

# LIBERTY MD<sub>DRIVE</sub> STEPPER MOTOR

## LMD•M42 Programmable Motion Control



### Specifications

Communication	Protocol type		RS-422/485	
Input power	Voltage	VDC	+12...+48	
	Current maximum <sup>(1)</sup>	Amp	2.0	
Motor	Frame size	NEMA	17	
		inches	1.7	
		mm	42	
	Performance level		Standard torque	
	Holding torque	oz-in		44 ... 88
N-cm			31 ... 62	
Length	stack sizes		1, 2 & 3	
Thermal	Temperature Maximums	Power stage maximum	85°C (185°F)	
		Motor maximum	100°C (212°F)	
	Ambient Operating Conditions	Operating Temperature		-20° to 50°C (-4° to 122°F)
		Temperature Variation		0.5°C/min (0.9°F/min)
		Humidity		5% to 95% (non-condensing)
	Storage & Transport	Temperature		-25° to 70°C (-13° to 158°F)
		Temperature Variation		-25° to 30°C (-13° to 86°F)
Humidity			0.5°C (32.9°F) min	
Altitude	Installation Altitude		Up to 3280 ft (1000 m) above sea level <sup>(5)</sup>	
Protection	Type	Temperature warning	0...84°C, user selectable	
		IP rating	IP20, IP65	
		Earth grounding	Via product chassis ground lug	
Hardware I/O, sourcing or sinking	One analog input <sup>(2)</sup>	Resolution	12 bit	
		Voltage range	0...+5 VDC, 0...+10 VDC, 0...20 mA, 4...20 mA	
	Three signal inputs	Voltage range		+5...+24 VDC, TTL level compatible
		Protection		Over temp, short circuit, transient, over voltage, inductive clamp
	One high-speed signal output	Current open collector/emitter		5.5 mA
		Voltage open collector		+60 VDC
		Voltage open emitter		+7 VDC
Aux. logic input	Voltage range <sup>(3)</sup>		+12...+24 VDC	
Encoder options	Multi-turn absolute	Position update/retention	Up to 30 days on internal power; 5 years with optional battery pack	
		Line count	1000 lines / 4000 edges per rev	
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)	
	Counters	Type		Position, encoder / 32 bit
		Edge rate maximum		5 MHz
	Velocity	Range		+/- 2,560,000
		Resolution		0.5961 steps per second
	Accel/Decel	Range		1.1 x 10 <sup>9</sup> steps per second <sup>2</sup>
		Resolution		90.9 steps per second <sup>2</sup>
		Types		linear
	Software	Program storage	Type/size	flash/11,120
User registers		Number/resolution	4/32-bit	
Floating point registers		Number/precision	8/double	
Math functions		Arithmetic		+, -, x, ÷, >, <, =, >=, <=
		Logic		AND, OR, XOR, NOT
		Trigonometric		ABS, COS, ACOS, LOG2, LOG10, PI, SIN, ASIN, SQRT, TAN, ATAN
Branch functions				Branch & call
I/O functions		Inputs		Home, limit plus, limit minus, go, stop, pause, jog plus, jog minus, general purpose, capture
		Outputs		Moving, error, velocity change,, moving position, trip, attention. general purpose
Trip functions				Trip on input, trip on position, trip on time, trip capture, trip on relative position, trip on main power loss
Party mode addresses			General purpose	
Encoder functions <sup>(4)</sup>			stall detection, position maintenance, find index, hMT	

<sup>1</sup> Actual power supply current will depend on voltage and load.

<sup>2</sup> Not available on products with multi-turn absolute encoder.

<sup>3</sup> When input voltage is removed, maintains power only to control and feedback circuits.

<sup>4</sup> Closed-loop models with encoder only.

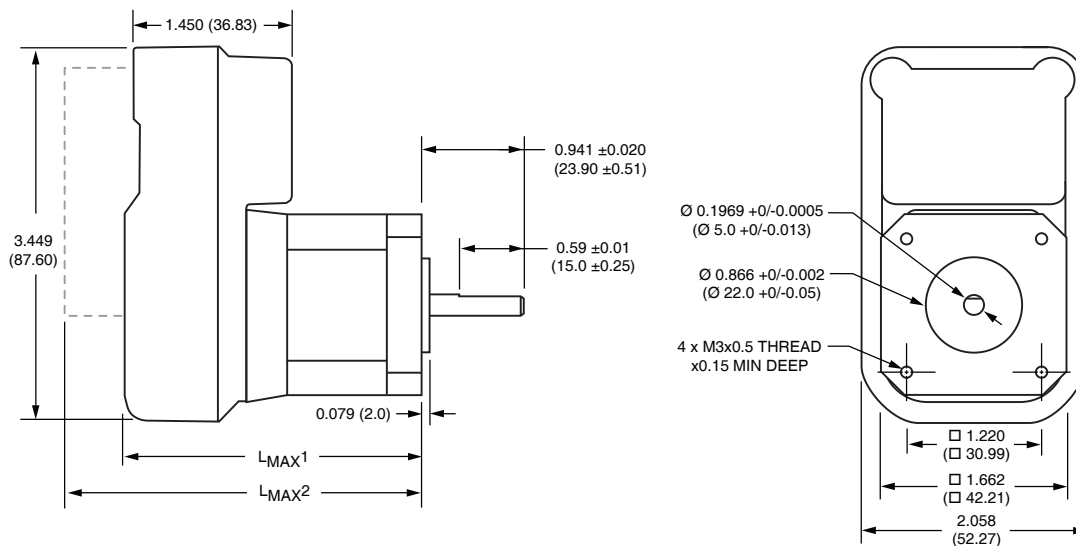
<sup>5</sup> Installation above 3280 ft (1000 m) may require derating output current and maximum ambient temperature.

# LMD•M42 Programmable Motion Control

## Dimensions

### LM•42 NEMA 17 Motor, IP20-rated

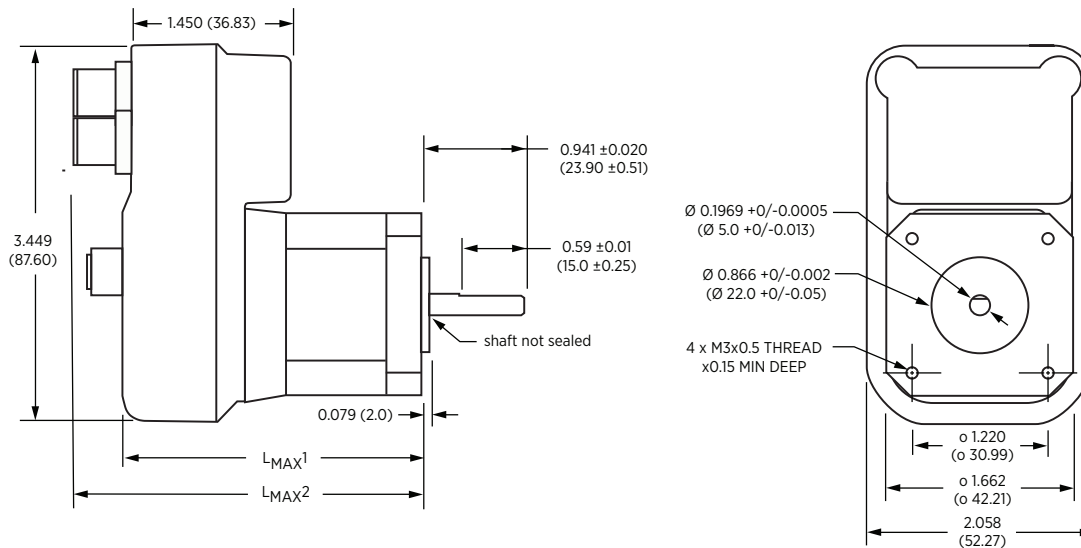
inches (mm)



Motor Stack Length	Lmax1	Lmax2
Single	2.48 (63.0)	3.22 (81.8)
Double	2.71 (69.0)	3.46 (88.0)
Triple	3.04 (77.3)	3.78 (96.0)

### LM•42•C NEMA 17 Motor, IP65-rated<sup>(1)</sup>

inches (mm)



Motor Stack Length	Lmax1	Lmax2
Single	2.78 (70.7)	3.39 (86.0)
Double	2.98 (75.7)	3.58 (91.0)
Triple	3.33 (84.7)	3.94 (100.0)

<sup>1</sup> Motor shaft is not sealed. To meet an IP65 rating, ensure that the shaft end of the motor is properly sealed.

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



# LMD•M42 Programmable Motion Control

## Motor Performance

Motor	Stack length	LMD•42 Standard Torque		
		Single	Double	Triple
Holding torque	oz-in	44	58	88
	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 @ 1500rpm (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

## Connector & Indicator Layout

### IP20-rated Models

#### LEDs

Two signal indicators

#### Chassis Ground

One #6-32 screw

#### Connectors

##### P1: Power

One 2-pin screw lock

##### P2: I/O & Multifunction

Two keyed 7-pin spring lock

##### P3: Communication

One DB9 male



### IP65-rated Models

#### Connector

##### P1: Power

One M12 4-pin male

#### Chassis Ground

One #6-32 screw

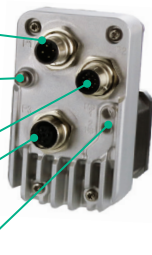
#### Connectors

##### P2: I/O & multifunction

One M12 12-pin male

##### P3: Communication

One M12 5-pin female



#### LEDs

Two signal indicators

## Part Number Breakdown

Example part number	L	M	D	C	A	4	2	1	C
<b>Product</b> LMD = Liberty MDrive with standard hybrid stepper motor	L	M	D	C	A	4	2	1	C
<b>Control type</b> C = Closed loop / with hMT and incremental magnetic encoder <sup>1</sup> A = Closed loop / with hMT and multi-turn absolute encoder <sup>1</sup> O = Open loop / no hMT or encoder	L	M	D	C	A	4	2	1	C
<b>Communication type</b> M = Programmable Motion Control	L	M	D	C	M	4	2	1	C
<b>Flange size</b> 42 = NEMA 42 1.7" / 42mm	L	M	D	C	A	4	2	1	C
<b>Motor length</b> 1 = single stack 2 = double stack 3 = triple stack	L	M	D	C	A	4	2	1	C
<b>Variation</b> — omit from part number if unwanted C = M12 circular connectors and IP65 rating	L	M	D	C	A	4	2	1	C

<sup>1</sup> Closed loop control delivers encoder feedback and hMT enhanced motor performance.



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 from <https://novantaims.com/resources/part-number-builders/>



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