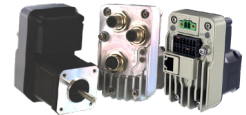


# LIBERTY MD<sub>DRIVE</sub> STEPPER MOTOR

## LMD•E42 Ethernet TCP/IP



### Specifications

Communication	Protocol type	Ethernet TCP/IP		
	Protocols	Profinet		
		Ethernet/IP (ODVA compliant)		
		Modbus TCP		
		MCode/TCP on configuration port		
Baud rate	100 Mbps			
Configuration port	503			
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>(4)</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	
	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	1.5 x 10 <sup>9</sup> steps per second <sup>2</sup>	
		Resolution	90.9 steps per second <sup>2</sup>	
Software	Profinet	Output slot 1	128 bytes, 38 registers	
		Input slot 2	128 bytes, 34 registers	
		Register mapping	variable, user defined	
	Ethernet/IP	Device class	Adapter	
		Message types	explicit or implicit	
		Objects	identity, assembly, TCP, Ethernet link, Manufacturing specific	
	Modbus TCP	Device ID	43/14d (0x2B/0x0E)	
		Function codes	Public and manufacturer specific	
	MCode/TCP	Proprietary	Programming over Ethernet	

<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.

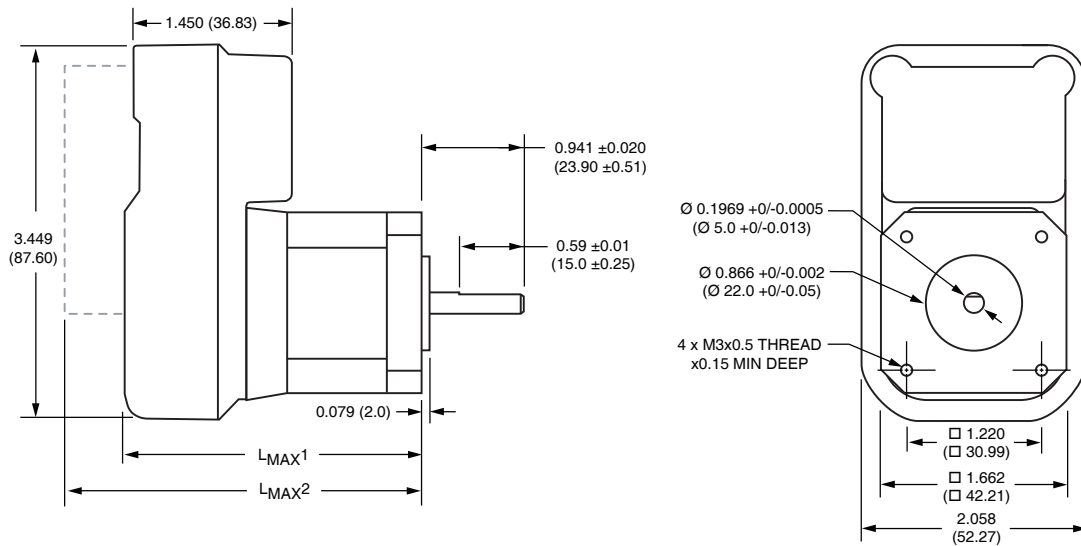
<sup>4</sup> Installation above 3280 ft (1000 m) may require derating output current and maximum ambient temperature.

# LMD•E42 Ethernet TCP/IP

## Dimensions

### LM•42 NEMA 17 Motor, IP20-rated

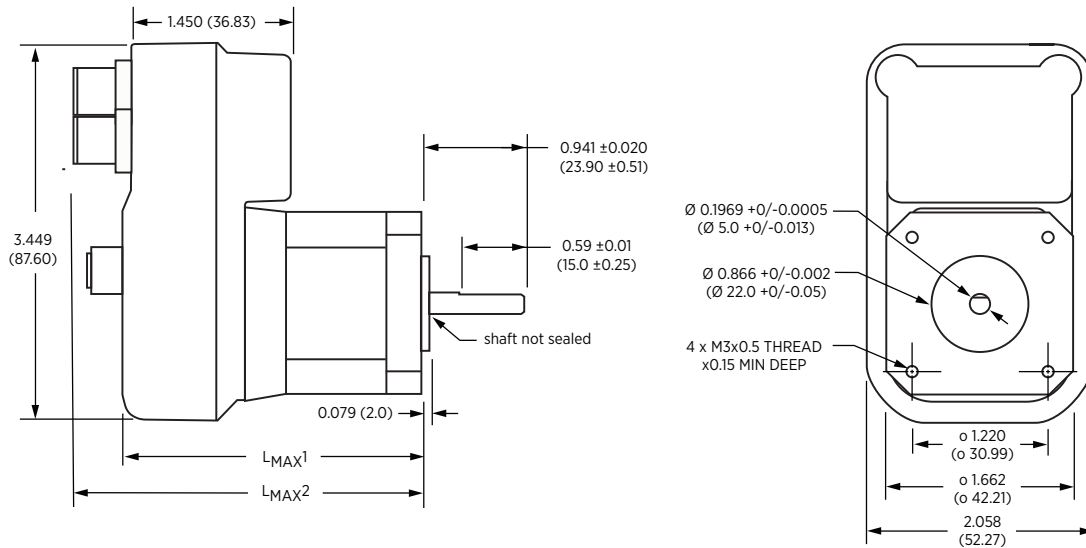
inches (mm)



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•E42 Ethernet TCP/IP

## 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

#### Connectors

##### P1: Power

One 2-pin screw lock

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

Two keyed 7-pin spring lock

##### P3: Communication

One DB9 male

#### Chassis Ground

One #6-32 screw

### 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 male

#### LEDs

Two signal indicators

## Part Number Breakdown

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