

# AEROTECH AUTOMATION1

## Linear Servo Motor Drives **Automation1 XL5e**

### High-Powered Linear Amplifier Performance

Aerotech's highest performance single-axis linear servo motor drive, the XL5e enables low noise and high-precision motion control for the world's most demanding precision motion applications, including eddy current inspection, sensor testing and high-precision position and velocity tracking.

You'll see more accurate position tracking, more precise in-position stability and smaller minimum step sizes because the XL5e's performance is driven by high-end components that enable zero amplifier "dead time" and high-resolution, low-noise current sensing. A highly integrated design means you have control and bus power supplies, servo and current controllers, linear power amplifiers, cooling fans and heatsinks in a single package.

### Automation1

The XL5e 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:

- ◆ Controls drive brush, brushless, voice coil & stepper motors
- ◆ Connects through the HyperWire® fiber-optic bus, which has **20 TIMES THE BANDWIDTH** of 100BASE-T Ethernet buses
- ◆ Produces **UP TO 600W POWER OUTPUT** from integral power supply
- ◆ Includes **SAFE TORQUE OFF (STO)** safety circuit
- ◆ Features **67.1 MB** drive array with **MORE THAN 16 MILLION 32-BIT ELEMENTS**
- ◆ Offers many optional features, including Multi-axis Position Synchronized Output (PSO) and I/O expansion board

## AUTOMATION1 XL5e GENERAL SPECIFICATIONS

Category	Specification
<b>Position Synchronized Output (PSO)</b>	<p>Standard: One-axis PSO (includes One-axis part-speed PSO)</p> <p>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</p>
<b>25-Pin Motor Feedback Connector</b>	<p>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</p>
<b>26-Pin Auxiliary Feedback Connector</b>	<p>High-speed differential inputs (encoder sin, cos and marker)* 4x optically isolated digital inputs 4x optically isolated digital outputs 1x 16-bit differential <math>\pm 10</math> V analog input 1x 16-bit single-ended <math>\pm 10</math> V analog output 2x optically isolated high-speed inputs</p> <p>*This channel is bidirectional and can be used to echo out encoder signals.</p>
<b>Multiplier Options</b>	<p>MX0 option: Primary encoder: 40 million counts per second square-wave input Auxiliary encoder: 40 million counts per second square-wave input</p> <p>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</p> <p>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*</p> <p>*Encoders multiplied with this input cannot be echoed out.</p>
<b>I/O Expansion Board (-EB1)</b>	<p>1x additional PSO connection point 16x digital inputs, optically isolated 16x digital outputs, optically isolated 3x analog inputs, 16-bit, differential, <math>\pm 10</math> V 3x analog outputs, 16-bit, single-ended, <math>\pm 10</math> V</p>
<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>	2x 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, 2011/65/EU RoHS 2 directive

## AUTOMATION1 XL5e 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			

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  $(V_{bus} - V_{out}) \cdot I_{out}$  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 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.

## AUTOMATION1 XL5e ORDERING OPTIONS

### Automation1 XL5e

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**Automation1-XL5e** Automation1-XL5e High-Performance Linear Servo Motor Drive

#### Peak Current

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- 10 10 A Peak 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)

#### PSO

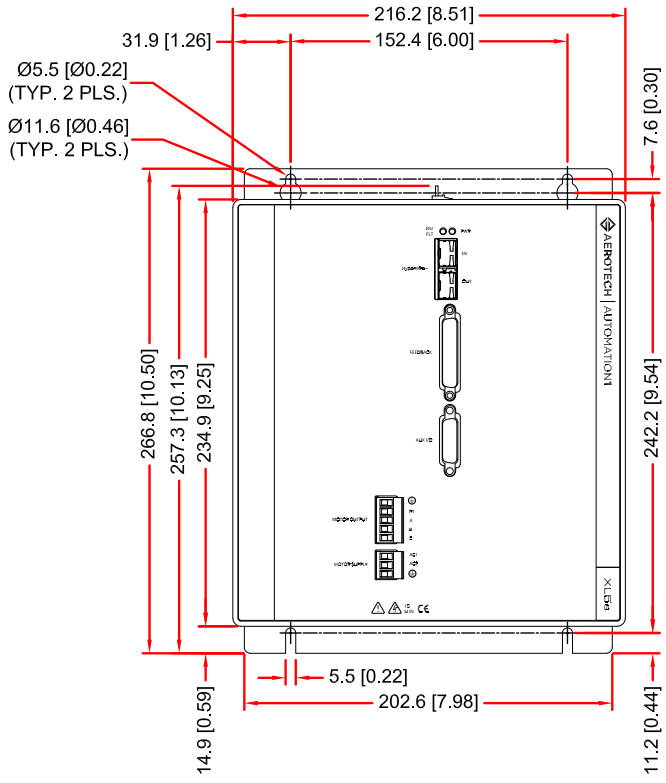
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- PSO1 One-Axis PSO (includes One-axis Part-Speed PSO) (Default)
- PSO2 Two-Axis PSO (includes Two-Axis Part-Speed PSO)
- PSO3 Three-Axis PSO (includes Three-Axis Part-Speed PSO)
- PSO5 Two-Axis Part-Speed PSO
- PSO6 Three-Axis Part-Speed PSO

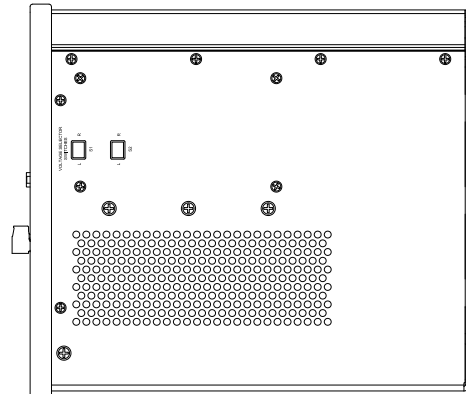
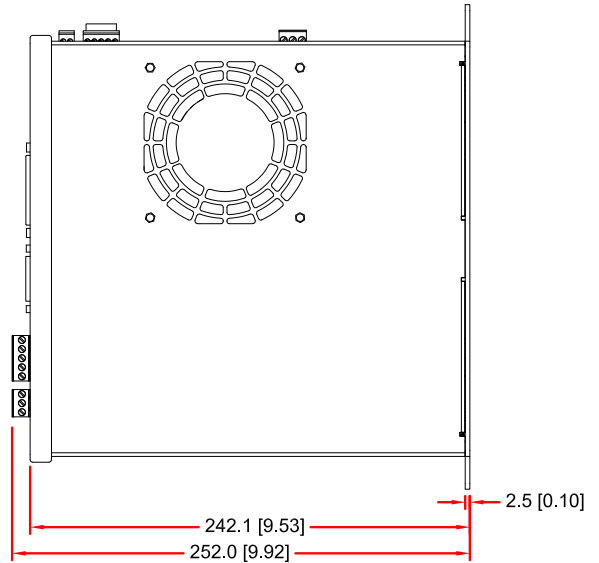
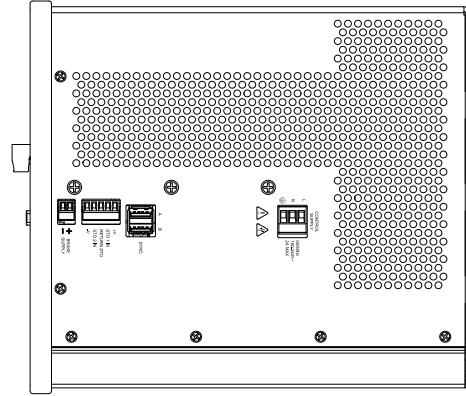


# AUTOMATION1 XL5e DIMENSIONS

## AUTOMATION1 XL5e, -EB0 OPTION

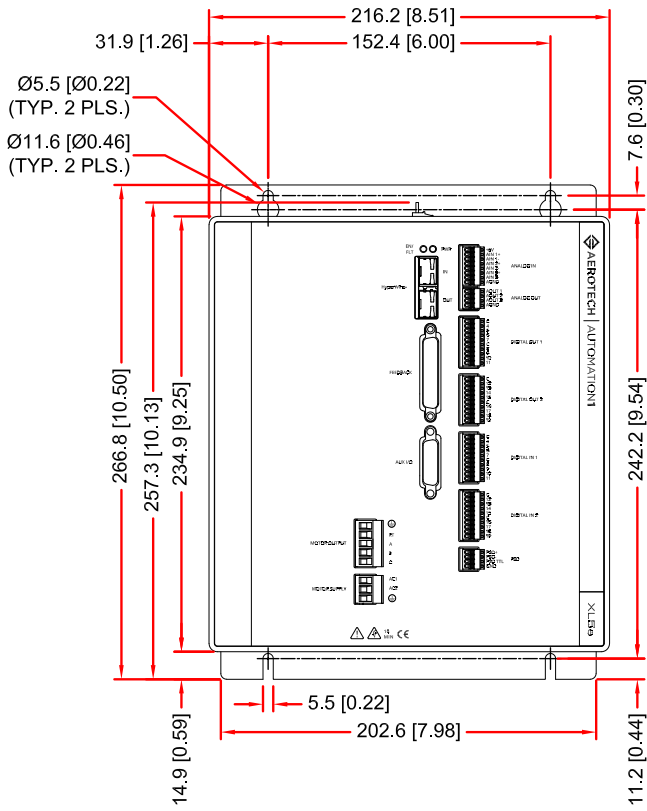


REC. MTG. HDWR: M5 [#10]



# AUTOMATION1 XL5e DIMENSIONS

## AUTOMATION1 XL5e, -EB1 OPTION



REC. MTG. HDWR: M5 [#10]

