CE RoHS REACH

MDrive® Linear Actuator

MLI•14 CANopen

Product overview

MDrive® Linear Actuators are compact linear motion systems. External or non-captive shaft linear mechanicals are integrated with stepper motor and electronics for reliable, repeatable motion. Customization is available for volume opportunities.

CANopen products integrate 1.8° 2-phase stepper motor linear actuator, motion controller and drive electronics, supporting CiA DS301 and DSP402 Device Profile for Drives and Motion Control. Options include encoder, and CANopen dongle MD-CC500-000 for product setup and testing.

MDrive product's precision rolled lead screws are manufactured from premium grade stainless steel with optional Teflon® coating. Designed specifically for motion control applications, our high quality screws deliver long life and quiet operation.

Simplify machine design and reduce assembly time by replacing multiple components with a single compact integrated motor. Fewer individual system components eliminates multiple potential failure points, and lowers risk of electrical noise by eliminating cabling between motor and drive.

MDrive Linear Actuator MLI•14 CANopen products: integrated NEMA14 motor, controls and mechanicals, non-captive and external shaft styles, IP20-rated

Specifications

Communication	Protocol type		CANopen
Input power	Voltage	VDC	+12...+48
	Current maximum (1)	Amp	1.0
Motor	Frame size	NEMA	14
		inches	1.4
		mm	35
	Length	stack size	single
Maximum thrust (2)	Non-captive shaft	lbs	50
		kg	22
	External shaft with general purpose nut	lbs	25
		kg	11
	External shaft with anti-backlash nut	lbs	5
		kg	2
Maximum repeatability	General purpose	inch	0.005
		mm	0.127
	Anti-backlash (3)	inch	0.0005
		mm	0.0127
Thermal	Operating temp non-condensing	Heat sink maximum	85°C
		Motor maximum	100°C
Protection	Type	IP rating	IP20
Motion	Microstep resolution	Number of settings	20
		Steps per revolution	200, 400, 800, 1000, 1600, 2000, 3200, 5000, 6400, 10000, 12800, 20000, 25000, 25600, 40000, 50000, 51200, 36000 (0.01 deg/µstep), 21600 (1 arc minute/µstep), 25400 (0.001mm/µstep)

(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.
(3) Only applicable for External shaft linear actuator with anti-backlash nut.

See User Manual for complete details: www.motion.schneider-electric.com/manuals.html

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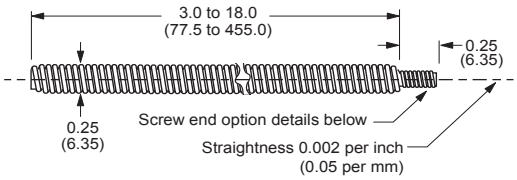
Screws (1)

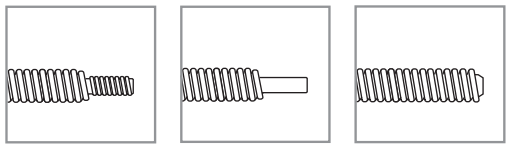
Screw lengths (2)	minimum	inches	3.0	
		mm	77.5	
	maximum	inches	18.0	
		mm	455.0	
Load limits (3)	non-captive shaft	lbs	50	
		kg	22	
	external shaft w/ general purpose nut	lbs	25	
		kg	11	
	external shaft w/ anti-backlash nut	lbs	5	
		kg	2	
End options	threaded	metric	M4 x 0.7 mm thread to within 0.03" / 0.76 mm of shoulder	
		UNC	#8-32 UNC-2A thread to within 0.03" / 0.76 mm of shoulder	
	smooth	inches	Ø 0.1967 ±0.001	
		mm	Ø 5 ±0.003	
	none	–	–	
Lead / pitch		travel	per rev	per full step
	screw A	inches	0.250	0.00125
		mm	6.350	0.0317
	screw B	inches	0.125	0.00063
		mm	3.175	0.0158
	screw C	inches	0.063	0.00031
		mm	1.588	0.0079

(1) Stainless steel rolled screws are corrosion resistant and non-magnetic, with Teflon coating available.
(2) Standard 0.1" / 2.5mm screw length increments are available.
(3) Performance data for maximum force/load is based on a static load and will vary with a dynamic load.

screw dimensions



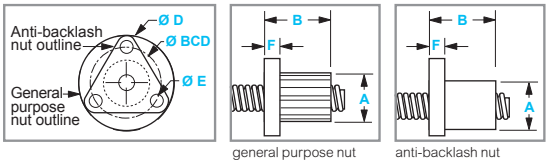
end options



Nuts (4)

			general purpose nuts	anti-backlash nuts
Dimensions	A	inches	0.50	0.50
		mm	12.7	12.7
	B	inches max	0.75	0.9
		mm max	19.1	22.86
	D	inches	1.0	1.0
		mm	25.4	25.4
	E	inches	0.14	0.14
		mm	3.6	3.6
	F	inches	0.15	0.18
		mm	3.81	4.57
	BCD	inches	0.75	0.75
		mm	19.1	19.1
Load limit		lbs	25	5
		kg	11	2
Drag torque			free wheeling	< 1.0 oz-in < 0.7 N-cm

(4) External shaft MDrive Linear Actuators employ a nut which moves axially along the threaded shaft as the screw rotates. Two nut styles are available: general purpose and anti-backlash. While anti-backlash nuts provide higher accuracy and low drag torque, general purpose nuts are rated for higher load limits.



general purpose nut anti-backlash nut

MDrive Linear Actuator

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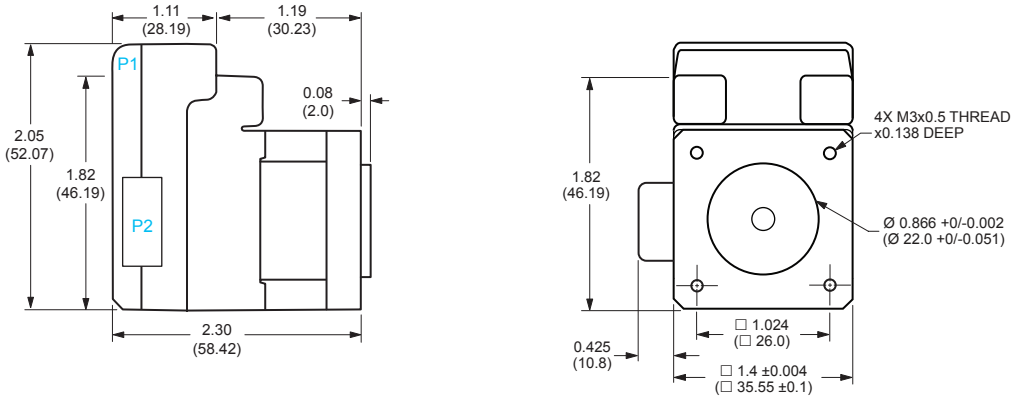
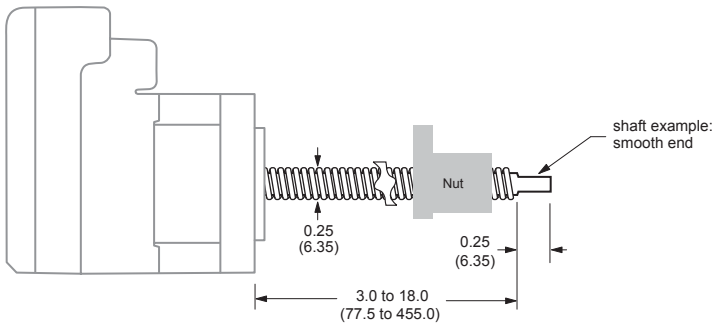
Dimensions

inches (mm)

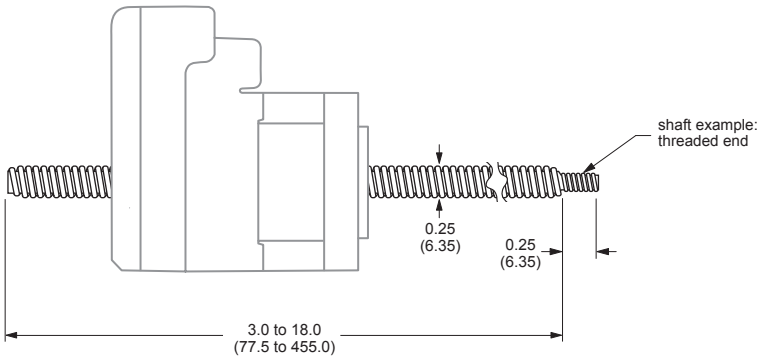
MDrive body



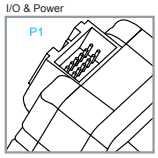
external shaft



non-captive shaft

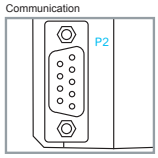


P1 connector
I/O & Power

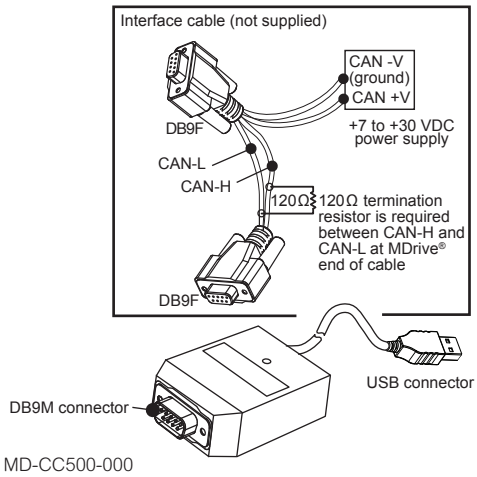


16-pin locking wire
crimp connector

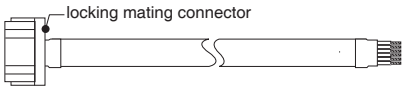
P2 connector
Communication



DB9 (male)



MD-CC500-000



PD16-1417-FL3

Accessories

description	length feet (m)	part number
Communication converter Electrically isolated, in-line converter pre-wired with mating connector to conveniently set/program communication parameters for a single MDrive Plus via a PC's USB port.		
Interface cable for all CANopen products. Requires mating connector adapter for DB9 connector. Requires power supply, not supplied.	12.0 (3.6)	MD-CC500-000
Prototype development cable Speed test/development with pre-wired mating connector with other cable end open.		
Mates to 16-pin locking wire crimp connector for I/O and power	10.0 (3.0)	PD16-1417-FL3
Mating connector kits Connectors for assembly of cables, cable material not supplied. Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors.		
16-pin locking wire crimp connector for I/O and power	—	CK-10
Drive protection module Limits surge current and voltage to a safe level when DC input power is switched on-and-off to an MDrive Plus.		
For all MDrive Plus linear actuator products	—	DPM75

MDrive Plus

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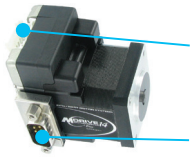
MDrive® 14 Plus² IP20



P1: I/O & Power, and optional remote encoder
C = 16-pin locking wire crimp connector

P2: Communication
B = CANopen with DB9 male connector

Non-captive shaft style

External shaft style

Part numbers

IP20-rated products

example part number	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
MDrive Linear Actuator version MLI = = Intelligent — CANopen	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
Input 3 = Plus² version with expanded features	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
P1 connector C = wire crimp	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
Communication type C = CANopen	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
P2 connector B = DB9	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
Motor size 14 = NEMA 14 1.4" / 35mm	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
Motor length A = single stack	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
Drive voltage 4 = +12 to +48 VDC	M	L	I	3	C	C	B	1	4	A	4	–EQ	–●
Options — omit from part number if unwanted –EQ = internal 512-line magnetic encoder w/ index mark												–EQ	–●
Linear actuator specifications Complete the part number from the table below													–●

–● continued

example part number — linear actuator specifications	–L	A	1	M	0	6	0	Z	T
Linear actuator –L	–L	A	1	M	0	6	0	Z	T
Screw lead / pitch by travel per rev A = 0.250" / 6.35mm B = 0.125" / 3.175mm C = 0.063" / 1.588mm	–L	A	1	M	0	6	0	Z	T
Shaft style 1 = non-captive (2) 3 = external (3)	–L	A	1	M	0	6	0	Z	T
Screw end finish M = metric threaded U = UNC threaded S = smooth Z = none	–L	A	1	M	0	6	0	Z	T
Screw length (4) 030 = minimum 3.0" / 77.5mm 180 = maximum 18.0" / 455.0mm	–L	A	1	M	0	6	0	Z	T
Nut Z = none – for non-captive shaft products G = general purpose – for external shaft products A = anti-backlash – for external shaft products	–L	A	1	M	0	6	0	Z	T
Coating T = Teflon® Z = none	–L	A	1	M	0	6	0	Z	T

(2) Unsupported loads and side loading are not recommended.
(3) Loads must be supported. Side loading is not recommended.
(4) Screw lengths specified in 0.1" / 2.5mm increments.

MDrive Plus

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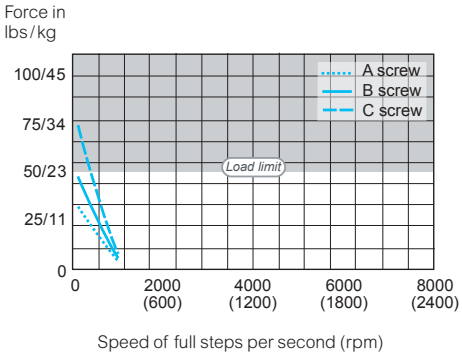
Motor performance

ML•14 NEMA 14 motor specifications	Motor		Stack length	Single
	Holding torque		oz-in	18
			N-cm	13
	Rotor inertia		oz-in-sec^2	0.0003
			kg-cm^2	0.021
	Weight without screw		oz	8.0
			g	230.0
	Maximum screw misalignment		°	±1
	Maximum thrust (1)	Non-captive shaft	lbs	50
			kg	22
		External shaft with general purpose nut	lbs	25
			kg	11
		External shaft with anti-backlash nut	lbs	5
			kg	2
	Maximum repeatability	General purpose	inch	0.005
			mm	0.127
		Anti-backlash (2)	inch	0.0005
			mm	0.0127

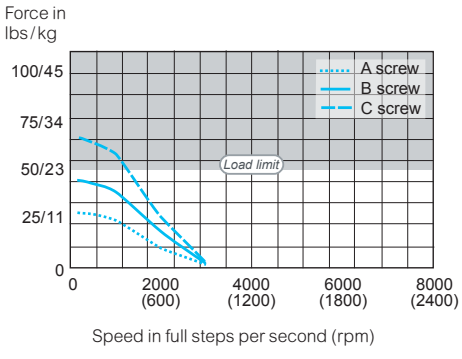
(1) Performance data for maximum force/load is based on a static load and will vary with a dynamic load.
(2) Only applicable for External shaft linear actuator with anti-backlash nut.

ML•14 NEMA 14 speed force

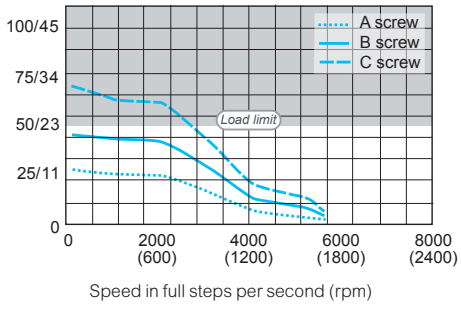
12 VDC



24 VDC



48 VDC



Test conditions: maximum force/load is based on a static load. This will vary with a dynamic load.

Load limits – non-captive shaft: 50lbs/22kg
– external shaft: determined by selected nut

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