

# AEROTECH AUTOMATION1

## Enhanced Linear Servo Drive with Motion Controller **Automation1 iXL5e**

### Powerful Linear Drive & A Full Motion Controller

The iXL5e is your one-stop shop for high-powered, high-performance precision motion control applications. Linear amplifiers enable low noise and high precision motor control. A powerful motion control device, the iXL5e runs the [Automation1-iSMC](#) motion controller, connects to other Automation1 drives over HyperWire and connects to other automation devices over EtherCAT, Modbus TCP/IP or a TCP Socket interface. Multi-axis PSO synchronizes your process tool control with your motion trajectory.

The iXL5e is an ideal choice for applications such as eddy current inspection, sensor testing and high-precision position and velocity tracking.

### Automation1

The iXL5e 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:

- ◆ Unlocks the full **MOTION CONTROL** power of our Automation1-iSMC intelligent software-based motion controller
- ◆ Provides **SUB-NANOMETER POSITIONING** capability
- ◆ Features **COMPLETE CONFIGURATION & PERFORMANCE** capability of the XL5e enhanced linear servo drive
- ◆ **CONNECT TO THE CONTROLLER** using EtherCAT, Modbus or a Socket interface
- ◆ Allows for up to **12 AXES OF CONTROL** when more Automation1 drives are connected over the HyperWire fiber-optic bus
- ◆ Includes **SAFE TORQUE OFF (STO)** functional safety
- ◆ **EXPANDS YOUR I/O** when an expansion board is added to the iXC4e or other connected drives

## AUTOMATION1 iXL5e CONTROLLER SPECIFICATIONS

SPECIFICATION	DESCRIPTION
<b>Motion Controller<sup>(1)</sup></b>	Aerotech's <a href="#">Automation1-iSMC</a> Intelligent Software-Based Motion Controller (version 2.2 and above)
<b>Maximum Axes of Control<sup>(1)</sup></b>	Up to 12 axes
<b>I/O Points<sup>(1)</sup></b>	See "general specifications" below. Note: Controller can control I/O from connected devices.
<b>Programming Language<sup>(1)</sup></b>	AeroScript, RS-274 G-code
<b>APIs<sup>(1)</sup></b>	<ul style="list-style-type: none"> <li>• .NET (cross-platform Linux support)</li> <li>• C (cross-platform Linux support)</li> <li>• Python (cross-platform Linux support)</li> <li>• Instrument Driver for LabVIEW</li> <li>• EPICS (cross-platform Linux support) see <a href="#">EPICS &amp; TANGO Drivers – Aerotech US</a></li> <li>• TANGO; see <a href="#">EPICS &amp; TANGO Drivers – Aerotech US</a></li> </ul>
<b>Programming Tasks<sup>(1)</sup></b>	4 user tasks (standard) / 9 user tasks (optional) 1 reserved task
<b>Position Modes</b>	Absolute, incremental, dynamic trajectory correction
<b>Motion Types<sup>(1)</sup></b>	<ul style="list-style-type: none"> <li style="width: 50%;">• Linear motion</li> <li style="width: 50%;">• Rapid</li> <li style="width: 50%;">• Clockwise &amp; counterclockwise</li> <li style="width: 50%;">• Freerun</li> <li style="width: 50%;">• Jogging</li> <li style="width: 50%;">• Many more</li> <li style="width: 50%;">• Homing</li> </ul>
<b>Acceleration Profiles</b>	<ul style="list-style-type: none"> <li>• Linear (time &amp; rate based)</li> <li>• Sine (time &amp; rate based)</li> <li>• S-curve (time &amp; rate based)</li> </ul>
<b>Velocity Profiling<sup>(1)</sup></b>	Yes
<b>Safe Zones<sup>(1)</sup></b>	Yes
<b>Advanced Features<sup>(1)</sup></b>	<ul style="list-style-type: none"> <li style="width: 50%;">• Corner rounding</li> <li style="width: 50%;">• Orthogonality correction</li> <li style="width: 50%;">• Tool normalcy control</li> <li style="width: 50%;">• Electronic gearing</li> <li style="width: 50%;">• Cutter compensation</li> <li style="width: 50%;">• EasyTune® &amp; classical tuning</li> <li style="width: 50%;">• Programmable fixture offsets<sup>(2)</sup></li> <li style="width: 50%;">• Backlash compensation</li> <li style="width: 50%;">• Rotation, mirroring &amp; translation transformations</li> <li style="width: 50%;">• Spindle motion</li> <li style="width: 50%;">• Part profile scaling</li> <li style="width: 50%;">• High-speed registration</li> <li style="width: 50%;">• Polar &amp; cylindrical transformations<sup>(2)</sup></li> <li style="width: 50%;">• Multi-dimensional error mapping</li> </ul>
<b>Access Control</b>	No
<b>Controller File System</b>	Yes (5 GB)
<b>Supported HyperWire Drives</b>	<ul style="list-style-type: none"> <li style="width: 50%;">• Automation1-XC6e<sup>(3)(4)</sup></li> <li style="width: 50%;">• Automation1-XR3<sup>(3)</sup></li> <li style="width: 50%;">• Automation1-XC4e<sup>(3)(4)</sup></li> <li style="width: 50%;">• Automation1-XL5e<sup>(3)(4)</sup></li> <li style="width: 50%;">• Automation1-XC2e<sup>(3)(4)</sup></li> <li style="width: 50%;">• Automation1-XL2e<sup>(3)(4)</sup></li> <li style="width: 50%;">• Automation1-XC4<sup>(3)(4)</sup></li> <li style="width: 50%;">• Automation1-SI4<sup>(3)</sup></li> <li style="width: 50%;">• Automation1-XC2<sup>(3)(4)</sup></li> <li style="width: 50%;">• Automation1-XI4<sup>(3)</sup></li> </ul>
<b>Industrial Ethernet Communication<sup>(5)</sup></b>	EtherCAT (optional, requires Automation1-iSMC, -IE2 option) Modbus (standard, 1 server, 1 client connection; optional, up to 16 client connections with Automation1-iSMC, -CP1 option)
<b>Ethernet Communication<sup>(6)</sup></b>	Socket (standard, TCP client and TCP server)
<b>Communication/Configuration Connection</b>	<ul style="list-style-type: none"> <li>• Ethernet</li> <li>• USB</li> </ul>

**Notes:**

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.
5. Modbus and EtherCAT cannot be used concurrently.
6. Socket interface can be used concurrently with industrial ethernet.

## AUTOMATION1 iXL5e GENERAL SPECIFICATIONS

CATEGORY	SPECIFICATION
<b>Position Synchronized Output (PSO)</b>	Standard: One-axis PSO (includes one-axis Part-Speed PSO)  Optional: Two-axis PSO (includes two-axis Part-Speed PSO) Three-axis PSO (includes three-axis Part-Speed PSO) Two-axis Part-Speed PSO only Three-axis Part-Speed PSO only
<b>25-Pin Motor Feedback Connector</b>	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
<b>26-Pin Auxiliary Feedback Connector</b>	High-speed differential inputs (encoder sin, cos and marker)* 4x optically isolated digital inputs 4x optically isolated digital outputs 1x 16-bit differential $\pm 10$ V analog input 1x 16-bit single-ended $\pm 10$ V analog output 2x optically isolated high-speed inputs  *This channel is bidirectional and can be used to echo out encoder signals.
<b>Multiplier Options</b>	MX0 option: Primary encoder: 40 million counts per second square-wave input Auxiliary encoder: 40 million counts per second square-wave input  MX2 option: Primary encoder: 2 MHz/450 kHz (bandwidth selectable) sine-wave input, encoder multiplier up to 65,536 Auxiliary encoder: 40 million counts per second square-wave input  MX3 option: Primary encoder: 2 MHz/450 kHz (bandwidth selectable) sine-wave input, encoder multiplier up to 65,536 Auxiliary encoder: 450 kHz sine-wave input, encoder multiplier up to x16,384*  *Encoders multiplied with this input cannot be echoed out.
<b>I/O Expansion Board (-EB1)</b>	1x additional PSO connection point 16x digital inputs, optically isolated 16x digital outputs, optically isolated 3x analog inputs, 16-bit, differential, $\pm 10$ V 3x analog outputs, 16-bit, single-ended, $\pm 10$ V
<b>Drive Array Memory</b>	67.1 MB (16,777,216 32-bit elements)
<b>High Speed Data Capture</b>	Yes (50 ns latency)
<b>Safe Torque Off (STO)</b>	Yes, SIL3/PLe/Cat 4
<b>HyperWire Connections</b>	1x HyperWire small form-factor pluggable (SFP) ports
<b>Automatic Brake Control</b>	Standard; 24 V at 1 A
<b>Absolute Encoder</b>	BiSS C Unidirectional; EnDat 2.1; EnDat 2.2
<b>Current Loop Update Rate</b>	20 kHz
<b>Servo Loop Update Rate</b>	20 kHz
<b>Operating Temperature</b>	0 to 50 °C
<b>Storage Temperature</b>	-30 to 85 °C
<b>Weight</b>	11.31 kg (24.93 lb)
<b>Compliance</b>	CE approved, NRTL safety certification, EU 2015/863 RoHS 3 directive

## AUTOMATION1 iXL5e LINEAR AMPLIFIER SPECIFICATIONS

CATEGORY		XL5E-10-VB4	XL5E-20-VB4	XL5E-10-VB5	XL5E-10-VB6
Nominal Motor Bus Voltage		±40 V	±40 V	±60 V	±80 V
Peak Output Current		10 A <sub>pk</sub>	20 A <sub>pk</sub>	10 A <sub>pk</sub>	10 A <sub>pk</sub>
Continuous Output Current @ 25°C <sup>(1)(2)</sup>		5 A <sub>pk</sub> / 5 A <sub>pk</sub>	5 A <sub>pk</sub> / 9 A <sub>pk</sub>	3.2 A <sub>pk</sub> / 6 A <sub>pk</sub>	2.5 A <sub>pk</sub> / 4.5 A <sub>pk</sub>
Continuous Output Current @ 35°C <sup>(1)(2)</sup>		4 A <sub>pk</sub> / 5 A <sub>pk</sub>	4 A <sub>pk</sub> / 8 A <sub>pk</sub>	2 A <sub>pk</sub> / 5.5 A <sub>pk</sub>	2 A <sub>pk</sub> / 4 A <sub>pk</sub>
Maximum Continuous Total Power Dissipation <sup>(2)(3)(4)</sup>		340 W / 585 W			
Peak Amplifier Power Dissipation per Phase <sup>(5)</sup>		1200 W			
Effective Heatsink Thermal Resistance <sup>(2)</sup>		.15°C/W / .085°C/W			
Maximum Transistor Temperature		75°C			
Time to Reach Maximum Temperature at Maximum Continuous Power		10 minutes			
Motor Supply	Input Frequency	50-60 Hz			
	Inrush Current	34 Apk @ 120 V / 68 Apk @ 240 V			
	AC Line Voltage	AC input (switch selectable): 100 VAC (90 - 112 VAC) 120 VAC (103 - 127 VAC) 200 VAC (180 - 224 VAC) 240 VAC (207 - 254 VAC)			
	Input Current (Maximum, Continuous)	7 Arms @ 120 V / 3.5 Arms @ 240 V			
Control Supply	Input Frequency	50-60 Hz			
	Inrush Current	16 Apk			
	Input Current (Maximum, Continuous)	0.25 Arms			
Current Loop Bandwidth		2500 Hz (software selectable)			
Minimum Load Resistance		0 Ω			
Minimum Load Inductance		0 H			
Modes of Operation		Brushless, brush, voice coil			
Protection Features		Peak current limit, over temperature, RMS current limit, dynamic power limit (SOA)			
Encoder Supply		5V @ 500 mA			
<p>1. AC or DC motor type with a 0 Ω winding resistance assumed.</p> <p>2. The first value is for a stationary AC or DC motor. The second value is for a moving AC motor.</p> <p>3. De-rate at temperatures above 25°C ambient.</p> <p>4. Amplifier power dissipation is calculated as (V<sub>bus</sub> – V<sub>out</sub>) · I<sub>out</sub> for each phase. A 40B configuration that drives 1 A into 0 Ω results in 40 W of power dissipation in the amplifier.</p> <p>5. The XL5e 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.</p>					

## AUTOMATION1 iXL5e ORDERING OPTIONS

### Automation1-iXL5e

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**Automation1-iXL5e** Automation1-XL5e High-Performance Linear Servo Motor Drive with Motion Controller

#### Peak Current

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-10	10 A peak, 5 A cont. current (default)
-20	20 A peak current

#### Bus Voltage

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-VB4	+/- 40 VDC (585 W Power Supply)
-VB5	+/- 60 VDC (585 W Power Supply)
-VB6	+/- 80 VDC (585 W Power Supply)

#### Input Line Voltage

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-VL1	120 VAC Input Line Voltage
-VL2	240 VAC Input Line Voltage
-VL3	100 VAC Input Line Voltage
-VL4	200 VAC Input Line Voltage

#### Expansion Board

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-EB0	No Expansion Board (Default)
-EB1	IO Expansion Board

#### Multiplier

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-MX0	No Encoder Multiplier (Default)
-MX2	2 MHz / 450 kHz x65536 Multiplier (Primary), No Multiplier (Auxiliary)
-MX3	2 MHz / 450 kHz x65536 Multiplier (Primary), 450 kHz x16384

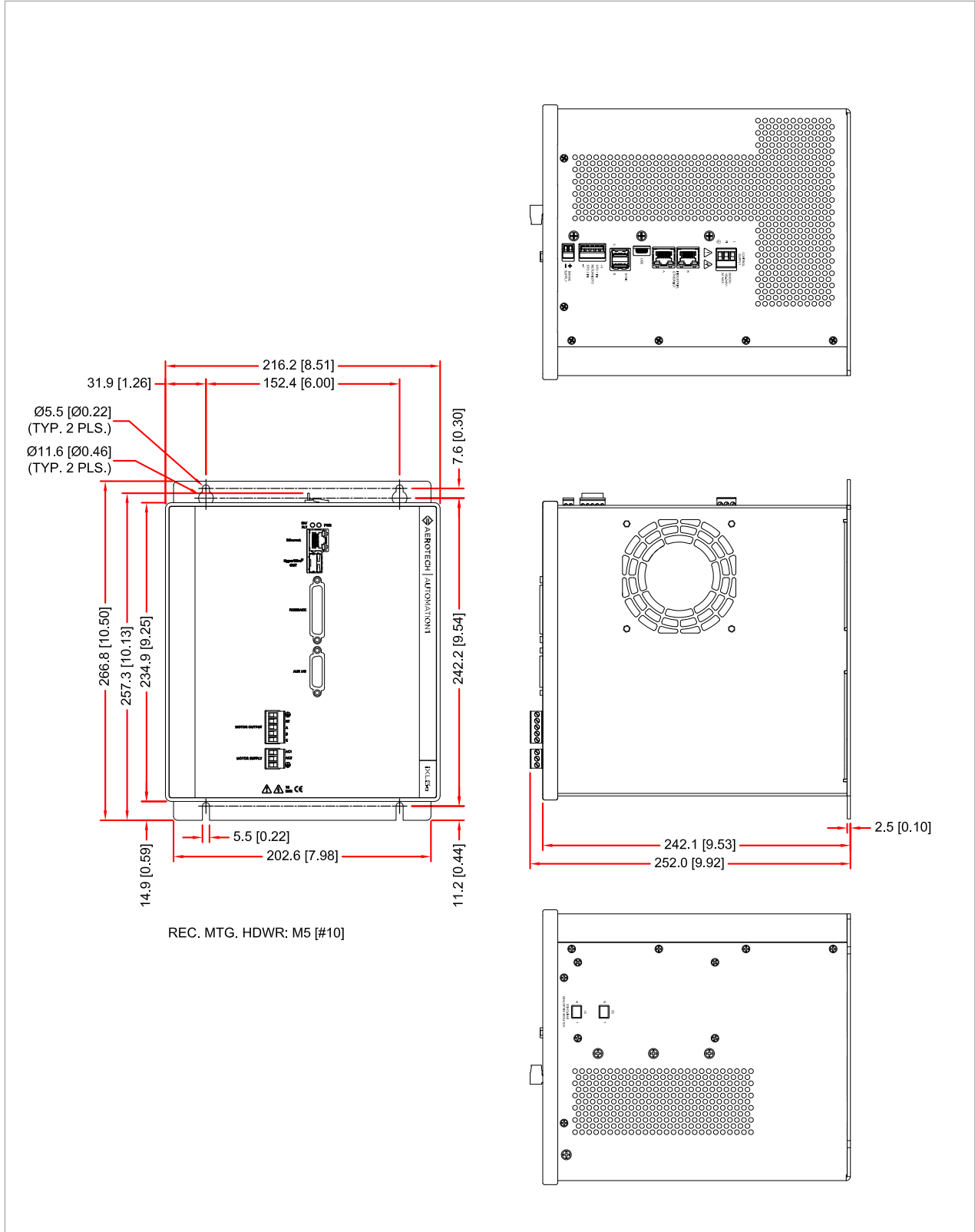
#### Multiplier (Auxiliary)

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-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

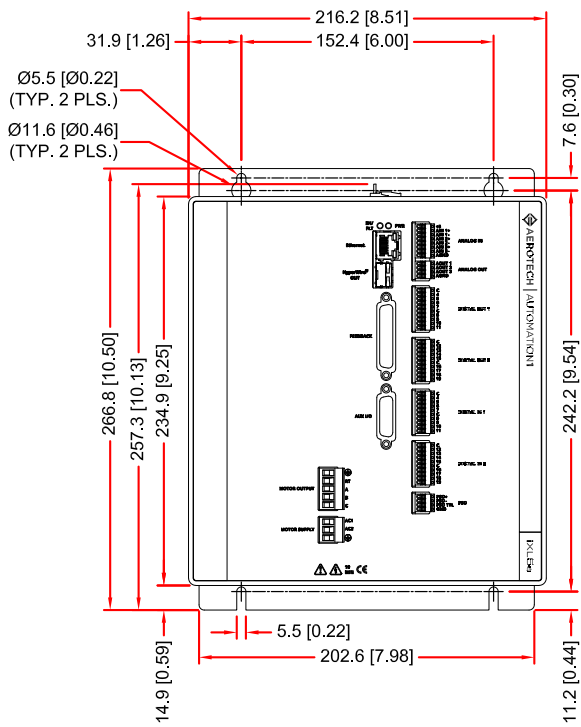
# AUTOMATION1 iXL5e DIMENSIONS

## AUTOMATION1 iXL5e, -EB0 OPTION



# AUTOMATION1 iXL5e DIMENSIONS

## AUTOMATION1 iXL5e, -EB1 OPTION



REC. MTG. HDWR: M5 [#10]

