

# MDrive® Plus/Plus<sup>2</sup> MLI•23

CE RoHS REACH IP20

NEMA 23 (57mm) CANopen Linear Actuator with integrated 1.8° 2-phase stepper motor & control electronics



## 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.

## FEATURES AND BENEFITS

- Compact integrated microstepping drive, motion controller and NEMA 23 1.8° 2-phase stepper motor
- Non-captive and external shaft style available
- Advanced current control for exceptional performance and smoothness
- Single supply: +12 to +75 VDC
- 20 microstep resolutions up to 51,200 steps per rev, including: Degrees, Metric, & Arc Minutes
- Auxiliary logic power supply input
- IP20 protection rating
- 0 to 5 MHz step clock rate selectable in 0.59 Hz increments
- Up to eight I/O lines and one 10-bit selectable analog input
- Programmable motor run/hold current
- Available options include:
  - Encoder
  - Multiple motor stack lengths
  - Connector options
  - Long life linear actuators
  - Rear control knob for manual positioning
- Single motor stack length available
- Lead screw lengths from 3.0" to 24.0" (77.5 to 610.0 mm) available in 0.1" (2.5mm) increments
- Lead screws with optional threaded or smooth screw ends and Teflon coating available
- Graphical user interface provided for quick and easy configuration and programming via optional MD-CC500-000 comm converter



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

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



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/>

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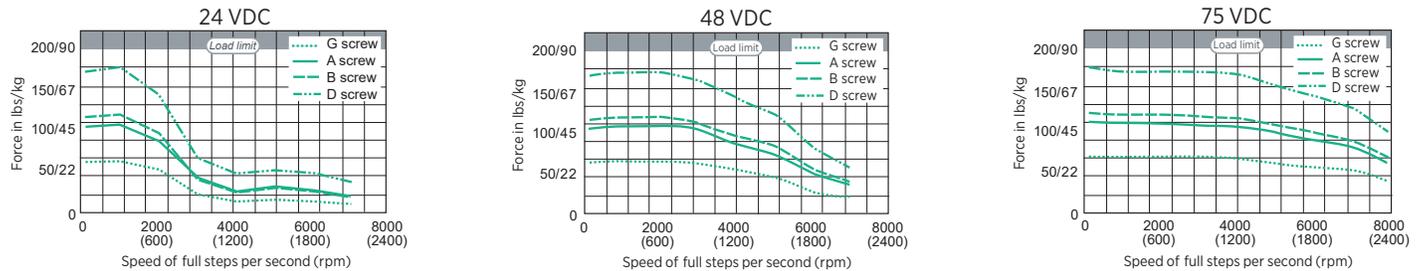
## Motor Performance

		MDrive 23	
Motor		Stack length	Single
Holding torque		oz-in	90
		N-cm	64
Rotor inertia		oz-in-sec <sup>2</sup>	0.0025
		kg-cm <sup>2</sup>	0.18
Weight without screw		oz	22.0
		g	625.0
Maximum screw misalignment		"	±1
Maximum thrust <sup>1</sup>	Non-captive shaft	lbs	200
		kg	91
	External shaft with general purpose nut	lbs	60
		kg	27
	External shaft with anti-backlash nut	lbs	25
		kg	11
Maximum repeatability	General purpose	inch	0.005
		mm	0.127
	Anti-backlash <sup>2</sup>	inch	0.0005
		mm	0.0127

<sup>1</sup> Performance data for maximum force/load is based on a static load and will vary with a dynamic load.

<sup>2</sup> Only applicable for External shaft linear actuator with anti-backlash nut.

## Motor Speed Force



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

## Screws<sup>1</sup>

Screw lengths <sup>2</sup>	minimum	inches	3.0	
		mm	77.5	
	maximum	inches	24.0	
		mm	610.0	
Load Limits <sup>3</sup>	non-captive shaft	lbs	200	
		kg	91	
	external shaft w/ general purpose nut	lbs	60	
		kg	27	
	external shaft w/ anti-backlash nut	lbs	25	
		kg	11	
End Options	threaded	metric	M6 x 1.0 mm thread to within 0.03" / 0.76 mm of shoulder	
		UNC	1/4-20 UNC-2A thread to within 0.05" / 1.3 mm of shoulder	
	smooth	inches	Ø 0.2362 ±0.001	
		mm	Ø 6 ±0.003	
Lead/Pitch		Travel	Per Rev	Per Full Step
		screw G	inches	0.375
		mm	9.525	0.0476
	screw A	inches	0.20	0.001
		mm	5.08	0.0254
	screw B	inches	0.167	0.000835
		mm	4.233	0.0212
	screw D	inches	0.083	0.0004165
	mm	2.116	0.0106	

<sup>1</sup> Stainless steel rolled screws are corrosion resistant and non-magnetic, with Teflon coating available.

<sup>2</sup> Standard 0.1" / 2.5mm screw length increments are available.

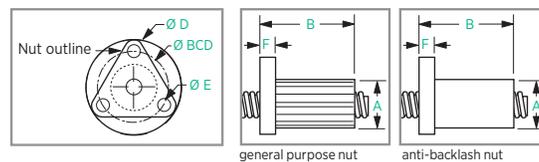
<sup>3</sup> Performance data for maximum force/load is based on a static load and will vary with a dynamic load

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## Nuts<sup>1</sup>

			General Purpose Nuts	Anti-backlash Nuts
Dimensions	A	inches	0.71	0.82
		mm	18.0	20.8
	B	inches (max)	1.5	1.875
		mm (max)	38.1	47.63
	D	inches	1.5	1.5
		mm	38.1	38.1
	E	inches	0.20	0.20
mm		5.08	5.08	
F	inches	0.20	0.20	
	mm	5.08	5.08	
BCD	inches	1.125	1.125	
	mm	28.6	28.6	
Load limit	lbs	60	25	
	kg	27	11	
Drag torque		free wheeling	1-to-3	

<sup>1</sup> 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.



## Accessories

Description	Length feet (m)	Part Number
<b>Communication Converter</b> 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 industrial connector. Requires power supply, not supplied.	12.0 (3.6)	MD-CC500-000
<b>Prototype Development Cables</b> Speed test/development with pre-wired mating connector with other cable end open.		
Mates to 14-pin locking wire crimp connector for I/O and remote encoder option	10.0 (3.0)	PD14-2334-FL3
Mates to 2-pin locking wire crimp connector for power	10.0 (3.0)	PD02-2300-FL3
<b>Mating Connector Kit</b> Connectors for the assembly of cables. (Cable material not included). Sold in lots of 5. Manufacturer's crimp tool recommended for crimp connectors		
14-pin locking wire crimp connector for I/O and remote encoder option	—	CK-09
2-pin locking wire crimp connector for power	—	CK-04
<b>Drive Protection Module</b> Limits surge current and voltage to a safe level when DC input power to the MDrive Plus is switched on and off		
For all MLI•23 CANopen products	—	DPM75