LMD Linears

Lexium MDrive® Linear Actuators – integrated motor, electronics and linear mechanicals

NEMA 17 & 23 external linear shaft style

c UL us LISTED CE RoHS REACH **IP65**

Intelligent motion systems | Schneider Electric

Description

LMD Linear Actuator

integrated 1.8° 2-phase stepper motor with external shaft

OEMs who want to reduce machine size, cost and complexity will find robust Lexium MDrive Linear products deliver exceptional performance and value for many applications.

LMD•42 linear actuator: NEMA 17, external shaft

IP65 & IP20 versions

LMD•57 linear actuator: NEMA 23, external shaft

IP65 & IP20 versions

Product offer

Lexium MDrive® 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 an extremely compact and low cost package. LMD linears may also 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. Offered in IP20 and IP65 versions.

Four (4) communication versions are available:
– Pulse/Direction: RS-422/485 serial interface products with 4 operating modes.
– Programmable Motion Control: RS-422/485 interface with programmable controller.
– CANopen: CANopen interface with programmable controller.
– Ethernet: supports user-selectable protocols Profinet, EtherNetIP and ModbusTCP.

Closed loop products are equipped with 1000 line (4000 count/rev) encoders internal to the unit, requiring no extra space in an application. Encoders perform stall detection, position maintenance and find index mark, in addition to monitoring motor shaft position for real time closed loop feedback accomplished with hMTechnology.

Unlike traditional motor systems, hMT combines the best of servo and stepper motor technologies, while delivering unique capabilities and enhancements over both, including:
– real time closed loop control
– no loss of synchronization/stalling
– full use of motor torque
– torque mode control
– reduced motor heat *(1)*
– lower energy consumption *(1)*

Application areas

Lexium MDrive® Linear Actuator products are compact motion control solutions that can reduce system cost, design and assembly time for a wide range of linear motion applications. They 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 and provide a lower cost option to servo motors in many applications.

General features

- Integrated microstepping drive, 1.8° 2-phase stepper motor and linear mechanicals
  – Motor sizes NEMA 17 and 23, single stack length
- Fully programmable integrated motion controller in some versions
- Advanced current control for exceptional performance and smoothness
- +12 up to +60 VDC input power range
- Closed loop control with 1000 line internal encoder and hMTechnology (optional)
  – Prevents motor stalling while delivering numerous performance advantages
  – Variable current control reduces motor heat and lowers energy consumption
- Protection includes IP20 or IP65 rating
- 20 microstep resolutions to 51,200 steps/rev including: Degrees, Metric, Arc Minutes
- 0 to 2.56 MHz step clock rate selectable in 0.59 Hz increments
- Graphical user interface provided for quick and easy parameter setup
- Cost effective
- Extremely compact
- Custom products available

(1) Achieved with hMTechnology variable current control.

LMD Linear Actuator

integrated 1.8° 2-phase stepper motor with external shaft

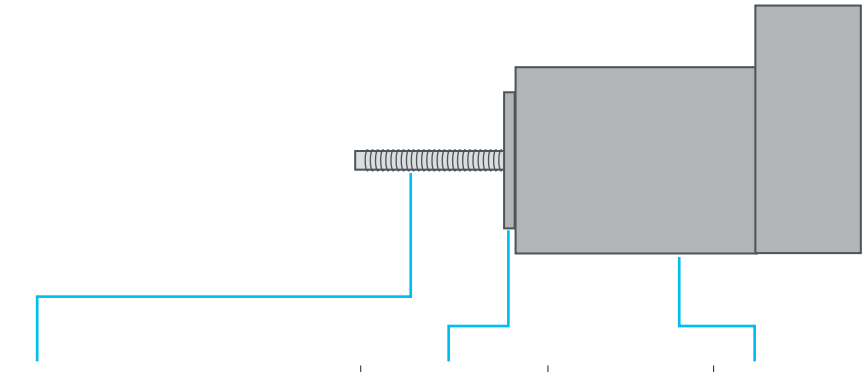
Specifications

			Linear LMD•42 (NEMA17)	**Linear LMD•57** (NEMA23)
Input power	Voltage		+12...+48 VDC	+12...+60 VDC
	Current maximum *(1)*		2.0 A	3.5 A
Motor	Frame size	NEMA	17	23
		inches	1.7	2.22
		mm	42.7	56.4
	Length	stack size	single	single
Maximum thrust *(2)*	General purpose nut	lbs	25	60
		kg	11	27
	Anti-backlash nut	lbs	5	25
		kg	2	11
Repeatability	Maximum	inch	0.005	0.005
		mm	0.127	0.127
Weight (without screw)		oz/g	13.6 / 385	24.8 / 703
Step angle α		°	1.8	1.8
Thermal	Operating temp non-condensing	Heat sink maximum	85°C	
		Motor maximum	100°C	
Protection	Type	Temp warning	0...84°C, user selectable	
		Earth grounding	via product chassis ground lug	
		IP ratings	IP20, IP65	
Communication versions	Pulse/Direction		RS-422/485	
	Programmable Motion Control		RS-422/485 programmable with stored memory	
	CANopen		CANopen interface with programmable controller	
	Ethernet		EtherNetIP, Profinet, ModbusTCP	

(1) Actual power supply current will depend on voltage and load.
(2) Performance data for maximum force/load is based on a static load and will vary with a dynamic load.

An optional Communication Converter is recommended with first orders.

Motor types



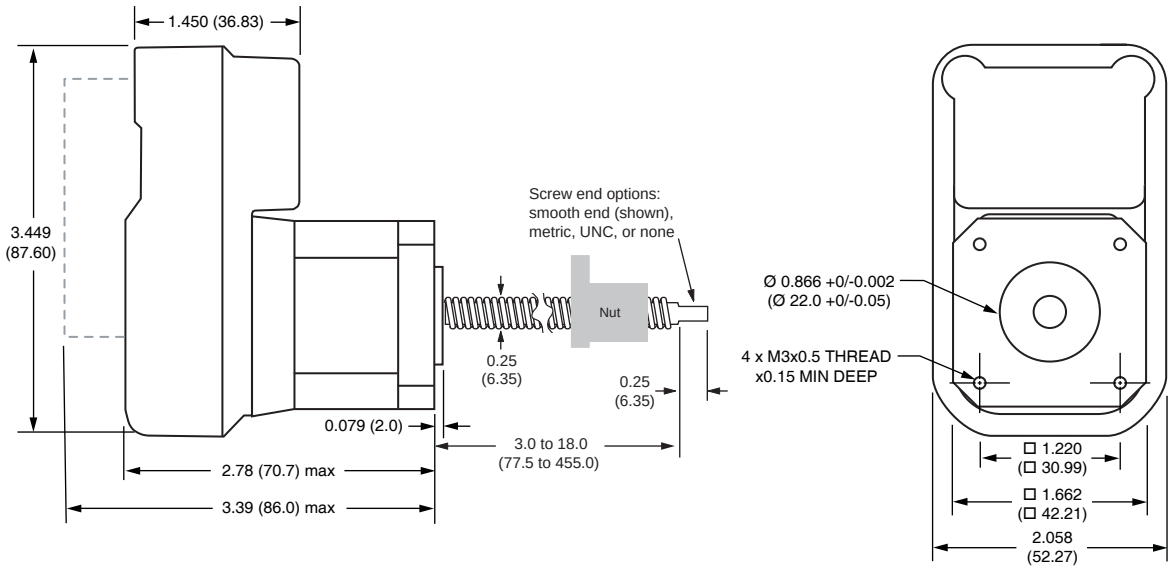
Lead screw		Centering collar	Flange size	Length – excluding screw and connectors	Winding	Motor connection
Size 42 – NEMA 17						
Acme-style lead screw with end finish options	Ø 0.25" / Ø 2.0 mm	Ø 0.87" / Ø 22.0 mm	NEMA 17 1.7" / 42.7 mm	IP20 = 2.40“ / 61.0mm IP65 = 2.78" / 70.7 mm	2-phase full coil for bi-polar operation	Pluggable or circular connectors
Size 57 – NEMA 23						
Acme-style lead screw with end finish options	Ø 0.375" / Ø 9.525 mm	Ø 1.50" / Ø 38.0 mm	NEMA 23 2.22" / 56.4 mm	IP20 = 3.17“ / 80.5mm IP65 = 3.32“ / 84.3 mm	2-phase full coil for bi-polar operation	Pluggable or circular connectors

LMD Linear Actuator

integrated 1.8° 2-phase stepper motor with external shaft

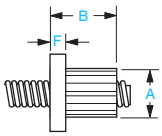
Dimensions in inches (mm), unless specified

LMD•42 Linear – external shaft, NEMA size 17



NOTE
Cantilevered loads MUST BE supported. Side loading is not recommended.

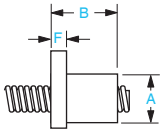
Nut specifications

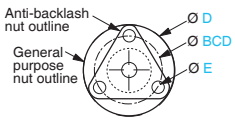


General purpose nut

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

inches (mm)	A	B	D	E	F	BCD	drag torque
General purpose	0.50 (12.7)	0.75 (19.1)	1.0 (25.4)	0.14 (3.6)	0.15 (3.81)	0.75 (19.1)	free wheeling
Anti-backlash	0.50 (12.7)	0.9 (22.86) max	1.0 (25.4)	0.143 (3.63)	0.18 (4.57)	0.75 (19.1)	< 1.0 oz-in < 0.7 N-cm

Lead screw specifications

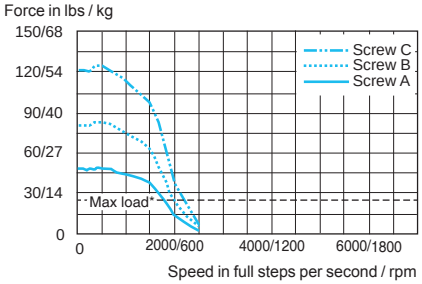
			Screw A	Screw B	Screw C
Travel	Per revolution		0.25" / 6.35 mm	0.125" / 3.175 mm	0.063" / 1.588 mm
	Per full step		0.00125" / 0.0317 mm	0.00063" / 0.0158 mm	0.00031" / 0.0079 mm
Load limit*	External shaft nuts	General purpose	25 lbs / 11 kg		
		Anti-backlash	5 lbs / 2 kg		

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

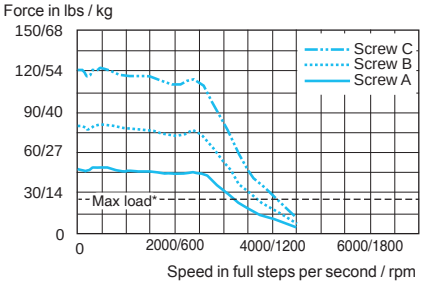
Threaded end	Metric end: M4 x 0.7mm thread to within 0.03"/ 0.76 mm of shoulder	UNC end: #8-32 UNC-2A thread to within 0.03"/ 0.76 mm of shoulder
Smooth end	Ø 0.1967" ±0.001 Ø 5 mm ±0.003	
None	—	

Speed-force curves

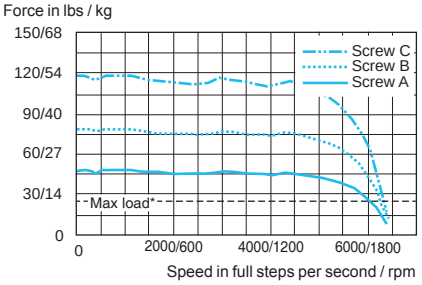
12 VDC



24 VDC



48 VDC



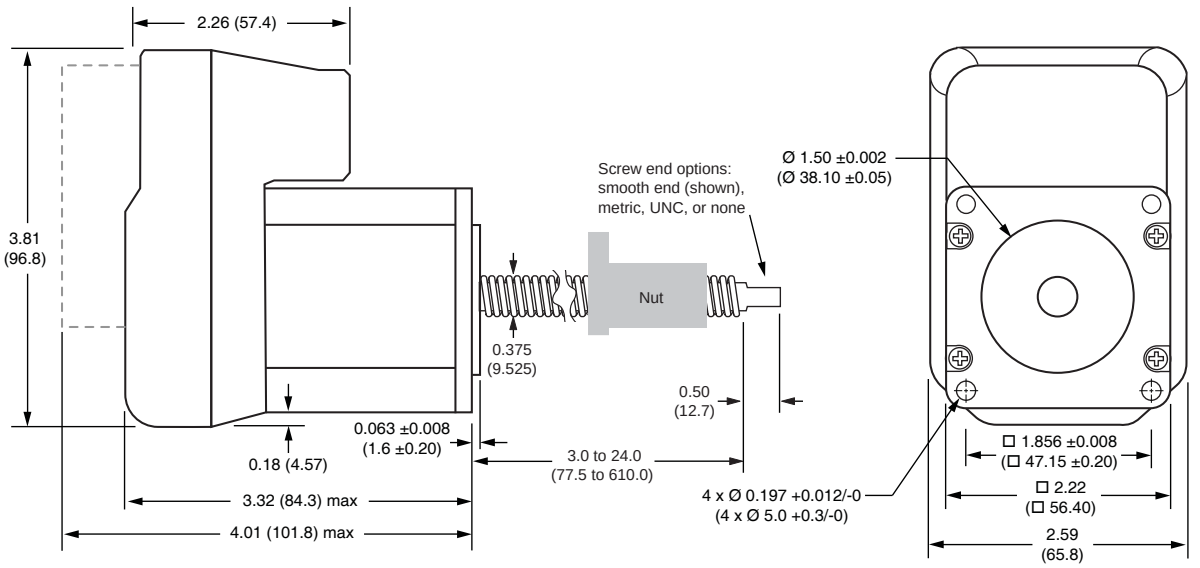
*Load limit is determined by selected nut. Performance data for maximun force/load is based on a *static* load and will vary with a *dynamic* load.

LMD Linear Actuator

integrated 1.8° 2-phase stepper motor with external shaft

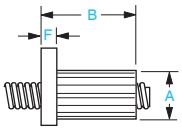
Dimensions in inches (mm), unless specified

LMD•57 Linear – external shaft, NEMA size 23



NOTE
Cantilevered loads MUST BE supported. Side loading is not recommended.

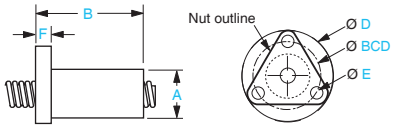
Nut specifications



General purpose nut

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

inches (mm)	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

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			

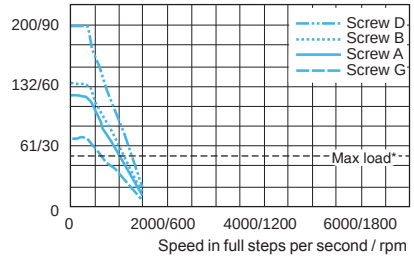
*Performance data for maximum force/load is based on a *static* load and will vary with a *dynamic* load.

Threaded end	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
Smooth end	Ø 0.2362" ±0.001 Ø 6mm ±0.003	
None	—	

Speed-force curves

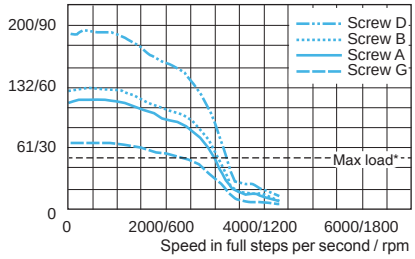
24 VDC

Force in lbs / kg



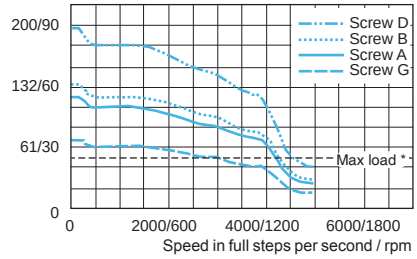
48 VDC

Force in lbs / kg



60 VDC

Force in lbs / kg



*Load limit is determined by selected nut. Performance data for maximun force/load is based on a *static* load and will vary with a *dynamic* load.

LMD Linear Actuator

integrated 1.8° 2-phase stepper motor with external shaft

Part numbers

Example	L	M	D	C	M	4	2	1	P	-LA	3	M	0	6	0	G	T
Product **LMD** = Lexium MDrive, with linear actuator external shaft	**L**	**M**	**D**	C	M	4	2	1	P	-LA	3	M	0	6	0	G	T
Control type **C** = Closed loop / with hMT and encoder *(1)* **O** = Open loop / no hMT or encoder	L	M	D	**C**	M	4	2	1	P	-LA	3	M	0	6	0	G	T
Communication type **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, ModbusTCP, Profinet, MCode/TCP	L	M	D	C	**M**	4	2	1	P	-LA	3	M	0	6	0	G	T
Flange size **42** = NEMA 17 / 42mm **57** = NEMA 23 / 57mm	L	M	D	C	M	**4**	**2**	1	P	-LA	3	M	0	6	0	G	T
Motor length **1** = single stack	L	M	D	C	M	4	2	**1**	P	-LA	3	M	0	6	0	G	T
IP rating **P** = IP20 with pluggable connectors **C** = IP65 with circular connectors	L	M	D	C	M	4	2	1	**P**	-LA	3	M	0	6	0	G	T
Lead screw *size 42/NEMA17:* **-LA** = 0.25" / 6.35 mm **-LB** = 0.125" / 3.175 mm **-LC** = 0.063" / 1.588 mm *size 57/NEMA23:* **-LG** = 0.375" / 9.525 mm **-LA** = 0.20" / 5.08 mm **-LB** = 0.167" / 4.233 mm **-LD** = 0.083" / 2.116 mm	L	M	D	C	M	4	2	1	P	**-LA**	3	M	0	6	0	G	T
Shaft style **3** = external shaft	L	M	D	C	M	4	2	1	P	-LA	**3**	M	0	6	0	G	T
Screw end finish **M** = metric **U** = UNC **S** = smooth **Z** = none	L	M	D	C	M	4	2	1	P	-LA	3	**M**	0	6	0	G	T
Screw length *(2)* *lengths available in 0.1" increments* **030** = 03.0" / 76 mm minimum **180** = 18.0" / 457 mm maximum (for size 42/NEMA17) **240** = 24.0" / 610 mm maximum (for size 57/NEMA23)	L	M	D	C	M	4	2	1	P	-LA	3	M	**0**	**6**	**0**	G	T
Nut **G** = general purpose **A** = anti-backlash	L	M	D	C	M	4	2	1	P	-LA	3	M	0	6	0	**G**	T
Screw coating **T** = Teflon® **Z** = none	L	M	D	C	M	4	2	1	P	-LA	3	M	0	6	0	G	**T**

(1) Closed loop control delivers encoder feedback and hMT enhanced motor performance.
(2) To calculate screw length: screw length = [desired stroke length] + [nut length] + [mounting surface plate thickness]

LMD Linear Actuator

integrated 1.8° 2-phase stepper motor with external shaft


MD-CC404-000


MD-CC501-000


MD-CC405-000


MD-CC502-000


MD-CS600-000


MD-CS620-000


MD-CS630-000


MD-CS610-000


MD-CS640-000


MD-CS650-000


PLG-M12TP
MD-CS660-000

for IP20 products – pluggable connectors

description	length feet (m)	part number	comm types *(1)* P	M	A	E
Communication converters USB-pluggable converter to set/program communication parameters in 32- or 64-bit						
Mates to DB9 connector	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			•	
Replacement mating connector kits						
Includes one 2-pin power mate, and one set (2 pieces) 7-pin multifunction mates	—	CK-14	•			
Includes one 2-pin power mate, and one set (2 pieces) 7-pin multifunction mates	—	CK-15		•	•	•

for IP65 products – M12 connectors

description	length feet (m)	part number	comm types *(1)* P	M	A	E
Communication converters USB-pluggable converter to set/program communication parameters in 32- or 64-bit						
Mates to M12 5-pin female connector	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			•	
Cordsets Shielded cables pre-wired with straight M12 mating connectors						
Communication cordset mates to 5-pin female connector	10.0 (3.0)	MD-CS600-000	•	•		
Power cordset mates to 4-pin male connector	10.0 (3.0)	MD-CS620-000	•	•	•	•
I/O cordset mates to 12-pin female connector	10.0 (3.0)	MD-CS630-000	•			
I/O cordset mates to 12-pin male connector	10.0 (3.0)	MD-CS610-000		•	•	•
Communication cordset mates to 4-pin female connector	6.5 (2.0)	MD-CS640-000				•
Communication cordset mates to 5-pin male connector	10.0 (3.0)	MD-CS650-000				
Daisy chaining Connect multiple units together in sequence with Y cable. 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			•	

(1) 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, ModbusTCP, Profinet, MCode/TCP

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