

Lexium MDrive®

LMD•E85 Ethernet TCP/IP

Product overview

Robust Lexium MDrive® Ethernet TCP/IP products integrate 1.8° 2-phase stepper motors with control electronics including an Ethernet controller that supports user-selectable protocols: Profinet, EtherNet/IP, and ModbusTCP. An optional encoder delivers hMT closed loop performance.

hMT closed loop performance is available in products with either a multi-turn absolute encoder or incremental magnetic encoder. Closed loop performance maintains functional motor control to prevent loss of synchronization, offers variable current control, torque control, and use of the motor's full torque range without derating.

Multi-turn absolute encoders may benefit users by detecting and storing position information, even when powered down. This can eliminate homing routines and reduce setup time at system startup.

Lexium MDrive products are ODVA-compliant adapter class devices capable of explicit or implicit messaging. Compact motion control solutions that interface with many manufacturer's systems.

Application areas

Especially well suited for industrial applications, products include an IP65 rated version with circular M12 connectors.

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•E85 Lexium MDrive Ethernet TCP/IP products: integrated NEMA34 motor and controls, IP65 & IP20-rated

Features overview

| | |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General | NEMA34 1.8° 2-phase stepper motor integrated with robust control electronics, including programmable motion controller Advanced current control for exceptional performance and smoothness |
| Input power | +12 to +70 VDC single supply |
| Communication protocols | EtherNet/IP Profinet ModbusTCP MCode/TCP |
| Encoder options | Multi-turn absolute or incremental magnetic |
| Motion | 20 microstep resolutions up to 51,200 steps per rev including: Degrees, Metric, Arc Minutes 336 user program labels / 11,120 bytes flash memory 0 to 2.56 MHz step clock rate selectable in 0.59 Hz increments |
| I/O, sourcing or sinking | +5 to +24 VDC signal inputs 12-bit analog input (1) 100mA power outputs 5.5mA high-speed signal output |
| Protection | Temperature warning IP20, IP65 ratings |
| Warranty | 4 year, conditional |

(1) Not available on products with multi-turn absolute encoder.

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LMD•E85 Ethernet TCP/IP

Specifications

| | | | | |
|--------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|
| Communication | 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...+70 | |
| | Current maximum (1) | Amp | 4.0 | |
| Motor | Frame size | NEMA | 34 | |
| | | inches | 3.4 | |
| | | mm | 85 | |
| | Performance levels | standard torque or premium high torque (2) | | |
| | Holding torque | oz-in | 336...920 | |
| N-cm | | 237...650 | | |
| Thermal | Length | stack sizes | 1, 2 & 3 | |
| | | Operating temp non-condensing | Heat sink maximum | 85°C |
| | | Motor maximum | 100°C | |
| Protection | Type | Temperature warning | 0...84°C, user selectable | |
| | | IP rating | IP20, IP65 | |
| | | Earth grounding | via product chassis ground lug | |
| I/O sourcing or sinking | One analog input (2) | 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 (3) | Current rating | -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 (4) | +12... +24 VDC | | |
| Encoder options | Multi-turn absolute | Position update / retention | 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 ⁹ steps per second ² | |
| | | | Resolution | 90.9 steps per second ² |
| | | 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 (5) | stall detection, position maintenance, find index, hMT | | | |

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

(2) Not available on products with multi-turn absolute encoder.

(3) Products with multi-turn absolute encoder have one power output.

(4) When input voltage is removed, maintains power only to control and feedback circuits.

(5) Closed-loop models with encoder only.

An optional Communication Converter is recommended to facilitate prototyping.

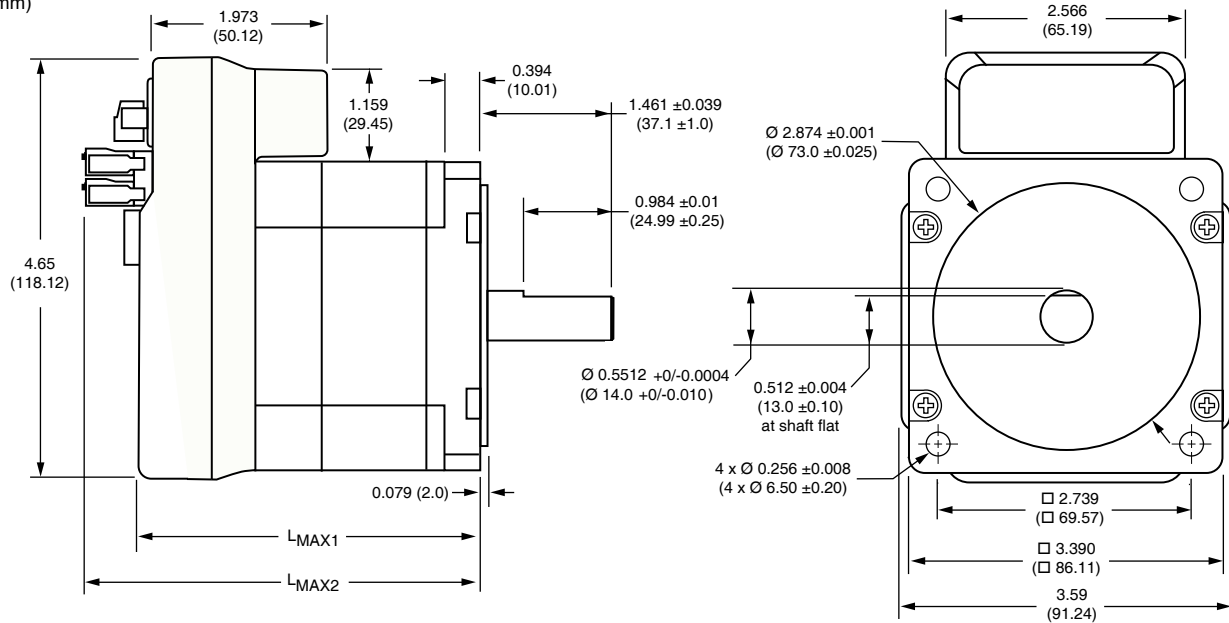
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Dimensions

LMD•85 NEMA34 motor, IP20-rated

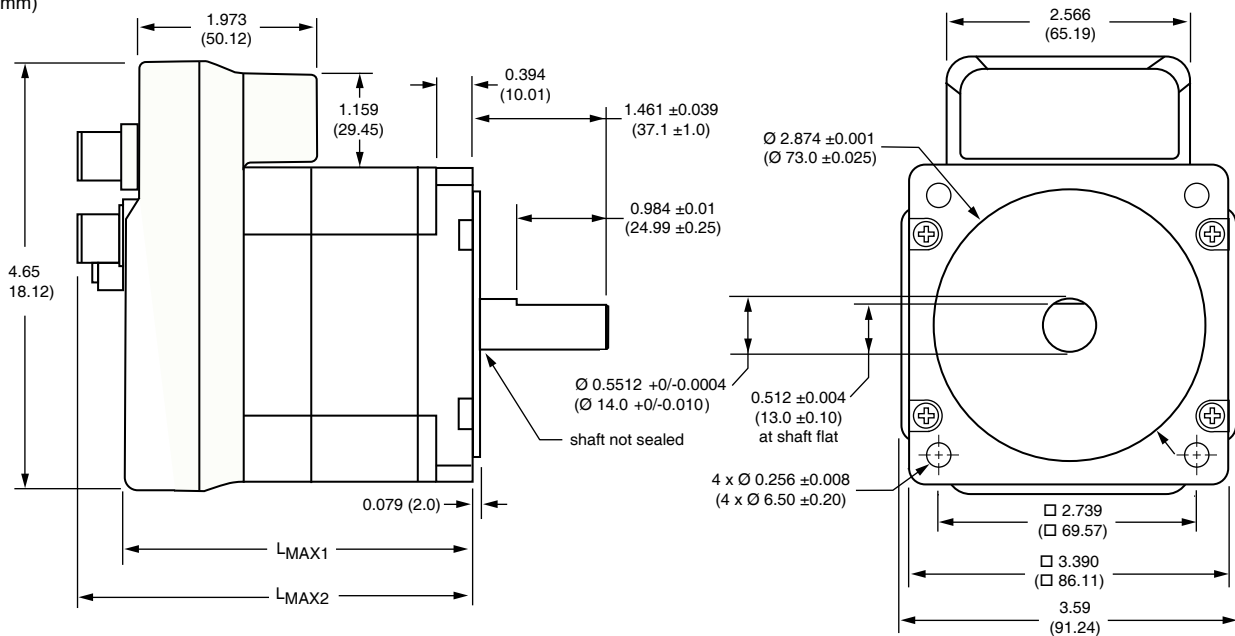
inches (mm)



| Motor stack length | L _{max1} | L _{max2} |
|--------------------|-------------------|-------------------|
| 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) |

LMD•85•C NEMA34 motor, IP65-rated

inches (mm)

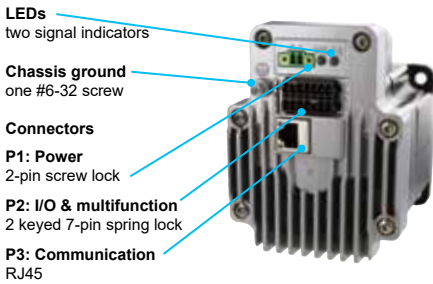


| Motor stack length | L _{max1} | L _{max2} |
|--------------------|-------------------|-------------------|
| Single | 4.04 (102.7) | 4.65 (118.2) |
| Double | 4.57 (116.2) | 5.18 (131.7) |
| Triple | 6.14 (156.1) | 6.75 (171.5) |

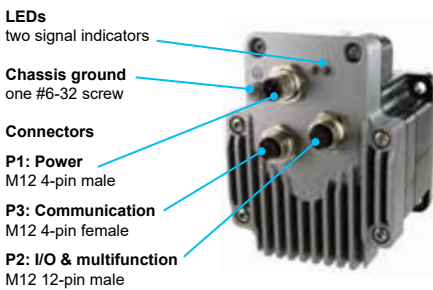
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IP20-rated products



IP65-rated products



Part numbers

| | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| example part number | L M D C E 8 5 1 C |
| Product LMD = Lexium MDrive with standard hybrid stepper motor LMH = Lexium MDrive with high torque stepper motor (1) | L M D C E 8 5 1 C |
| Control type C = Closed loop / with hMT and incremental magnetic encoder (1) A = Closed loop / with hMT and multi-turn absolute encoder (1) O = Open loop / no hMT or encoder | L M D C E 8 5 1 C |
| Communication type E = EtherNet/IP, ModbusTCP, Profinet, MCode/TCP | L M D C E 8 5 1 C |
| Flange size 85 = NEMA 34 3.4" / 85mm | L M D C E 8 5 1 C |
| Motor length 1 = single stack 2 = double stack 3 = triple stack | L M D C E 8 5 1 C |
| Variation — omit from part number if unwanted C = M12 circular connectors and IP65 rating | L M D C E 8 5 1 C |

(1) Contact the factory for product details.

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

Accessories

| description | length feet (m) | part number |
|-----------------------------------------------------------------------------------------------------------------|--------------------|---------------|
| IP65 cordsets | | |
| Shielded cables pre-wired with straight M12 mating connectors | | |
| Communication cordset mates to 4-pin female connector | 6.5 (2.0) | MD-CS640-000 |
| Power cordset mates to 4-pin male connector | 10.0 (3.0) | MD-CS620-000 |
| I/O cordset mates to 12-pin male connector | 10.0 (3.0) | MD-CS610-000 |
| Back-up battery pack for Absolute Encoder models | | |
| Extend stored position data up to 5-years for 1 to 6 LMDs with absolute encoder | | |
| Battery pack, DIN-rail mount. Uses 3 AA batteries, not provided | — | ICP0531 |
| LMD mating cable(s) with crimp connector to flying lead end | 3.3 (1.0) | PD02-0531-FL1 |
| PLC mating cable with crimp connector to flying lead end | 3.3 (1.0) | PD04-0531-FL1 |
| 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-15 |

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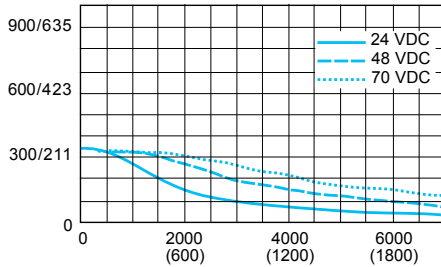
Motor performance

| LMD•85 NEMA 34 motor specifications | Motor | Stack length | Single | Double | Triple |
|-----------------------------------------------------|------------------------|--------------|----------------|--------|--------|
| | | | Holding torque | oz-in | 336 |
| | 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 ² | 0.0127 | 0.0191 | 0.0382 | |
| | kg-cm ² | 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) | lb | 4.45 | 5.65 | 9.0 | |
| | kg | 2.02 | 2.56 | 4.08 | |

LMD•85 NEMA 34 speed torque (1)

Single stack length

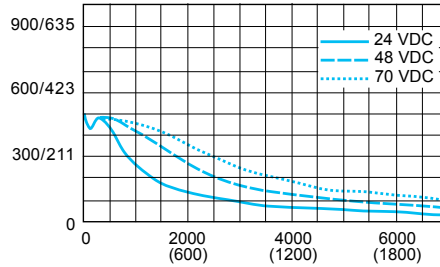
Torque in
Oz-In / N-cm



Speed of rotation in full steps per second (rpm)

Double stack length

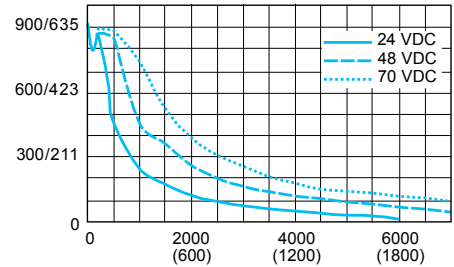
Torque in
Oz-In / N-cm



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.