

NA Series User's Manual

Linear actuators requiring external controllers



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1. Disclaimer

Zaber's devices 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 and all liability for injury or other damages resulting from the use of our products.

2. Precautions

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 leadscrew thread. These will reduce the performance of the device below stated specifications.

3. Installation

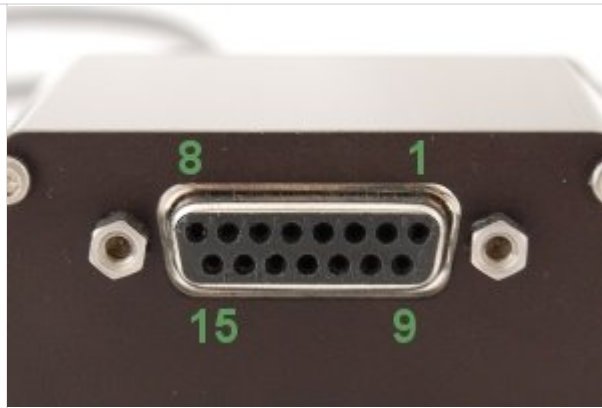
You can mount the NA actuators by the cylindrical mounting shank or by the four mounting holes on the square body section. See the NA web page for dimensions, resolution and other details.

4. Operation

This unit is designed to be controlled with any of Zaber's X-Series or A-Series Stepper Motor Controllers. Units produced before July 2012 with the round Minidin connectors are designed to be controlled with the older T-MCA series chopper drive controllers. Zaber's controllers and peripherals are designed for ease of use when used together. Optimal settings for each peripheral (such as the default current, speed, acceleration, and limit settings) can be loaded by setting the peripheralid (T:66) on the controller. The peripheral ID is listed as the ID on the peripheral's label. A list of IDs is also available on the ID Mapping page. For more information on device operation, refer to the controller's user manual.

4.1. Pinout for D-sub 15 Connectors (A-series and X-Series controllers and peripherals)

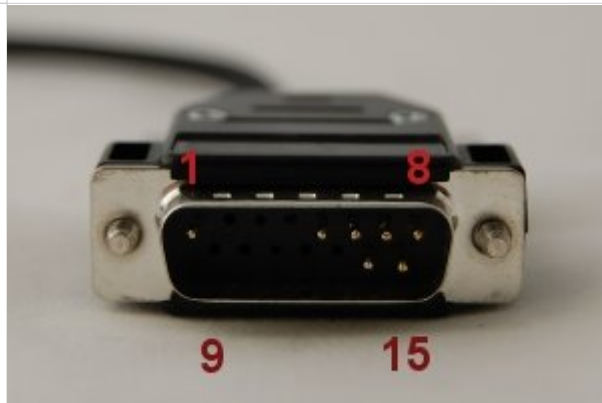
A- or X-series controller (female)



T3 Peripheral (male)



T4 Peripheral (male)



Pin #	Function
1	+5V
2	Encoder Error ****
3	reserved
4	Away Sensor ***

5	Home Sensor
6	Ground
7	Motor B1
8	Motor A1
9	+5V *
10	Encoder A *
11	Encoder B *
12	Encoder Index **
13	Ground *
14	Motor B2
15	Motor A2

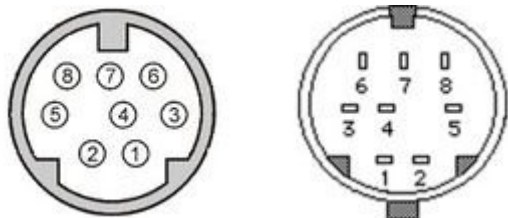
* encoder embedded peripherals only

** devices with encoders with index only

*** devices with away sensors only

**** devices with linear or direct-reading encoders only

4.2. Pin-Out for Minidin 8 (T-MCA connector and CDC6 cable to Peripheral)



Pin #	Function
1	Motor A1
2	Motor A2
3	Motor B1
4	Not Connected
5	Motor B2
6	+5V
7	Home Signal

4.3. Alternate Controllers

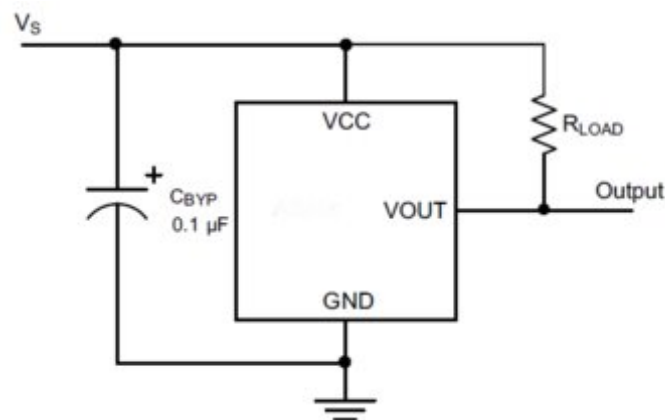
The device may be controlled by any 2-phase stepper motor controller with home sensor input. **Warning:** Operating the unit without correctly wiring up the home sensor can cause permanent damage to the unit. We do not recommend using your own controller unless you are familiar with how to control a stepper motor with a hall sensor limit switch. The following information is provided for reference only. Damage to the actuator or hall sensor due to incorrect wiring is not covered by warranty.

4.4. Home Sensor Wiring

A Hall effect sensor is mounted in the device for use as a home sensor. It is part number A1122LUA-T made by Allegro. Click [here](#) for data sheet. Your controller should be configured so the stage stops immediately (little deceleration) when the home sensor is triggered.

- Wire colour code:
 - 3.6-24 Vdc input - red
 - Home signal - yellow
 - 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 the 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) is 10k and for the bypass capacitor is 0.1uF to 1uF. The larger the capacitance, the better the noise filtering but the slower the response time.

5. Warranty and Repair

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

5.1. 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.

5.2. 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.

5.3. 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.

6. Email Updates

If you would like to receive our periodic email newsletter including product updates and promotions, please sign up online at www.zaber.com (news section). Newsletters typically include a promotional offer worth at least \$100.

7. Contact Information

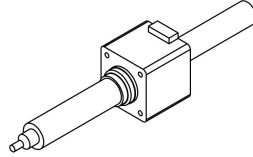
Contact Zaber Technologies Inc by any of the following methods:

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/NA>.

8. Product Drawing

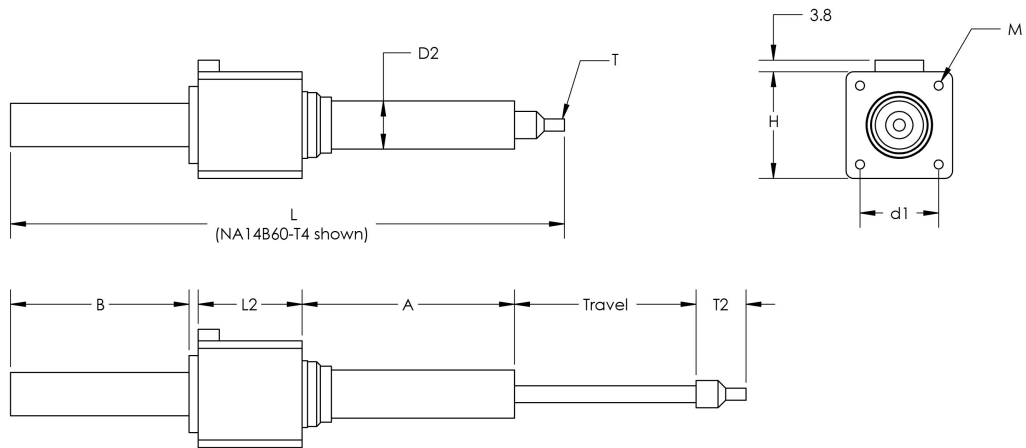
ZABER
NA Motorized Linear Actuator
dimensions in mm



Model Number*	Travel	A	B	L	d1	D2	H	L2	M**	T	T2
NA08A16-T4 & NA08B16-T4	16.0	20.5	18.7	80.2	15.4	9.0	20.0	27.0	M2	#4-40	11.5
NA08A30-T4 & NA08B30-T4	30.0	33.0	32.7	106.7	15.4	9.0	20.0	27.0	M2	#4-40	11.5
NA11B16-T4	16.0	26.8	16.0	86.9	23.0	14.0	28.2	32.2	M2.5	M3	8.8
NA11B30-T4	30.0	39.5	28.0	111.4	23.0	14.0	28.2	32.2	M2.5	M3	8.8
NA11B60-T4	60.0	70.5	60.6	175.9	23.0	14.0	28.2	32.2	M2.5	M3	8.8
NA14B16-T4	16.0	25.8	16.0	95.8	26.0	15.9	35.2	34.4	M3	M4	16.5
NA14B30-T4	30.0	38.6	29.0	121.5	26.0	15.9	35.2	34.4	M3	M4	16.5
NA14B60-T4	60.0	70.2	60.4	183.1	26.0	15.9	35.2	34.4	M3	M4	16.5
NA23C60-T4	60.0	74.5	65.5	208.4	47.1	28.0	56.4	45.2	5.2	1/4"-20	22.2
NA34C60-T4	60.0	80.0	65.5	266.2	69.3	40.0	86.3	78.6	6.5	7/16"-14	38.6

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

**In NA08, NA11 and NA14 models, "M" is a threaded hole; in NA23 and NA34 models, "M" is a through-hole diameter.



DWG 1077 R01

9. Specifications

Specification	Value	Alternate Unit
Built-in Controller	No	
Encoder Type	None	
Motor Temperature Rise	75 °C	
Motor Steps Per Rev	200	
Motor Type	Stepper (2 phase)	
Motor Connection	D-sub 15	
Mechanical Drive System	Precision lead screw	
Limit or Home Sensing	Magnetic home sensor	
Axes of Motion	1	
Vacuum Compatible	No	
CE Compliant	Yes	

9.1. Comparison

Part Number	Microstep Size (Default Resolution)	Recommended Controller	Travel Range	Accuracy (unidirectional)
NA08A16-T4	0.047625 µm	X-MCB1 (24 V) Recommended	16 mm (0.630 ")	20 µm (0.000787 ")
NA08A30-T4	0.047625 µm	X-MCB1 (24 V) Recommended	30 mm (1.181 ")	20 µm (0.000787 ")
NA08B16-T4	0.09525 µm	X-MCB1 (24 V) Recommended	16 mm (0.630 ")	20 µm (0.000787 ")
NA08B30-T4	0.09525 µm	X-MCB1 (24 V) Recommended	30 mm (1.181 ")	20 µm (0.000787 ")
NA11B16-T4	0.09921875 µm	X-MCB1 (24 V) Recommended	16 mm (0.630 ")	25 µm (0.000984 ")
NA11B30-T4	0.09921875 µm	X-MCB1 (24 V) Recommended	30 mm (1.181 ")	25 µm (0.000984 ")
NA11B60-T4	0.09921875 µm	X-MCB1 (24 V) Recommended	60 mm (2.362 ")	36 µm (0.001417 ")

NA14B16-T4	0.09525 µm	X-MCB1 (48 V) Recommended	16 mm (0.630 ")	25 µm (0.000984 ")
NA14B30-T4	0.09525 µm	X-MCB1 (48 V) Recommended	30 mm (1.181 ")	25 µm (0.000984 ")
NA14B60-T4	0.09525 µm	X-MCB1 (48 V) Recommended	60 mm (2.362 ")	36 µm (0.001417 ")
NA23C60-T4	0.1984375 µm	X-MCB1 (48 V) Recommended	60 mm (2.362 ")	36 µm (0.001417 ")
NA34C60-T4	0.1984375 µm	X-MCB1 (48 V) Recommended	60 mm (2.362 ")	45 µm (0.001772 ")

Part Number	Repeatability	Backlash	Maximum Speed	Minimum Speed
NA08A16-T4	< 5 µm (< 0.000197 ")	< 15 µm (< 0.000591 ")	26 mm/s (1.024 "/s)	0.0004465 mm/s (0.000018 "/s)
NA08A30-T4	< 5 µm (< 0.000197 ")	< 15 µm (< 0.000591 ")	26 mm/s (1.024 "/s)	0.0004465 mm/s (0.000018 "/s)
NA08B16-T4	< 5 µm (< 0.000197 ")	< 15 µm (< 0.000591 ")	52 mm/s (2.047 "/s)	0.000893 mm/s (0.000035 "/s)
NA08B30-T4	< 5 µm (< 0.000197 ")	< 15 µm (< 0.000591 ")	52 mm/s (2.047 "/s)	0.000893 mm/s (0.000035 "/s)
NA11B16-T4	< 5 µm (< 0.000197 ")	< 18 µm (< 0.000709 ")	52 mm/s (2.047 "/s)	0.0009302 mm/s (0.000037 "/s)
NA11B30-T4	< 5 µm (< 0.000197 ")	< 18 µm (< 0.000709 ")	52 mm/s (2.047 "/s)	0.0009302 mm/s (0.000037 "/s)
NA11B60-T4	< 5 µm (< 0.000197 ")	< 18 µm (< 0.000709 ")	52 mm/s (2.047 "/s)	0.0009302 mm/s (0.000037 "/s)
NA14B16-T4	< 5 µm (< 0.000197 ")	< 20 µm (< 0.000787 ")	52 mm/s (2.047 "/s)	0.000893 mm/s (0.000035 "/s)
NA14B30-T4	< 5 µm (< 0.000197 ")	< 20 µm (< 0.000787 ")	52 mm/s (2.047 "/s)	0.000893 mm/s (0.000035 "/s)
NA14B60-T4	< 5 µm (< 0.000197 ")	< 20 µm (< 0.000787 ")	52 mm/s (2.047 "/s)	0.000893 mm/s (0.000035 "/s)
NA23C60-T4	< 5 µm (< 0.000197 ")	< 30 µm (< 0.001181 ")	80 mm/s (3.150 "/s)	0.0009302 mm/s (0.000037 "/s)
NA34C60-T4	< 10 µm (< 0.000394 ")	< 65 µm (< 0.002559 ")	30 mm/s (1.181 "/s)	0.0009302 mm/s (0.000037 "/s)

Part Number	Speed Resolution	Peak Thrust	Maximum Continuous Thrust	Linear Motion Per Motor Rev
NA08A16-T4	0.0004465 mm/s (0.000018 "/s)	25 N (5.6 lb)	19 N (4.3 lb)	0.6096 mm (0.024 ")

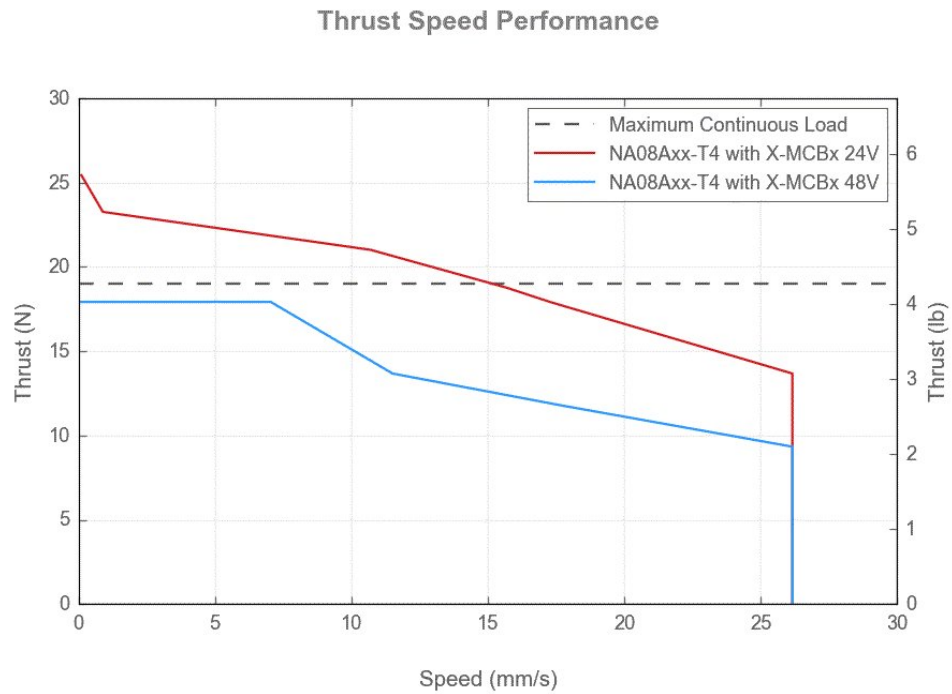
NA08A30-T4	0.0004465 mm/s (0.000018 "/s)	25 N (5.6 lb)	19 N (4.3 lb)	0.6096 mm (0.024 ")
NA08B16-T4	0.000893 mm/s (0.000035 "/s)	20 N (4.5 lb)	19 N (4.3 lb)	1.2192 mm (0.048 ")
NA08B30-T4	0.000893 mm/s (0.000035 "/s)	20 N (4.5 lb)	19 N (4.3 lb)	1.2192 mm (0.048 ")
NA11B16-T4	0.0009302 mm/s (0.000037 "/s)	58 N (13.0 lb)	58 N (13.0 lb)	1.27 mm (0.050 ")
NA11B30-T4	0.0009302 mm/s (0.000037 "/s)	58 N (13.0 lb)	58 N (13.0 lb)	1.27 mm (0.050 ")
NA11B60-T4	0.0009302 mm/s (0.000037 "/s)	58 N (13.0 lb)	58 N (13.0 lb)	1.27 mm (0.050 ")
NA14B16-T4	0.000893 mm/s (0.000035 "/s)	180 N (40.4 lb)	180 N (40.4 lb)	1.2192 mm (0.048 ")
NA14B30-T4	0.000893 mm/s (0.000035 "/s)	180 N (40.4 lb)	180 N (40.4 lb)	1.2192 mm (0.048 ")
NA14B60-T4	0.000893 mm/s (0.000035 "/s)	180 N (40.4 lb)	180 N (40.4 lb)	1.2192 mm (0.048 ")
NA23C60-T4	0.0009302 mm/s (0.000037 "/s)	700 N (157.0 lb)	700 N (157.0 lb)	2.54 mm (0.100 ")
NA34C60-T4	0.0009302 mm/s (0.000037 "/s)	1200 N (269.1 lb)	1200 N (269.1 lb)	2.54 mm (0.100 ")

Part Number	Motor Rated Current	Motor Winding Resistance	Inductance	Motor Rated Power
NA08A16-T4	490 mA/phase	5.1 ohms/phase	1.5 mH/phase	2.45 Watts
NA08A30-T4	490 mA/phase	5.1 ohms/phase	1.5 mH/phase	2.45 Watts
NA08B16-T4	490 mA/phase	5.1 ohms/phase	1.5 mH/phase	2.45 Watts
NA08B30-T4	490 mA/phase	5.1 ohms/phase	1.5 mH/phase	2.45 Watts
NA11B16-T4	1000 mA/phase	2.1 ohms/phase	1.5 mH/phase	4.2 Watts
NA11B30-T4	1000 mA/phase	2.1 ohms/phase	1.5 mH/phase	4.2 Watts
NA11B60-T4	1000 mA/phase	2.1 ohms/phase	1.5 mH/phase	4.2 Watts
NA14B16-T4	570 mA/phase	8.8 ohms/phase	13 mH/phase	5.7 Watts
NA14B30-T4	570 mA/phase	8.8 ohms/phase	13 mH/phase	5.7 Watts
NA14B60-T4	570 mA/phase	8.8 ohms/phase	13 mH/phase	5.7 Watts
NA23C60-T4	1300 mA/phase	3.8 ohms/phase	10.5 mH/phase	13 Watts
NA34C60-T4	1300 mA/phase	9.23 ohms/phase	8.8 mH/phase	31.2 Watts

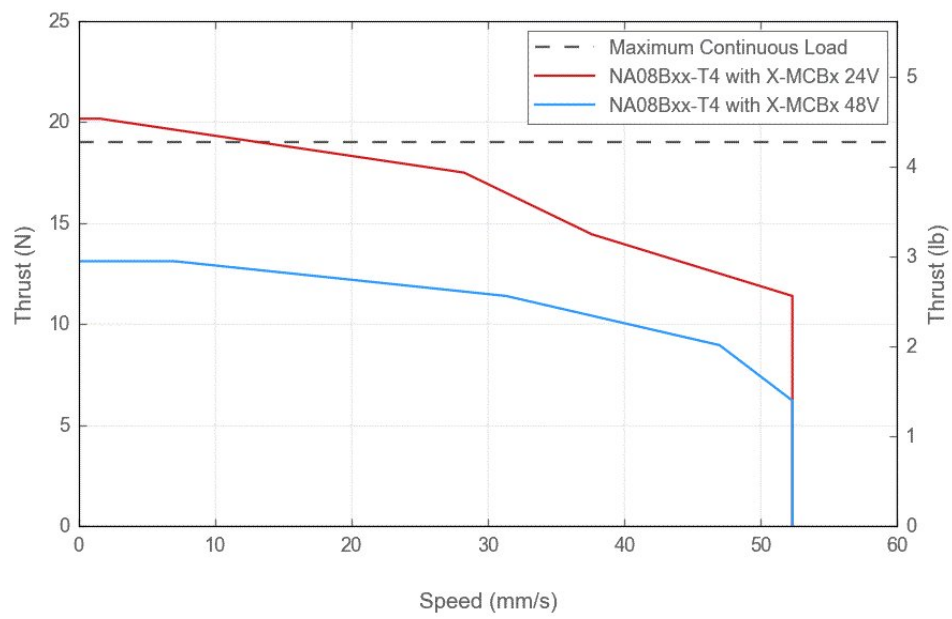
Part Number	Motor Frame Size	Mounting Interface	RoHS Compliant	Weight
NA08A16-T4	08	4 M2 tapped holes 15.4 mm apart or 9 mm dia smooth shank	Compliant Version Available	0.07 kg (0.154 lb)
NA08A30-T4	08	4 M2 tapped holes 15.4 mm apart or 9 mm dia smooth shank	Compliant Version Available	0.08 kg (0.176 lb)
NA08B16-T4	08	4 M2 tapped holes 15.4 mm apart or 9 mm dia smooth shank	Compliant Version Available	0.07 kg (0.154 lb)
NA08B30-T4	08	4 M2 tapped holes 15.4 mm apart or 9 mm dia smooth shank	Compliant Version Available	0.08 kg (0.176 lb)
NA11B16-T4	11	4 M2.5 tapped holes 23 mm apart or 14 mm smooth shank	Compliant Version Available	0.15 kg (0.331 lb)
NA11B30-T4	11	4 M2.5 tapped holes 23 mm apart or 14 mm smooth shank	Compliant Version Available	0.16 kg (0.353 lb)
NA11B60-T4	11	4 M2.5 tapped holes 23 mm apart or 14 mm smooth shank	Yes	0.17 kg (0.375 lb)
NA14B16-T4	14	4 M3 tapped holes 26 mm apart or 15 mm smooth shank	Yes	0.15 kg (0.331 lb)
NA14B30-T4	14	4 M3 tapped holes 26 mm apart or 15 mm smooth shank	Yes	0.22 kg (0.485 lb)
NA14B60-T4	14	4 M3 tapped holes 26 mm apart or 15 mm smooth shank	Yes	0.23 kg (0.507 lb)
NA23C60-T4	23	5.2 mm holes	Yes	0.75 kg (1.653 lb)
NA34C60-T4	34	6.5 mm hole	Yes	2.64 kg (5.820 lb)

9.2. Charts and Notes

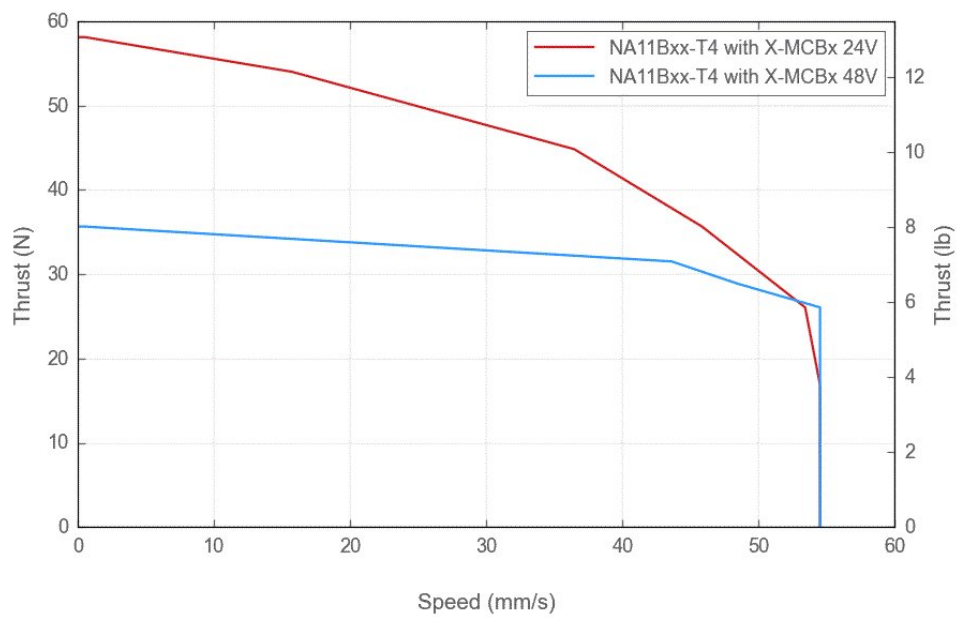
Thrust or torque is a function of speed. The values given above are maximums. These values cannot both be achieved simultaneously (i.e. at maximum speed, the unit will not produce maximum thrust).



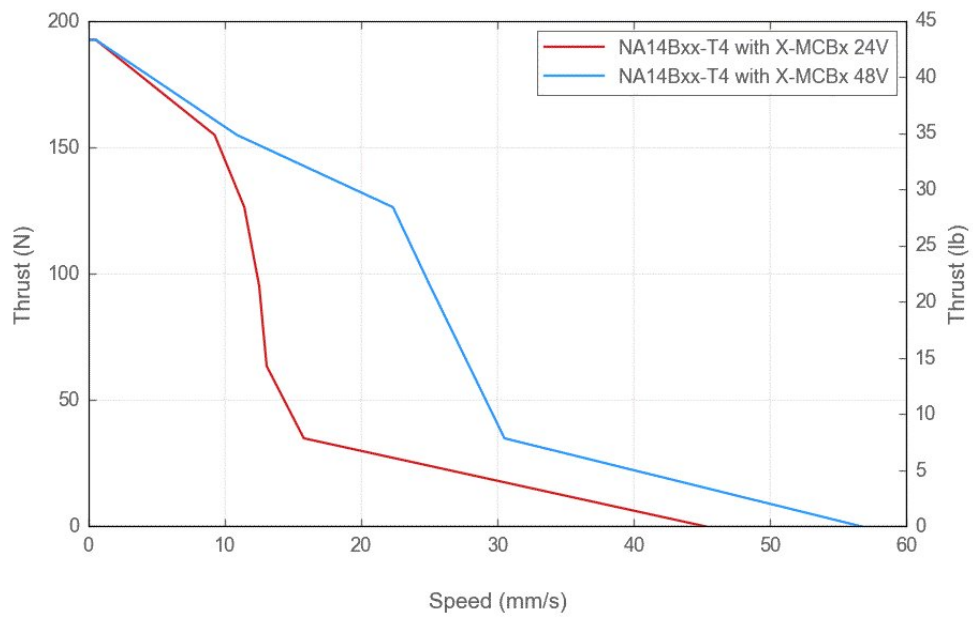
Thrust Speed Performance



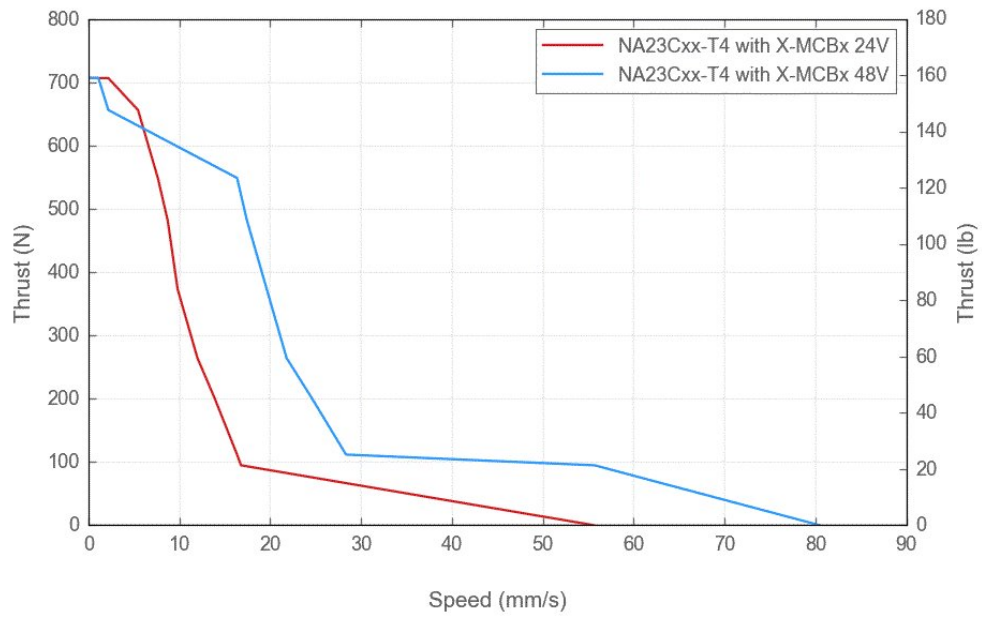
Thrust Speed Performance



Thrust Speed Performance



Thrust Speed Performance



Thrust Speed Performance

