

# LMD STEPPER MOTOR

## LMD•M57 Programmable Motion Control



### Specifications

Communication	Protocol type		RS-422/485	
Input power	Voltage	VDC	+12...+60	
	Current maximum <sup>(1)</sup>	Amp	3.5	
Motor	Frame size	NEMA	23	
		inches	2.3	
		mm	57	
	Performance levels		Standard torque or premium high torque	
Holding torque	oz-in		103...416	
	N-cm		73 ... 294	
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	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	Temperature	-25° to 70°C (-13° to 158°F)	
		Temperature Variation	-25° to 30°C (-13° to 86°F)	
		Humidity	5% to 95% (non-condensing)	
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 rating	-100...+100 mA	
		Voltage range	-24...+24 VDC	
	One high-speed signal output	Current open collector/emitter	Voltage open collector	+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	Resolution	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.

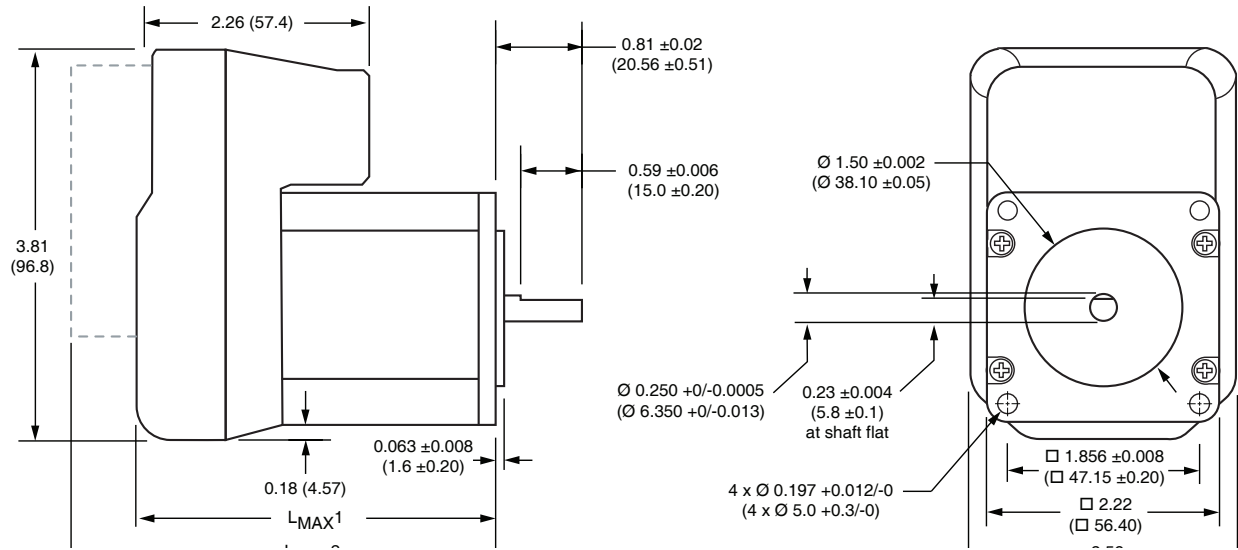
<sup>6</sup> Installation above 3280 ft (1000 m) may require derating output current and maximum ambient temperature.

# LMD•M57 Programmable Motion Control

## Dimensions

### LM•57 NEMA23 Motor, IP20-rated

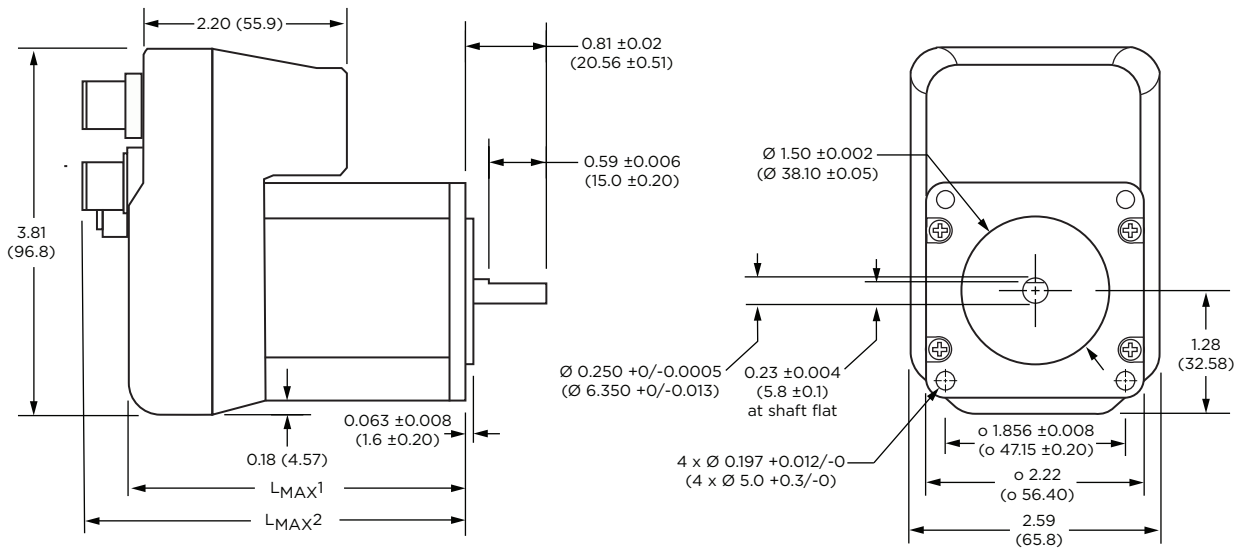
inches (mm)



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<sup>(1)</sup>

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)

<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•M57 Programmable Motion Control

## Motor Performance

Motor	Stack length	LMD•57 Standard Torque			LMH•57 High Torque		
		Single	Double	Triple	Single	Double	Triple
Holding torque	oz-in	103	159	242	152	264	416
	N-cm	73	112	171	107	186	294
Detent torque	oz-in	3.9	5.6	9.7	8.5	14.2	21.2
	N-cm	2.7	3.9	6.9	6.0	10	15
Rotor inertia	oz-in-sec <sup>2</sup>	0.0025	0.0037	0.0065	0.0019	0.0030	0.0065
	kg-cm <sup>2</sup>	0.18	0.26	0.46	0.14	0.22	0.46
Radial load limit, center of shaft	lbs	15	15	15	15	15	15
	kg	6.8	6.8	6.8	6.8	6.8	6.8
Axial load limit @ 1500rpm (5000 full steps/sec)	lbs	20	20	20	20	20	20
	kg	9	9	9	9	9	9
Weight (motor+driver)	oz	26.4	31.2	44.0	26.4	31.2	44.0
	g	748	885	1247	748	885	1247

## 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

#### LEDs

Two signal indicators

#### Chassis Ground

One #6-32 screw

#### Connectors

##### P1: Power

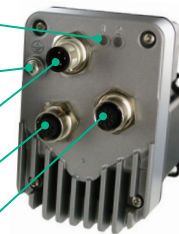
One M12 4-pin male

##### P3: Communication

One M12 5-pin female

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

One M12 12-pin male



## Part Number Breakdown

Example part number **L M D C A 5 7 1 C**

#### Product

**LMD** = Liberty MDrive with standard hybrid stepper motor

**LMH** = Liberty MDrive with high torque stepper motor

#### Control type

**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

#### Communication type

**M** = Programmable Motion Control

#### Flange size

**57** = NEMA 23 2.3" / 57mm

#### Motor length

**1** = single stack

**2** = double stack

**3** = triple stack

**Variation** — omit from part number if unwanted

**C** = M12 circular connectors and IP65 rating

<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/>