LRT-C Series User's Manual

High load motorized linear stages with dust covers

Disclaimer

Zaber's products are not intended for use in any critical medical, aviation, or military applications or situations where a product's use or failure could cause personal injury, death, or damage to property. Zaber disclaims any warranty of fitness for a particular purpose. The user of this product agrees to Zaber's general terms and conditions of sale.

Precautions

Zaber's autodetect peripheral axes are designed to be used effortlessly with Zaber's line of autodetect controllers. The LRT-C includes onboard memory that allows Zaber's controllers to autodetect the model and set reasonable parameters. See the Protocol Manual for more information on how to modify the settings. Damage to the axis may result if the settings are not correct. To use your Zaber peripheral with a third-party controller, review the motor, sensor, and encoder specifications and pin-outs carefully.

Zaber's motion control devices are precision instruments and must be handled with care. In particular, moving parts must be treated with care. Avoid axial loads in excess of the rated thrust load, axial and radial impact, dust and other contaminants and damage to the lead screw thread. These will reduce the performance of the device below stated specifications.

⚠ **Caution:** The motor in this device can exceed 60° C during normal operation and become hot enough to cause burns. Take precautions to prevent contact with the motor.

Conventions used throughout this document

- `Fixed width` type indicates communication to and from a device. The ↵ symbol indicates a carriage return, which can be achieved by pressing enter when using a terminal program.
- An ASCII command followed by (T:xx) indicates a legacy T-Series Binary Protocol command that achieves the same result. For example, `move abs 10000 (T:20:10000)` shows that a move abs ASCII command can also be achieved with Binary command number 20.

Not all ASCII commands have an equivalent Binary counterpart.

Device Overview

AutoDetect

Your LRT-C peripheral is equipped with AutoDetect, a feature that allows a Zaber controller to automatically configure its settings for the peripheral when it is connected.

☼ **Important:** The controller should always be powered down before disconnecting or connecting your LRT-C peripheral.

To connect the peripheral to a controller:

- Power off the controller.
- Connect the LRT-C peripheral.
- Power on the controller.
- The controller will activate the peripheral shortly after it is powered on.

See the Zaber controller user manual for more details on peripheral activation and control.

Connectors

Recommended controller(s) for your LRT-C peripheral are provided in the product specifications. Zaber's controllers and peripherals are designed for ease of use when used together. Optimal settings for each peripheral are automatically detected by Zaber's controllers when the device is connected.

For reference, the pinout for the peripheral cable connectors is shown below:

Pinout for D-sub 15 Connectors (peripherals)

T3A Peripheral (male)	
T4A Peripheral (male)	

Pin #	Function
1	+5V for Limits & Encoder
2	AutoDetect Data
3	*reserved*
4	Away Sensor
5	Home Sensor
6	Ground
7	Motor B1
8	Motor A1
9	AutoDetect Clock
10	Encoder A
11	Encoder B
12	Encoder Index
13	Ground
14	Motor B2
15	Motor A2

Not all pins are used for all models

Alternate Controllers

The LRT-C can be controlled by any 2-phase stepper motor controller with limit sensor input. **We do not recommend using your own controller unless you are familiar with how to control a stepper motor with hall sensor limit switches.** Damage to the device due to incorrect wiring is not covered by warranty.

Motors

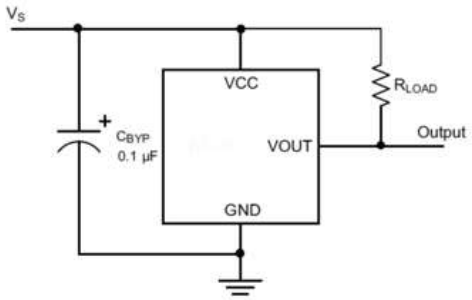
For motor information see the LRT-C product page

Limit Sensors

Hall effect sensors are used in the LRT-C as home sensors. The Hall sensors used are part number A1120LLHLT-T made by Allegro. Click here for data sheet. Your controller should be configured so the stage stops immediately (quick deceleration) when the sensors are triggered.

- PCB wire colour code:
  - 5 Vdc input - red
  - Home signal - yellow
  - Away signal - white
  - Ground - black

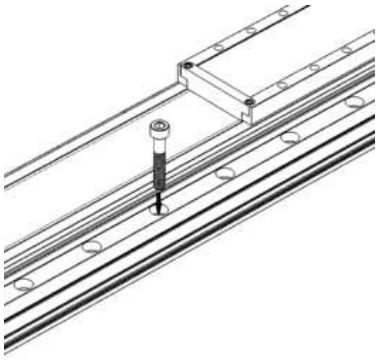
The Hall sensor has an open-collector output. The default output is high impedance when the Hall sensor is not active. When the sensor detects a magnet, the Hall sensor pulls the output low to ground.



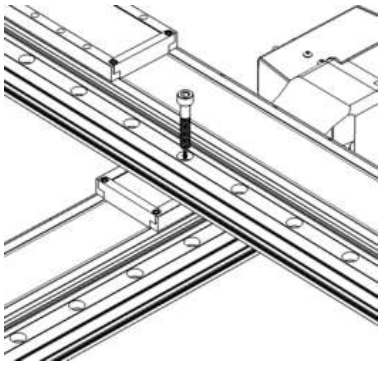
If you are not using a Zaber controller, ensure that your controller has a pull-up resistor on the output line of each Hall sensor as shown in the diagram. The bypass capacitor is optional, but may help to eliminate false triggering in noisy environments. The typical value for the pull-up resistor (R_{LOAD}) is 10 kΩ and for the bypass capacitor is 0.1 uF to 1 uF. The larger the capacitance, the better the noise filtering but the slower the response time.

Installation

Physical Installation



Secure stages with M6 (or 1/4"-20) socket cap screws, 35 mm or longer.



Two stages can be mounted directly in XY configuration.

Tip: To obtain the best pitch, roll, yaw and runout accuracy, mount the stage to a known flat, stiff surface. Our tests were performed on a granite table, grade A flatness.

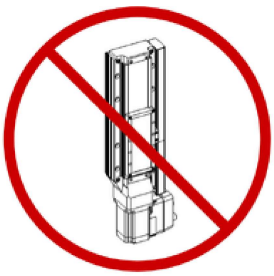
⚠ **Tipping Hazard!** Ensure stage is fastened to a secure surface before mounting load on carriage. An unmounted stage with a load presents a tipping hazard. Ensure loads are mounted securely to the carriage of the stage.

⚠ **Back-driving Hazard!** When mounting stages vertically where they will lift a load, do not exceed the values in the following table. Exceeding this load could backdrive the device, especially during loss of power, and could damage its controller and cause injury.

Drive Screw Version	Back-driving Force (N)
A	Non-back-driving
B	420
D	40
H	157

LRT-AE Installation

The LRT-AE version contains a linear encoder scale and flat flex cable on one side. It can be mounted in all orientations except the following. These orientations can cause the encoder flex cable to migrate out of its intended position:



LRT-AE Mounting

This orientation can cause the flex cable to bunch up, especially in stages over 500 mm travel.

LRT-AE Mounting

This orientation can cause the flex cable to migrate out of its cover, especially in stages over 500 mm travel.

Maintenance

Many factors affect the lifetime of the grease and bearings including duty cycle, environment, travel length, stage orientation, and loading configuration. As a general guideline for usage in a clean office environment, the recommended re-lubrication interval is 250 km with an inspection after every 1500 hours of continuous operation. Inspection should be done by wiping a bearing rail with a clean, lint-free wipe and ensuring that there is clean, wetted grease present.

Harsh environment, short travel, vertically oriented, and high duty cycle applications require more frequent re-lubrication and inspection. Contact an Applications Engineer to discuss your application for more specific recommendations.

Short travel can cause an insufficient distribution of lubricant amongst the rolling elements of the bearing system. For recirculating bearing guide types, short travel is equal to or less than the length of the carriage. For crossed-roller bearing guide types, short travel is equal to or less than twice the spacing of the rolling elements (typically 5-6 mm). If your application is considered short travel, it is recommended to occasionally drive the stage throughout its full travel range to maintain an even lubrication film over the entire guide surface. More frequent re-lubrication and inspection may be required in these applications.

Contact Zaber support for relubrication kit SG133. We recommend using Shell Gadus S2 V220 2 or similar lithium thickened petroleum grease.

Lead Screw Noise

If your stage develops a chirping or squealing sound while moving, especially at high speed, lubricating the lead screw will usually solve the problem. We recommend Super Lube 52004 Synthetic Lightweight Oil.

- Remove the dust cover by following the instructions in the next section
- Move the carriage to the away position.
- Wipe the lead screw clean of any dust or debris before application.
- Apply a small line of Super Lube down the whole length of the lead screw. Be careful not to get any oil into the lead nut as it can interfere with the anti-backlash mechanism.
- Move the carriage slowly (speed = ~60 rpm or 21,000 Zaber units) to the home position to evenly distribute the oil.
- Follow the instructions below to reinstall the rigid cover.

Applying Super Lube to lead screw

This is a good amount of oil

Remove dust cover

⚠ **Careful, dust cover edges are sharp!**

⚠ **Pinch Hazard!** You will need to move the stage with the power on while greasing. Be careful not to squish anything, especially fingers or hands, between the carriage and the end plates.

Remove the dust cover clamps at each end of the stage by removing their M3 screws.

Remove the carriage ramps by removing their screws.

Slide out the carriage cover.

Slide out the dust cover. **CAUTION! DUST COVER EDGES ARE SHARP!**

Insert angled syringe tip into grease hole in bearing end cap. With the power on and using the manual control knob (if equipped), move the stage about 100 mm (4") while squeezing grease in from the syringe. Don't drive the carriage close to the ends of the stage where the risk is greater of squishing the syringe or your fingers. Repeat with the other three end caps.

Reinstall dust cover

Slide dust cover into carriage, above angled sliding pads but below thin channel near the top. Position the dust cover so it's about even at both ends

Install one carriage end ramp and slide the top sheet in the thin channel near the top.

Attach the other carriage end ramp.

Position the dust cover so it comes close to the clamp holes at each end.

Loosely attach the clamps at each end. Run the stage back and forth once to position the dust cover. Gradually tighten the clamp screws, alternating between the two at each clamp. If part of the dust cover isn't seated properly, loosen the nearest clamp and re-tighten.

Trajectory Control and Behaviour

This section describes the behaviour of the axis trajectory when a movement command is issued.

Software Position Limits

The travel range of the axis is limited by the Minimum Position and Maximum Position settings. The factory settings for the axis are configured to match the physical travel range. If a customized range is desired, it can be changed by configuring the limit.min (T:106) and limit.max (T:44) settings to appropriate values. For the Current Position, query pos (T:60).

Minimum Position

When the Current Position is less than the Minimum Position value, the axis cannot move in the negative direction(towards the motor).

Maximum Position
When the Current Position is greater than the Maximum Position value, the axis cannot move in the positive direction(away from the motor).

Movement Speed

The movement speed of the axis depends on axis status and various speed settings. If the axis has not been initialized by the home (T:1) command or by moving towards the home end of the axis, movement speed will be constrained to fail-safe values. The home status of the axis can be determined by reading the limit.home.triggered(T:53:103) setting.

Movement speed of the axis is specified below:

move vel (T:22)
The axis will move at the specified speed regardless of home status.
Knob movement in Velocity Mode
The axis will move at the specified speed regardless of home status.
The speed is specified by the knob.speedprofile (T:112) and knob.maxspeed (T:111) settings.

Other movement commands - when the axis has not been homed
The axis will move at the slower of the maxspeed (T:42) and limit.approach.maxspeed (T:41) settings.

Other movement commands - when the axis has been homed
The axis will move at the speed specified by the maxspeed (T:42) setting.

Warranty and Repair

For Zaber's policies on warranty and repair, please refer to the Ordering Policies.

Standard products

Standard products are any part numbers that do not contain the suffix ENG followed by a 4 digit number. Most, but not all, standard products are listed for sale on our website. All standard Zaber products are backed by a one-month satisfaction guarantee. If you are not satisfied with your purchase, we will refund your payment minus any shipping charges. Goods must be in brand new saleable condition with no marks. Zaber products are guaranteed for one year. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

Custom products

Custom products are any part numbers containing the suffix ENG followed by a 4 digit number. Each of these products has been designed for a custom application for a particular customer. Custom products are guaranteed for one year, unless explicitly stated otherwise. During this period Zaber will repair any products with faults due to manufacturing defects, free of charge.

How to return products

Customers with devices in need of return or repair should contact Zaber to obtain an RMA form which must be filled out and sent back to us to receive an RMA number. The RMA form contains instructions for packing and returning the device. The specified RMA number must be included on the shipment to ensure timely processing.

Email Updates

If you would like to receive our periodic email newsletter including product updates and promotions.

Contact Information

Contact Zaber Technologies Inc by any of the following methods:

Phone	1-604-569-3780 (direct) 1-888-276-8033 (toll free in North America)
Fax	1-604-648-8033
Mail	#2 - 605 West Kent Ave. N., Vancouver, British Columbia, Canada, V6P 6T7
Web	www.zaber.com
Email	Please visit our website for up to date email contact information.

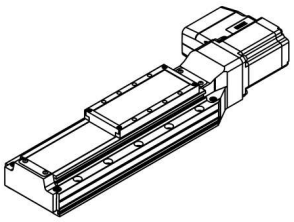
The original instructions for this product are available at https://www.zaber.com/manuals/LRT-C.

Appendix A: Default Settings

Please see the Zaber Support Page for default settings for this device.

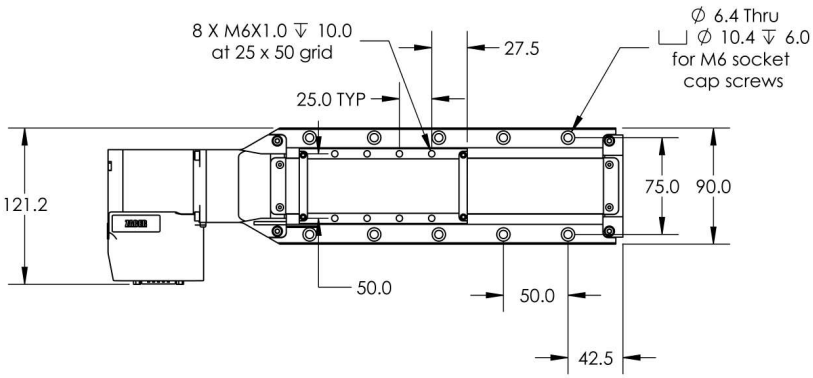
Product Drawing

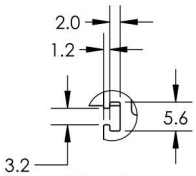
ZABER
LRT-C Motorized Stage
dimensions in mm



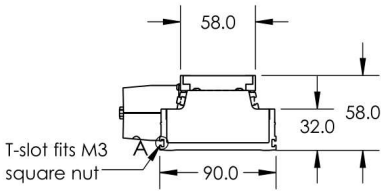
Model Number*	Travel	A	B
LRT0100xL-CT3A	100	399	245
LRT0250xL-CT3A	250	549	395
LRT0500xL-CT3A	500	799	645
LRT0750xL-CT3A	750	1049	895
LRT1000xL-CT3A	1000	1299	1145
LRT1500xL-CT3A	1500	1799	1645

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

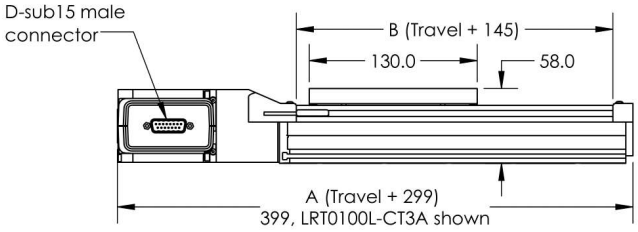




DETAIL A
SCALE 1 : 1



End opposite motor



DWG 3085 R01

Specifications

Specification	Value	Alternate Unit
Built-in Controller	No	
Recommended Controller	X-MCC (48 V) Recommended	
AutoDetect	Yes	
Maximum Centered Load	2940 N	659.3 lb
Maximum Moment (Pitch)	70 N·m	51.7 ft·lb
Maximum Moment (Roll)	120 N·m	88.6 ft·lb
Maximum Moment (Yaw)	70 N·m	51.7 ft·lb
Vertical Runout	< 10 µm	< 0.000394"
Horizontal Runout	< 50 µm	< 0.001968"
Pitch	0.015°	0.262 mrad
Roll	0.02°	0.349 mrad
Yaw	0.03°	0.523 mrad
Stiffness in Pitch	1400 N·m/°	12 µrad/N·m
Stiffness in Roll	700 N·m/°	25 µrad/N·m

Specification	Value	Alternate Unit
Stiffness in Yaw	1200 N·m/°	15 µrad/N·m
Motor Steps Per Rev	200	
Motor Type	Stepper (2 phase)	
Motor Rated Current	3000 mA/phase	
Motor Winding Resistance	0.53 ohms/phase	
Inductance	2 mH/phase	
Motor Connection	D-sub 15	
Default Resolution	1/64 of a step	
Guide Type	Recirculating Ball Linear Guide	
Limit or Home Sensing	Magnetic home sensor	
Axes of Motion	1	
Operating Temperature Range	0 to 50 °C	
CE Compliant	Yes	
Vacuum Compatible	No	

Comparison

Part Number	Microstep Size (Default Resolution)	Travel Range	Accuracy (unidirectional)	Repeatability
LRT0100AL-CT3A	0.124023438 µm	100 mm (3.937")	25 µm (0.000984")	< 4 µm (< 0.000157")
LRT0100BL-CT3A	0.49609375 µm	100 mm (3.937")	25 µm (0.000984")	< 4 µm (< 0.000157")
LRT0100DL-CT3A	1.984375 µm	100 mm (3.937")	25 µm (0.000984")	< 8 µm (< 0.000315")
LRT0100HL-CT3A	0.390625 µm	100 mm (3.937")	45 µm (0.001772")	< 4 µm (< 0.000157")
LRT0250AL-CT3A	0.124023438 µm	250 mm (9.843")	63 µm (0.002480")	< 4 µm (< 0.000157")
LRT0250BL-CT3A	0.49609375 µm	250 mm (9.843")	63 µm (0.002480")	< 4 µm (< 0.000157")
LRT0250DL-CT3A	1.984375 µm	250 mm (9.843")	63 µm (0.002480")	< 8 µm (< 0.000315")
LRT0250HL-CT3A	0.390625 µm	250 mm (9.843")	113 µm (0.004449")	< 4 µm (< 0.000157")
LRT0500AL-CT3A	0.124023438 µm	500 mm (19.685")	125 µm (0.004921")	< 4 µm (< 0.000157")
LRT0500BL-CT3A	0.49609375 µm	500 mm (19.685")	125 µm (0.004921")	< 4 µm (< 0.000157")
LRT0500DL-CT3A	1.984375 µm	500 mm (19.685")	125 µm (0.004921")	< 8 µm (< 0.000315")
LRT0500HL-CT3A	0.390625 µm	500 mm (19.685")	225 µm (0.008858")	< 4 µm (< 0.000157")
LRT0750AL-CT3A	0.124023438 µm	750 mm (29.528")	188 µm (0.007402")	< 4 µm (< 0.000157")
LRT0750BL-CT3A	0.49609375 µm	750 mm (29.528")	188 µm (0.007402")	< 4 µm (< 0.000157")
LRT0750DL-CT3A	1.984375 µm	750 mm (29.528")	188 µm (0.007402")	< 8 µm (< 0.000315")
LRT0750HL-CT3A	0.390625 µm	750 mm (29.528")	338 µm (0.013307")	< 4 µm (< 0.000157")
LRT1000AL-CT3A	0.124023438 µm	1000 mm (39.370")	250 µm (0.009842")	< 4 µm (< 0.000157")
LRT1000BL-CT3A	0.49609375 µm	1000 mm (39.370")	250 µm (0.009842")	< 4 µm (< 0.000157")
LRT1000DL-CT3A	1.984375 µm	1000 mm (39.370")	250 µm (0.009842")	< 8 µm (< 0.000315")
LRT1000HL-CT3A	0.390625 µm	1000 mm (39.370")	450 µm (0.017716")	< 4 µm (< 0.000157")
LRT1500AL-CT3A	0.124023438 µm	1500 mm (59.055")	375 µm (0.014764")	< 4 µm (< 0.000157")
LRT1500BL-CT3A	0.49609375 µm	1500 mm (59.055")	375 µm (0.014764")	< 4 µm (< 0.000157")
LRT1500DL-CT3A	1.984375 µm	1500 mm (59.055")	375 µm (0.014764")	< 8 µm (< 0.000315")

Part Number	Backlash	Maximum Speed	Minimum Speed	Speed Resolution
LRT0100AL-CT3A	< 12 µm (< 0.000472")	45 mm/s (1.772"/s)	0.000076 mm/s (0.000003"/s)	0.000076 mm/s (0.000003"/s)
LRT0100BL-CT3A	< 45 µm (< 0.001772")	175 mm/s (6.890"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
LRT0100DL-CT3A	< 75 µm (< 0.002953")	700 mm/s (27.559"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
LRT0100HL-CT3A	< 25 µm (< 0.000984")	240 mm/s (9.449"/s)	0.000239 mm/s (0.000009"/s)	0.000239 mm/s (0.000009"/s)
LRT0250AL-CT3A	< 12 µm (< 0.000472")	45 mm/s (1.772"/s)	0.000076 mm/s (0.000003"/s)	0.000076 mm/s (0.000003"/s)
LRT0250BL-CT3A	< 45 µm (< 0.001772")	175 mm/s (6.890"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
LRT0250DL-CT3A	< 75 µm (< 0.002953")	700 mm/s (27.559"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
LRT0250HL-CT3A	< 25 µm (< 0.000984")	240 mm/s (9.449"/s)	0.000239 mm/s (0.000009"/s)	0.000239 mm/s (0.000009"/s)
LRT0500AL-CT3A	< 12 µm (< 0.000472")	45 mm/s (1.772"/s)	0.000076 mm/s (0.000003"/s)	0.000076 mm/s (0.000003"/s)
LRT0500BL-CT3A	< 45 µm (< 0.001772")	175 mm/s (6.890"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
LRT0500DL-CT3A	< 75 µm (< 0.002953")	700 mm/s (27.559"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
LRT0500HL-CT3A	< 25 µm (< 0.000984")	240 mm/s (9.449"/s)	0.000239 mm/s (0.000009"/s)	0.000239 mm/s (0.000009"/s)
LRT0750AL-CT3A	< 12 µm (< 0.000472")	45 mm/s (1.772"/s)	0.000076 mm/s (0.000003"/s)	0.000076 mm/s (0.000003"/s)
LRT0750BL-CT3A	< 45 µm (< 0.001772")	175 mm/s (6.890"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
LRT0750DL-CT3A	< 75 µm (< 0.002953")	700 mm/s (27.559"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
LRT0750HL-CT3A	< 25 µm (< 0.000984")	150 mm/s (5.905"/s)	0.000239 mm/s (0.000009"/s)	0.000239 mm/s (0.000009"/s)
LRT1000AL-CT3A	< 12 µm (< 0.000472")	28 mm/s (1.102"/s)	0.000076 mm/s (0.000003"/s)	0.000076 mm/s (0.000003"/s)
LRT1000BL-CT3A	< 45 µm (< 0.001772")	120 mm/s (4.724"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
LRT1000DL-CT3A	< 75 µm (< 0.002953")	500 mm/s (19.685"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)
LRT1000HL-CT3A	< 25 µm (< 0.000984")	95 mm/s (3.740"/s)	0.000239 mm/s (0.000009"/s)	0.000239 mm/s (0.000009"/s)
LRT1500AL-CT3A	< 12 µm (< 0.000472")	13 mm/s (0.512"/s)	0.000076 mm/s (0.000003"/s)	0.000076 mm/s (0.000003"/s)
LRT1500BL-CT3A	< 45 µm (< 0.001772")	55 mm/s (2.165"/s)	0.000303 mm/s (0.000012"/s)	0.000303 mm/s (0.000012"/s)
LRT1500DL-CT3A	< 75 µm (< 0.002953")	225 mm/s (8.858"/s)	0.001212 mm/s (0.000048"/s)	0.001212 mm/s (0.000048"/s)

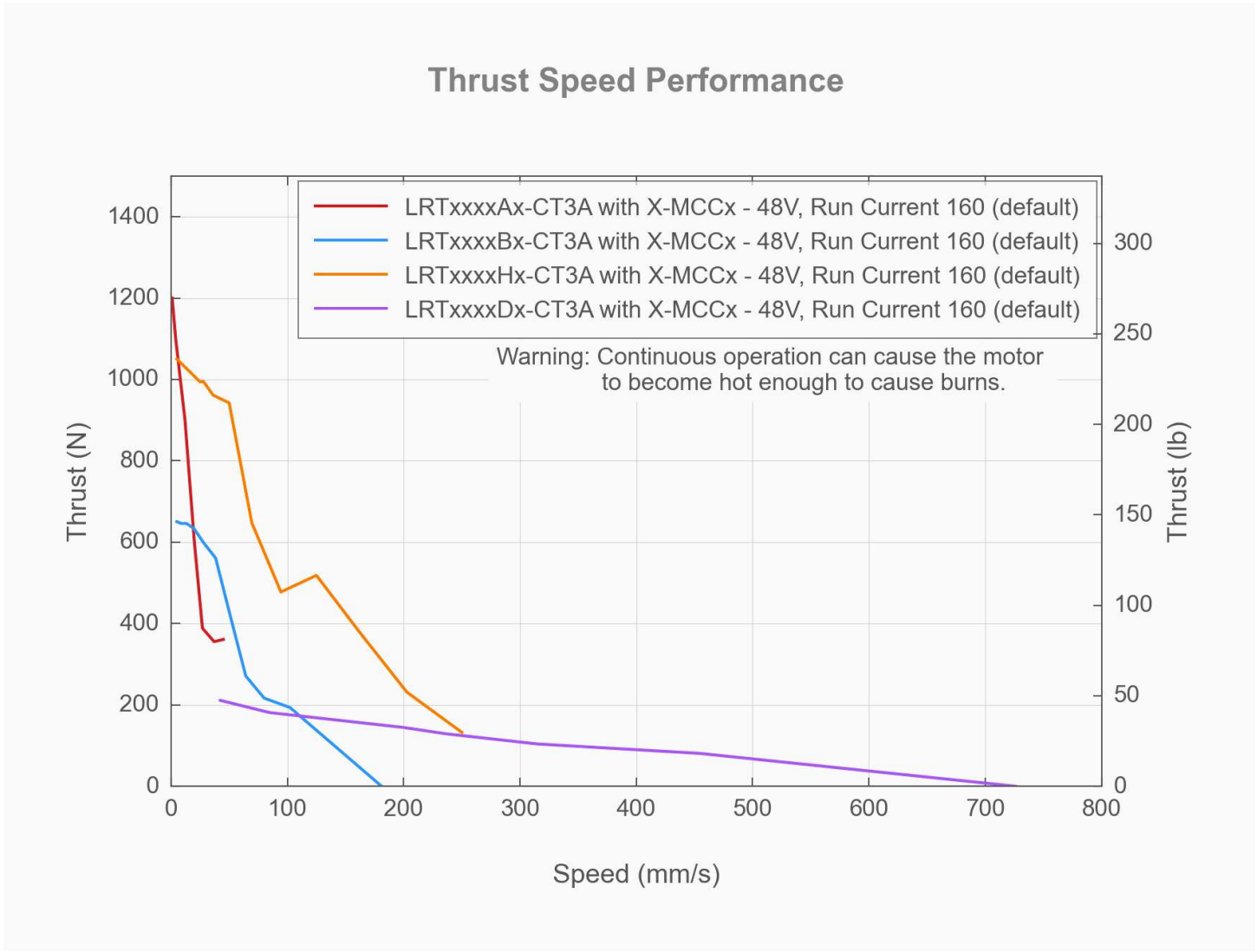
Part Number	Peak Thrust	Back-driving Force*	Maximum Continuous Thrust	Linear Motion Per Motor Rev
LRT0100AL-CT3A	1200 N (269.1 lb)	Non-back-driving	1200 N (269.1 lb)	1.5875 mm (0.062")

Part Number	Peak Thrust	Back-driving Force*	Maximum Continuous Thrust	Linear Motion Per Motor Rev
LRT0100BL-CT3A	600 N (134.6 lb)	420 N (94.2 lb) *(± 30%)*	600 N (134.6 lb)	6.35 mm (0.250")
LRT0100DL-CT3A	200 N (44.9 lb)	40 N (9.0 lb) *(± 30%)*	180 N (40.4 lb)	25.4 mm (1.000")
LRT0100HL-CT3A	1200 N (269.1 lb)	157 N (35.2 lb) *(± 30%)*	1200 N (269.1 lb)	5 mm (0.197")
LRT0250AL-CT3A	1200 N (269.1 lb)	Non-back-driving	1200 N (269.1 lb)	1.5875 mm (0.062")
LRT0250BL-CT3A	600 N (134.6 lb)	420 N (94.2 lb) *(± 30%)*	600 N (134.6 lb)	6.35 mm (0.250")
LRT0250DL-CT3A	200 N (44.9 lb)	40 N (9.0 lb) *(± 30%)*	180 N (40.4 lb)	25.4 mm (1.000")
LRT0250HL-CT3A	1200 N (269.1 lb)	157 N (35.2 lb) *(± 30%)*	1200 N (269.1 lb)	5 mm (0.197")
LRT0500AL-CT3A	1200 N (269.1 lb)	Non-back-driving	1200 N (269.1 lb)	1.5875 mm (0.062")
LRT0500BL-CT3A	600 N (134.6 lb)	420 N (94.2 lb) *(± 30%)*	600 N (134.6 lb)	6.35 mm (0.250")
LRT0500DL-CT3A	200 N (44.9 lb)	40 N (9.0 lb) *(± 30%)*	180 N (40.4 lb)	25.4 mm (1.000")
LRT0500HL-CT3A	1200 N (269.1 lb)	157 N (35.2 lb) *(± 30%)*	1200 N (269.1 lb)	5 mm (0.197")
LRT0750AL-CT3A	1200 N (269.1 lb)	Non-back-driving	1200 N (269.1 lb)	1.5875 mm (0.062")
LRT0750BL-CT3A	600 N (134.6 lb)	420 N (94.2 lb) *(± 30%)*	600 N (134.6 lb)	6.35 mm (0.250")
LRT0750DL-CT3A	200 N (44.9 lb)	40 N (9.0 lb) *(± 30%)*	180 N (40.4 lb)	25.4 mm (1.000")
LRT0750HL-CT3A	1200 N (269.1 lb)	157 N (35.2 lb) *(± 30%)*	1200 N (269.1 lb)	5 mm (0.197")
LRT1000AL-CT3A	1200 N (269.1 lb)	Non-back-driving	1200 N (269.1 lb)	1.5875 mm (0.062")
LRT1000BL-CT3A	600 N (134.6 lb)	420 N (94.2 lb) *(± 30%)*	600 N (134.6 lb)	6.35 mm (0.250")
LRT1000DL-CT3A	200 N (44.9 lb)	40 N (9.0 lb) *(± 30%)*	180 N (40.4 lb)	25.4 mm (1.000")
LRT1000HL-CT3A	1200 N (269.1 lb)	157 N (35.2 lb) *(± 30%)*	1200 N (269.1 lb)	5 mm (0.197")
LRT1500AL-CT3A	1200 N (269.1 lb)	Non-back-driving	1200 N (269.1 lb)	1.5875 mm (0.062")
LRT1500BL-CT3A	600 N (134.6 lb)	420 N (94.2 lb) *(± 30%)*	600 N (134.6 lb)	6.35 mm (0.250")
LRT1500DL-CT3A	200 N (44.9 lb)	40 N (9.0 lb) *(± 30%)*	180 N (40.4 lb)	25.4 mm (1.000")

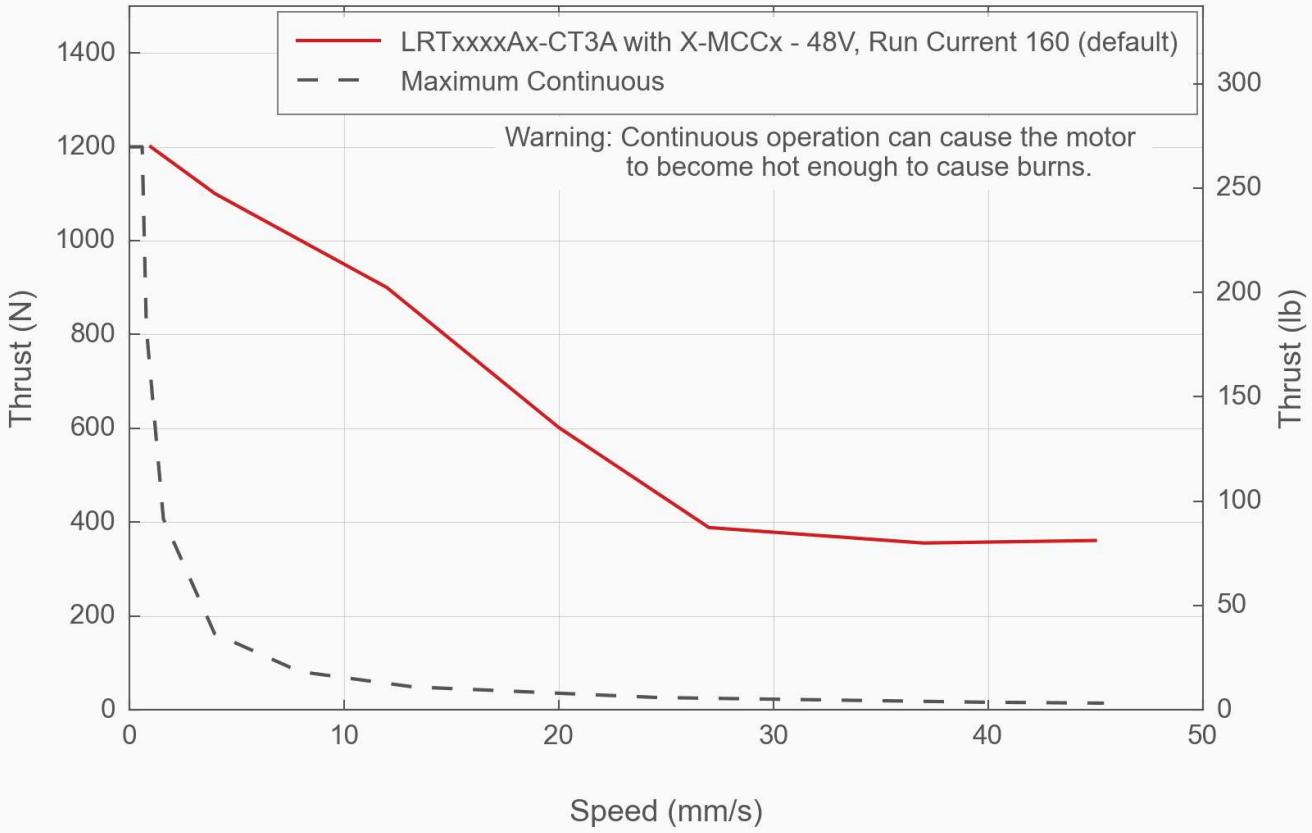
Part Number	Mechanical Drive System	Weight
LRT0100AL-CT3A	Precision lead screw	3.65 kg (8.047 lb)
LRT0100BL-CT3A	Precision lead screw	3.65 kg (8.047 lb)
LRT0100DL-CT3A	Precision lead screw	3.65 kg (8.047 lb)
LRT0100HL-CT3A	Precision ball screw	3.65 kg (8.047 lb)
LRT0250AL-CT3A	Precision lead screw	4.441 kg (9.791 lb)
LRT0250BL-CT3A	Precision lead screw	4.441 kg (9.791 lb)

Part Number	Mechanical Drive System	Weight
LRT0250DL-CT3A	Precision lead screw	4.441 kg (9.791 lb)
LRT0250HL-CT3A	Precision ball screw	4.441 kg (9.791 lb)
LRT0500AL-CT3A	Precision lead screw	5.758 kg (12.694 lb)
LRT0500BL-CT3A	Precision lead screw	5.758 kg (12.694 lb)
LRT0500DL-CT3A	Precision lead screw	5.758 kg (12.694 lb)
LRT0500HL-CT3A	Precision ball screw	5.758 kg (12.694 lb)
LRT0750AL-CT3A	Precision lead screw	7.076 kg (15.600 lb)
LRT0750BL-CT3A	Precision lead screw	7.076 kg (15.600 lb)
LRT0750DL-CT3A	Precision lead screw	7.076 kg (15.600 lb)
LRT0750HL-CT3A	Precision ball screw	7.076 kg (15.600 lb)
LRT1000AL-CT3A	Precision lead screw	8.393 kg (18.503 lb)
LRT1000BL-CT3A	Precision lead screw	8.393 kg (18.503 lb)
LRT1000DL-CT3A	Precision lead screw	8.393 kg (18.503 lb)
LRT1000HL-CT3A	Precision ball screw	8.393 kg (18.503 lb)
LRT1500AL-CT3A	Precision lead screw	11.028 kg (24.313 lb)
LRT1500BL-CT3A	Precision lead screw	11.028 kg (24.313 lb)
LRT1500DL-CT3A	Precision lead screw	11.028 kg (24.313 lb)

Charts and Notes



Thrust Speed Performance



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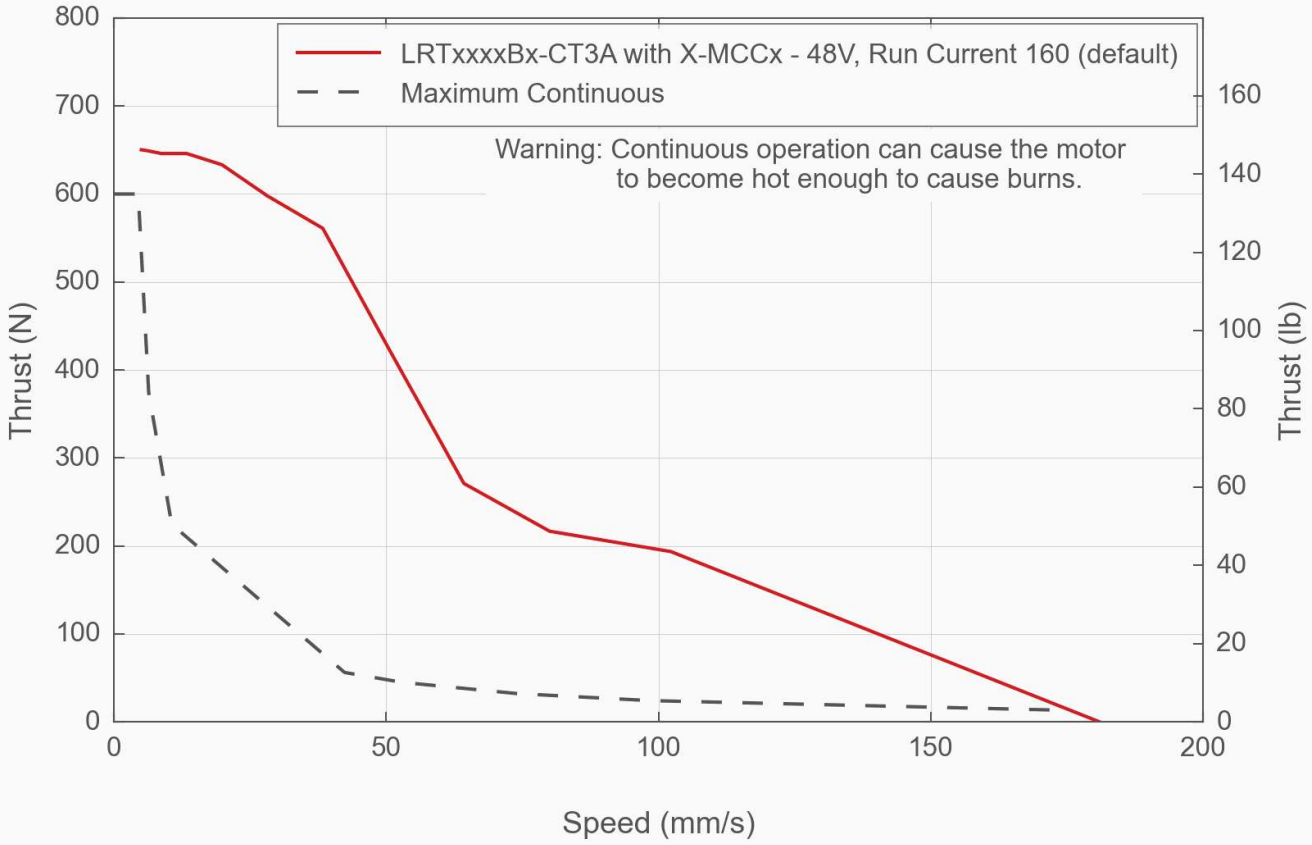

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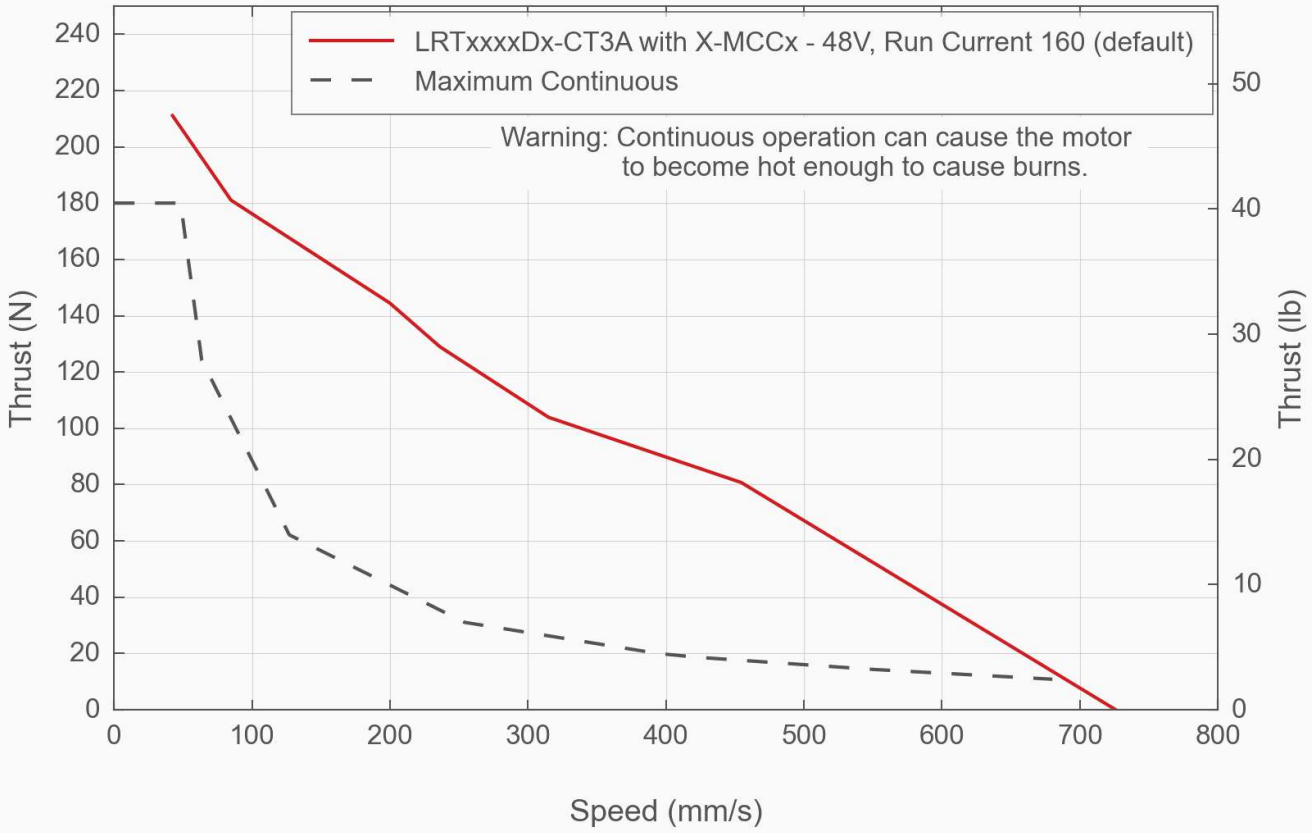

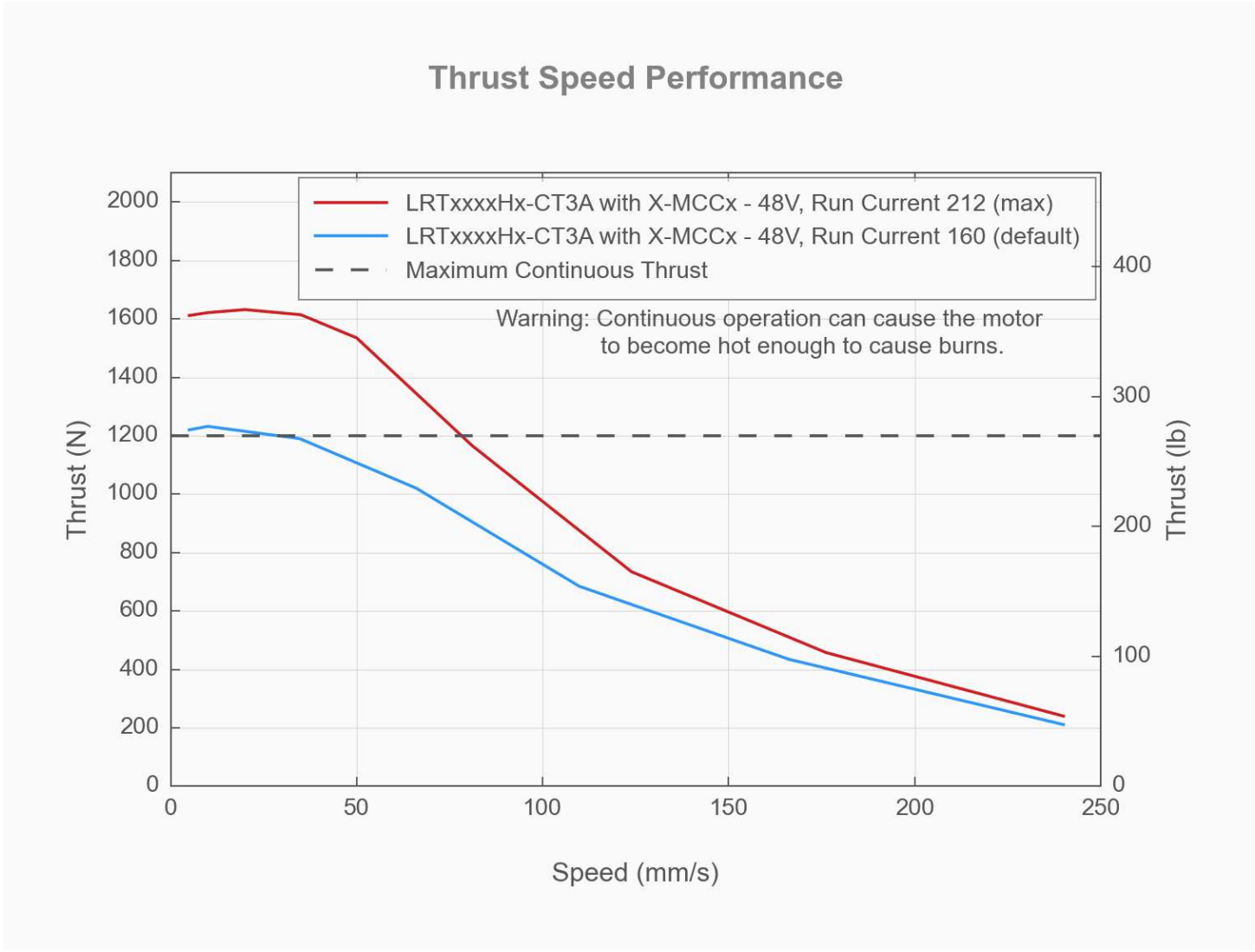

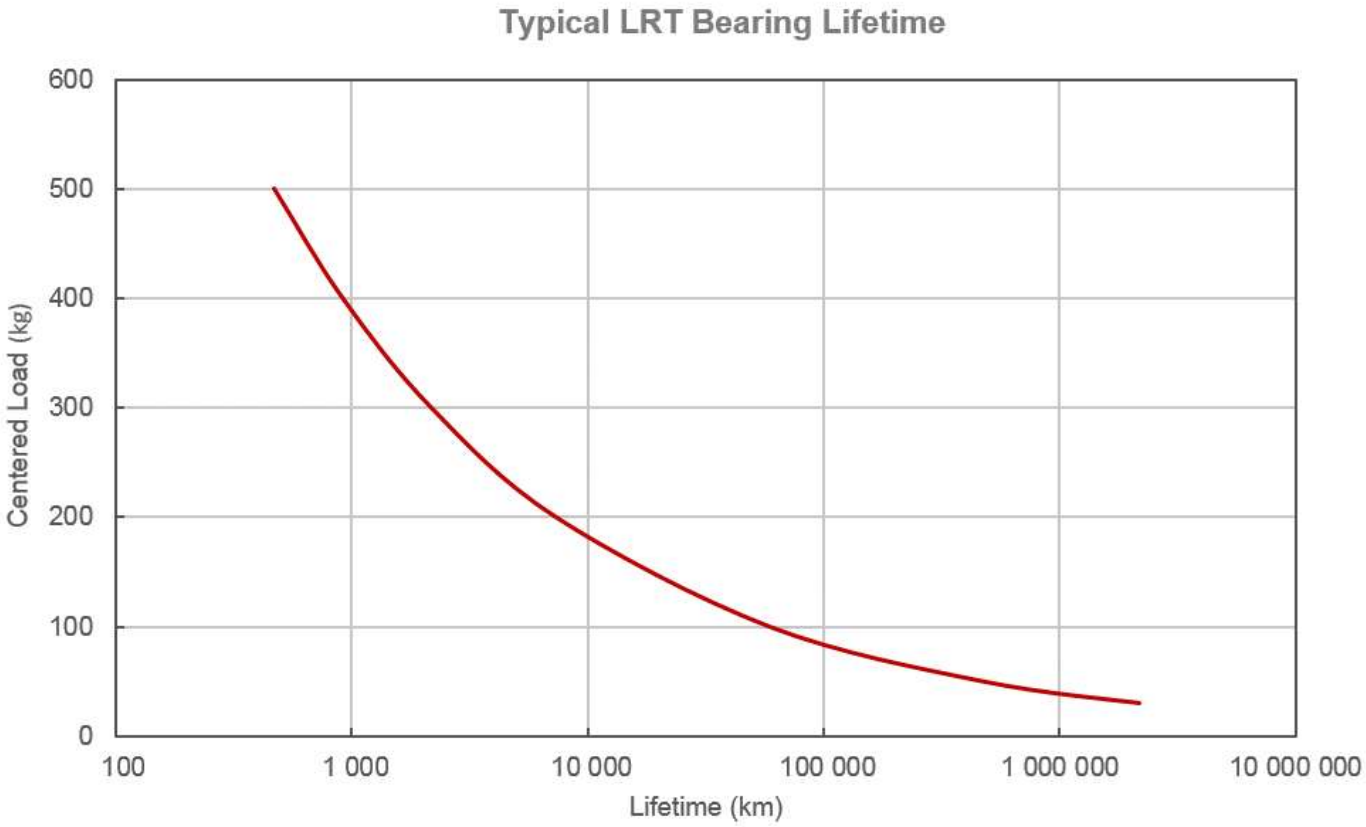

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