

Lexium MDrive®

LMD•M57 programmable Motion Control

Product overview

Robust Lexium MDrive® Motion Control products integrate 1.8° 2-phase stepper motors with control electronics, including an on-board programmable motion controller for stand-alone operation. An optional encoder, internal to the product, delivers hMT closed loop performance.

With an RS-422/485 serial interface, settings can be downloaded and stored in nonvolatile memory. Commissioning, parameterization and monitoring is done via the user-friendly software provided.

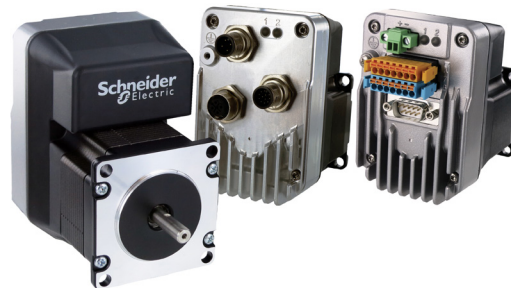
Products with encoder feature hMT closed loop performance to maintain functional motor control and prevent loss of synchronization. Benefits include: variable current control, torque control, using the motor's full torque range without derating.

Application areas

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

M12 connectors. A high torque motor (LMH•57) is also available, increasing torque up to 50%.

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•M57 Lexium MDrive Motion Control products: integrated NEMA23 motor and controls, IP65 & IP20-rated

General features

| | |
|---|---|
| Robust control electronics, including programmable motion controller, integrated with NEMA23 1.8° 2-phase stepper motor | |
| Advanced current control for exceptional performance and smoothness | |
| RS-422/485 serial interface | |
| +12 to +60 VDC single supply | |
| 20 microstep resolutions up to 51,200 steps per rev including: Degrees, Metric, Arc Minutes | |
| 62 software addresses for multi-drop communications | |
| Protection | 0...84°C temperature warning, user selectable IP20, IP65 ratings |
| I/O, sourcing or sinking | +5 to +24 VDC signal inputs 12-bit analog input 100mA power outputs 5.5mA high-speed signal output |
| Encoder | 1000 lines / 4000 edges per rev internal magnetic |
| 336 user program labels / 11,120 bytes flash memory | |
| 0 to 2.56 MHz step clock rate selectable in 0.59 Hz increments | |
| Graphical user interface provided for quick and easy parameter setup | |
| 4 year warranty | |

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Specifications

| | | | | |
|-------------------------------|-------------------------------|--------------------------------|--|---|
| Communication | Protocol type | | RS-422/485 | |
| Input power | Voltage | VDC | +12...+60 | |
| | Current maximum (1) | Amp | 3.5 | |
| Motor | Frame size | NEMA | 23 | |
| | | inches | 2.3 | |
| | | mm | 57 | |
| | Performance level | | standard torque or premium high torque | |
| | Holding torque | oz-in | | 103...416 |
| N-cm | | | 73... 294 | |
| Thermal | Operating temp non-condensing | Heat sink maximum | 85°C | |
| | | Motor maximum | 100°C | |
| | | Length | stack sizes | 1, 2 & 3 |
| Protection | Type | Temp 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 | 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 | 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 (2) | | +12... +24 VDC | |
| 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) | |
| | Encoder | Line count | | 1000 lines / 4000 edges per rev |
| | | Style | | internal, magnetic |
| | 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 ⁹ steps persecond ² |
| | | Resolution | | 90.9 steps per second ² |
| | Software | Program storage | Type/size | flash / 11,120 |
| | | User registers | | four 32 bit |
| | | User program labels & variable | | 336 |
| Math functions | | | +, -, x, ÷, >, <, <=, >=, AND, OR, XOR, NOT | |
| Branch functions | | | Branch and Call | |
| General purpose I/O functions | | Inputs | | home, limit plus, limit minus, go, stop, pause, jog plus, jog minus, reset, capture, general purpose |
| | | Outputs | | moving, error, stall, velocity change, general purpose, locked rotor, moving to position, hMT active, make up active, attention |
| Trip functions | | | trip on input, trip on position, trip on time, trip capture, trip on relative position | |
| Party mode addresses | | 62 | | |
| | | | stall detection, position maintenance, find index | |

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

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

An optional Communication Converter is recommended to facilitate prototyping.



See User Manual for complete details: www.motion.schneider-electric.com/manuals.html

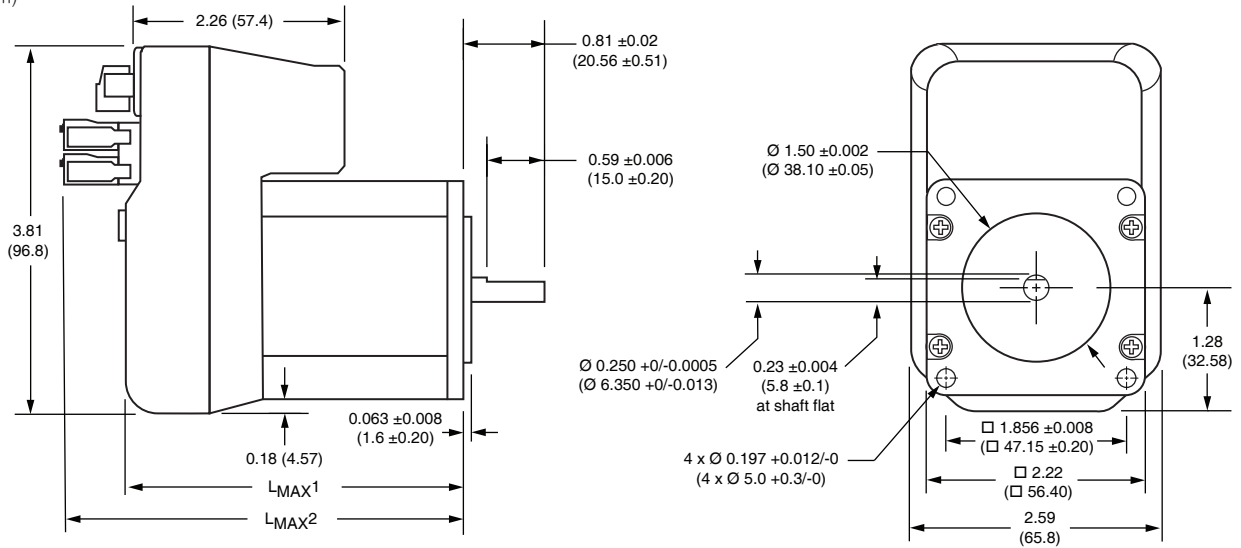
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Dimensions

LM•57 NEMA23 motor, IP20-rated

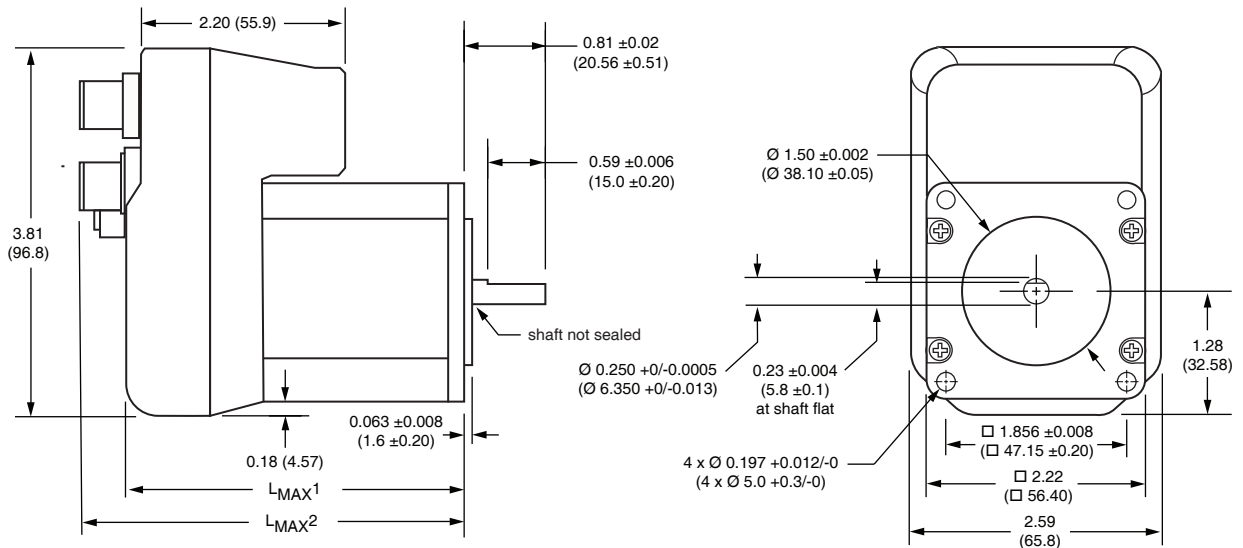
inches (mm)



| 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

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) |

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IP20-rated products

LEDs

two signal indicators

Chassis ground
one #6-32 screw

Connectors

P1: Power
2-pin screw lock

P2: I/O & multifunction
2 keyed 7-pin spring lock

P3: Communication
DB9 male



IP65-rated products

LEDs

two signal indicators

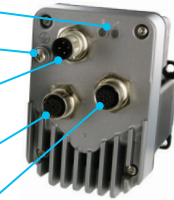
Chassis ground
one #6-32 screw

Connectors

P1: Power
M12 4-pin male

P3: Communication
M12 5-pin female

P2: I/O & multifunction
M12 12-pin male



MD-CC404-000



MD-CC405-000



MD-CS600-000



MD-CS620-000



MD-CS610-000

Part numbers

| | | | | | | | | | |
|--|---|---|---|---|---|---|---|---|---|
| example part number | L | M | D | C | M | 5 | 7 | 1 | C |
| Product LMD = Lexium MDrive with standard hybrid stepper motor LMH = Lexium MDrive with high torque stepper motor | L | M | D | C | M | 5 | 7 | 1 | C |
| Control type C = Closed loop / with hMT and encoder (1) O = Open loop / no hMT or encoder | L | M | D | C | M | 5 | 7 | 1 | C |
| Communication type M = programmable Motion Control via RS-422/485 serial interface | L | M | D | C | M | 5 | 7 | 1 | C |
| Flange size 57 = NEMA 23 2.3" / 57mm | L | M | D | C | M | 5 | 7 | 1 | C |
| Motor length 1 = single stack 2 = double stack 3 = triple stack | L | M | D | C | M | 5 | 7 | 1 | C |
| Variation — omit from part number if unwanted C = M12 circular connectors and IP65 rating | L | M | D | C | M | 5 | 7 | 1 | C |

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

Accessories

| description | length feet (m) | part number |
|--|--------------------|--------------|
| Communication converter USB-pluggable converter to set/program communication parameters in 32- or 64-bit | | |
| Mates to DB9 connector | 6.0 (1.8) | MD-CC404-000 |
| Mates to M12 5-pin female connector | 6.0 (1.8) | MD-CC405-000 |

IP65 cordsets

Shielded cables pre-wired with straight M12 mating connectors

| | | |
|---|------------|--------------|
| Communication cordset mates to 5-pin female connector | 10.0 (3.0) | MD-CS600-000 |
| 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 |

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 |
|--|---|-------|

MDrive Plus

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Motor performance

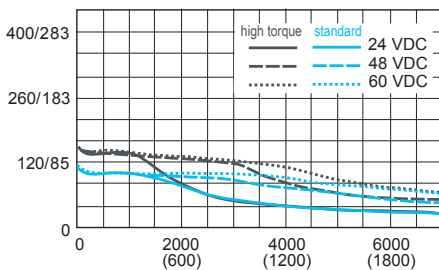
| LMD•57 standard torque NEMA 23 motor specifications | Motor | Stack length | Single | Double | Triple |
|--|------------------------|--------------|--------|--------|--------|
| | Holding torque | oz-in | | 103 | 159 |
| N-cm | | | 73 | 112 | 171 |
| Detent torque | oz-in | | 3.9 | 5.6 | 9.7 |
| | N-cm | | 2.7 | 3.9 | 6.9 |
| Rotor inertia | oz-in-sec ² | | 0.0025 | 0.0037 | 0.0065 |
| | kg-cm ² | | 0.18 | 0.26 | 0.46 |
| Radial load limit, center of shaft | lbs | | 15 | 15 | 15 |
| | kg | | 6.8 | 6.8 | 6.8 |
| Axial load limit @ 1500rpm (5000 full steps/sec) | lbs | | 20 | 20 | 20 |
| | kg | | 9 | 9 | 9 |
| Weight (motor+driver) | oz | | 26.4 | 31.2 | 44.0 |
| | g | | 748 | 885 | 1247 |

| LMH•57 high torque NEMA 23 motor specifications | Motor | Stack length | Single | Double | Triple |
|---|------------------------|--------------|--------|--------|--------|
| | Holding torque | oz-in | | 152 | 264 |
| N-cm | | | 107 | 186 | 294 |
| Detent torque | oz-in | | 8.5 | 14.2 | 21.2 |
| | N-cm | | 6.0 | 10 | 15 |
| Rotor inertia | oz-in-sec ² | | 0.0019 | 0.0030 | 0.0065 |
| | kg-cm ² | | 0.14 | 0.22 | 0.46 |
| Radial load limit, center of shaft | lbs | | 15 | 15 | 15 |
| | kg | | 6.8 | 6.8 | 6.8 |
| Axial load limit @ 1500rpm (5000 full steps/sec) | lbs | | 20 | 20 | 20 |
| | kg | | 9 | 9 | 9 |
| Weight (motor+driver) | oz | | 26.4 | 31.2 | 44.0 |
| | g | | 748 | 885 | 1247 |

LM•57 NEMA 23 speed torque (1)

Single stack length

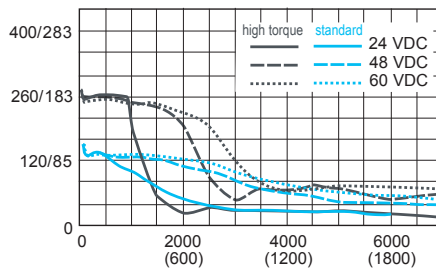
Torque in
Oz-In / N-cm



Speed of rotation in full steps per second (rpm)

Double stack length

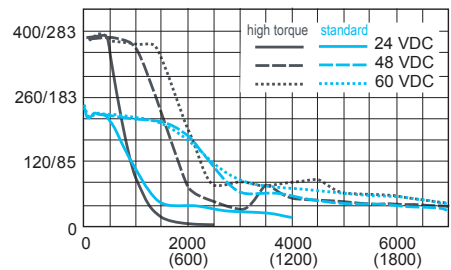
Torque in
Oz-In / N-cm



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.

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