

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

## LMD•M85 Programmable Motion Control



### Specifications

Communication	Protocol type		RS-422/485	
Input power	Voltage	VDC	+12...+70	
	Current maximum <sup>(1)</sup>	Amp	4.0	
Motor	Frame size	NEMA	34	
		inches	3.4	
		mm	85	
	Performance level		Standard torque	
Holding torque	oz-in		336 ... 920	
	N-cm		237 ... 650	
Thermal	Length	stack sizes	1, 2 & 3	
		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)
	Storage & Transport	Humidity		5% to 95% (non-condensing)
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>(6)</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	
	Four signal inputs	Voltage range	+5...+24 VDC, TTL level compatible	
		Protection	Over temp, short circuit, transient, over voltage, inductive clamp	
	Two power outputs <sup>(3)</sup>	Current range	-100... +100 mA	
		Voltage range	-24...+24 VDC	
	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>(4)</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	
		Incremental magnetic	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, triangle s-curve, sinusoidal s-curve
	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			62	
Encoder functions <sup>(5)</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> Products with multi-turn absolute encoder have one power output

<sup>4</sup> When input voltage is removed, maintains power only to control and feedback circuits.

<sup>5</sup> Closed-loop models with encoder only.

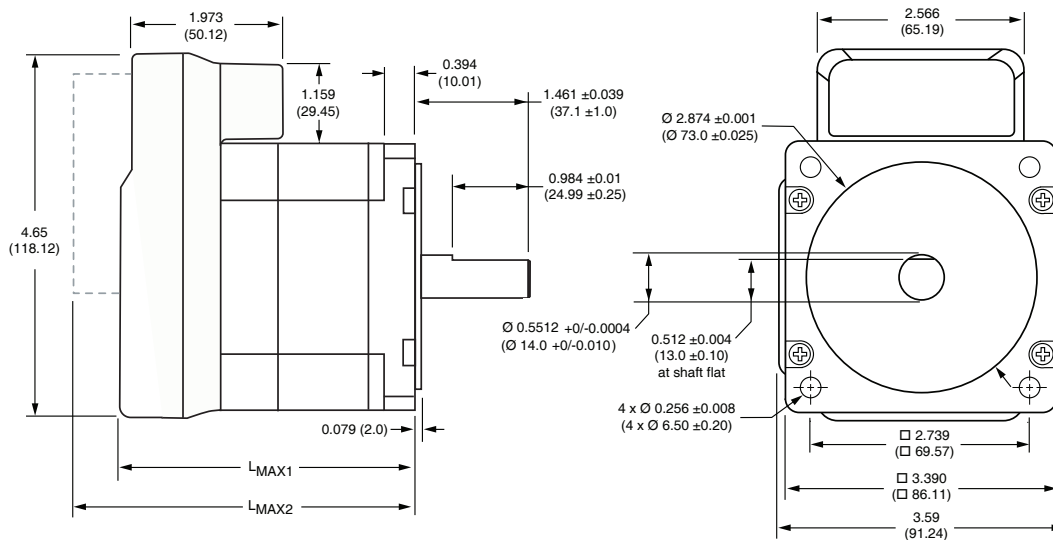
<sup>6</sup> Installation above 3280 ft (1000 m) may require derating output current and maximum ambient temperature.

# LMD•M85 Programmable Motion Control

## Dimensions

### LM•85 NEMA 34 Motor, IP20-rated

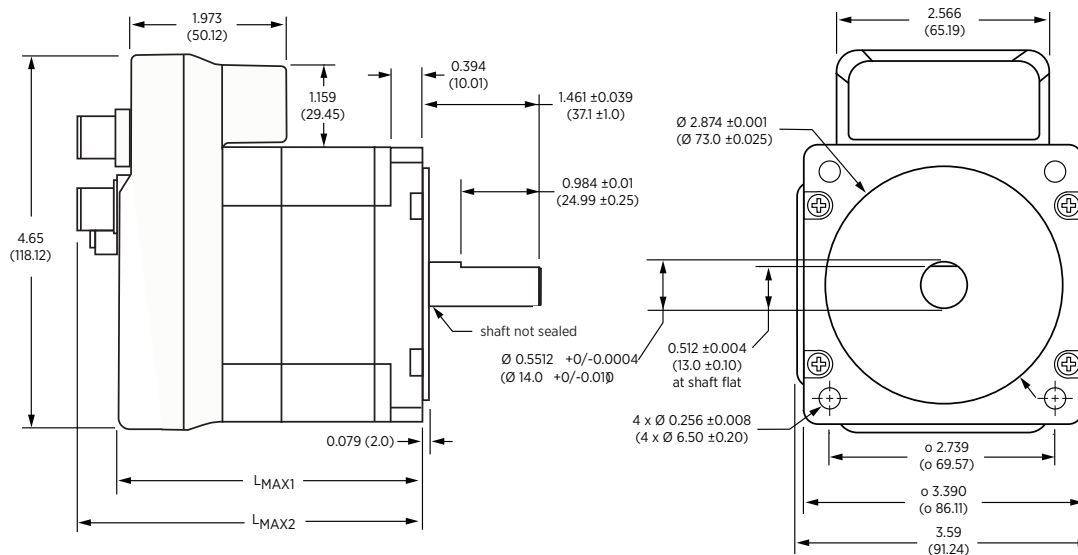
inches (mm)



Motor Stack Length	Lmax1	Lmax2
Single	3.79 (96.2)	4.55 (115.7)
Double	4.33 (110.0)	5.07 (128.8)
Triple	5.90 (149.9)	6.65 (168.9)

### LM•85•C NEMA 34 Motor, IP65-rated<sup>(1)</sup>

inches (mm)



Motor Stack Length	Lmax1	Lmax2
Single	4.04 (102.7)	4.65 (118.2)
Double	4.57 (116.2)	5.18 (131.7)
Triple	6.14 (156.1)	6.75 (171.5)

<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/>



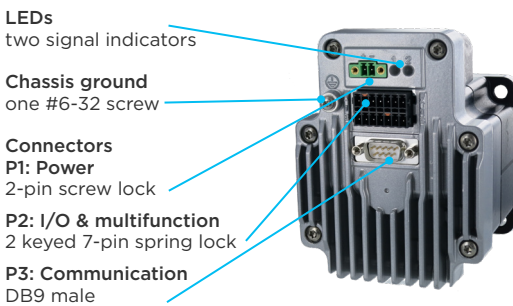
# LMD•M85 Programmable Motion Control

## Motor Performance

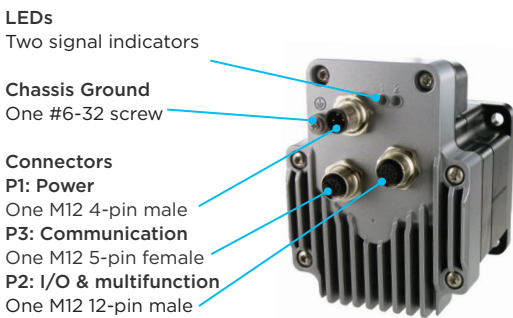
Motor	Stack length	LMD•85 Standard Torque		
		Single	Double	Triple
Holding torque	oz-in	336	480	920
	N-cm	237	339	650
Detent torque	oz-in	10.9	14.16	19.83
	N-cm	7.7	10.0	14.0
Rotor inertia	oz-in-sec <sup>2</sup>	0.0127	0.0191	0.0382
	kg-cm <sup>2</sup>	0.90	1.35	2.70
Radial load limit, center of shaft	lbs	65	65	65
	kg	29.4	29.4	29.4
Axial load limit @ 1500rpm (5000 full steps/sec)	lbs	20	20	20
	kg	9	9	9
Weight (motor+driver)	oz	4.45	5.65	9.0
	g	2.02	2.56	4.08

## Connector & Indicator Layout

### IP20-rated Models



### IP65-rated Models



## Part Number Breakdown

Example part number	L	M	D	C	A	8	5	1	C
<b>Product</b> LMD = Liberty MDrive with standard hybrid stepper motor	L	M	D	C	A	8	5	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	8	5	1	C
<b>Communication type</b> M = Programmable Motion Control	L	M	D	C	M	8	5	1	C
<b>Flange size</b> 85 = NEMA 34 3.4" / 85mm	L	M	D	C	A	8	5	1	C
<b>Motor length</b> 1 = single stack 2 = double stack 3 = triple stack	L	M	D	C	A	8	5	1	C
<b>Variation</b> — omit from part number if unwanted C = M12 circular connectors and IP65 rating	L	M	D	C	A	8	5	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/>

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