Enhanced, Compact Linear Servo Drive with Motion Controller
Automation1 iXL2e

Compact Linear Drive & Full Motion Controller

Control your machine and motor to incredibly high levels of precision with the Automation1 iXL2e compact linear servo motor drive with full motion controller. This highly integrated, high-performance precision motion control device enables low noise and high precision motor control by combining high-end, low noise linear power amplifiers, precision servo control technology and a full motion controller in a compact form factor—all without sacrificing high-end controller features. The iXL2e's linear amplifier circuitry eliminates switching noise and deadtime, enabling the higher-precision, low EMI noise control required for eddy current inspection, sensor testing and high-precision position and velocity tracking. It is also ideal for small step size and in-position stability applications.

Automation1

The iXL2e is a part of the user-friendly Automation1 motion control platform, which includes the following:

- **Development Software**
- **Controls**
- **Motor Drives**
- **Fiber-Optic HyperWire® Communication Bus**

KEY FEATURES:

- Delivers industry leading **IN-POSITION STABILITY** performance

- Unlocks the full **MOTION CONTROL** power of our Automation1-iSMC intelligent software-based motion controller

- Features **COMPLETE CONFIGURATION & PERFORMANCE** capability of the XL2e linear servo drive

- **ELIMINATES THE PC** from your control scheme

- Allows for up to **12 AXES OF CONTROL** when more Automation1 drives are connected over the HyperWire fiber-optic bus

- Includes PSO, the **ULTIMATE IN POSITION-BASED CONTROL** for industrial lasers, cameras & more

- Includes **SAFE TORQUE OFF (STO)** functional safety

SPECIFICATION	DESCRIPTION
Motion Controller[1]	Aerotech's Automation1-iSMC Intelligent Software-Based Motion Controller (version 2.3 and above)
Maximum Axes of Control[1]	Up to 12 axes
I/O Points[1]	See "general specifications" below. Note:Controller can control I/O from connected devices.
Programming Language[1]	AeroScript, RS-274 G-code
APIs[1]	.NET (cross-platform Linux support) - C (cross-platform Linux support) - Python (cross-platform Linux support) - EPICS (cross-platform Linux support) see EPICS.anl.gov - LabVIEW (requires Automation1-MDK -LV1 option)
Programming Tasks[1]	4 user tasks (standard) / 9 user tasks (optional) 1 reserved task
Position Modes	Absolute, incremental, dynamic trajectory correction
Motion Types[1]	- Linear motion - Clockwise & counterclockwise - Jogging - Homing - Rapid - Freerun - Many more
Acceleration Profiles	- Linear (time & rate based) - Sine (time & rate based) - S-curve (time & rate based)
Velocity Profiling[1]	Yes
Safe Zones[1]	Yes
Advanced Features[1]	- Corner rounding - Tool normalcy control - Cutter compensation - Programmable fixture offsets[2] - Rotation, mirroring & translation transformations - Part profile scaling - Polar & cylindrical transformations[2] - Orthogonality correction - Electronic gearing - EasyTune® & classical tuning - Backlash compensation - Spindle motion - High-speed registration - Multi-dimensional error mapping
Access Control	No
Controller File System	Yes (5 GB)
Supported HyperWire Drives	- Automation1-XC6e[3][4] - Automation1-XC4e[3][4] - Automation1-XC2e[3][4] - Automation1-XC4[3][4] - Automation1-XC2[3][4] - Automation1-XR3[3] - Automation1-XL5e[3][4] - Automation1-XL2e[3][4] - Automation1-SI4[3] - Automation1-XI4[3]
Industrial Ethernet Communication	EtherCAT (optional)
Communication/Configuration Connection	- Ethernet - USB

Note:

1. See the Automation1-iSMC controller page for more information.

2. May require advanced programming.

3. Contains I/O on base drive.

4. Drive I/O expansion board option available.

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CATEGORY	SPECIFICATION
Position Synchronized Output (PSO)	Standard One-axis PSO: Command position synchronized output pulses based on distance calculated from a single encoder. Includes one-axis part-speed PSO.* Optional Two-axis PSO: Command position synchronized output pulses based on distance calculated from two encoders. Includes two-axis part-speed PSO.* Three-axis PSO: Command position synchronized output pulses based on distance calculated from three encoders. Includes three-axis part-speed PSO.* Two-axis part-speed PSO: Command position synchronized output pulses based on vector velocity command of up to two axes.* Three-axis part-speed PSO: Command position synchronized output pulses based on vector velocity command of three or more axes.* *Requires adding an expansion board to the drive to output PSO pulses via a physical connection.
25-Pin Motor Feedback Connector	High-speed differential inputs (encoder sin, cos and marker) CW and CCW limits Hall effect sensor inputs (A, B and C) Analog motor temperature input (accepts digital) Brake output
Multiplier Options	MX0 option Primary encoder: 40 million counts per second square-wave input Auxiliary encoder: 40 million counts per second square-wave input (required EB1 expansion board) MX2 option Primary encoder: 2 MHz/200 kHz (bandwidth selectable) sine-wave input, encoder multiplier up to 65,536 Auxiliary encoder: 40 million counts per second square-wave input (required EB1 expansion board) MX3 option Primary encoder: 2 MHz/200 kHz (bandwidth selectable) sine-wave input, encoder multiplier up to 65,536 Auxiliary encoder: 200 kHz sine-wave input, encoder multiplier up to x16,384 (required EB1 expansion board)* *Encoders multiplied with this input cannot be echoed out.
I/O Expansion Board (-EB1)	• PSO output connector with up to 12.5 MHz output rate • Auxiliary Encoder Port • 1x 16-bit differential, ±10 V analog input • 1x 16-bit single-ended, ±10 V analog input • 8x optically isolated digital inputs • 8x optically isolated digital outputs

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CATEGORY	SPECIFICATION
I/O Expansion Board (-EB2)	• PSO output connector with up to 12.5 MHz output rate • Auxiliary Encoder Port • 2x Industrial Ethernet Ports
Available Power Supply	Automation1-PS2
Drive Array Memory	67.1 MB (16,777,216 32-bit elements)
High Speed Data Capture	Yes (50 ns latency)
Safe Torque Off (STO)	Yes, SIL3/PLe/Cat 4 (certification pending)
HyperWire Connections	2x HyperWire small form-factor pluggable (SFP) ports
Automatic Brake Control	Standard (24 V at 0.5 A)
Absolute Encoder	BiSS C Unidirectional; EnDat 2.1; EnDat 2.2; SSI
Current Loop Update Rate	20 kHz
Servo Loop Update Rate	20 kHz
Operating Temperature	0 to 40 °C
Storage Temperature	-30 to 85 °C
Weight	1 kg (2.2 lb)
Compliance	CE approved, NRTL safety certification, EU 2015/863 RoHS 3 directive

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AUTOMATION1 iXL2e LINEAR AMPLIFIER SPECIFICATIONS

CATEGORY		iXL2e-10 (±12 VDC)	iXL2e-10 (±20 VDC)	iXL2e-10 (±24 VDC)	iXL2e-10 (±40 VDC)	iXL2e-10 (±48 VDC)
Motor Supply	Input Voltage	+/-5VDC to +/-48 VDC				
	Input Current (Continuous)	5 A_{rms}				
	Input Current (Peak)	10 A_{rms}				
Control Supply	Input Voltage	24 VDC				
	Input Current	2 A max, 1.0 A typical without brake				
Nominal Motor Bus Voltage		Equals motor supply input voltage				
Common Motor Supply Bus Voltage		±12 VDC	±20 VDC	±24 VDC	±40 VDC	±48 VDC
Continuous Output Current @ 25°C [1][2][3]		5.0 A_{pk} ǀ 5.0 A_{pk}	3.3 A_{pk} ǀ 4.5 A_{pk}	2.7 A_{pk} ǀ 3.8 A_{pk}	1.6 A_{pk} ǀ 2.2 A_{pk}	1.3 A_{pk} ǀ 1.7 A_{pk}
Peak Output Current(1 second)[5]		10 A_{pk}				
Maximum Continuous Total Power Dissipation[3]		180 W				
Peak Amplifier Power Dissipation per Phase[5]		400 W				
Effective Heatsink Thermal Resistance		0.25 C/W				
Maximum Transistor Temperature		75°C				
Time to Reach Maximum Temperature at Maximum Continuous Power[6]		8 minutes				
Current Loop Bandwidth		2500 Hz (software selectable)				
Minimum Load Resistance		0 Ω				
Minimum Load Inductance		0 H				
Modes of Operation		Brushless, brush, stepper				
Protection Features		Peak current limit, over temperature, RMS current limit, dynamic power limit (SOA)				
Encoder Supply		5V @ 500 mA				

1. AC or DC motor type with a 0 Ω winding resistance assumed.
2. The first value is for a stationary AC or DC motor. The second value is for a moving AC motor.
3. De-rate at temperatures above 25°C ambient.
4. Amplifier power dissipation is calculated as (Vbus – Vout) · Iout for each phase. A 40B configuration that drives 1 A into 0 Ω results in 40 W of power dissipation in the amplifier.
5. The amplifier has peak power-limiting circuitry to protect itself from damage. The power limiting bit in the drive status word indicates if this has occurred.
6. This specification depends on the motor supply voltage, the motor speed, and motor resistance. Contact an Aerotech sales engineer for more information.

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Automation1-iXL2e

Automation1-iXL2e	Enhanced, Compact Linear Servo Drive with Motion Controller

Peak Current

-10	10 A peak current (default)

Expansion Board

-EB0	No expansion board (default)
-EB1	Expansion Board with Analog/Digital I/O (-EB1)
-EB2	Expansion Board with Industrial Ethernet Ports (-EB2)

Multiplier

-MX0	No Encoder Multiplier (default) (-MX0)
-MX2	x65536 Multiplier (Primary), No Multiplier (Auxiliary) (-MX2)
-MX3	x65536 Multiplier (Primary), x16384 Multiplier (Auxiliary) (-MX3)

PSO

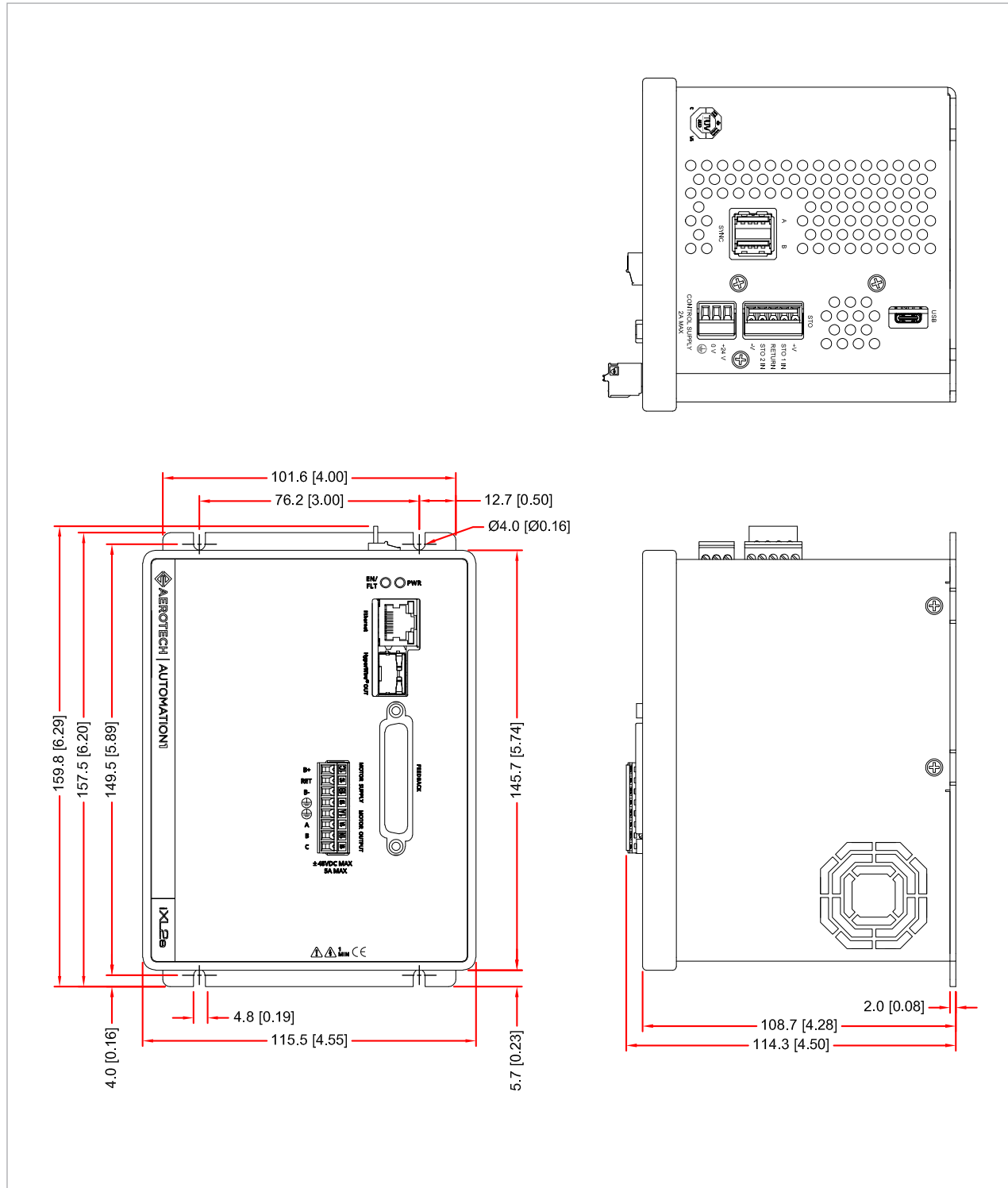|	
-PSO1	One-axis PSO (includes one-axis Part-Speed PSO) (default))
-PSO2	Two-axis PSO (includes two-axis Part-Speed PSO)
-PSO3	Three-axis PSO (includes three-axis Part-Speed PSO)
-PSO5	Two-axis Part-Speed PSO
-PSO6	Three-axis Part-Speed PSO

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AUTOMATION1-iXL2e WITH -EBO (NO EXPANSION BOARD) OPTION

101.6 [4.00]

76.2 [3.00]

12.7 [0.50]

Ø4.0 [Ø0.16]

159.8 [6.29]

157.5 [6.20]

149.5 [5.89]

145.7 [5.74]

4.8 [0.19]

4.0 [0.16]

115.5 [4.55]

5.7 [0.23]

2.0 [0.08]

108.7 [4.28]

114.3 [4.50]

AUTOMATION1-iXL2e WITH -EB1 (EXPANSION BOARD) OPTION
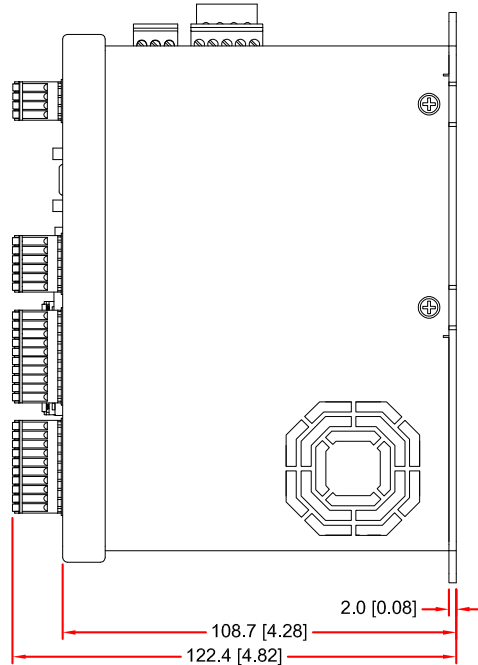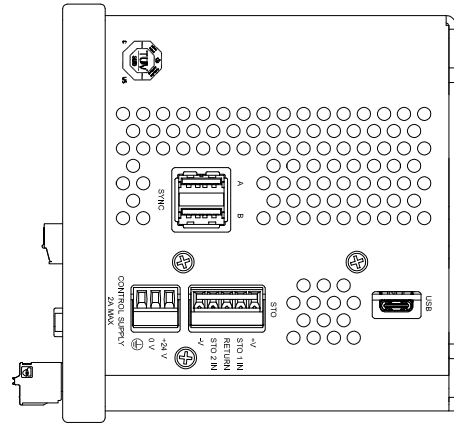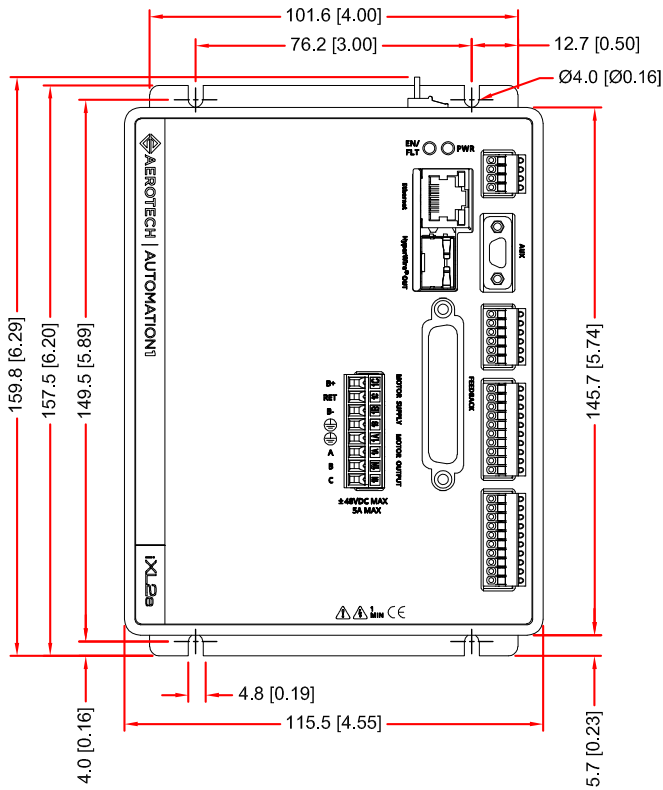
AUTOMATION1-iXL2e WITH -EB2 (EXPANSION BOARD) OPTION

101.6 [4.00]

76.2 [3.00]

12.7 [0.50]

Ø4.0 [Ø0.16]

159.8 [6.29]

157.5 [6.20]

149.5 [5.89]

145.7 [5.74]

4.8 [0.19]

4.0 [0.16]

115.5 [4.55]

5.7 [0.23]

2.0 [0.08]

108.7 [4.28]

122.4 [4.82]

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