PRODUCT LINE
Luminary Series For Motion Control

IIS
Industrial Indexing Systems, Inc
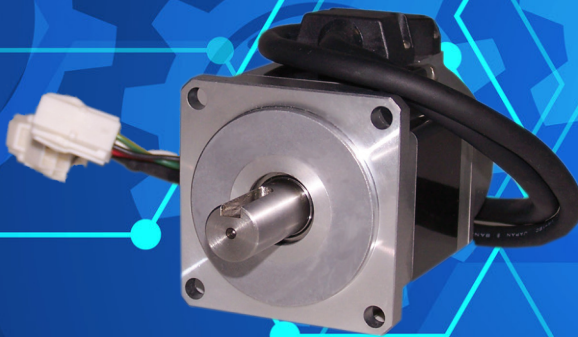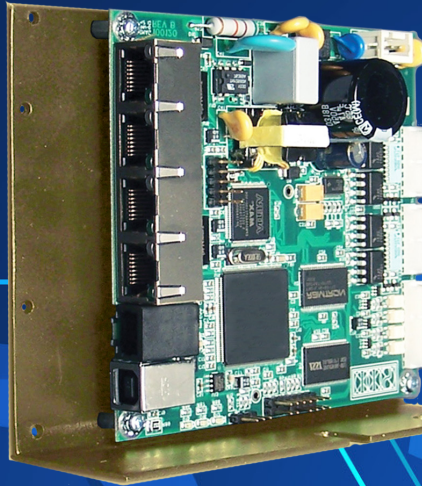
Luminary Series Features and Benefits

√ **Designed with the OEM in mind**

√ **Power-to-size ratio that gives the OEM an advantage**

√ **Proven servo motion technology provides product reliability**

√ **Flexible hardware platform for made-to-order designs**

√ **Open technologies to expand its range of capabilities**

√ **Multi-axis connectivity for flexible coordinated motion control**
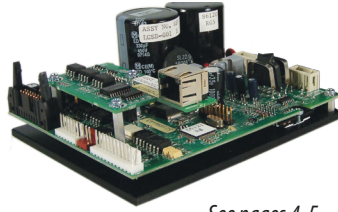

Call us today at (585) 924-9181 to discuss our product line in greater detail

626 Fishers Run, Victor, NY. 14564 ~ info@iis-servo.com ~ www.iis-servo.com

Luminary Motion Control

Servo Drives

- 5.0 amps or 10.0 amps
- 100 to 240 Vac input power
- Analog speed control or optional Serial Bus Drive Interface
- Encoder feedback outputs

See pages 4-5

Servo Motors

- 30 to 2200 Watts
- Speeds to 6000 RPM
- Torques to 10 Nm (90 in-lbs)
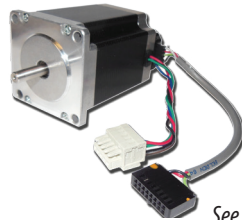
See pages 6-11

Stepper Drives

- 24 Vdc input power
- Analog speed command
- Encoder feedback outputs
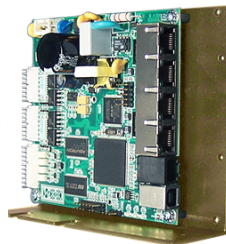- Serial Bus Drive Interface

See page 12

Stepper Motors

- Nema 23
- Nema 17
- Encoder feedback
- Low noise
- No skip

See page 13

Automation Controller

- Serial Bus Interface hub for four axis control
- Master encoder input interface
- Digital inputs & outputs
- High speed trap hardware-based input port
- Bus expension bridge module

See pages 14-17

Software Development

- Multi-Axis real time programming
- Flexible EDE configurations

See pages 18-19

OEM Design Services

- Let Industrial Indexing Systems, Inc. design a motion control system based on your requirements for function and fit.

See pages 20-23

Ordering Guide

- Luminary Drive ordering guidelines

See pages 24-27

Development Software Support

EDE 4.xx
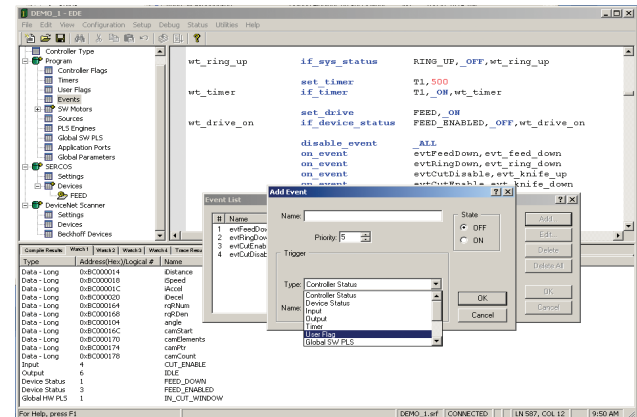
Multi-Axis Software Automation Development and Diagnostic Tools

Servo Mechnical Analysis Software
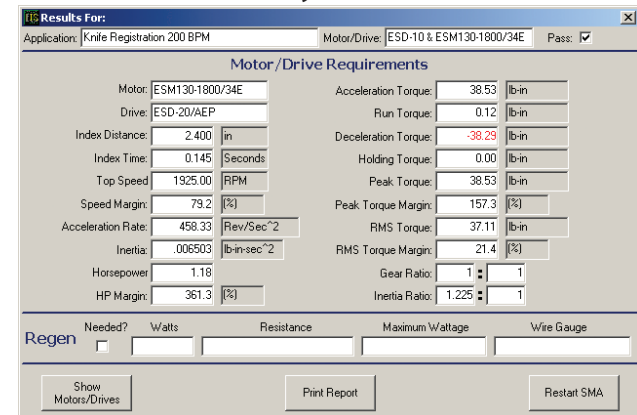
Motor/Drive/Load Analysis and Motor Selection Software

L-Drive

Real-time Motor/Drive Performance Monitoring and Tuning Software

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2

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Luminary Series Product Overview

High volume custom configurations engineered for the exact function and fit is why the Luminary Series is part of the Industrial Indexing Systems' product offering to the automation mark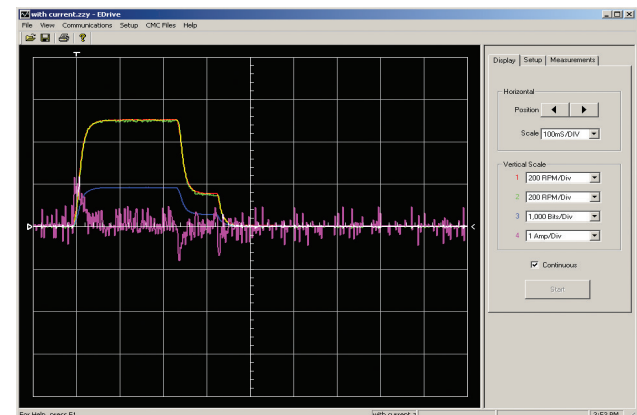et place. Luminary Series products include the single axis motor and drive and multi-axis motor and drive systems functioning in simple torque, velocity or position control mode.

A product's form, fit, and function are important to an original equipment manufacturer (OEM). All the Luminary system components are configurable in size and shape to meet your requirements. Dedicated design engineers are ready to discuss how our system can be best utilized for your project.

We select the most efficient motors for the job, write software to perform the required motion sequences, I/O functions and communications; all packaged into a system with the form and function you need. OEM package designs can range from a kit of parts to a custom enclosed turnkey system you can plug in and turn on.

Flexible built-in I/O for digital and analog sensor interfaces not only keep the size of the system down but also the cost. Various mounting options and compact design features benefit system integration efforts and allow the economy of scale to benefit the budget.

Inexpensive software tools are available for the system sizing, system functions, and commissioning. Operator interface development is offered using standard off-the-shelf displays, custom designs or external PC based HMI display units.

Industrial Indexing delivers systems guaranteed to meet your specifications with an OEM warranty period lasting18 months from time of shipment.

Additional Technical Reference Material and Software Tools

Luminary Drives and Motors Technical Manual IB-30B001

Luminary Controller Technical Manual IB-30B002

Luminary Performance and Tuning Software .... L-Drive v1.0

Emerald Development Environment (EDE) Tools EDEv4.xx

Features At a Glance

√ PC Development Tools -- Project management, device organization, real time trace, debugging EDE controls, watch windows, and a context sensitive text editor.

√ PC Commissioning Tools -- Motor parameter LDrive access, live trace of torque and velocity, session storage for fast setup.

√ Software and hardware engineering design services for custom form, fit, and function.

√ Great for multi-axis actuator systems.

√ Use in light industrial, biomedical systems, light sewing systems to provide quiet operation.

√ G-code conversion routines for programming coordinated motion sequences.

√ Automation Controller (up to four axis control with input for a master device)

√ Communication ports (rs232, rs485, USB Serial)

√ Computer access to all controller data

√ Simple HMI access to program, data and I/O

√ Single axis (standalone axis) options

√ 100 to 240 Vac input power range

√ Digital networked servo and stepper drives

√ Analog interface servo and stepper drives

√ Control motor torque, speed and/or position

√ Power range from 30 watts to 2200 watts

√ Speed range to 6000 RPM

√ Stepper motors (Sizes Nema 17, Nema 23)

√ Digital Inputs, 5 volt or 24 volt DC

√ Analog Inputs +/-10 volts, control speed or torque

√ Digital Outputs, 5 volt to 24 volt DC

√ Analog Outputs +/- 10 volts for speed or torque

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3

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Luminary Digital Servo Drives

Low Cost Drives
The Luminary Series Drive provides the OEM market with a low cost alternative to current stepper or servo control systems. Common hardware platforms and flexible software configurations result in a cost effective high volume manufacturing environment .

Wide Servo motor Range
The versatile drives, LD-500 and the LD-101, are digitally controlled drives designed to run low cost servo motors ranging from 30 to 2200 watts and 0 to 6000 RPM.

Standard Analog Interface
Standard ports for analog input and encoder feedback outputs provide the basic needs of a servo motor drive system providing excellent four quadrant velocity or torque control. Speed regulation to +/- 0.2 rpm and torque regulation to +/- 0.1Nm. Any position controller requiring a +/- 10 volt interface and encoder feedback can be used directly with the LD Series drives. A 2500 line encoder provides +/- .036 degrees of resolution.
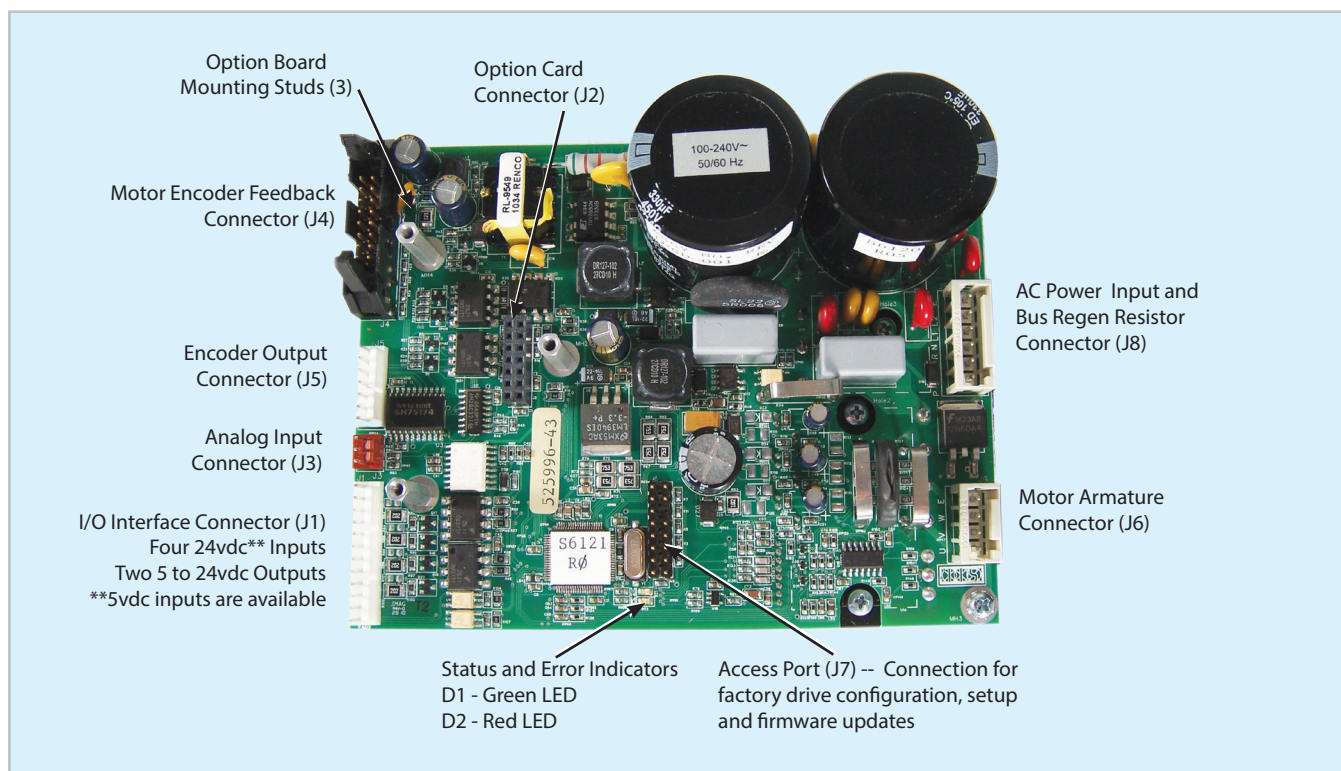
Digital Interface Options
Optional interface cards can piggy-back onto the drive to provide unique digital interface schemes. Stock interface cards (outlined on page 17) are available to communicate with the LMC-400 multi-axis controller, to interface with a PC, and to communicate with a PLC over Modbus.
If the standard options cannot fulfill the requirements of an OEM, design services provided by the IIS engineering staff can be contracted to develop an option interface card for the LD drive to meet your requirements.

Easy Drive Setup
The L-Drive software package for the PC allows easy entry of motor parameters and shows real-time motor response to assist in tuning the servo motor to the load. The motor setup resides on the board giving the board the correct personality for the motor it will control on power up. All parameter entries for the motor can then be backed up as a personality file on your PC. The USB Interface option card (page 21) is used to connect the LD drive to the L-Drive performance and tuning software tool.

Option Board Mounting Studs (3)

Option Card Connector (J2)

Motor Encoder Feedback Connector (J4)

AC Power Input and Bus Regen Resistor Connector (J8)

Encoder Output Connector (J5)

Analog Input Connector (J3)

I/O Interface Connector (J1)
Four 24vdc** Inputs
Two 5 to 24vdc Outputs
**5vdc inputs are available

Motor Armature Connector (J6)

Status and Error Indicators
D1 - Green LED
D2 - Red LED

Access Port (J7) -- Connection for factory drive configuration, setup and firmware updates

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4

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LD-500 and LD-101 Drive Features

√ Drive sizes: 5.0 amp or 10.0 amp RMS continuous.

√ +/- 10V analog control input with sinusoidal drive output for smooth velocity or torque control (J3)

√ Optional card interface for digital drive communications or custom hardware needs (J2)

√ Four inputs, optically isolated, 24Vdc or 5Vdc digital logic (J1)

√ Two outputs, optically isolated, 5-24Vdc, 10ma drive digital logic (J1)

√ Motor encoder input port -- for 5Vdc (single or differential), quadrature, ABZ/UVW (J4)

√ Encoder feedback output for interfacing to a position controller or PLC (J5)

√ Direct line input power with integral power supply, 100 – 240Vac input range (J8)

√ Easy setup for various motor and drive configurations

# Luminary Servo Drive Overview

Up to 2200 watts of drive power are available for use in a variety of motion applications that require low cost precision control of position, velocity or torque.

A quad encoder (ABZ) output connector (J5) provides motor position data for a positioning controller. With the drive in velocity mode the position controller uses the analog input as the velocity command.

The base configuration for the LD series drive is the ±10 Volt analog interface (J3). Select either velocity or torque mode analog control with input switch (J1-3).

When an OEM requires an all digital control scheme, the digital network interface (J2) is available for our standard option cards or custom engineered option cards tailored to meet the OEM specification. See page 21
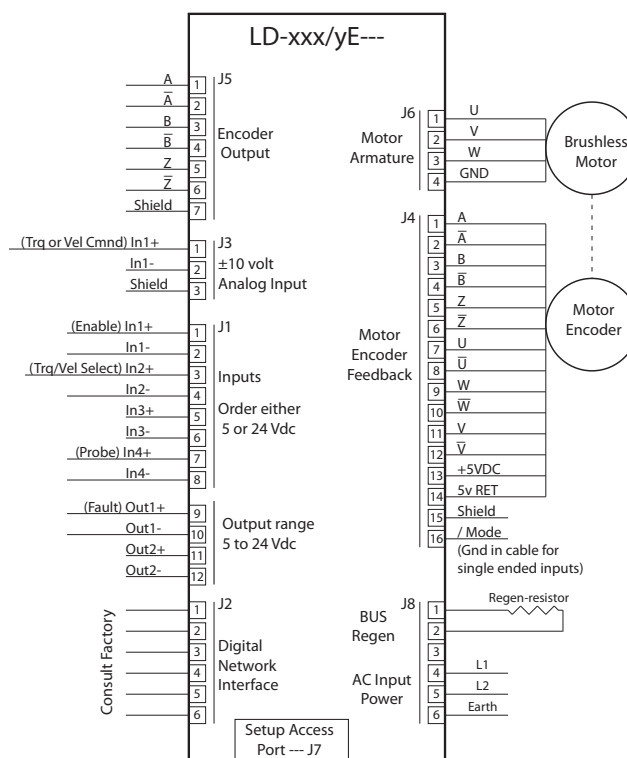
The LD series output power section (J6) will drive up to a 2200 watt 3-phase brushless motor equipped with an encoder feedback (J4) device. IIS provides a variety of brushless motors to choose from, ranging from 50 watts to 2200 watts.

The compact design of the LD series features a selection of 5 amp with 10 amp peak, and 10 amp with 18 amp peak, each with a bus voltage of up to 315 volts when used with a 220 AC (J8) voltage source. Custom servo motors are available to meet your torque and speed requirements.

Our stepper series outlined on page 12 provides a low cost motion control system with all of the programmable features of a servo based system.

LD-xxx/yE---

J5 — Encoder Output
1 A
2 Ā
3 B
4 B̄
5 Z
6 Z̄
7 Shield

J3 — ±10 volt Analog Input
1 (Trq or Vel Cmnd) In1+
2 In1-
3 Shield

J1 — Inputs (Order either 5 or 24 Vdc)
1 (Enable) In1+
2 In1-
3 (Trq/Vel Select) In2+
4 In2-
5 In3+
6 In3-
7 (Probe) In4+
8 In4-

Output range 5 to 24 Vdc
9 (Fault) Out1+
10 Out1-
11 Out2+
12 Out2-

J2 — Digital Network Interface (Consult Factory)
1
2
3
4
5
6

Setup Access Port --- J7

J6 — Motor Armature
1 U
2 V
3 W
4 GND

Brushless Motor

J4 — Motor Encoder Feedback
1 A
2 Ā
3 B
4 B̄
5 Z
6 Z̄
7 U
8 Ū
9 W
10 W̄
11 V
12 V̄
13 +5VDC
14 5v RET
15 Shield
16 / Mode
(Gnd in cable for single ended inputs)

Motor Encoder

J8 — BUS Regen / AC Input Power
Regen-resistor
1
2
3
4 L1
5 L2
6 Earth

Servo Motor Mechanical Specification Chart

Described below are standard motors for the Luminary Series that are, for the most part, in-stock. Motors can be ordered with modifications to meet customer requirements. Armature and encoder feedback connector styles vary depending on motor size. Please reference their corresponding drawing on pages 9 and 11. Additional motors are outlined in the Luminary drive manual IB-30001.

Motor Number	Pilot Diameter	Bolt Hole Circumference	Shaft Diameter	Shaft Length	Body Length	Frame Size	Weight
	mm	mm	mm	mm	mm	mm	Kg
LSM40-50/30E	30	45	5	23	86	40	0.5
LSM40-100/30E	30	46	8	27.5	74	40	0.4
LSM60A-200/30E	50	70	12.7	30	102	60	1.0
LSM60A-400/30E	50	70	12.7	30	122	60	1.63
LSM60A-600/30E	50	70	12.7	30	144	60	2.0
LSM80A-1000/25E	70	90	16	35	178	80	3.7
ESM80K-C1	70	90	16	35	178	80	3.7
ESM85A-C	70	100	14	32.5	160	85	3.0
ESM85C-C	70	100	16	32.5	200	85	4.0
ESM85D-C	70	100	16	32.5	200	85	6.0
ESM110-1200/20E	95	100	19	55	204	110	6.7
ESM110-1800/30E	95	100	19	55	219	110	6.7

Custom Mechanical Design Examples

Custom cabling is available. IIS will design, manufacture, and test to your standards. Special speed/torque motor profiles to meet your needs are also available.

Large frame motors include ruggedized connectors for motor power and feedback cables installed on the motor for easy hook up.

Custom face mounting, pilot and shaft dimensions to simplify retrofit and upgrade programs. Shown here is the NEMA56 C-face line of servo motors.

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6

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Motor/Drive Specification Chart

A motion control application depends on selecting the proper motor and drive combination. The performance goal requires how far, how fast, and how often the given load needs to move. Motion analysis determines the peak and rated horsepower a motor and drive combination needs to produce the performance required. An accurate definition of the load and actuator is crucial to the design.

With the actuator size and the size of the load defined, the optimum performance will also determine the proper gearing between the motor and the load needed to achieve the goal. Gearing selection is a trade-off between speed and torque at the given horsepower.   Varying a belt pulley ratio, leadscrew pitch, roll feed diameter, and/or gearbox ratio in the actuator design are examples of the gearing analysis that allows the designer to select the motor and drive combination that gives optimum system performance.

Optimum performance can be a tradeoff between system cost and initial goals. Industrial Indexing Systems works with our customers to achieve those goals and guarantees an agreed upon performance standard. Our motors are for complex environments such as food production, medical applications, oil refining, explosive liquid, dust and vapor atmospheres, and submersible assemblies. Agency standards: UL, cUL, TEX, ECEx and FDA (rated and certified).
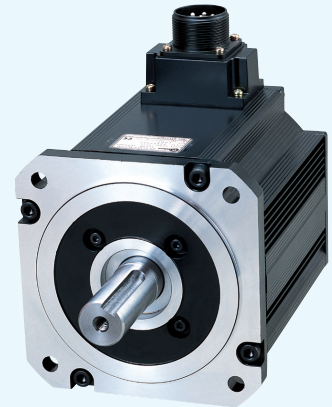
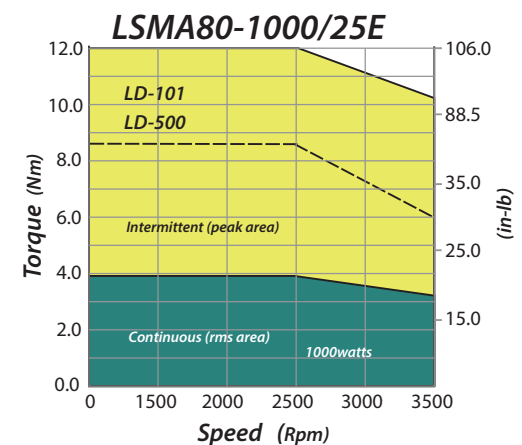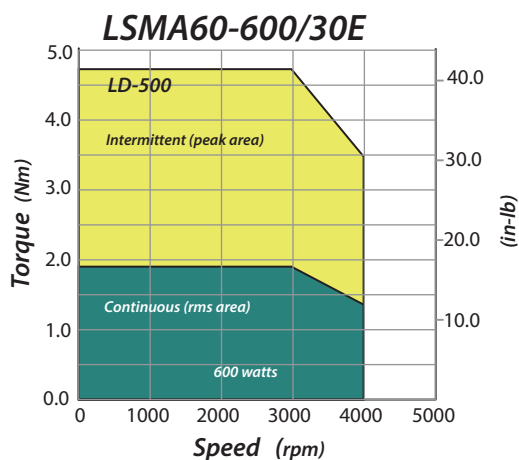| Motor Number	Recommended Drive*	Rated Speed	Max Speed**	Rated Torque	Max Torque	Voltage Constant	Torque Constant	Rotor Inertia
	Part number	rpm	rpm	Nm	Nm	V/Krpm	Nm/amp	Kg-cm^2
LSM40-50/30E	LD- 500	3000	5000	0.160	0.480	16	.0265	0.031
LSM40-100/30E	LD- 500	3000	5000	0.320	0.950	33.7	0.320	0.030
LSM60A-200/30E	LD- 500	3000	4000	0.64	3.78	50.3	0.48	0.340
LSM60A-400/30E	LD- 500	3000	4000	1.27	1.52	22.2	0.36	0.180
LSM60A-600/30E	LD- 500	3000	4000	1.91	4.17	27.2	0.49	1.08
LSM80A-1000/25E	LD- 101	2500	3000	3.50	9.44	67.1	1.11	2.30
ESM80K-C1	LD- 500	2000	3000	3.50	6.63	48	0.78	2.36
ESM85A-C	LD- 500	2000	4000	1.90	5.70	45	0.76	2.44
ESM85C-C	LD- 101	2000	3850	3.53	7.48	48	0.88	4.20
ESM85D-C	LD- 101	2000	3850	4.60	7.82	48	0.92	5.10
ESM110-1200/20E	LD-101	2000	2750	6.00	12.00	83	1.3	7.6
ESM110-1800/30E	LD- 101	3000	3800	6.00	17.00	60	1	7.6

Notes:

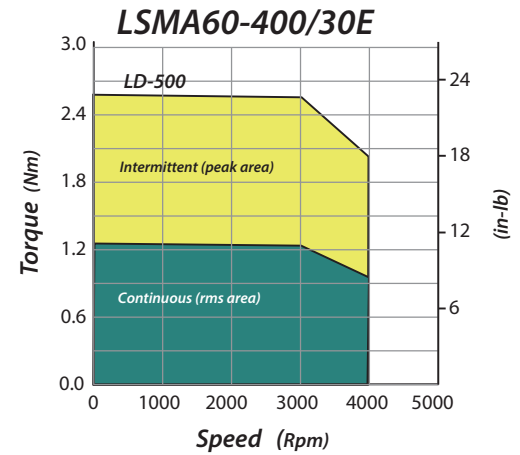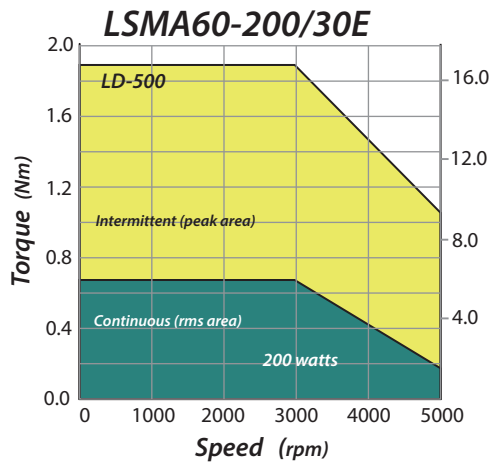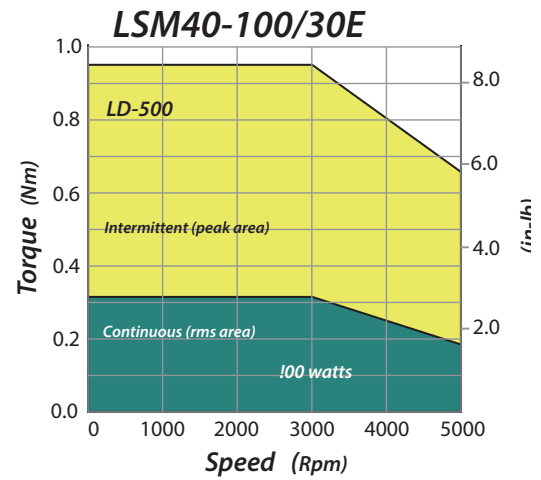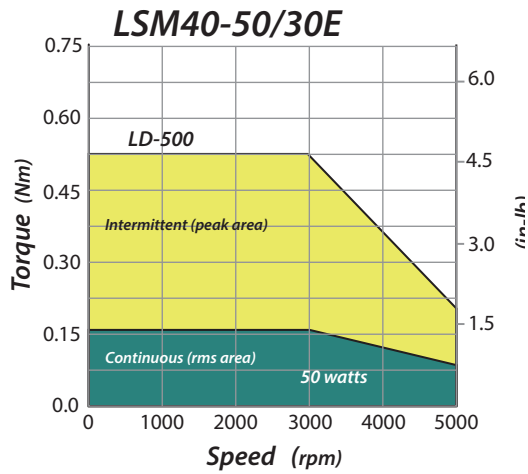*The recommended drive size is selected to give the best motor performance.*

** Maximum speeds shown reflect a drive input voltage of 220Vac.*

Encoder line count of 2500 pulses per rev provides 10000 count/rev resolution.

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7

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LSM40-50/30E

Torque (Nm) vs Speed (rpm)

LD-500
Intermittent (peak area)
Continuous (rms area)
50 watts

LSM40-100/30E

Torque (Nm) vs Speed (Rpm)

LD-500
Intermittent (peak area)
Continuous (rms area)
!00 watts

LSMA60-200/30E

Torque (Nm) vs Speed (rpm)

LD-500
Intermittent (peak area)
Continuous (rms area)
200 watts

LSMA60-400/30E

Torque (Nm) vs Speed (Rpm)

LD-500
Intermittent (peak area)
Continuous (rms area)

LSMA60-600/30E

Torque (Nm) vs Speed (rpm)

LD-500
Intermittent (peak area)
Continuous (rms area)
600 watts

LSMA80-1000/25E

Torque (Nm) vs Speed (Rpm)

LD-101
LD-500
Intermittent (peak area)
Continuous (rms area)
1000watts

Encoder feedback and power cables

0.10 [2.6]
0.81±0.01[20.5±0.2]
6.0 [150]
6.0 [150]
0.44 [11] MAX

$30 \begin{bmatrix} 0.000 \\ -0.021 \end{bmatrix}$

$1.181 \begin{bmatrix} 0.0000 \\ -0.0008 \end{bmatrix}$

0.19 [5]
0.94±0.03[23.8±0.8]
3.36±0.04 [85.3±1]

$0.196 \begin{matrix} 0.0000 \\ -0.0005 \end{matrix} \begin{bmatrix} 5 \begin{matrix} 0.000 \\ -0.013 \end{matrix} \end{bmatrix}$ 50 watts

$0.236 \begin{matrix} 0.0000 \\ -0.0005 \end{matrix} \begin{bmatrix} 6 \begin{matrix} 0.000 \\ -0.013 \end{matrix} \end{bmatrix}$ 100 watts

1.77 [45] B.C.
0.14 [4x3.5]
1.57 [40]
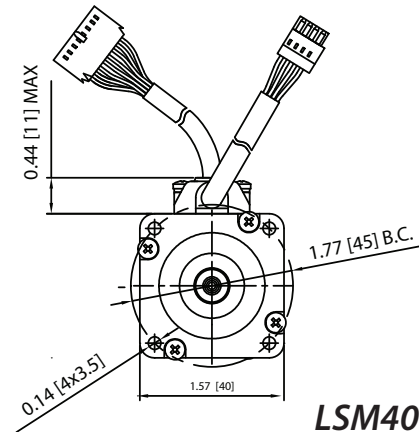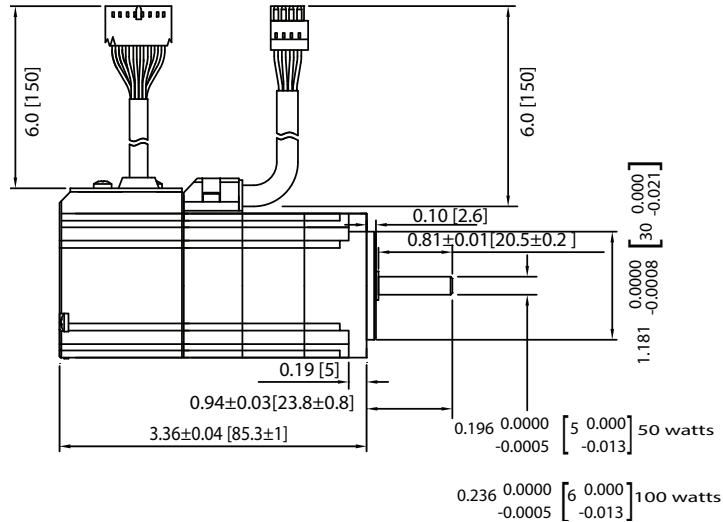
LSM40-50/30E
LSM40-100/30E

YYY
0.12 [3.0]
1.18 [30.0]
0.47 [11.9]
0.79 [20.0]
6.0" [150MM]

$0.5000 \begin{matrix} +0.0000 \\ -0.0005 \end{matrix} [16.000] \quad +0.000 \\ -0.012 [16.000]$

$1.969 \\ 1.964 \begin{bmatrix} 50.00 \\ 49.87 \end{bmatrix}$

0.22 [5.5]4 HOLES
ON Ø2.756 [Ø70.00] BC

NOTES:
1. THRUST LOAD 12 KG   [26 LBS].
2. RADIAL LOAD 71 KG [157 LBS].
3. ENCODER 2500 LINE COUNT.
4. IP-55 SEALING.
5. MOTOR WEIGHT: 2 KG [4.4 LBS].
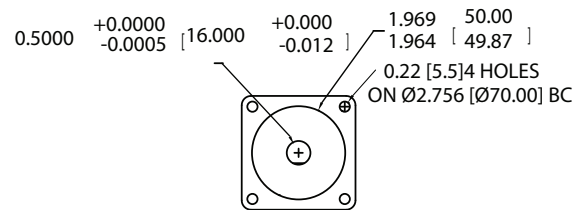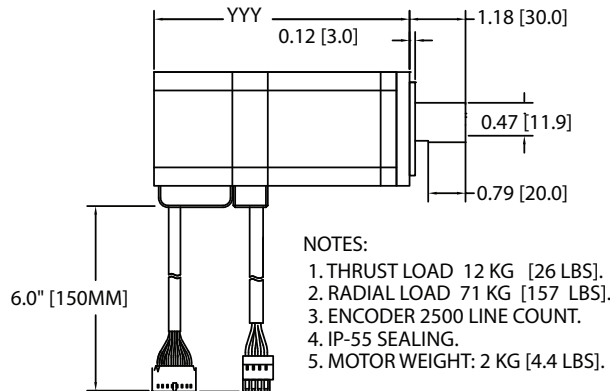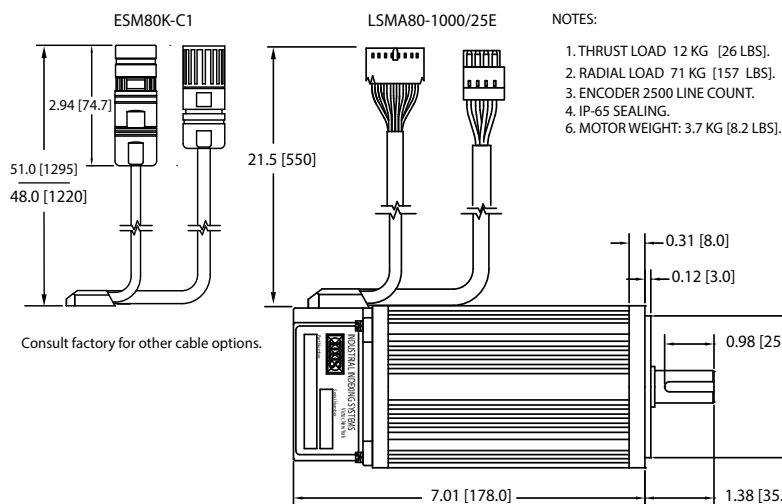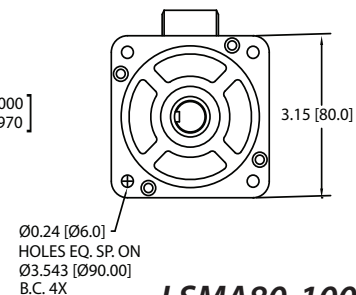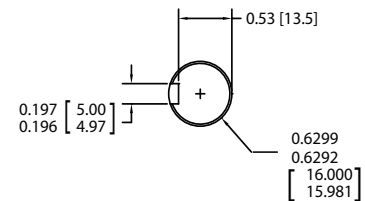
Length: YYY

Watts	in	mm
200	4.99	102
400	5.39	122
600	6.00	144

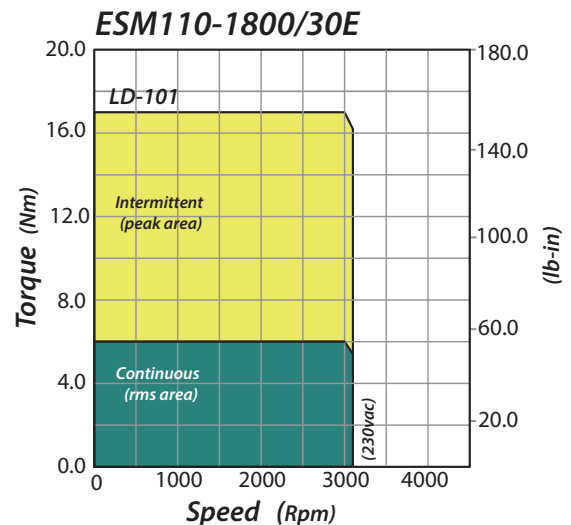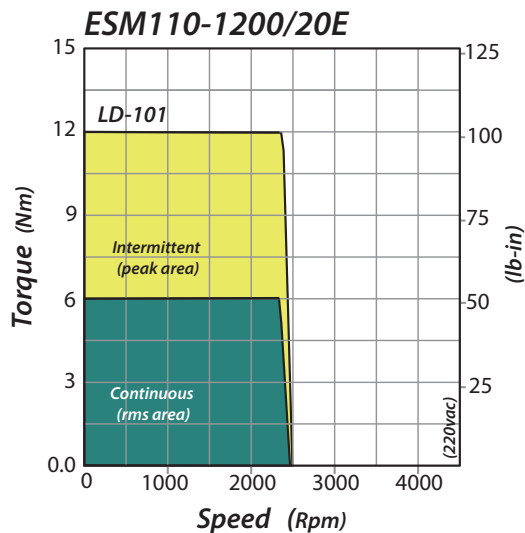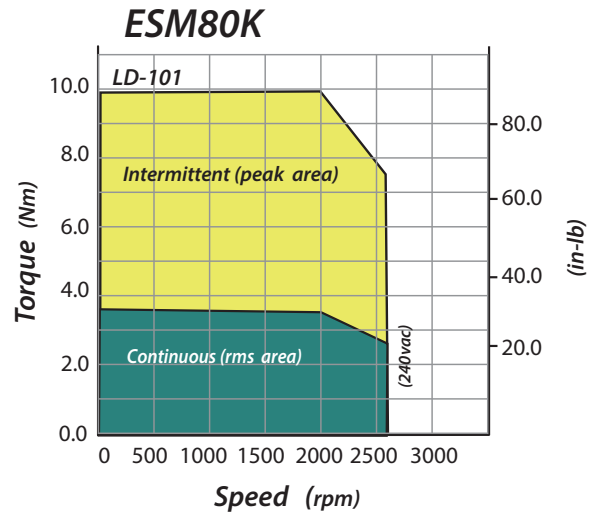### LSMA60-200/30E
LSMA60-400/30E
LSMA60-600/30E

ESM80K-C1
LSMA80-1000/25E
MOTOR SHAFT DIMENSIONS

2.94 [74.7]
51.0 [1295]
48.0 [1220]
21.5 [550]

NOTES:
1. THRUST LOAD 12 KG   [26 LBS].
2. RADIAL LOAD 71 KG [157 LBS].
3. ENCODER 2500 LINE COUNT.
4. IP-65 SEALING.
6. MOTOR WEIGHT: 3.7 KG [8.2 LBS].

0.53 [13.5]

$0.197 \\ 0.196 \begin{bmatrix} 5.00 \\ 4.97 \end{bmatrix}$

0.6299
0.6292

$\begin{bmatrix} 16.000 \\ 15.981 \end{bmatrix}$

Consult factory for other cable options.

0.31 [8.0]
0.12 [3.0]
0.98 [25.0]

$2.7559 \begin{bmatrix} 70.000 \\ 69.970 \end{bmatrix}$
2.7547

3.15 [80.0]

7.01 [178.0]
1.38 [35.0]

Ø0.24 [Ø6.0]
HOLES EQ. SP. ON
Ø3.543 [Ø90.00]
B.C. 4X

INDUSTRIAL INDEXING SYSTEMS

LSMA80-1000/25E
ESM80K-C1

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9

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ESM85A

ESM85C

ESM85D

ESM80K

ESM110-1200/20E

ESM110-1800/30E

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10

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ESM85A-C
ESM85B-C
ESM85C-C
ESM85D-C

"L" MAX
See chart

32.5 [1.28]
20.0 [0.79]
3.0 [0.12]
SEE DETAIL "C"

132.6 [5.22] MAX

70.000 [2.7559]
69.965 [2.7545]

8.5 [0.34]
2.5 [0.10]

INDUSTRIAL INDEXING SYSTEMS

M5 X 0.8 THD
20.0 [0.79] DP

"W"
"K"
"S"

DETAIL C
MOTOR SHAFT DIMENSIONS
See chart

Ø7.0 [Ø0.28]
HOLES EQ. SP. ON
Ø100.0 [Ø3.937]
B.C. 4X

85.0 [3.35] SQ.

	ESM85A-C	ESM85B-C	ESM85C-C	ESM85D-C
MOTOR BODY LENGTH (L)	160.0 [6.30]	192.5 [7.58]	200.0 [7.87]	220.0 [8.66]
SHAFT DIAMETER (S)	14.000 [0.5512] 13.992 [0.5509]	16.000 [0.6299] 15.992 [0.6296]	16.000 [0.6299] 15.992 [0.6296]	16.000 [0.6299] 15.992 [0.6296]
KEY DEPTH (K)	11.50 [0.453]	13.50 [0.531]	13.50 [0.531]	13.50 [0.531]
KEY WIDTH (W)	4.988 [0.1964] 4.958 [0.1952]	4.988 [0.1964] 4.958 [0.1952]	4.988 [0.1964] 4.958 [0.1952]	4.988 [0.1964] 4.958 [0.1952]
MOTOR WEIGHT (kg [lb])	3.0 [6.6]	4.0 [8.8]	5.0 [11.0]	6.0 [13.2]

NOTES:
1.) THRUST LOAD 12 KG   26 LBS.
2.) RADIAL LOAD 71 KG 157 LBS.
3.) ENCODER 2500 LINE COUNT.
4.) IP-55 SEALING.
5.) MOTOR SHAFT SEAL IS STANDARD.

ESM110-1200/20E
ESM110-1800/30E

SHAFT
SEE DETAIL C

INDUSTRIAL INDEXING SYSTEMS

0.10 [2.50]
1.57 [40.00]

0.236 [6.00]
0.235 [5.97]

0.8464 [21.50]
0.8425 [21.40]

0.7480 [19.00]
0.7468 [18.97]

DETAIL C
SHOWN ENLARGED

ESM110-1200/20E 204 [8.03]
ESM110-1800/30E 219 [8.81]

0.47 [12.0]
2.17 [55.0]
0.20 [5.0]
0.08 [2.0]
3.74 [95.0]

4.33 [110.0]

Ø0.35 [Ø9.00]
ON Ø5.12 [Ø130.0] BC
(4X)

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11

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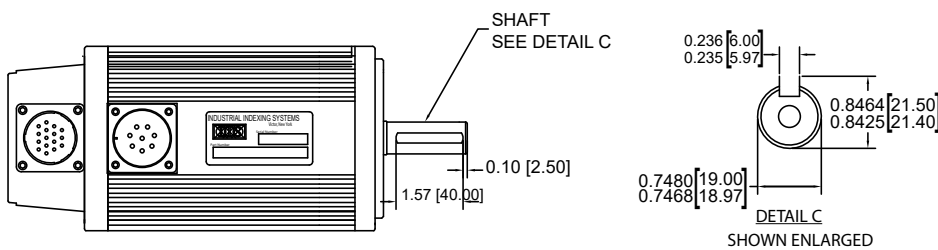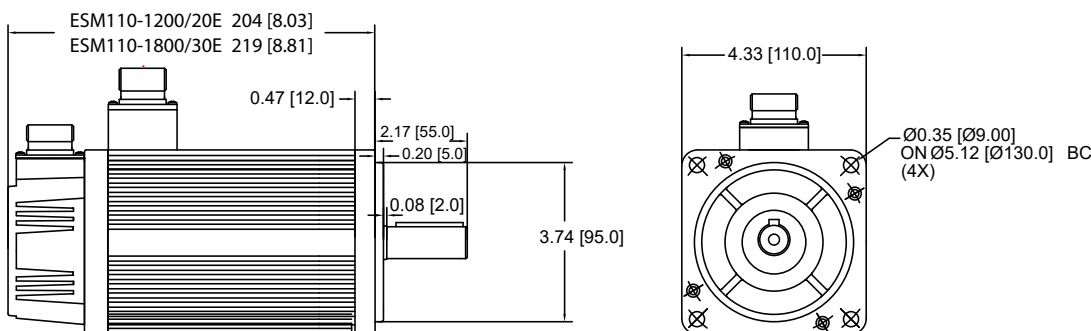
Stepper Motors and Drives
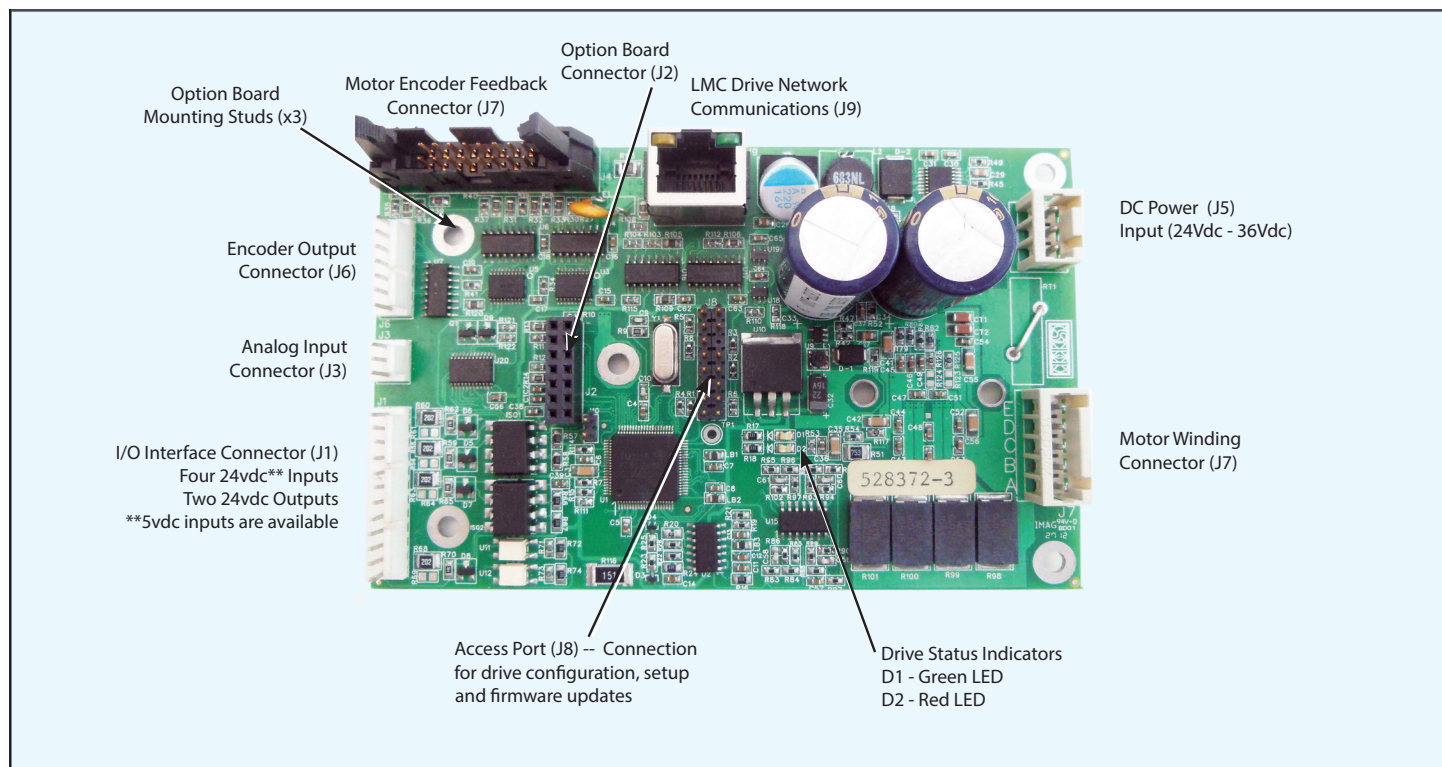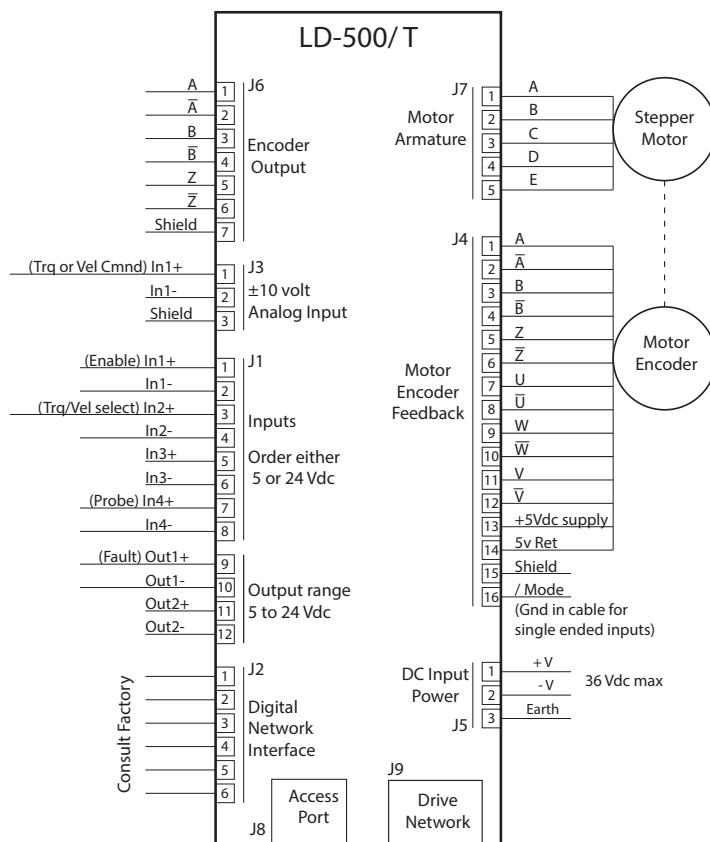
Versatile Drive Interface

Designed with the OEM in mind, the Luminary Series Stepper drive packs a full complement of interface options. Analog velocity and torque control, digital encoder feedback, and digital input and output control points provide flexible design options needed by the OEM.

Stepper Motors with Servo Performance

By using integral encoder feedback, no loss of shaft position under peak torque conditions and quiet operation are true benefits when applied in many environments.
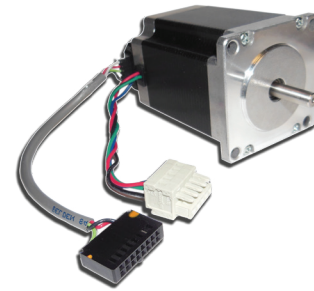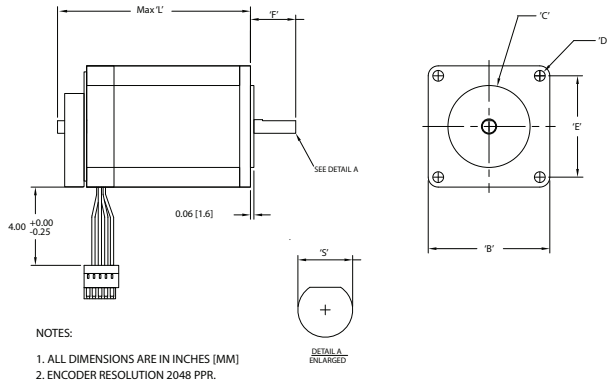
Full Control for Less Cost

This stepper drive and motor combination, (see page 14) when networked with the LMC-400 controller, gains the standard Emerald Motion Language and the EDE software tool kit providing electronic cam motion, electronic gearing and programmable limit switch outputs for synchronized and coordinated motion profiles.

LD-500/ T

Option Board Mounting Studs (x3)

Motor Encoder Feedback Connector (J7)

Option Board Connector (J2)

LMC Drive Network Communications (J9)

Encoder Output Connector (J6)

Analog Input Connector (J3)

I/O Interface Connector (J1)
Four 24vdc** Inputs
Two 24vdc Outputs
**5vdc inputs are available

Access Port (J8) -- Connection for drive configuration, setup and firmware updates

Drive Status Indicators
D1 - Green LED
D2 - Red LED

DC Power (J5)
Input (24Vdc - 36Vdc)

Motor Winding Connector (J7)

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12

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Mechanical Specifications

NOTES:

1. ALL DIMENSIONS ARE IN INCHES [MM]
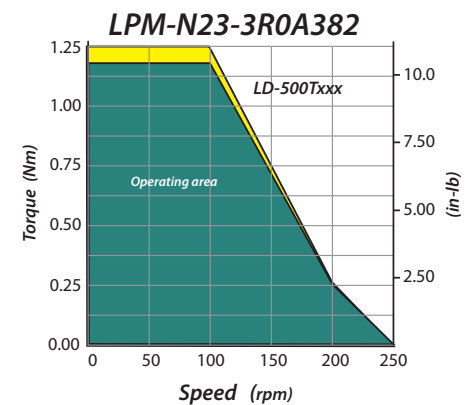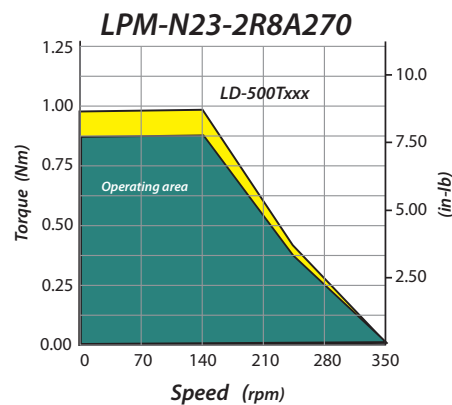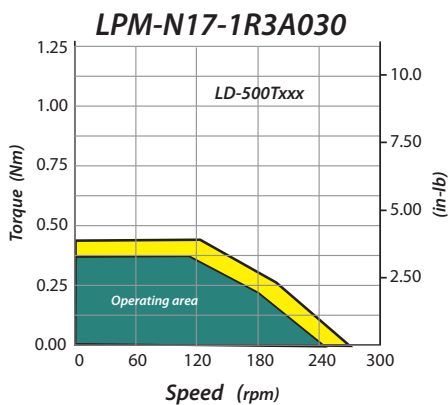2. ENCODER RESOLUTION 2048 PPR.

Stepper motor with standard connectors
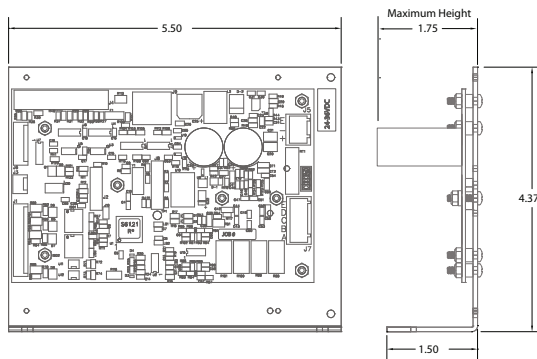
LD-500T drive mounted with the flat plate option

Motor Number	Pilot Diameter C	Bolt Hole E	Shaft Diameter S	Shaft Length F	Body Length L	Frame Size B	Max Temperature	Weight
Scale	mm	mm	mm	mm	mm	mm	C	Kg [lb]
LPM-N17-1R3A030	22	31	5	24	40	42	50°	0.22[]
LPM-N23-2R8A270	38.1	47.1	6.35	21	90	57	50°	1.1[]
LPM-N23-3R0A382	38.1	47.1	6.35	21	90	57	50°	1.1[]

Speed vs. Torque Curves

LPM-N17-1R3A030

LPM-N23-2R8A270

LPM-N23-3R0A382

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13

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Luminary Automation Controller - LMC-400

Multi-Axis Servo Control Capability
The LMC-400 Luminary Automation Controller features multi-axis capability to control four Luminary Series drives and provide access to 36 I/O points. The LMC-400 features a master encoder input bus and four drive ports for synchronized motion and coordinated I/O. Touchscreens, ASCII terminals, or a PC can connect to one of two serial ports for operator interaction or remote access control.

Versatile Automation Controller
Designed with the OEM in mind, the Luminary Series packs a full feature list of control capabilities into a low cost hardware platform.   In most cases, after discovering the versatility of the Luminary Series, an OEM can realize additional cost savings by integrating other existing logic functionally into the IIS Luminary Series System.

Comprehensive Software Integration
Program the LMC-400 with the standard Emerald Motion Language using the EDE software development tools. With over 40 years of motion control experience behind the EDE tools, IIS provides the OEM a complete menu driven project management consisting of servo motors, external devices, input and output hardware switches and sensors. The EDE tools include content-sensitive text editing, code tracing and watch windows.

Full Control for Less Cost
Using the LMC-400 automation controller, one can setup electronic cam motion, electronic gear ratio functions and programmable limit/drum switch control to run as high priority synchronized background tasks. Deterministic motion bus, subroutine mapping to an interrupt manager, and access to user memory through the serial port provides the real-time environment for a flexible system with consistent results.
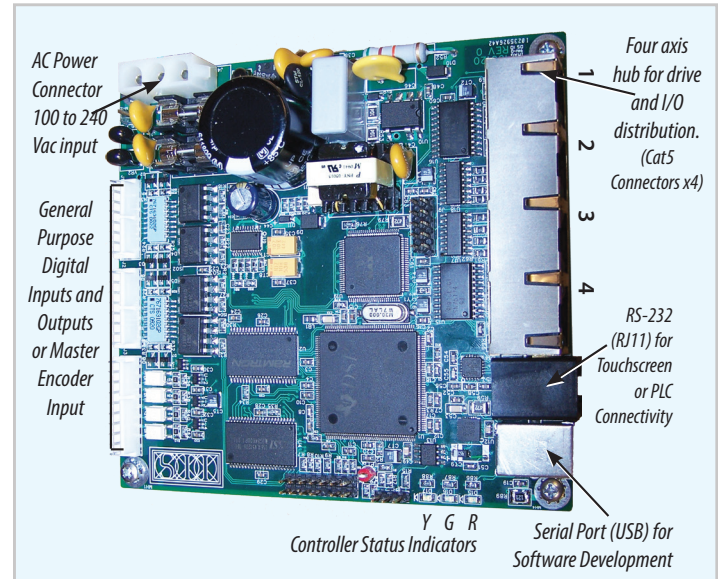
Open Protocols
IIS motion control software contains a variety of functions needed to address multiple situations when creating a system design using multi-axis servo motors and integrating with digital and analog parts.

Our controllers have open protocols granting total access to data memory locations in a motion control application, allowing a host computer real-time access needed to guide the system while running.

Our protocols enable monitoring critical data, the status of digital and analog inputs, and controlling digital and analog outputs without program interruption.

The software development environment for the IIS motion control products provides a project management approach to visualizing your design.

AC Power Connector 100 to 240 Vac input

General Purpose Digital Inputs and Outputs or Master Encoder Input

Four axis hub for drive and I/O distribution. (Cat5 Connectors x4)

RS-232 (RJ11) for Touchscreen or PLC Connectivity

Y   G   R
Controller Status Indicators

Serial Port (USB) for Software Development

LMC-400 Controller Features

√ Four port drive network hub -- Interfaces to an LCSD option card installed on the LD drive.

√ Eight general purpose digital inputs and four digital outputs, 24Vdc logic, optically isolated

√ Digital inputs can also be configured for special use as a master encoder input, registration marker input and position capture functions.

√ All outputs can be controlled separately or synchronized to a master axis and configured as programmable limit switches.

√ "BASIC-like" programming using (EML) Emerald Motion Language provides integer, floating point, strings, arrays, full motion functions for indexing, positioning, gear ratio, and versatile electronic cam arrays.

√ Full control of interrupts which can be tagged to any digital input or output, status flag, or timer flag transitions.

√ USB Serial (Port1) as the software development port.

√ RS-232 Serial (Port2) for ASCII terminals and touchscreens.

√ Line input power: 100 – 240Vac input range.

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14

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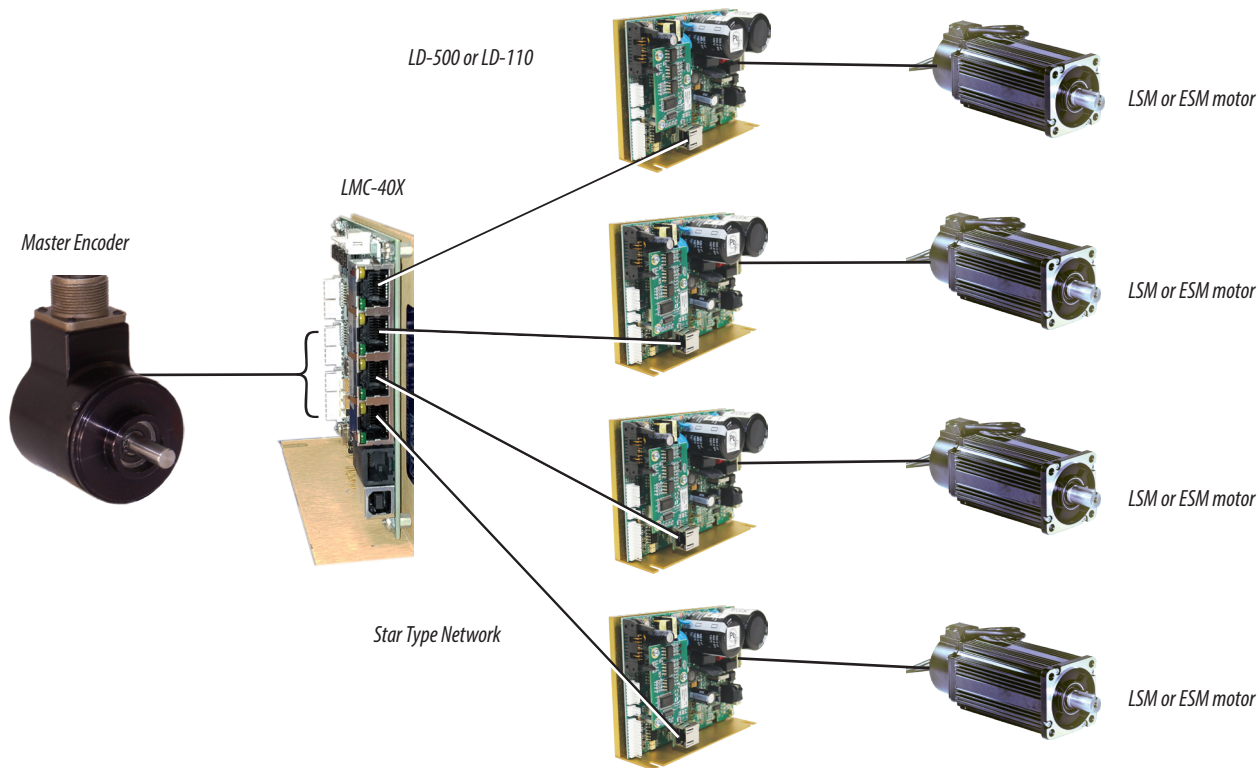Email: info@iis-servo.com
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Automation Network for Luminary Drives

The four axis hub on the LMC-400 provides digital control of position, velocity, and torque for brushless motors driven by the LD drive. The LD servo and stepper drives connect to the LMC-400 with a Cat5 type cable up to 100ft.

High performance motion sequencing between multiple axes is programmed using the EDE development software and the EML language. The EML is a "Basic like" motion control language structure built on a real-time operating system and a vast motion control library designed for automation.

When the LD drive connects to the network all digital and analog I/O points on the LD drives are available to your application program. The general purpose inputs and outputs can also be configured for real-time interrupt control of subroutine execution or as programmable limit switches.

LD-500 or LD-110

LMC-40X

Master Encoder

LSM or ESM motor

LSM or ESM motor

LSM or ESM motor

LSM or ESM motor

Star Type Network

Bus Expansion Bridge for the Luminary Network

Ports for a star-type network are available on the Luminary Controller (LMC-400) to connect four Luminary drives. A new hardware option to bridge two Luminary Controller networks together is ready for immediate use. The ExpBridge option is available to bring two more physical drives onto the network.

In addition to normal controlling more drives, the ExpBridge provides a common communication memory area allowing the two LMC controllers to communicate over a shared dual-port memory. Memory consists of ten long-integer values to accommodate the passing of data or commands in formats as it seems fit.

Bus Expansion Bridge
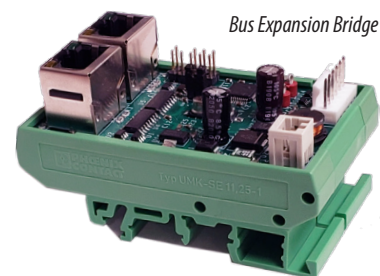
Two "pseudo/virtual/digital motors" are available to command and use as master axis to drive motion profiles in cam tables and programmable limit switches (digital outputs) that can be controlled by time (i.e. speed) or master axis position. See page 16 for configuration.

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15

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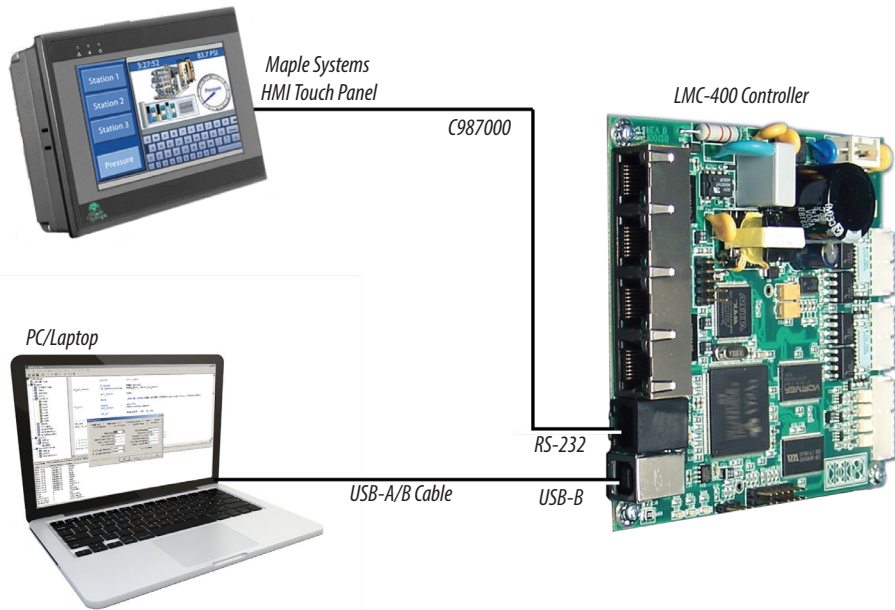Email: info@iis-servo.com
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Dual Controller, Six Servo Axis Configuration

Using the Bus Expansion Bridge to connect two controllers for increased functionality, gaining two additional motor axis, 24 additionl I/O points, and two additional analog inputs.

LMC-400

LD-500 or LD101

80mm, 1000 watts

60mm, 400 watts

40mm, 100 watts

Bus Expansion Bridge includes Dual port shared memory, Two digital "pseudo motors" and Auxiliary serial interface port.

SPI Aux Interface port with custom functionality.

LMC-400

LD-500 or LD-101

80mm, 1000 watts

110mm, 1800 watts

The Luminary LMC controllers will manage the access to servo and stepper motors simultaneously.

Nema 23 - 280

LD-500T

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16

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Luminary Connectivity Configurations

Maple Systems
HMI Touch Panel

C987000

LMC-400 Controller

PC/Laptop

RS-232

USB-A/B Cable

USB-B

Serial Interface Options
Two ports (USB and Rs232)
are available for program
development, direct access
to I/O points, controller
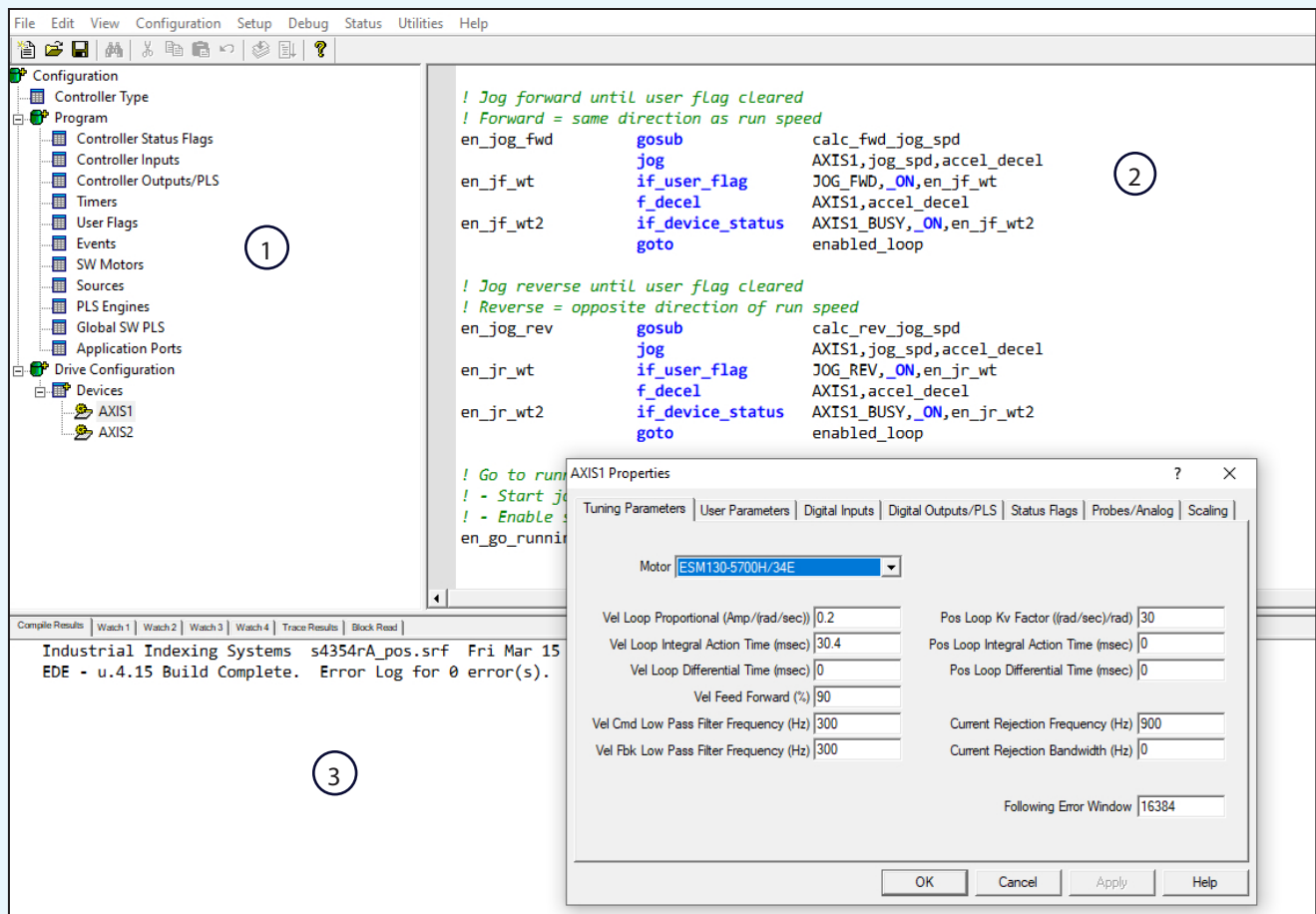status, and data structures
linked to program memory.

Maple Systems
HMI Touch Panel

LMC-400 Controller

Ethernet Bus

PLC

RS-232 to Ethernet
Converter

RS-232

PC/Laptop
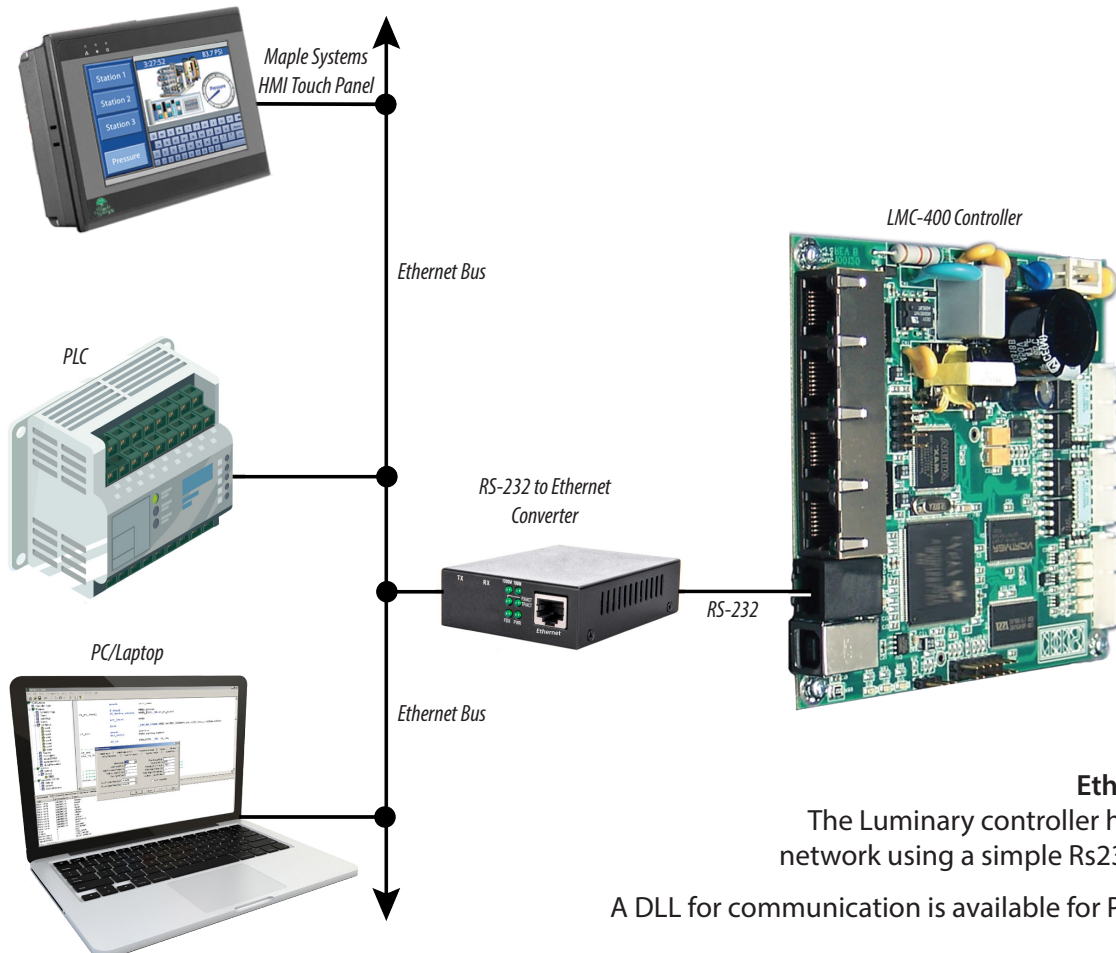
Ethernet Bus

Ethernet Interface Options
The Luminary controller has full access to a TCP/IP
network using a simple Rs232 to Ethernet converter.

A DLL for communication is available for PC-control development.

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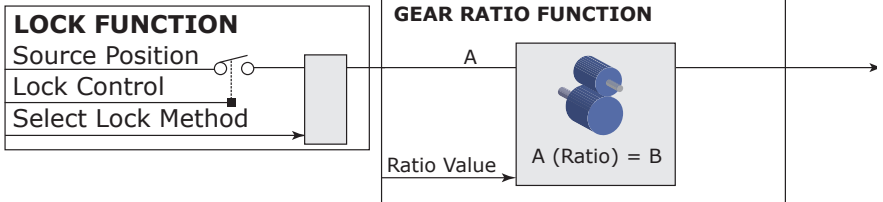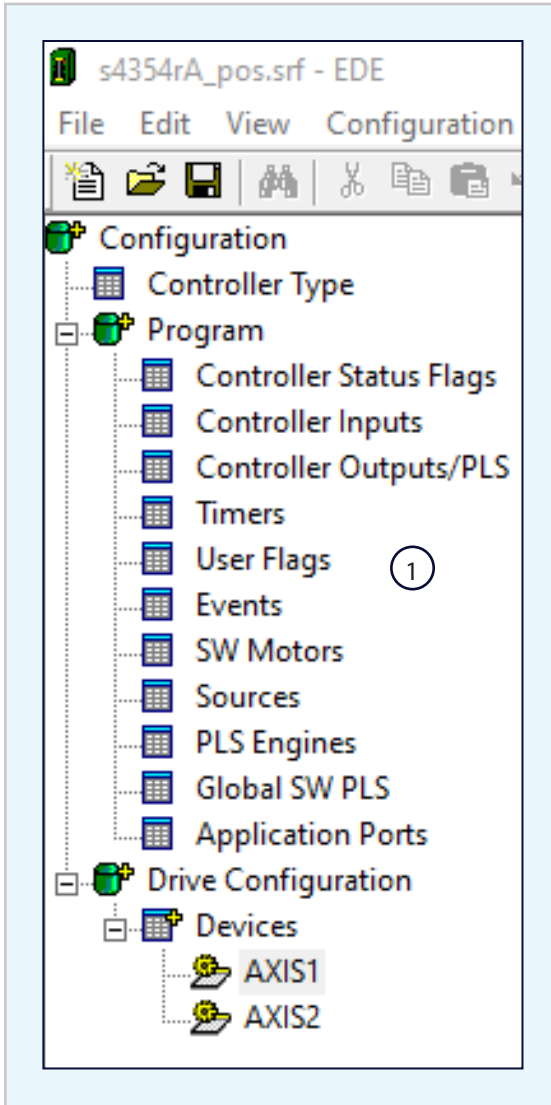
Multi-Axis Real-Time Programming

EDE software development tools for the Luminary Controller showing a servo drive configuration, parameter dialog window, program editor, and real time debugging window.
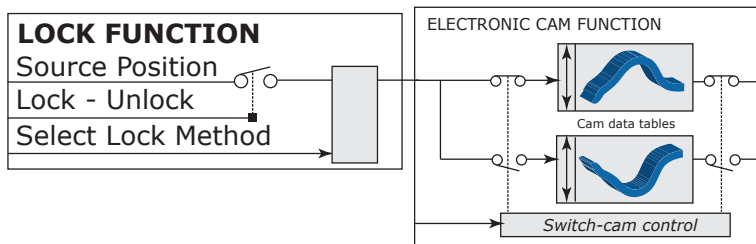
(1) The Emerald Development Environment (EDE) provides software management utilizing system *component configuration* windows to manage all controllers, drives, I/O devices, and files used in an automation system configuration.

(2) The EDE *program code editor* is content-sensitive and easy to use. The Emerald Motion Language (EML) is a language that uses a standard structure with mature functions tailored to all the real-time aspects of motion control.

(3) EDE provides a *debugging window* for program development support. In real time watch data values, trace the program flow, and view network device status. Minimize costly travel expenses and the loss of time using remote PC access to provide worldwide support from our system engineers.

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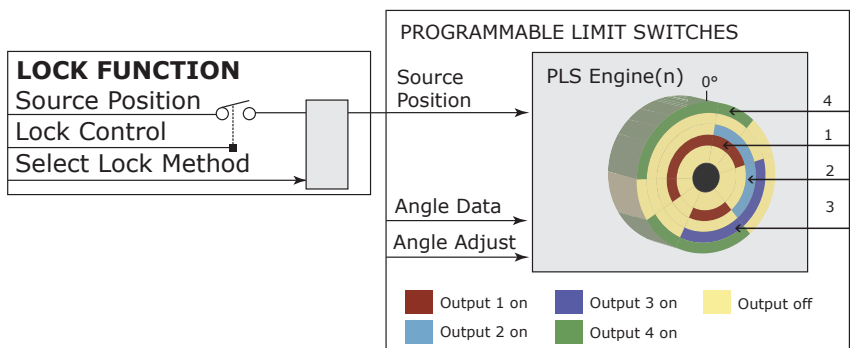626 Fishers Run Victor, NY 14564
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18

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Flexible EDE Configurations

LOCK FUNCTION
Source Position
Lock Control
Select Lock Method

GEAR RATIO FUNCTION
A
Ratio Value
A (Ratio) = B

The source position comes from a "master axis" source entity named and defined in the EDE Configuration window. This entity identifies a digital motor, auxiliary encoder, servo axis, or stepper axis as a master in the program instruction. The output of the ratio function drives another servomotor axis or stepper motor axis by the ratio specified.

LOCK FUNCTION
Source Position
Lock - Unlock
Select Lock Method

ELECTRONIC CAM FUNCTION
Cam data tables
Switch-cam control

A Master Axis source and the Cam data tables are named and defined in the EDE Configuration window. The program code loads the cam table with values defining the shape, selects the lock method, initilizes the master and starts the lock procedure. If needed, code can switch cam tables on-the-fly.

LOCK FUNCTION
Source Position
Lock Control
Select Lock Method

PROGRAMMABLE LIMIT SWITCHES
Source Position
Angle Data
Angle Adjust

PLS Engine(n) 0°
4
1
2
3

■ Output 1 on   ■ Output 3 on   ■ Output off
■ Output 2 on   ■ Output 4 on

This control configures actual outputs or internal event flags to be turned off and on at certain portions of a machine cycle. The master source input controls speed of the cycle. On and off switch points can be adjusted as the cycle is active.

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19

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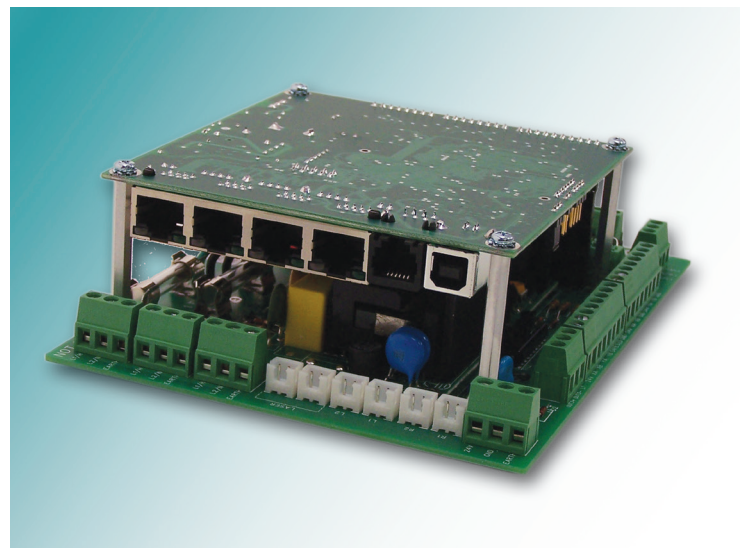
From Design Concept to Reality

Let IIS work with your concepts and design a cost effective system to meet your performance goals.
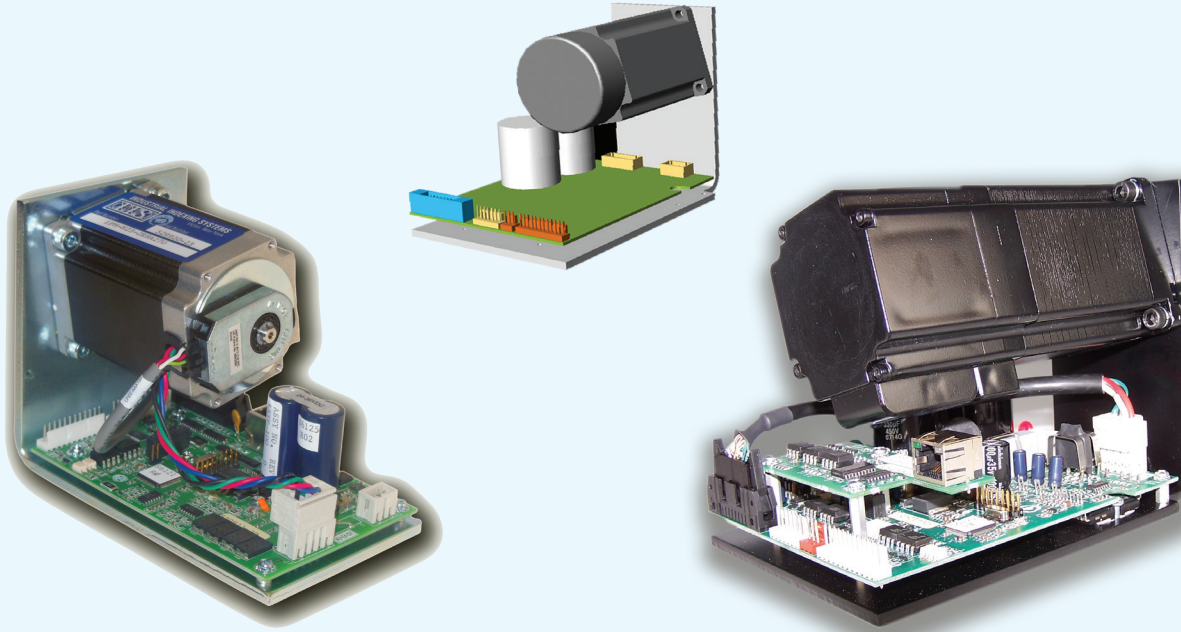
By keeping motor and drive assemblies close together motor and feedback cable lengths are kept to a minimum.

*Custom LMC-400 controller assembly housed in an enclosure integrating the OEM power supply requirements*

Custom LMC-400 controller assembly designed to include additional power supply management requirements for the LD drives .

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20

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Luminary Digital Drive

Digital Interface Card Option Slot

Digital Interface Option

Besides the built-in analog input and encoder output ports, the LD drives will also accept a digital interface card for custom requirements.

Tailored to the OEM needs for special network connectivity or motion control functionality, the digital interface card is designed and built to the OEM's specifications. Digital option cards, customized for the OEM, are installed onto the LD drive to provide a variety of connectivity solutions.

The LD-drive to the right shows the standard unit, and below are the digital option cards available as standard products.

LDCA-001
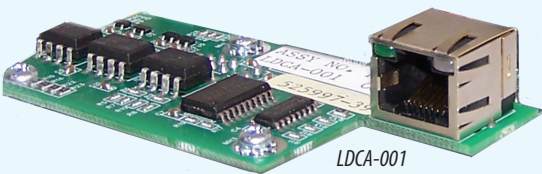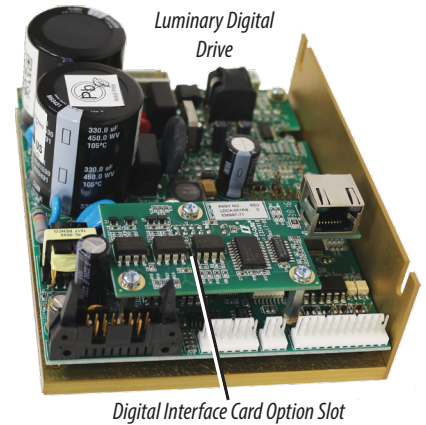
Multi Axis Digital Driver Option Board

Installation for the multi-axis network connection to the LMC-400 controller. LMC400 provides complete network ability for four motors/drives.
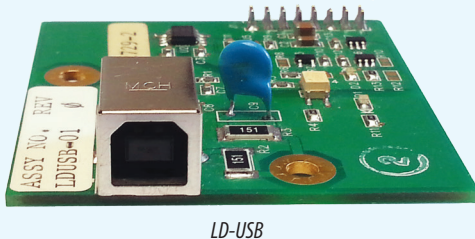
LD-USB

USB Serial Interface Card for the LD Drive

Use the LD-USB option for Modbus serial communication over USB as a PC link to the LD drive interface port. Use with the L-Drive PC based setup and commissioning software for the LD drive. The L-Drive software allows setting motor and drive parameters along with monitoring features providing speed-vs-time and torque-vs-time graphs displaying motor responses in real-time on your PC.

Input/Output (3)

Address Switch (2)

Setup (1)

LD485-01
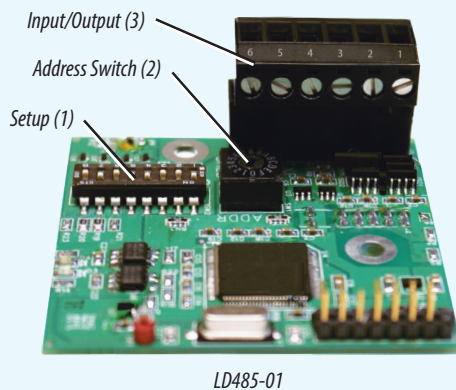
RS485 Serial Interface Card for the LD Drive

For connections to the digital LD drive functions you can also use the RS485 option card, LD-485. Using simple twisted pair wire, the LD-485 will connect as point-to-point, multi-dropped or multi-point network (3) of 1 to 16 drives (2). Modbus RTU protocol with half-duplex or full duplex configurations (1), provide real time read/write access to all 16 bit and 32 bit register values on the LD drive.
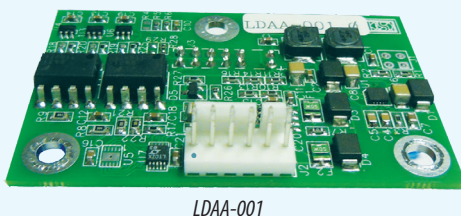
LDAA-001

Analog Output Option Card for the LD Drive

Monitor either motor speed or motor torque with an option card for an analog output. The LDAA-001 card provides a standard +10 / -10 voltage output and a dual 12 dc voltage supply. The supply is limited to 20 ma but can be used has an isolated source for the digital input interface.

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21

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Luminary Motion Control

System Configurations

For an operator interface the Maple systems has direct connectivity to the LMC -400 Multi-Axis Controller. Other options include the Windows CE based displays or custom designs using Visual Basic, C++, or C# on the an embedded PC.

IIS will specify actuators, motor sizing, and software design for turn-key motion control systems .

Custom hardware designs are available to provide a form-to-fit requirement.
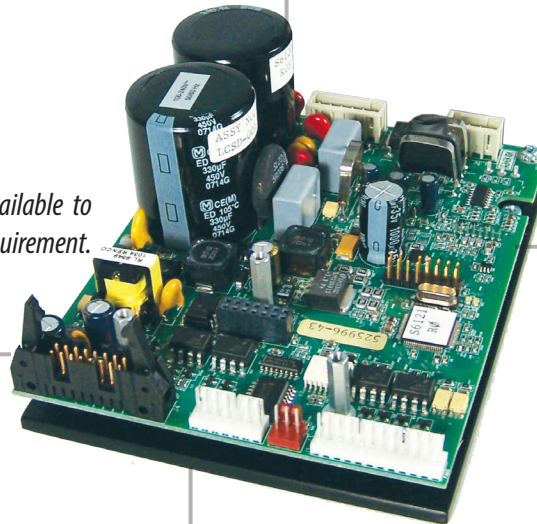
740-watt high speed AC digital servo motors and drives provide perfectly aligned stitches, quilting and perforations on the toughest of materials.
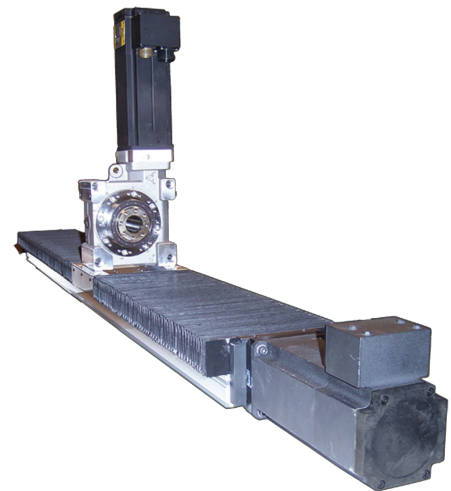
Two axis 1200mm actuator design provides high speed and precise rotational and linear motion on a mandrel system.

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22

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Mounting Configurations

Standard mounting plates provide a heat sink for the LD drive and are available as stock items. To keep costs down, mounting the LD drive directly to your panel of the appropriate heat dissipation material is also an option.

LD drive attached to a standard flat mounting plate

Mounting plate hole dimensions to accommodate both the LD drive and the LMC-400 controller.
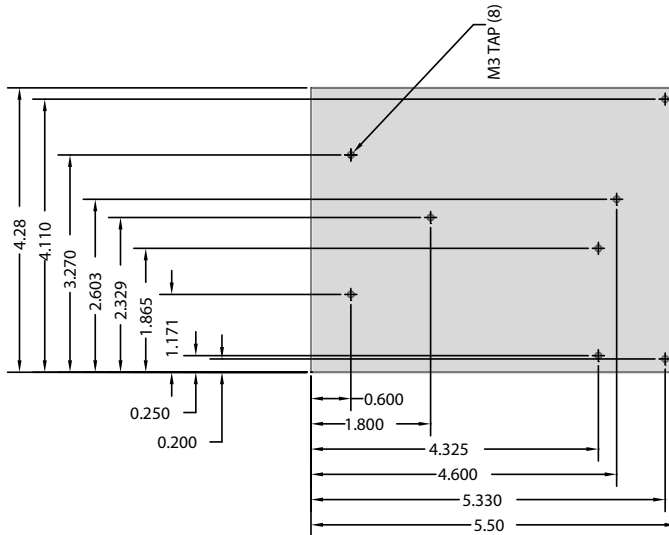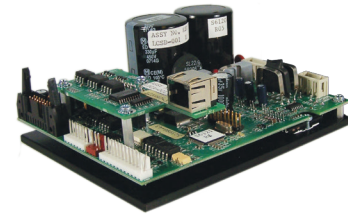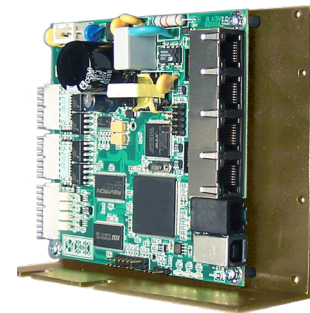
Right angle mounting plate showing the LMC-400 controller

Relays and IO Connections

Power Contactors and Protection Devices

Controller and Drives

Power Supplies

Configured Systems

IIS provides system design services integrating enclosures or panel assemblies for single-axis or multi-axis configurations to meet your control requirements.

Pictured here is a three axis CNC control system mounted on a steel 24"x30" panel using the Luminary Series. Turn-key product development can involve a custom operator interface and custom control software.

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23

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Luminary Motion Control

Luminary Drive ~ LD-101/SE21

5.50 [140]

2.60 [66]

MAX COMPONENT HEIGHT

4.38 [111]

0.19 [4.8]

0.39 [10]

0.310 [7.9]

4.880 [124]

1.50 [38.1]
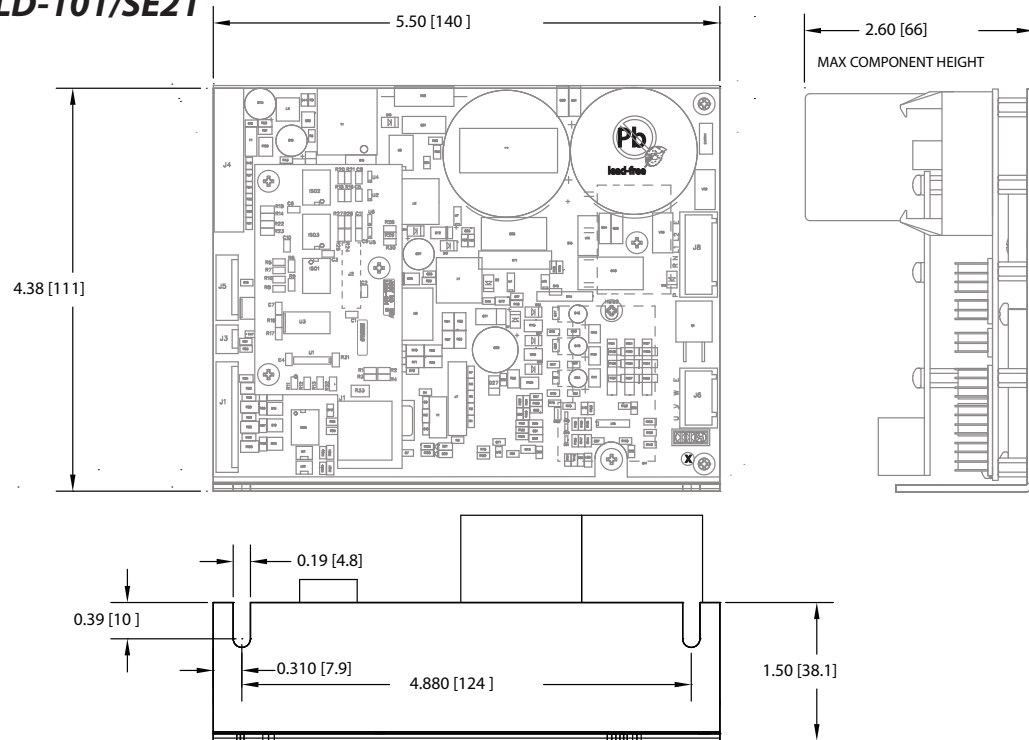
Luminary Controller ~ LMC-400-21

5.50

4.38

4.88

0.19 x2

0.39

1.50
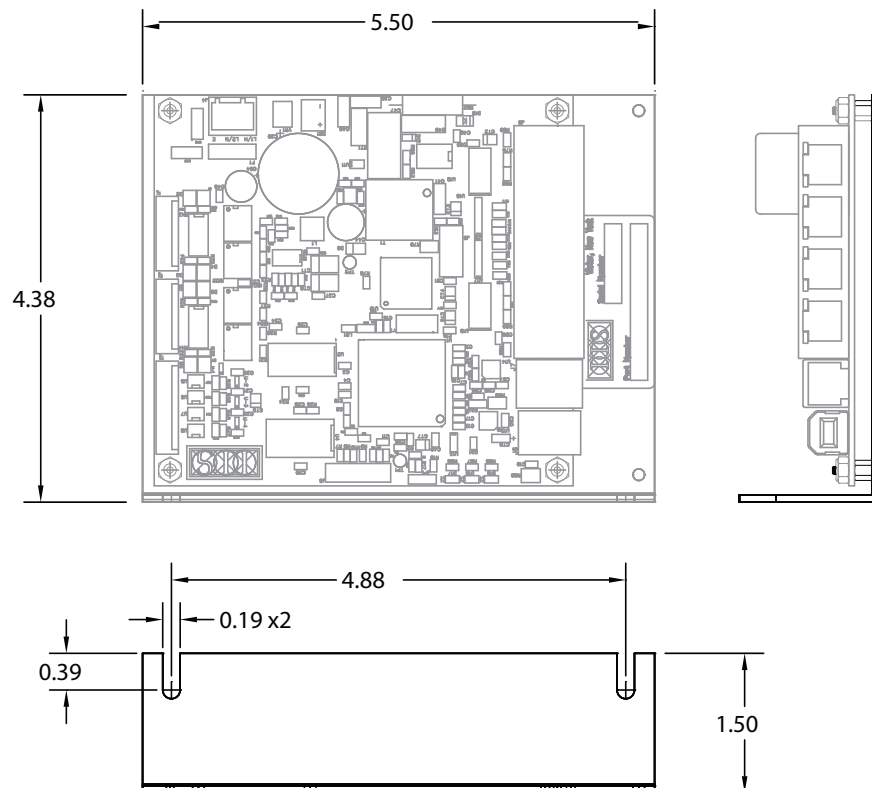
Luminary Drive Ordering Guide

Rated Current ~ Two versions are available to drive a servo motor and one version for the stepper motor. Choose which version based on the size of the motor that you need to drive and the price point you need.

Drive I/O Voltage ~ Connections to the digital i/o points are offered for either 5 Vdc or 24 Vdc operation.

Motor Feedback ~ An encoder is the only feedback device interface currently offered on the Luminary Series. The servo encoder used must provide six channels of data whereas the stepper encoder needs only three. Channels A and B for shaft resolution, the Z channel for marking the shaft's zero position, and channels U, V, W for winding commutation on the servo encoder. The Luminary drives will accept either differential or single ended channel line drivers. Quadrature multiplication is provided on the A and B channels to increase the shaft resolution to four times the line count of the encoder.

Mounting Style ~ Drives can be mounted in the horizontal orientation or vertical orientation. Mounting brackets are part of the cooling system, but to save costs can be substituted by mounting the drive to a proper heat sink surface.

Option Cards ~ The Luminary drive provides an option interface connector allowing the design of custom capabilities that require addition hardware. A variety of options are currently available. Select an interface from our list or let IIS design one for you. When two cards can be mounted, the secondary option identifies the second card.

Functional Configuration ~ A motor's characteristics are documented in the drive's configuration file. Configurations allow the drive to properly control the motor's operation and apply limits to the torque-speed boundary. Servo gain adjustments, that affect the motor's response under load, are also stored in the configuration file.

The configuration file for a stand-alone analog drive is loaded into the drive at the time of manufacture and verified. Parameters can be changed in the field through one of the communication options cards using the L-Drive software program. In the special case where the LMC-400 Controller is used with option card "C" installed on the drive, no motor configuration files are loaded at the factory, but are stored on the LMC-400 controller and loaded on power up.

Special Options ~ Calls out any other OEM special design request.

LD-aaa/bcdef-unn-xxx

Luminary Drive Series

Rated Current Limit
500: 5.00 amps
101: 10.00 amps

Drive Type- Digital I/O
R: Servo ~ 5vdc
S: Servo ~ 24vdc
T: Stepper ~ 24vdc

Motor Feedback Device
E: Encoder

Mounting Style
00: No mounting plate
01: Flat plate mount
21: L-plate mount
22: Custom mount
23: Custom mount

Option Cards
0: None
A: Analog Out
C: LMC drive network
D: USB comm
E: Reserved
F: RS485 comm

Second Card Options
0: None
D: USB comm

Functional Configuration
ref: SU-6000nn.idc
(Load setup control file "nn" for this drive)

Special Options
Blank: None
A to Z: Consult Factory

Parts Configuration Table

LMC Controller Ordering Guide

LMC-400-21   Luminary Controller (4-Axis) mounted on a right angle plate.

~ Interfaces with drive option card "C" using the C-885yyy cable.

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25

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Motor Ordering Guide

Variations ~ Shaft size, pilot configurations, or motor construction

Rated Speed ~ Speed at which the motor will perform while providing its rated torque

Feedback Type ~ An encoder is the only feedback device interface currently offered

Rated Power ~ Torque and speed combination motor can provide

Flange Size ~ Mounting face's overall size, Refer to motor's specification drawing for mounting details

Motor Series ~ The Luminary series drives will power either Luminary series or the Emerald series of motors

q q q s s - w w w w / x n n v

Variations
~ : None

Rated Speed
nn: RPM in hundreds

Feedback Type
E: Encoder (ABZ-UVW) 2500 PPR

Rated Power
wwww: Watts

Flange Size
ss: Millimeters square

Motor Series
ESM: Emerald Motor Series
LSM: Luminary Motor Series

Custom Motors
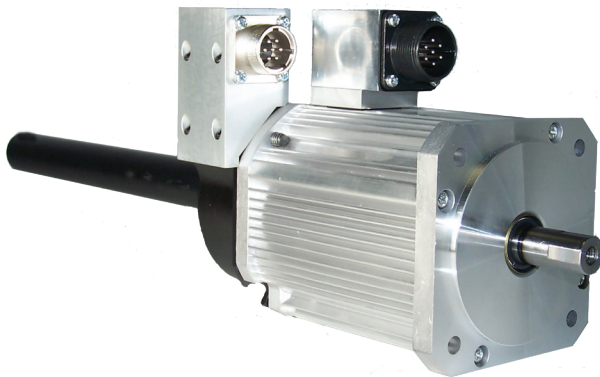
Custom cables, actuator assemblies, and special mounting requests are provided.
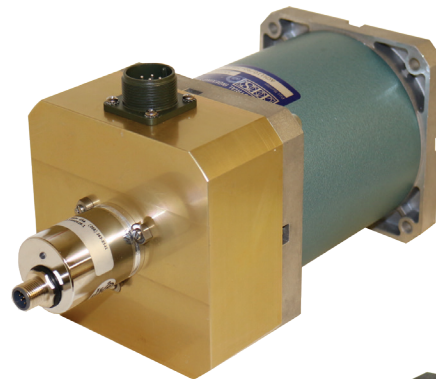
Industrial Indexing Systems will develop Luminary drive configurations that are engineered to operate with numerous motor designs. Motor types range from AC synchronous to DC brush types. Numerous feedback devices, coupled with custom mounts to match a customer's exact requirements, assures reliable system performance.

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26

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Cable Selection Guide

LEC-XYZMMM

Pin	Wire	Signal
1	GRN	A
2	BLK	A~
3	BLU	B
4	BLK	B~
5	YEL	Z
6	BLK	Z~
7	BRN	U
8	BLK	U~
9	WHT	W
10	BLK	W~
11	ORN	V
12	BLK	V~
13	RED	+5V
14	BLK	5V RET
15		SHLD
16		Install only to enable single ended inputs.

MOTOR ENCODER

LIC-XCBMMM

ENCODER OUTPUTS

5V LINE DRIVERS

Signal	Wire	Pin
A	RED	1
A~	BLK	2
B	RED/WHT	3
B~	YEL/WHT	4
Z	BLU	5
Z~	YEL	6
SHLD		7

LUMINARY DRIVE BOARD

OPTIONAL INTERFACE BOARD

J4
J5
J3
J1
J7
J8
J6

LIC-XAAMMM

ANALOG ± 10V

Signal	Wire	Pin
IN+	RED	1
IN-	BLK	2
SHLD		3

C-886YYY

INPUT POWER 100-240VAC 50/60 Hz

Pin	Signal
6	NC GROUND
5	L2
4	L1
3	NO CONN
2	
1	

OPTIONAL REGEN RESISTOR

LIC-XFDMMM

INPUTS 5vdc or 24vdc

Specify type at time of order

OUTPUTS 5vdc to 24vdc

Signal	Wire	Pin
IN1+ (ENABLE+)*	BRN	1
IN1- (ENABLE-)	BLK	2
IN2+ (TRQ/VEL+)	RED	3
IN2- (TRQ/VEL-)	BLK	4
IN3+	ORN	5
IN3 -	BLK	6
IN4+ (PROBE+)**	YEL	7
IN4 - (PROBE-)	BLK	8
OUT1+ (FAULT+)	GRN	9
OUT1- (FAULT-)	BLK	10
OUT2+	BLU	11
OUT2 -	BLK	12

LAC-XYZMMM

Pin	Wire	Signal
4	GRN	GND
3	BLK	W
2	WHT	V
1	RED	U

MOTOR

Cable	Drive Option	Interface	Function
C-885YYY	C	LDCA-001	LMC Automation Controller
C-894YYY	D	LDUSB-01	PC for commissioning
25.320.3653.1	F	LD485-01	PLC network communication
LIC-XBBMMM	A	LDAA-001	Analog Output

Stock Luminary cables* assembled and cut to length.

L t t - x y z m m d

- **Cable Length**
  - Metric Specification
  - mm - two digit value,
  - d - multiplier; 0 is 0.1, 1 is 1.0, 2 is 10
  - (e.g. 300 is 0.30 meters; 601 is 6.0 meters)
- **Material Configuration**
  - See cable drawings configuration
  - of connectors and types of cable
- **Cable Type**
  - Luminary specific cable drawing
  - LAC - Motor Armature Cable
  - LEC - Motor Encoder Cable
  - LIC - Interface Cable
  - LPAC - Stepper Armature Cable
  - LPEC - Stepper Encoder Cable

Reference manual IB-30B001 for stock cable details.

Cable connector packages

LC-CONKIT   Connector Kit for LMC-400 I/O

LD-CONKIT-MTR   Connector Kit for Motor Cables

LD-CONKIT-I/O   Connector Kit for Drive I/O

Communication cables

C-849YYY**   USB-A to USB-B Comm Cable

C-885YYY   LMC Network Cable

C-886YYY   LD/LMC Power Cable

C-776YYY   Setup Configuration Cable

C-987YYY   Serial Communications Cable

C-822000   PC Adapter Connector (9 pin)

** YYY is length in feet

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27

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IIS

The IIS Team

Discover how our advanced motion control components and superior support can redefine your operations. Let's embark on a journey to operational excellence. Ready to elevate the efficiency, consistency, and repeatability in your operations? Call us today at (585)924-9181 to discuss your application.

Headquarters in Victor NY

Our location houses all critical departments: Applications Engineering, R&D, Production, Warehouse, Panel Shop, Quality Control, Sales, Marketing, and Customer Support. Having everything under one roof speeds communications and provides better service to our customers.

Check out our IIS InMotion Blog for the Servo Motion Control Professional ~ https://www.iis-servo.com/blog/

If you're interested in becoming a Sales Representative for Industrial Indexing Systems, where you'll play a crucial role in boosting brand recognition and nurturing client connections, contact our offices at: (585) 924-9181 ~ Email: sales@iis-servo.com

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