

Lexium MDrive®

LMD•P57 Pulse/direction input

Product overview

Robust Lexium MDrive® Pulse/Direction products integrate 1.8° 2-phase stepper motors with on-board control electronics and hMT closed loop performance. Products have 4 modes of operation: pulse/direction input, variable speed control, constant velocity drive, and variable torque control.

With an RS-422/485 serial interface, settings can be downloaded and stored in nonvolatile memory. Commissioning, parameterization and monitoring is done via the user-friendly software provided.

Products may include an encoder, which is internal to the unit so no extra space is required. Encoders perform stall detection, position maintenance and find index mark, in addition to monitoring motor shaft position for real time closed loop feedback.

Application areas

Especially well suited for industrial applications, products include an IP65 rated version with circular M12 connectors. A high torque motor (LMH•P57) is also available, increasing torque up to 50%.

Lexium MDrive products can reduce machine complexity, size and cost in many stepper and servo motor applications. Their high degree of integration can increase system reliability by reducing the number of individual components, eliminating multiple potential failure points.



LMD•P57 Lexium MDrive Pulse/direction input products: integrated NEMA23 motor and controls, IP65 & IP20-rated

General features

Robust integrated microstepping drive and NEMA23 1.8° 2-phase stepper motor	
Advanced current control for exceptional performance and smoothness	
RS-422/485 serial interface with 4 operating modes: pulse/direction, speed, torque and velocity control	
+12 to +60 VDC single supply	
20 microstep resolutions up to 51,200 steps per rev including: Degrees, Metric, Arc Minutes	
Protection	0...84°C temperature warning, user selectable
	IP20, IP65 ratings
Hardware I/O	Sourcing or sinking
	1 analog input, 2 signal inputs, 1 attention output, 6 encoder outputs
Encoder	1000 lines / 4000 edges per rev
	internal magnetic
0 to 2.56 MHz step clock rate selectable in 0.59 Hz increments	
Graphical user interface provided for quick and easy parameter setup	
4 year conditional warranty	

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Specifications

Communication	Protocol type		RS-422/485	
Input power	Voltage	VDC	+12...+60	
	Current maximum (1)	Amp	3.5	
Motor	Frame size	NEMA	23	
		inches	2.3	
		mm	57	
	Performance level		standard torque or premium high torque	
	Holding torque	oz-in		103...416
N-cm			73 ... 294	
Thermal	Length	stack sizes	1, 2 & 3	
		Operating temp non-condensing		
	Heat sink maximum		85°C	
	Motor maximum		100°C	
Protection	Type	Temp warning	0...84°C, user selectable	
		IP rating	IP20, IP65	
		Earth grounding	via product chassis ground lug	
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	Line count		1000 lines / 4000 edges per rev
		Style		internal, magnetic
		Outputs		6 TTL level compatible
	Operating modes	Open loop configuration		pulse/direction input, speed control, velocity mode
		Closed loop configuration (2)		pulse/direction input, speed control, velocity mode, variable torque mode
	Digital filter range			50 nS ... 12.9 μS (10 MHz ... 38.8 kHz)
	Clock types (step mode)			step/direction, quadrature, step up/step down, clockwise/counterclockwise
	Step frequency	Maximum		2.56 MHz
Minimum pulse width			100 ns	

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

(2) Only with closed loop products.

Setup parameters

Operating modes	Basic	Pulse/direction	microstep resolution, run current, hold current, hold delay, clock mode, motion, enable active, input filters
	Advanced	Speed control	acceleration, deceleration, velocity, flags
		Torque mode (3)	set torque speed, % maintained motor torque, torque current, filtering
		Velocity control	acceleration, deceleration, velocity, slew, flags
Device parameters	Analog input settings		select range and resolution
	Communication bus settings		set baud rate, enable/disable parity mode and features, check sum
	I/O settings		clock and filter settings, attention output with selectable pre-programmed fields
	Motion settings		select motion, analog and velocity settings as available by operating mode
	hMT settings (3)		hMT setup/status; hMT operation
Device ID			device information, restore settings

(3) Only with closed loop products.

An optional Communication Converter is recommended to facilitate prototyping.



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

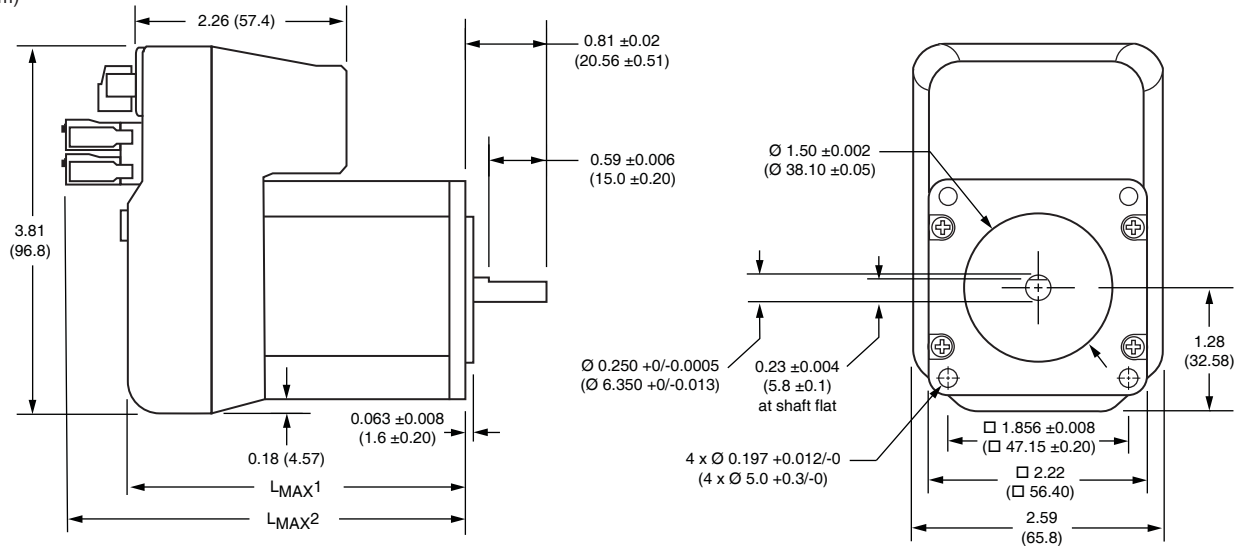
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Dimensions

LM•57 NEMA23 motor, IP20-rated

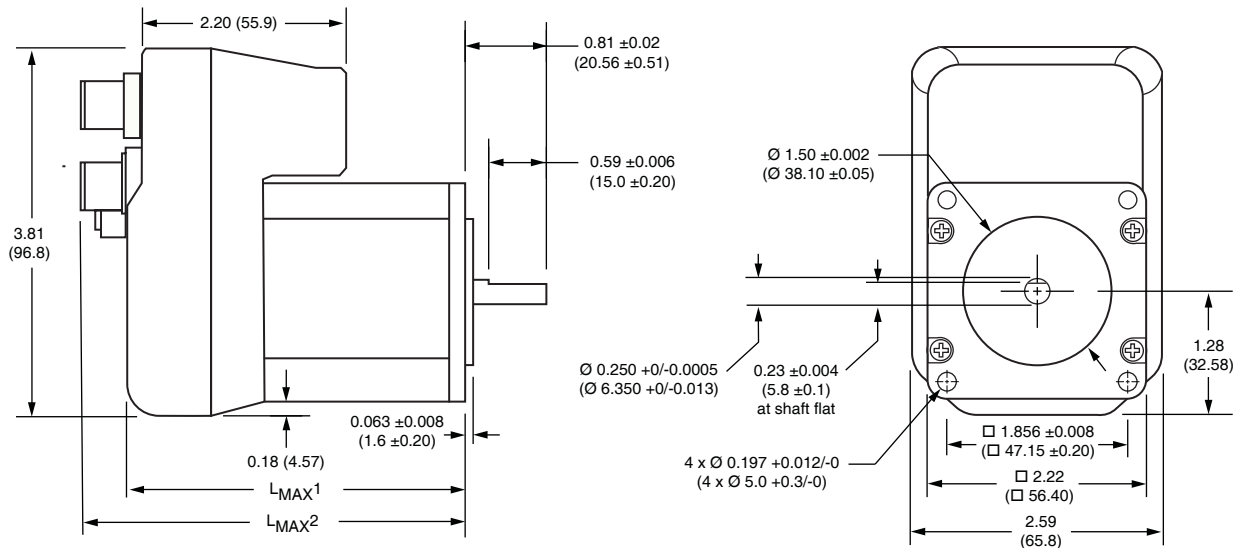
inches (mm)



Motor stack length	Lmax1		Lmax2	
	Standard - LMD	High torque - LMH	Standard - LMD	High torque - LMH
Single	3.17 (80.5)	3.32 (84.3)	3.91 (99.3)	4.01 (101.8)
Double	3.52 (89.4)	3.73 (94.8)	4.26 (108.2)	4.36 (110.7)
Triple	4.38 (111.3)	4.60 (116.8)	5.13 (130.3)	5.23 (133.0)

LM•57•C NEMA23 motor, IP65-rated

inches (mm)



Motor stack length	Lmax1		Lmax2	
	Standard - LMD	High torque - LMH	Standard - LMD	High torque - LMH
Single	3.22 (81.8)	3.32 (84.3)	3.91 (99.3)	4.01 (101.8)
Double	3.63 (92.3)	3.73 (94.8)	4.26 (108.2)	4.36 (110.7)
Triple	4.50 (114.3)	4.60 (116.8)	5.13 (130.3)	5.23 (133.0)

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IP20-rated products

LEDs

two signal indicators

Chassis ground
one #6-32 screw

Connectors

P1: Power
2-pin screw lock

P2: I/O & multifunction
2 keyed 7-pin spring lock

P3: Communication
DB9 male



IP65-rated products

LEDs

two signal indicators

Chassis ground
one #6-32 screw

Connectors

P1: Power
M12 4-pin male

P3: Communication
M12 5-pin female

P2: I/O & multifunction
M12 12-pin female



Part numbers

example part number	L	M	D	C	P	5	7	1	C
Product	L	M	D	C	P	5	7	1	C
LMD = Lexium MDrive with standard hybrid stepper motor LMH = Lexium MDrive with high torque stepper motor									
Control type	L	M	D	C	P	5	7	1	C
C = Closed loop / with hMT and encoder (1) O = Open loop / no hMT or encoder									
Communication type	L	M	D	C	P	5	7	1	C
P = Pulse/Direction via RS-422/485 serial interface									
Flange size	L	M	D	C	P	5	7	1	C
57 = NEMA 23 2.3" / 57mm									
Motor length	L	M	D	C	P	5	7	1	C
1 = single stack 2 = double stack 3 = triple stack									
Variation — omit from part number if unwanted C = M12 circular connectors and IP65 rating	L	M	D	C	P	5	7	1	C

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

Accessories

description	length feet (m)	part number
Communication converter		
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 M12 5-pin female connector	6.0 (1.8)	MD-CC405-000
IP65 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
Replacement mating connector kit		
Kits are for IP20 products. They include one 2-pin power mate, and one set (2 pieces) 7-pin multifunction mates		
	—	CK-14

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Motor performance

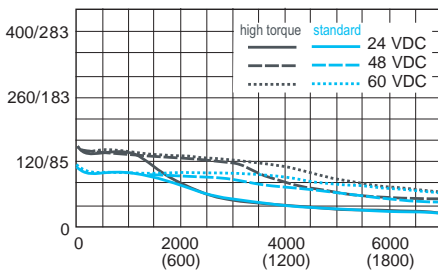
LMD•57 standard torque NEMA 23 motor specifications	Motor	Stack length	Single	Double	Triple
	Holding torque	oz-in		103	159
N-cm			73	112	171
Detent torque	oz-in		3.9	5.6	9.7
	N-cm		2.7	3.9	6.9
Rotor inertia	oz-in-sec ²		0.0025	0.0037	0.0065
	kg-cm ²		0.18	0.26	0.46
Radial load limit, center of shaft	lbs		15	15	15
	kg		6.8	6.8	6.8
Axial load limit @ 1500rpm (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

LMH•57 high torque NEMA 23 motor specifications	Motor	Stack length	Single	Double	Triple
	Holding torque	oz-in		152	264
N-cm			107	186	294
Detent torque	oz-in		8.5	14.2	21.2
	N-cm		6.0	10	15
Rotor inertia	oz-in-sec ²		0.0019	0.0030	0.0065
	kg-cm ²		0.14	0.22	0.46
Radial load limit, center of shaft	lbs		15	15	15
	kg		6.8	6.8	6.8
Axial load limit @ 1500rpm (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

LM•57 NEMA 23 speed torque (1)

Single stack length

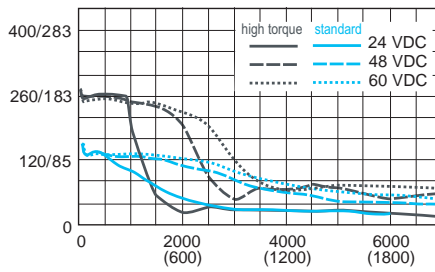
Torque in
Oz-In / N-cm



Speed of rotation in full steps per second (rpm)

Double stack length

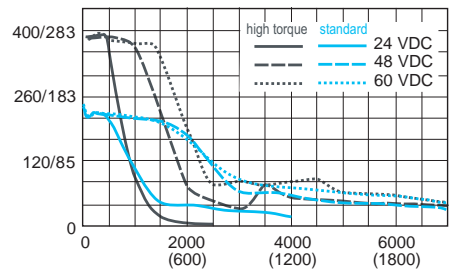
Torque in
Oz-In / N-cm



Speed of rotation in full steps per second (rpm)

Triple stack length

Torque in
Oz-In / N-cm



Speed of rotation in full steps per second (rpm)

(1) Test conditions: 100% current with damper simulating load.

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