

# Lexium MDrive<sup>®</sup>

Simplifying machine building with  
compact integrated motors

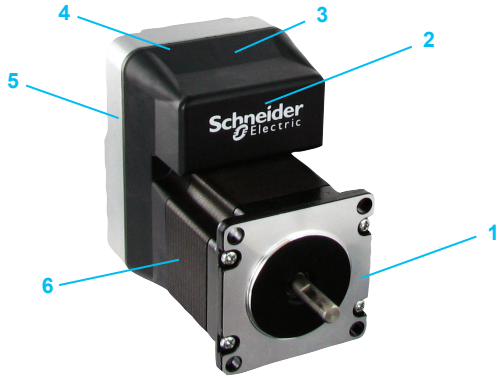


## CANopen version

Integrated stepper motors with on-board controller,  
I/O, drive electronics, and closed loop performance

CE  REACH

## Lexium MDrive® CANopen CANopen interface integrated 2-phase stepper motor



- 1 rotary stepper motor
- 2 microstepping drive
- 3 motion controller
- 4 up to 8 I/O lines
- 5 internal encoder option
- 6 closed loop performance

### Product offer

Lexium MDrive® CANOpen products integrate a high-torque 1.8° 2-phase stepper motor with on-board controller, I/O, drive electronics, and closed loop performance with internal encoder option.

Lexium MDrive Motion CANOpen products (LMD•A) support CiA DS301 and DSP402 Device Profile for Drives and Motion Control. Interface to CANopen networks is easy with direct configuration of LMD products via layer setting services. An optional CANopen communication kit and configuration utility are also available.

Lexium MDrive CANOpen closed loop products (LMDCA) 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 CANOpen products are ideal for machine builders who want an optimized motor with on-board electronics, with closed loop performance providing a lower cost option to servo motors in many applications. The integrated electronics of Lexium MDrive CANOpen products also reduce the potential for problems due to electrical noise by eliminating cabling between motor and drive.

These compact, powerful and cost effective motion control solutions deliver unsurpassed smoothness and performance that will reduce system cost, design and assembly time for a large range of motion applications.

### Features

- Integrated microstepping drive and high torque 1.8° 2-phase NEMA stepper motor
- Integrated motion controller
- 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
- Advanced current control for exceptional performance and smoothness
- CANopen interface
- +12 up to +70 VDC input power range
- Cost effective
- Extremely compact
- Up to 8 I/O
  - Up to four +5 to +24 VDC signal inputs
  - One 12 bit analog input
  - Two 100mA power outputs (only LMD57 & LMD85 products)
  - One 5.5mA high-speed signal output
- Auxiliary logic power supply input
- 20 microstep resolutions to 51,200 steps/rev including: Degrees, Metric, Arc Minutes
- Programmable motor run and hold currents
- 0 to 2.56 MHz step clock rate selectable in 0.59 Hz increments
- Motor stack lengths: single, double and triple
- Graphical user interface available to configure setup parameters and perform firmware upgrades via optional MD-CC501-000 communication converter
- Extended 4 year product warranty

(1) Achieved with hMTechnology variable current control.



# Lexium MDrive® CANopen

## CANopen interface

### integrated 2-phase stepper motor

Specifications			LMD•A42 (NEMA17)	LMD•A57 (NEMA23)	LMD•A85 (NEMA34)
Input power	Voltage		+12...+48 VDC	+12...+60 VDC	+12...+70 VDC
	Current maximum (1)		2.0 A	3.5 A	4.0A
I/O sourcing or sinking	Number of I/O	Analog input	1	1	1
		Signal inputs	3	4	4
		Power outputs	0	2	2
		Signal outputs	1	1	1
		Analog input	Resolution	12 bit	
		Voltage range	0...+5 VDC, 0...+10 VDC, 0...20 mA, 4...20 mA		
	Signal inputs	Voltage range	+5...+24 VDC, TTL level compatible		
		Protection	over temp, short circuit, transient, over voltage, inductive clamp		
	Power outputs	Current rating	-100...+100mA		
		Voltage range	-24...+24 VDC		
	High-speed signal output	Current open collector/emitter	5.5 mA		
		Voltage open collector	+60 VDC		
		Voltage open emitter	+7 VDC		
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 rating	20		
Aux. logic input Communication	Voltage range (2)		+12...+24 VDC		
	Type		CANopen CiA DS301, DSP402, 2.0B active		
	Baud rate		10...1000 kbps		
	ID		11 and/or 29 bit		
	Isolation		Galvanic		
	Features		Node guarding, heartbeat, SDOs, PDOs (variable mapping)		
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)		
	Encoder (3)	Line count	1000 lines/4000 edges per rev		
		Style	internal, magnetic		
	Counters	Type	position, encoder/32 bit		
		Edge rate maximum	5 MHz		
	Velocity	Range	+/- 2,560,000 steps per second		
		Resolution	0.5961 steps per second		
	Accel/Decel	Range	1.5 x 10 <sup>9</sup> steps per second <sup>2</sup>		
		Resolution	90.9 steps per second <sup>2</sup>		
Software	Setup parameters		storable to nonvolatile memory		
	Transmit PDOs		3 dynamically mappable		
	Receive PDOs		3 dynamically mappable		
	Manufacturer specific objects		I/O configuration, run/hold current		
	Modes of operation		profile position, homing mode, profile velocity		
	Input functions		general purpose, homing mode profiles		
Output functions		general purpose			

(1) Actual power supply current will depend on voltage and load.

(2) When input voltage is removed, maintains power only to control and feedback circuits.

(3) Only with Lexium MDrive closed loop/encoder products.

An optional Communication Converter is recommended with first orders.

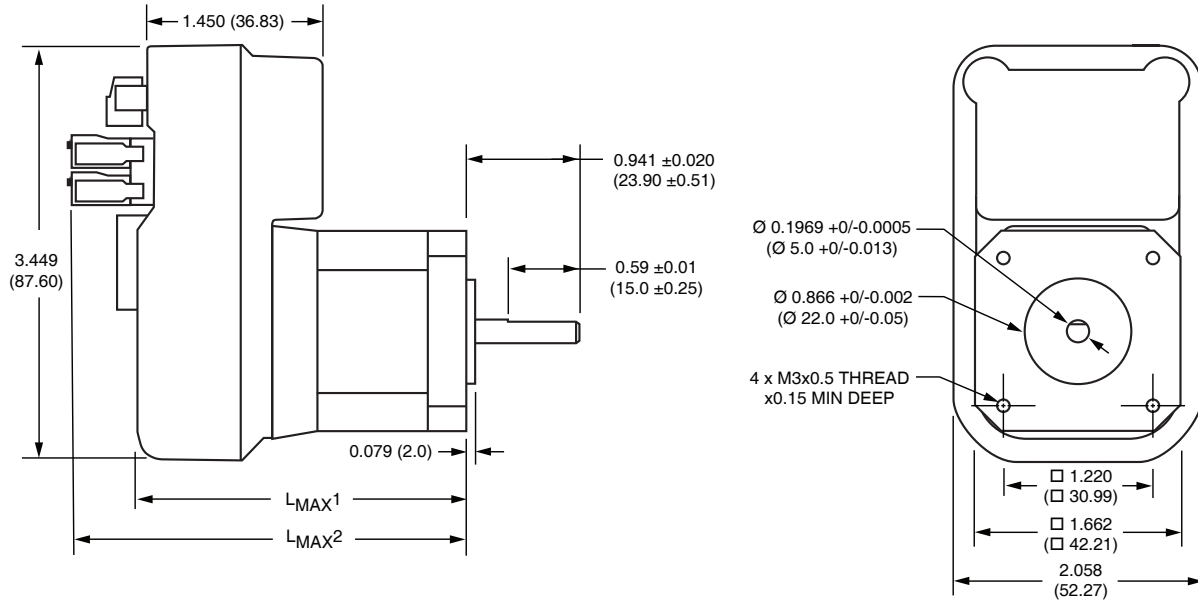


See User Manual for complete details: [motion.schneider-electric.com/manuals.html](http://motion.schneider-electric.com/manuals.html)

# Lexium MDrive® CANopen

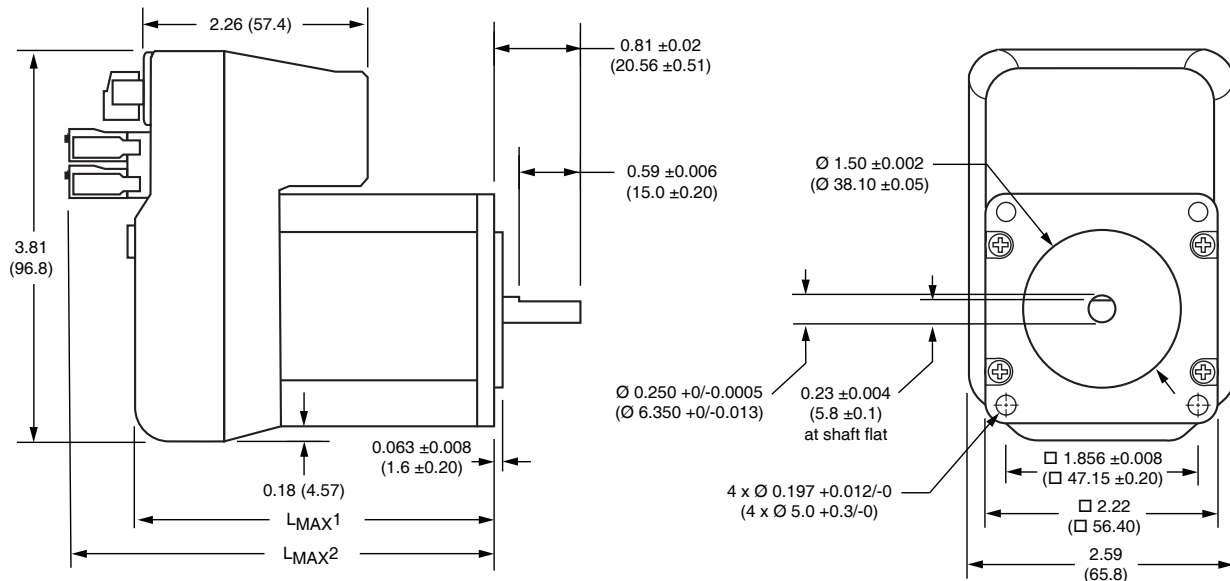
CANopen interface  
integrated 2-phase stepper motor

## LMD•42 NEMA17 motor – dimensions in inches (mm)



Motor stack length	L <sub>max1</sub>	L <sub>max2</sub>
Single	2.40 (61.0)	3.22 (81.8)
Double	2.64 (67.0)	3.46 (88.0)
Triple	2.96 (75.3)	3.78 (96.0)

## LMD•57 NEMA23 motor – dimensions in inches (mm)

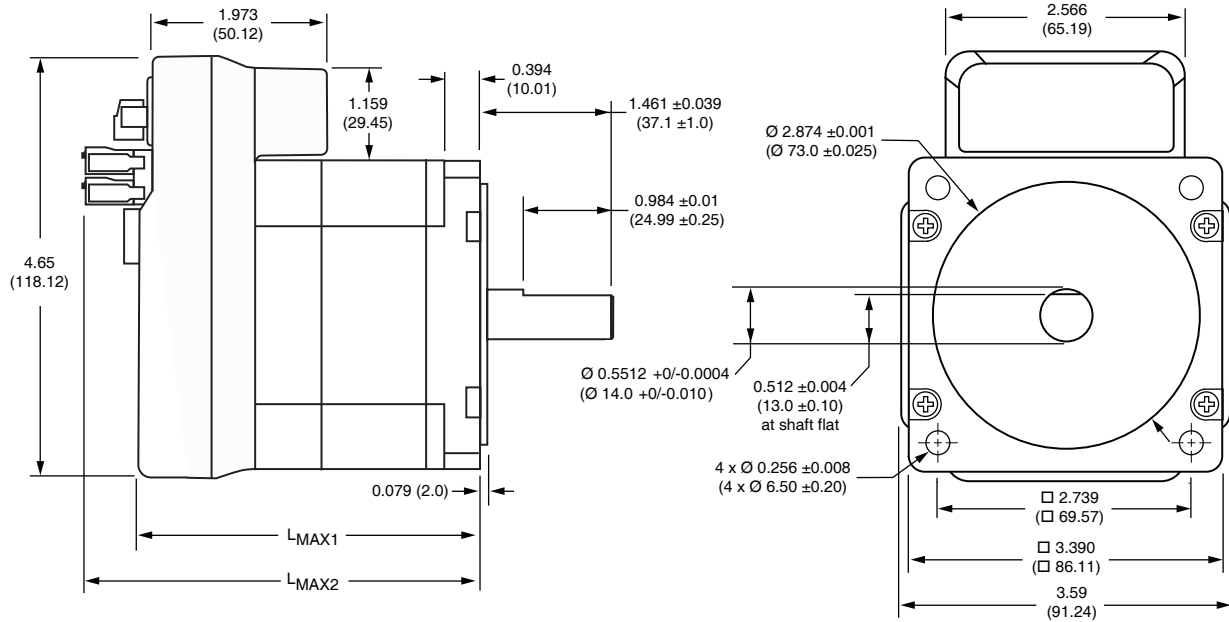


Motor stack length	L <sub>max1</sub>	L <sub>max2</sub>
Single	3.17 (80.5)	3.91 (99.3)
Double	3.52 (89.4)	4.26 (108.2)
Triple	4.38 (111.3)	5.13 (130.3)

# Lexium MDrive® CANopen

CANopen interface  
integrated 2-phase stepper motor

**LMD•85 NEMA34 motor – dimensions in inches (mm)**



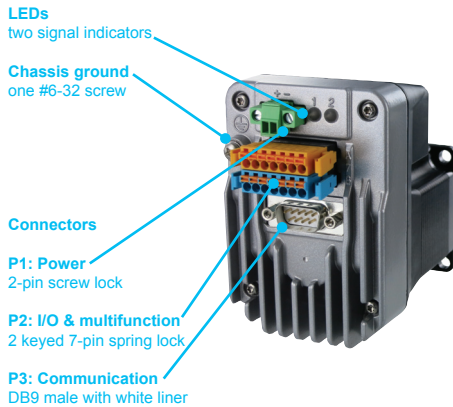
Motor stack length	Lmax1	Lmax2
Single	3.76 (95.5)	4.41 (112.0)
Double	4.33 (110.0)	4.98 (126.5)
Triple	5.90 (149.9)	6.55 (166.4)



See User Manual for complete details: [motion.schneider-electric.com/manuals.html](http://motion.schneider-electric.com/manuals.html)

# Lexium MDrive® CANopen

CANopen interface  
integrated 2-phase stepper motor



## Software interface

Interface to CANopen networks is easy with direct configuration of LMD products via layer setting services. Optional communication kit and configuration utility are also available.

The CANopen communication kit (part # MD-CC501-000) includes a USB to CAN dongle, terminator, and 6.0'/1.8m cable with DB9 mating connectors.

The free Lexium MDrive Software Suite includes a CANopen configuration utility to setup parameters and perform firmware upgrades via a PC.

## Connectors

All Lexium MDrive connectors are conveniently grouped in the same location at the back of each product. The same style locking connectors are also used consistently on all motor sizes of Lexium MDrive products.

Mating connectors for P1 and P2 are provided, and extra connectors may be ordered. A #6-32 screw lug is provided for earth grounding.

Connector	Style	Assignment
P1	2-pin screw lock	Supply voltage
P2	2 keyed 7-pin spring lock, color coded for ease of use	I/O and multifunction interface
P3	DB9 male with white liner	Communication
Chassis ground	#6-32 screw lug	Earth grounding

## Status indicators

Lexium MDrive products include 2 LED signal indicators. The multi-color LEDs are programmed to indicate a range of pre-defined messages to aid users. See product user manual for details.

# Lexium MDrive® CANopen

CANopen interface  
integrated 2-phase stepper motor



LMD-A85

LMD-A57

LMD-A42

Part numbers									
<b>Example</b>	L	M	D	C	A	4	2	1	
<b>Product</b> LMD = Lexium MDrive	L	M	D	C	A	4	2	1	
<b>Control type</b> C = Closed loop / with hMT and encoder (1) O = Open loop / no hMT or encoder	L	M	D	C	A	4	2	1	
<b>Communication type</b> A = CANopen interface	L	M	D	C	A	4	2	1	
<b>Flange size</b> 42 = NEMA 17 / 42mm 57 = NEMA 23 / 57mm 85 = NEMA 34 / 85mm	L	M	D	C	A	4	2	1	
<b>Motor length</b> 1 = single stack 2 = double stack 3 = triple stack	L	M	D	C	A	4	2	1	

(1) Closed loop control delivers encoder feedback and hMT enhanced motor performance.



MD-CC501-000

Installation accessories			
Description	Length m	Length feet	Reference
<b>Communication converter, USB to CAN</b>			
USB-pluggable converter to set/program communication parameters in 32- or 64-bit. Includes pre-wired DB9 mating cable.			
■ For CANopen products	1.8	6.0	MD-CC501-000

Description	Quantity	Reference
<b>Mating connector kit</b>		
Mating connectors for power and multifunction interface are included with each new product. If additional mating connectors are needed for Lexium MDrive CANopen products, a single mating connector kit is offered which includes the following:		
■ 2-pin screw lock mate (DC voltage supply)	1 pc	CK-15
■ 7-pin locking mates (multifunction), keyed	2 pcs - 1 blue, 1 orange	

# Lexium MDrive®

## Motor specifications

LMD•42 NEMA 17 motor specifications				
	Motor stack length	Single	Double	Triple
Holding torque	oz-in	43.9	58.1	87.8
	N-cm	31	41	62
Detent torque	oz-in	1.7	2.1	3.5
	N-cm	1.2	1.5	2.5
Rotor inertia	oz-in-sec <sup>2</sup>	0.0005	0.0008	0.0012
	kg-cm <sup>2</sup>	0.038	0.057	0.082
Radial load limit, center of shaft	lbs	8.5	8.5	8.5
	kg	3.8	3.8	3.8
Axial load limit @ 1500 rpm (5000 full steps/sec)	lbs	10	10	10
	kg	4.5	4.5	4.5
Weight (motor+driver)	oz	13.6	16.0	18.4
	g	385	454	522

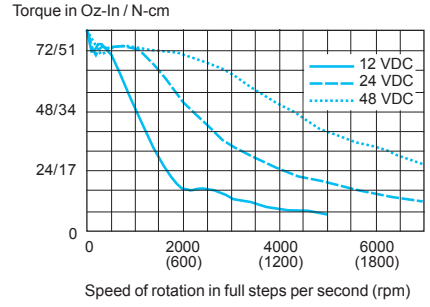
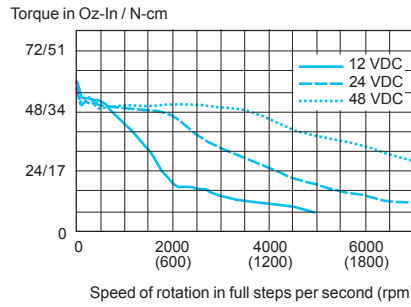
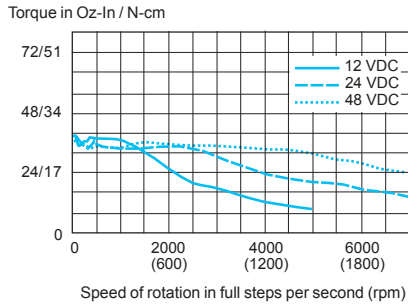
LMD•57 NEMA 23 motor specifications				
	Motor stack length	Single	Double	Triple
Holding torque	oz-in	103.4	158.6	242.2
	N-cm	73.0	112.0	171.0
Detent torque	oz-in	3.9	5.6	9.72
	N-cm	2.7	3.9	6.86
Rotor inertia	oz-in-sec <sup>2</sup>	0.0025	0.0037	0.0065
	kg-cm <sup>2</sup>	0.18	0.26	0.46
Radial load limit, center of shaft	lbs	15	15	15
	kg	6.8	6.8	6.8
Axial load limit @ 1500 rpm (5000 full steps/sec)	lbs	20	20	20
	kg	9	9	9
Weight (motor+driver)	oz	26.4	31.2	44.0
	g	748	885	1247

LMD•85 NEMA34 motor specifications				
	Motor stack length	Single	Double	Triple
Holding torque	oz-in	336.0	480.0	920.0
	N-cm	237.0	339.0	650.0
Detent torque	oz-in	10.9	14.16	19.83
	N-cm	7.7	10.0	14.0
Rotor inertia	oz-in-sec <sup>2</sup>	0.0127	0.0191	0.0382
	kg-cm <sup>2</sup>	0.90	1.35	2.70
Radial load limit, center of shaft	lbs	65	65	65
	kg	29.4	29.4	29.4
Axial load limit @ 1500 rpm (5000 full steps/sec)	lbs	20	20	20
	kg	9	9	9
Weight (motor+driver)	lb	4.45	5.65	9.0
	kg	2.02	2.56	4.08



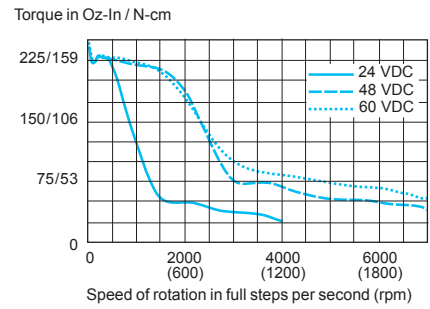
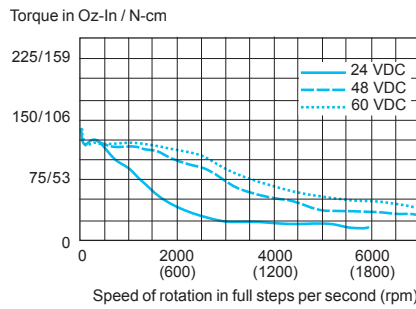
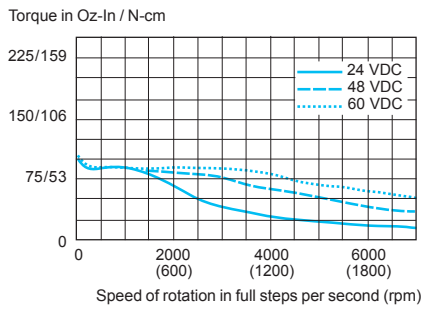
**LMD•42 NEMA 17 speed torque (1)**

**Single stack length      Double stack length      Triple stack length**



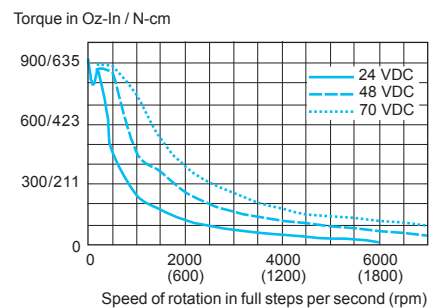
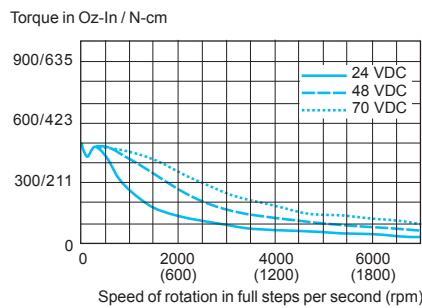
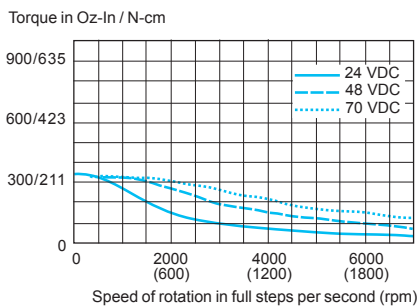
**LMD•57 NEMA 23 speed torque (1)**

**Single stack length      Double stack length      Triple stack length**



**LMD•85 NEMA34 speed torque (2)**

**Single stack length      Double stack length      Triple stack length**



(1) Test conditions: 100% current, 0.84 oz. damper, 0.18589 oz-in<sup>2</sup> inertia, hMT off  
 (2) Test conditions: 100% current, 3.7 oz. damper, 4.75670 oz-in<sup>2</sup> inertia, hMT off

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Tel. +00 (1) 860-295-6102 – Fax +00 (1) 860-295-6107

e-mail: [etech@imshome.com](mailto:etech@imshome.com)

#### **Schneider Electric Motion USA**

370 N. Main Street  
Marlborough, CT 06447 USA

[www.motion.schneider-electric.com](http://www.motion.schneider-electric.com)

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