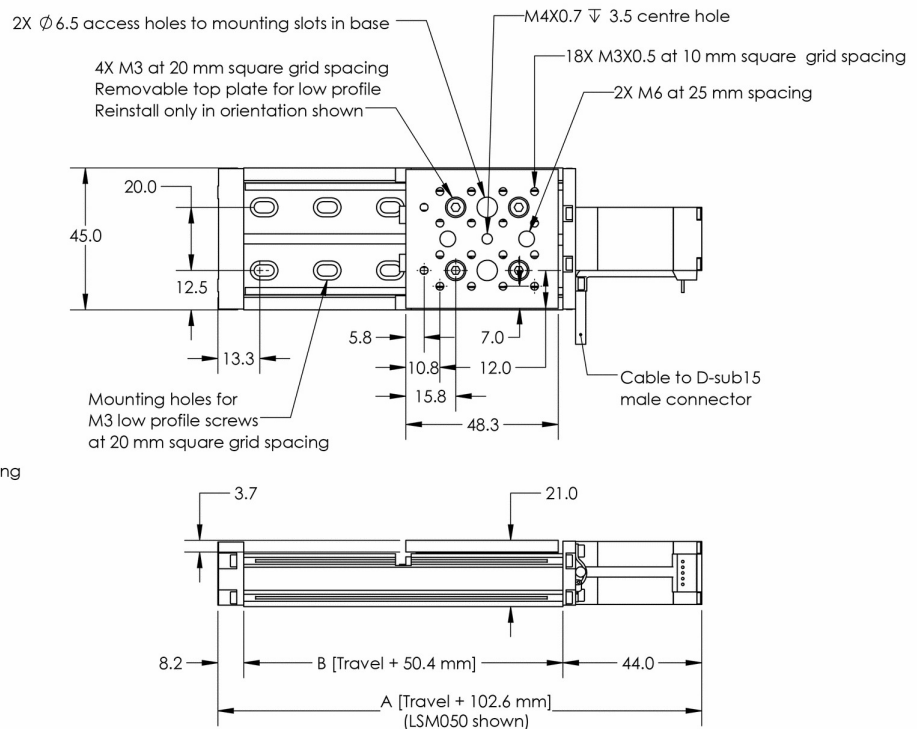
# ZABER

**LSM Miniature Motorized Linear Stage**  
dimensions in mm



| Model Number* | Travel | A     | B     |
|---------------|--------|-------|-------|
| LSM025        | 25.4   | 128.0 | 75.8  |
| LSM050        | 50.8   | 153.4 | 101.2 |
| LSM100        | 101.6  | 204.2 | 152.0 |
| LSM150        | 152.4  | 255.0 | 202.8 |
| LSM200        | 203.2  | 305.8 | 253.6 |

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



DWG 1177 801

## LSM Series Specifications

| Specification               | Value                                                | Alternate Unit |
|-----------------------------|------------------------------------------------------|----------------|
| Built-in Controller         | No                                                   |                |
| Recommended Controller      | X-MCC (48 V) Recommended                             |                |
| AutoDetect                  | Yes                                                  |                |
| Encoder Type                | None                                                 |                |
| Maximum Continuous Thrust   | 25 N                                                 | 5.6 lb         |
| Maximum Centered Load       | 100 N                                                | 22.4 lb        |
| Maximum Cantilever Load     | 300 N-cm                                             | 424.8 oz-in    |
| Guide Type                  | Needle roller bearing                                |                |
| Stiffness in Pitch          | 55 N-m/°                                             | 317 µrad/N-m   |
| Stiffness in Roll           | 52.5 N-m/°                                           | 332 µrad/N-m   |
| Stiffness in Yaw            | 85 N-m/°                                             | 205 µrad/N-m   |
| Motor Steps Per Rev         | 200                                                  |                |
| Motor Type                  | Stepper (2 phase)                                    |                |
| Motor Rated Current         | 600 mA/phase                                         |                |
| Motor Winding Resistance    | 6.5 ohms/phase                                       |                |
| Inductance                  | 3.5 mH/phase                                         |                |
| Motor Rated Power           | 6.9 Watts                                            |                |
| Motor Connection            | D-sub 15                                             |                |
| Motor Rotor Inertia         | 2.9 g-cm <sup>2</sup>                                |                |
| Default Resolution          | 1/64 of a step                                       |                |
| Motor Frame Size            | NEMA 08                                              |                |
| Mechanical Drive System     | Precision lead screw                                 |                |
| Limit or Home Sensing       | Magnetic hall sensor                                 |                |
| Axes of Motion              | 1                                                    |                |
| Mounting Interface          | M3 and M6 threaded holes and M4 threaded center hole |                |
| Operating Temperature Range | 0 to 50 °C                                           |                |
| Vacuum Compatible           | No                                                   |                |
| RoHS Compliant              | Yes                                                  |                |
| Stage Parallelism           | < 25 µm                                              | < 0.000984"    |
| CE Compliant                | Yes                                                  |                |

| Part Number | Microstep Size<br>(Default<br>Resolution) | Travel Range         | Accuracy<br>(unidirectional) | Repeatability           |
|-------------|-------------------------------------------|----------------------|------------------------------|-------------------------|
| LSM025A-T4A | 0.047625 µm                               | 25.4 mm (1.000")     | 15 µm<br>(0.000591")         | < 3 µm<br>(< 0.000118") |
| LSM025B-T4A | 0.1905 µm                                 | 25.4 mm (1.000")     | 15 µm<br>(0.000591")         | < 6 µm<br>(< 0.000236") |
| LSM050A-T4A | 0.047625 µm                               | 50.8 mm (2.000")     | 20 µm<br>(0.000787")         | < 3 µm<br>(< 0.000118") |
| LSM050B-T4A | 0.1905 µm                                 | 50.8 mm (2.000")     | 25 µm<br>(0.000984")         | < 6 µm<br>(< 0.000236") |
| LSM100A-T4A | 0.047625 µm                               | 101.6 mm<br>(4.000") | 35 µm<br>(0.001378")         | < 3 µm<br>(< 0.000118") |
| LSM100B-T4A | 0.1905 µm                                 | 101.6 mm<br>(4.000") | 45 µm<br>(0.001772")         | < 6 µm<br>(< 0.000236") |
| LSM150A-T4A | 0.047625 µm                               | 152.4 mm<br>(6.000") | 50 µm<br>(0.001968")         | < 3 µm<br>(< 0.000118") |
| LSM150B-T4A | 0.1905 µm                                 | 152.4 mm<br>(6.000") | 65 µm<br>(0.002559")         | < 6 µm<br>(< 0.000236") |
| LSM200A-T4A | 0.047625 µm                               | 203.2 mm<br>(8.000") | 60 µm<br>(0.002362")         | < 3 µm<br>(< 0.000118") |
| LSM200B-T4A | 0.1905 µm                                 | 203.2 mm<br>(8.000") | 85 µm<br>(0.003346")         | < 6 µm<br>(< 0.000236") |

| Part Number | Backlash                 | Maximum Speed          | Minimum Speed                  | Speed<br>Resolution            |
|-------------|--------------------------|------------------------|--------------------------------|--------------------------------|
| LSM025A-T4A | < 12 µm<br>(< 0.000472") | 26 mm/s<br>(1.024"/s)  | 0.000029 mm/s<br>(0.000001"/s) | 0.000029 mm/s<br>(0.000001"/s) |
| LSM025B-T4A | < 16 µm<br>(< 0.000630") | 104 mm/s<br>(4.094"/s) | 0.000116 mm/s<br>(0.000005"/s) | 0.000116 mm/s<br>(0.000005"/s) |
| LSM050A-T4A | < 12 µm<br>(< 0.000472") | 26 mm/s<br>(1.024"/s)  | 0.000029 mm/s<br>(0.000001"/s) | 0.000029 mm/s<br>(0.000001"/s) |
| LSM050B-T4A | < 16 µm<br>(< 0.000630") | 104 mm/s<br>(4.094"/s) | 0.000116 mm/s<br>(0.000005"/s) | 0.000116 mm/s<br>(0.000005"/s) |
| LSM100A-T4A | < 12 µm<br>(< 0.000472") | 26 mm/s<br>(1.024"/s)  | 0.000029 mm/s<br>(0.000001"/s) | 0.000029 mm/s<br>(0.000001"/s) |
| LSM100B-T4A | < 16 µm<br>(< 0.000630") | 104 mm/s<br>(4.094"/s) | 0.000116 mm/s<br>(0.000005"/s) | 0.000116 mm/s<br>(0.000005"/s) |
| LSM150A-T4A | < 12 µm<br>(< 0.000472") | 26 mm/s<br>(1.024"/s)  | 0.000029 mm/s<br>(0.000001"/s) | 0.000029 mm/s<br>(0.000001"/s) |
| LSM150B-T4A | < 16 µm<br>(< 0.000630") | 104 mm/s<br>(4.094"/s) | 0.000116 mm/s<br>(0.000005"/s) | 0.000116 mm/s<br>(0.000005"/s) |
| LSM200A-T4A | < 12 µm<br>(< 0.000472") | 26 mm/s<br>(1.024"/s)  | 0.000029 mm/s<br>(0.000001"/s) | 0.000029 mm/s<br>(0.000001"/s) |
|             | < 16 µm                  | 104 mm/s               | 0.000116 mm/s                  | 0.000116 mm/s                  |

| Part Number | Backlash      | Maximum Speed | Minimum Speed | Speed Resolution |
|-------------|---------------|---------------|---------------|------------------|
| LSM200B-T4A | (< 0.000630") | (4.094"/s)    | (0.000005"/s) | (0.000005"/s)    |

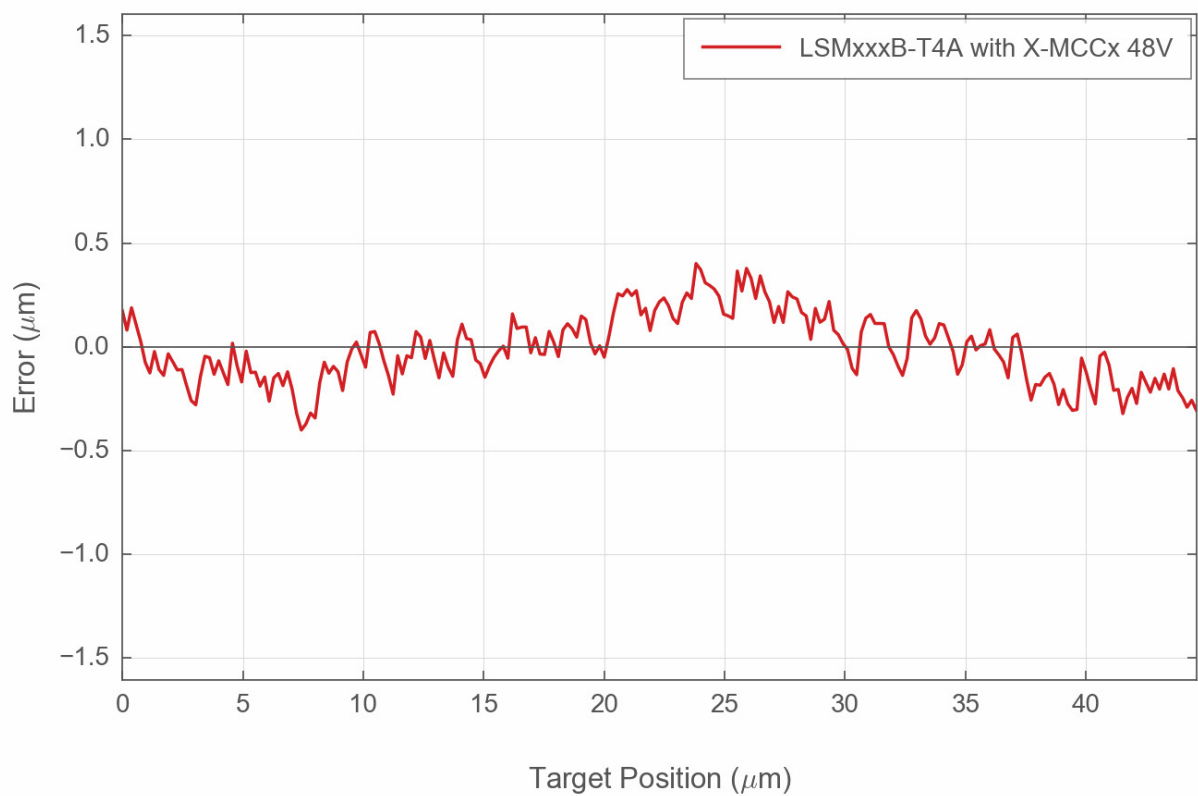
| Part Number | Peak Thrust    | Vertical Runout          | Horizontal Runout        | Pitch                 |
|-------------|----------------|--------------------------|--------------------------|-----------------------|
| LSM025A-T4A | 55 N (12.3 lb) | < 8 µm<br>(< 0.000315")  | < 12 µm<br>(< 0.000472") | 0.02°<br>(0.349 mrad) |
| LSM025B-T4A | 25 N (5.6 lb)  | < 8 µm<br>(< 0.000315")  | < 12 µm<br>(< 0.000472") | 0.02°<br>(0.349 mrad) |
| LSM050A-T4A | 55 N (12.3 lb) | < 11 µm<br>(< 0.000433") | < 14 µm<br>(< 0.000551") | 0.03°<br>(0.523 mrad) |
| LSM050B-T4A | 25 N (5.6 lb)  | < 11 µm<br>(< 0.000433") | < 14 µm<br>(< 0.000551") | 0.03°<br>(0.523 mrad) |
| LSM100A-T4A | 55 N (12.3 lb) | < 18 µm<br>(< 0.000709") | < 18 µm<br>(< 0.000709") | 0.04°<br>(0.698 mrad) |
| LSM100B-T4A | 25 N (5.6 lb)  | < 18 µm<br>(< 0.000709") | < 18 µm<br>(< 0.000709") | 0.04°<br>(0.698 mrad) |
| LSM150A-T4A | 55 N (12.3 lb) | < 25 µm<br>(< 0.000984") | < 23 µm<br>(< 0.000906") | 0.04°<br>(0.698 mrad) |
| LSM150B-T4A | 25 N (5.6 lb)  | < 25 µm<br>(< 0.000984") | < 23 µm<br>(< 0.000906") | 0.04°<br>(0.698 mrad) |
| LSM200A-T4A | 55 N (12.3 lb) | < 32 µm<br>(< 0.001260") | < 27 µm<br>(< 0.001063") | 0.04°<br>(0.698 mrad) |
| LSM200B-T4A | 25 N (5.6 lb)  | < 32 µm<br>(< 0.001260") | < 27 µm<br>(< 0.001063") | 0.04°<br>(0.698 mrad) |

| Part Number | Roll                  | Yaw                   | Linear Motion Per Motor Rev | Weight                |
|-------------|-----------------------|-----------------------|-----------------------------|-----------------------|
| LSM025A-T4A | 0.02°<br>(0.349 mrad) | 0.03°<br>(0.523 mrad) | 0.6096 mm<br>(0.024")       | 0.2 kg (0.441 lb)     |
| LSM025B-T4A | 0.02°<br>(0.349 mrad) | 0.03°<br>(0.523 mrad) | 2.4384 mm<br>(0.096")       | 0.2 kg (0.441 lb)     |
| LSM050A-T4A | 0.03°<br>(0.523 mrad) | 0.03°<br>(0.523 mrad) | 0.6096 mm<br>(0.024")       | 0.21 kg<br>(0.463 lb) |
| LSM050B-T4A | 0.03°<br>(0.523 mrad) | 0.03°<br>(0.523 mrad) | 2.4384 mm<br>(0.096")       | 0.21 kg<br>(0.463 lb) |
| LSM100A-T4A | 0.04°<br>(0.698 mrad) | 0.04°<br>(0.698 mrad) | 0.6096 mm<br>(0.024")       | 0.24 kg<br>(0.529 lb) |
| LSM100B-T4A | 0.04°<br>(0.698 mrad) | 0.04°<br>(0.698 mrad) | 2.4384 mm<br>(0.096")       | 0.24 kg<br>(0.529 lb) |
| LSM150A-T4A | 0.05°<br>(0.873 mrad) | 0.05°<br>(0.873 mrad) | 0.6096 mm<br>(0.024")       | 0.28 kg<br>(0.617 lb) |
|             | 0.05°                 | 0.05°                 | 2.4384 mm                   | 0.28 kg               |

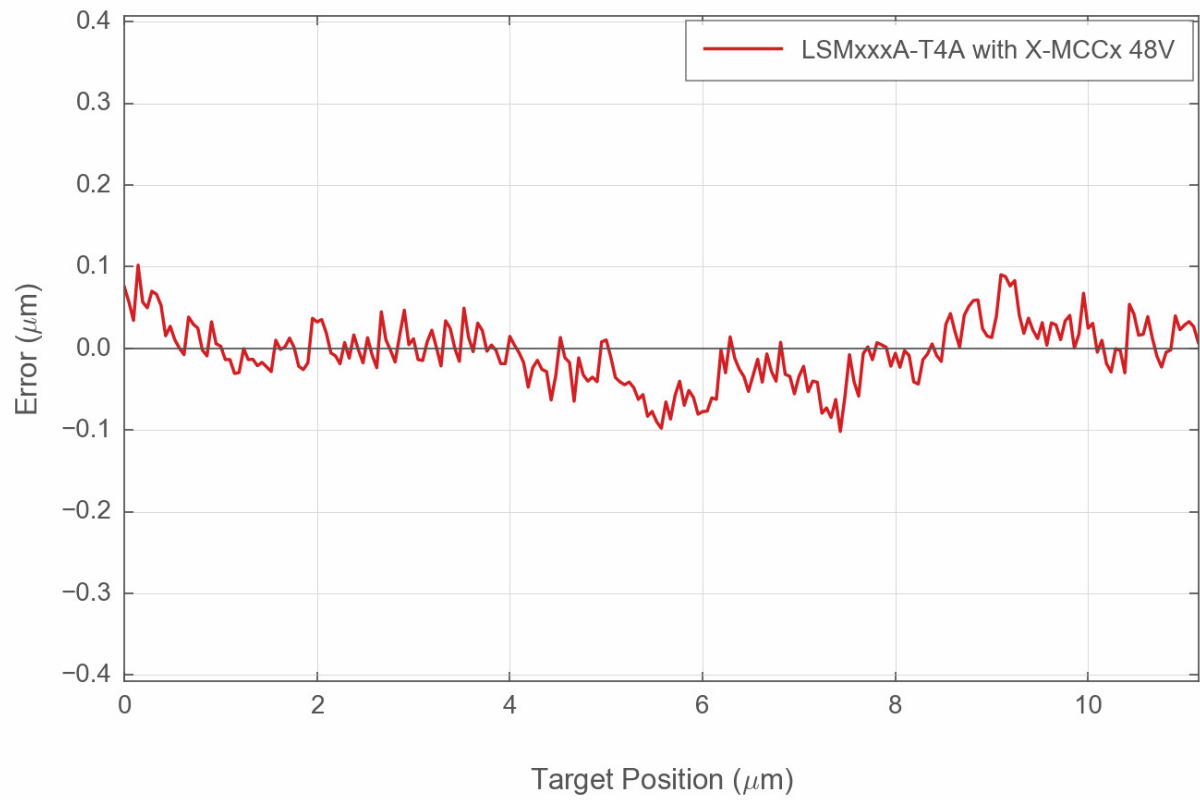
| Part Number | Roll                  | Yaw                   | Linear Motion<br>Per Motor Rev | Weight                |
|-------------|-----------------------|-----------------------|--------------------------------|-----------------------|
| LSM150B-T4A | (0.873 mrad)          | (0.873 mrad)          | (0.096")                       | (0.617 lb)            |
| LSM200A-T4A | 0.05°<br>(0.873 mrad) | 0.05°<br>(0.873 mrad) | 0.6096 mm<br>(0.024")          | 0.31 kg<br>(0.683 lb) |
| LSM200B-T4A | 0.05°<br>(0.873 mrad) | 0.05°<br>(0.873 mrad) | 2.4384 mm<br>(0.096")          | 0.31 kg<br>(0.683 lb) |

## LSM Series Charts

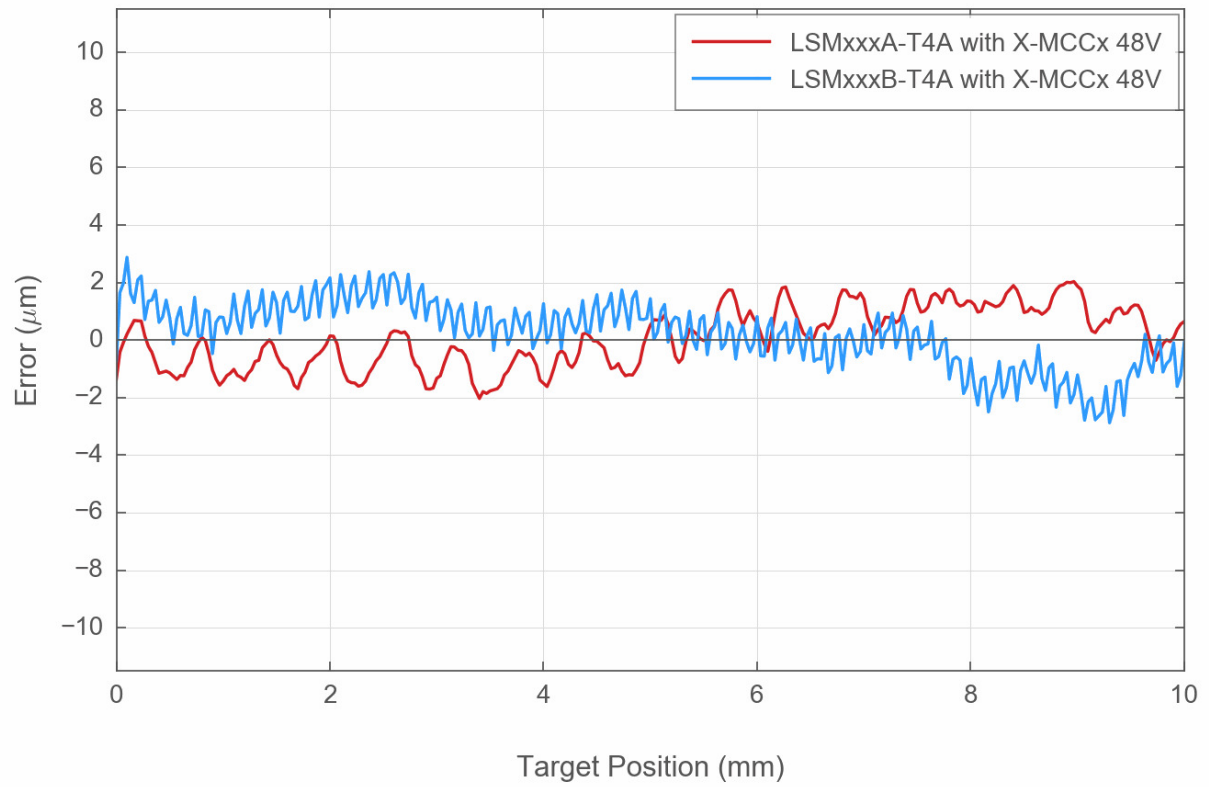
### Typical Microstepping Accuracy



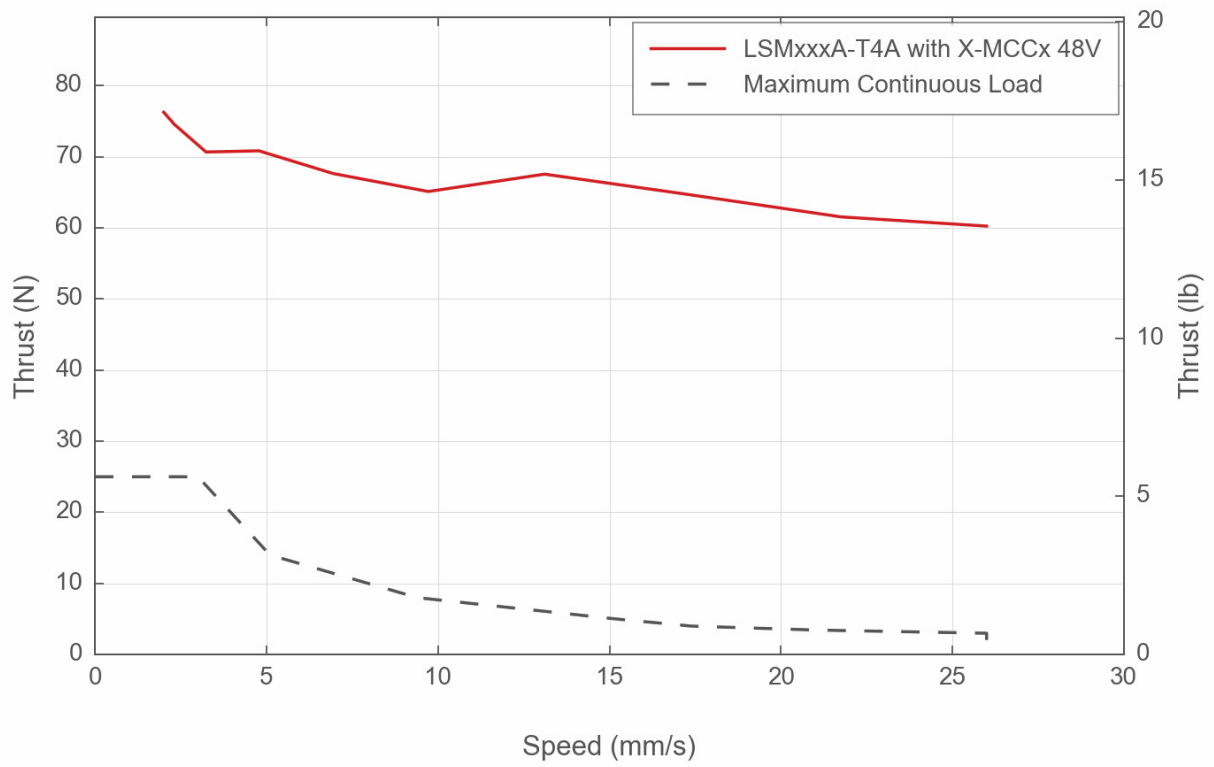
## Typical Microstepping Accuracy



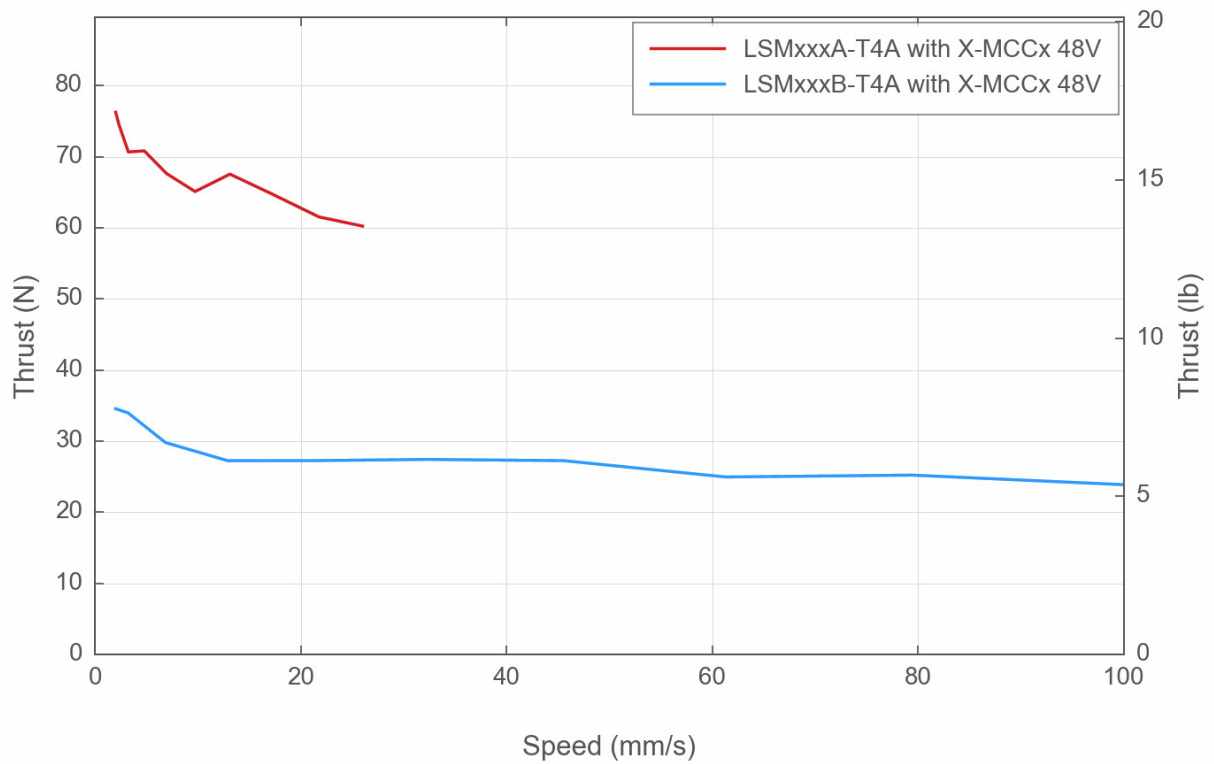
## Typical Accuracy



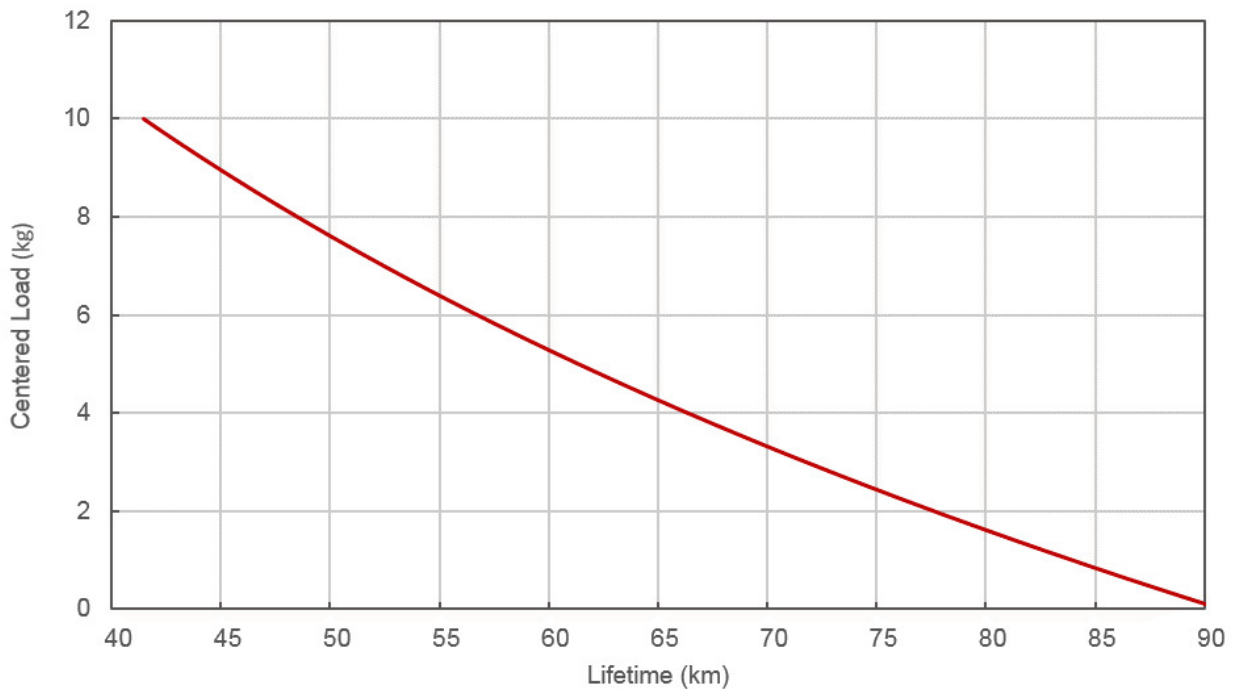
## Thrust Speed Performance



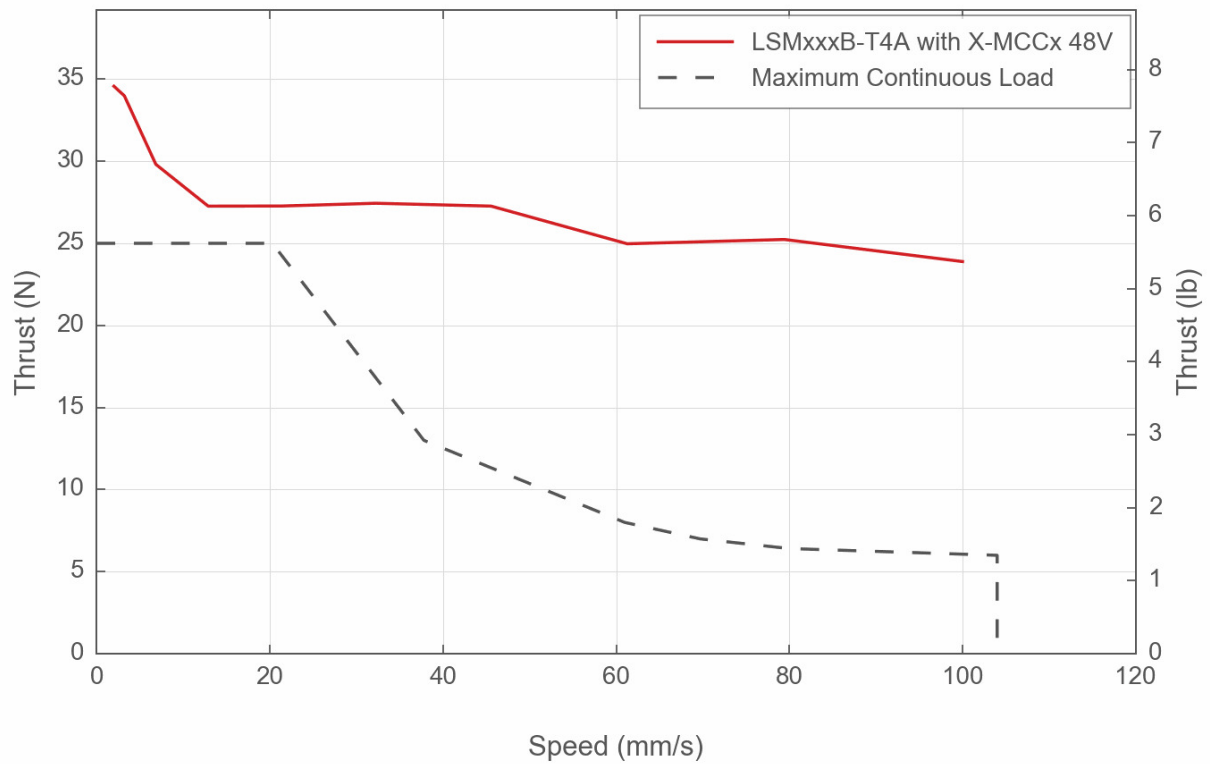
### Thrust Speed Performance



### LSM Linear Bearing Lifetime



## Thrust Speed Performance



## Contact

Email: [contact@zaber.com](mailto:contact@zaber.com)

Phone (toll free Canada/USA): 1-888-276-8033

Phone (direct): 1-604-569-3780

Fax: 1-604-648-8033

Zaber Technologies Inc.

#2 - 605 West Kent Ave. N.

Vancouver, British Columbia

Canada, V6P 6T7

<https://www.zaber.com>