

# Liberty MDrive 57mm Linear Actuator

NEMA 23 integrated 1.8° 2-phase stepper motor with external shaft

## PRODUCT OVERVIEW

Liberty MDrive (LMD) Linear Actuator products integrate a 1.8° 2-phase stepper motor, external shaft linear mechanicals and drive electronics to deliver long life, high accuracy, and repeatability in compact, low cost packages. A graphical user interface is provided for quick and easy parameter setup.

LMD linears may include a fully programmable motion controller with on-board I/O, enabling stand-alone motion control without need of an external controller. Real time closed loop performance is available for enhanced performance and feedback.

hMT closed loop performance is available in products with either a multi-turn absolute encoder or incremental magnetic encoder. Closed loop performance maintains functional motor control to prevent loss of synchronization, offers variable current control, torque control, and use more of the motor's full torque range.

Multi-turn absolute encoders may benefit users by retaining position information when powered down. This can eliminate homing routines and reduce setup time at system startup.

Liberty MDrive Linear Actuator products are ideal for machine builders who want a robust motor with integrated electronics and linear mechanicals. Reduced system cabling can minimize problems due to electrical noise, while closed loop products deliver enhanced performance. Fewer individual system components also eliminate multiple potential failure points.



## FEATURES AND BENEFITS

- Quiet, clean and compact
- Integrated motor, drive electronics, and external shaft linear mechanicals to provide long life, accuracy, and repeatability in one affordable package
- Two (2) connection options available: Pluggable terminal and M12 circular. Pluggable and M12 models are IP20 rated.
- User interface available for download, providing quick & easy commissioning
- Multi-turn absolute or incremental magnetic encoder options
- Operating temperature of -20 to 50 °C (-4 ... 122 °F)
- Nominal operating voltage: 24/48 VDC  
Maximum Current: 3.5A
- User selectable Temperature Warning (Range: 0° - 84° C (32° - 183.2° F))
- Stroke length of 2.0 to 24.0 inches (51 to 610 mm)
- Four (4) versions available: Pulse & Direction, Programmable Motion Control, CANopen, and Ethernet
- Ethernet communication available in single or dual port interface
- 24 month conditional warranty from date of purchase.



Additional setup, quick reference information, and supporting documents are available for download from the Novanta IMS download website <https://novantaims.com/downloads/>

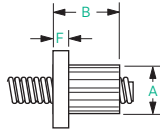
Three-dimensional depictions of this product are available for download from <https://novantaims.com/downloads/3dconfigurator/>



To select from the available features and build the LMD integrated stepper motor to fit your needs, use the Novanta IMS part number builder, available online at <https://novantaims.com/resources/part-number-builders/>

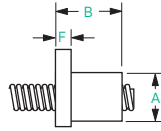
# LMDx•57 with Linear Actuator

## Nut Specifications



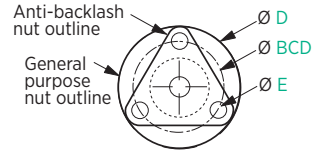
### General Purpose Nut

**Purpose:** for applications not requiring anti-backlash and wear compensation  
**Flange shape:** round



### Anti-backlash Nut

**Purpose:** backlash free operation for high accuracy and low drag torque.  
**Flange shape:** triangle



	A	B	D	E	F	BCD	Drag Torque
General Purpose	0.71 (18.0)	1.50 (38.1)	1.5 (38.1)	0.20 (5.08)	0.20 (5.08)	1.125 (28.6)	free wheeling
Anti-backlash	0.82 (20.8)	1.875 (47.63)	1.5 (38.1)	0.20 (5.08)	0.20 (5.08)	1.125 (28.6)	1-to-3 oz-in / 0.7-2.1 Ncm

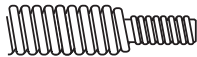
**NOTE:** Measurements shown are in inches (mm)

## Lead Screw Specifications

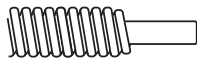
			Screw G	Screw A	Screw B	Screw D
Travel	Per revolution		0.375" / 9.525 mm	0.20" / 5.08 mm	0.167" / 4.233 mm	0.0833" / 2.116 mm
	Per full step		0.001875" / 0.0476 mm	0.001" / 0.0254 mm	0.000835" / 0.0212 mm	0.0004165" / 0.0106 mm
Load limit*	External shaft nuts	General purpose	60 lbs / 27 kg			
		Anti-backlash	25 lbs / 11 kg			

\*Performance data for maximum force/load is based on a static load and will vary with a dynamic load.

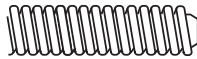
Threaded end



Smooth end



None



Metric end:  
M6 x 1.0mm  
thread to within  
0.03" / 0.76 mm  
of shoulder

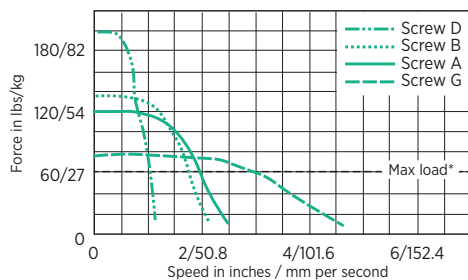
UNC end:  
1/4-20 UNC-2A  
thread to within  
0.05" / 1.3 mm of  
shoulder

Ø 0.2362" ±0.001  
Ø 6mm ±0.003

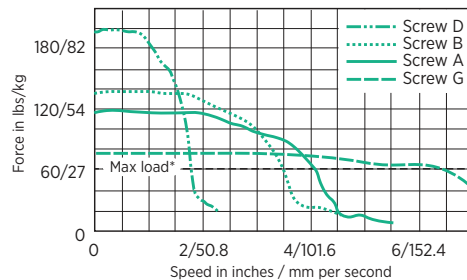
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## Speed-Force Curves

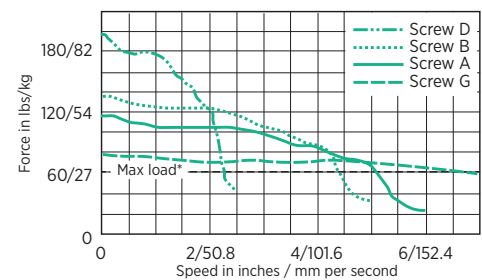
24 VDC



48 VDC









60 VDC



# LMDx•57 with Linear Actuator

## Accessories

for pluggable connector products				Comm Types <sup>1</sup>			
	Description	Length feet (m)	Part Number	P	M	A	E
	<b>Communication converters</b> USB-pluggable converter to set/program communication parameters in 32- or 64-bit Windows®						
	Mates to DB9 connector. Includes: RS-485 converter and pre-wired mating cable	6.0 (1.8)	MD-CC404-000	•	•		
	Mates to DB9 connector. Includes: CAN dongle, terminating resistor, and pre-wired mating cables	6.0 (1.8)	MD-CC501-000			•	
	<b>Replacement mating connector kits</b> Includes one 2-pin power mate, and two 7-pin multifunction mates (Pulse & Direction Pluggable Products)	—	CK-14	•			
	Includes one 2-pin power mate, and two 7-pin multifunction mates (Motion Control, CANopen, and Ethernet Pluggable Products)	—	CK-15		•	•	•
for M12 circular connector products				Comm Types <sup>1</sup>			
	Description	Length feet (m)	Part Number	P	M	A	E
	<b>Communication Converter</b> USB-pluggable converter to set/program communication parameters in 32- or 64-bit Windows®						
	Mates to M12 5-pin female connector. Includes: RS-485 converter and pre-wired mating cable	6.0 (1.8)	MD-CC405-000	•	•		
	Mates to M12 5-pin male connector. Includes: CAN dongle, terminating resistor, and pre-wired mating cables	6.0 (1.8)	MD-CC502-000			•	
	<b>Straight Configuration Cordsets</b> Shielded cables pre-wired with straight M12 mating connectors						
	Communication cordset w/ leads, mates to 5-pin female connector	10.0 (3.0)	MD-CS600-000	•	•		
	Power cordset w/ leads, mates to 4-pin male connector	10.0 (3.0)	MD-CS620-000	•	•	•	•
	I/O cordset w/ leads, mates to 12-pin female connector	10.0 (3.0)	MD-CS630-000	•			
	I/O cordset w/ leads, mates to 12-pin male connector	10.0 (3.0)	MD-CS610-000		•	•	•
	Communication cordset w/ leads, mates to 4-pin female connector	6.5 (2.0)	MD-CS640-000				•
	Communication cordset w/ leads, mates to 5-pin male connector	10.0 (3.0)	MD-CS650-000			•	
	<b>Right Angle Configuration Cordsets</b> Shielded cables pre-wired with right angle M12 mating connectors						
	I/O cordset w/ leads, mates to 12-pin male connector	10.0 (3.0)	MD-CS611-000		•	•	•
	Power cordset w/ leads, mates to 4-pin male connector	10.0 (3.0)	MD-CS621-000	•	•	•	•
	Communication cordset w/ leads, mates to 4-pin female connector	6.5 (2.0)	MD-CS641-000				•
	<b>Daisy Chaining</b> Connect multiple units together in sequence with Y cable. The termination plug, sold separately, is required at end of run.						
	Y cable mates to M12 communication connector	0.3 (1.0)	MD-CS660-000			•	
	M12 bus termination (resistor) plug	—	PLG-M12TP			•	
	<b>Cable Accessory Kit</b> Includes two M12 screw plugs and one sealing cap	—	CK-16	•	•	•	•
for all product with Absolute Encoder							
	<b>Back-up Battery Pack for Absolute Encoder Models</b> Extend stored position data up to 5-years for 1 to 6 LMDs with absolute encoder						
	Battery pack, DIN-rail mount. Uses 3 AA batteries, not provided	—	ICP0531				
	LMD mating cable(s) with crimp connector to flying lead end	3.3 (1.0)	PD02-0531-FL1				
	PLC mating cable with crimp connector to flying lead end	3.3 (1.0)	PD04-0531-FL1				

<sup>1</sup> Communication types:

P = Pulse/Direction via RS-422/485 serial interface

M = Programmable Motion Control via RS-422/485 serial interface

A = CANopen interface

E = EtherNet/IP, Modbus/TCP, Profinet, MCode/TCP