

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
Position Synchronized Output (PSO)	<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>
25-Pin Motor Feedback Connector	<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>
26-Pin Auxiliary Feedback Connector	<p>High-speed differential inputs (encoder sin, cos and marker)* 4x optically isolated digital inputs 4x optically isolated digital outputs 1x 16-bit differential ± 10 V analog input 1x 16-bit single-ended ± 10 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>
Multiplier Options	<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>
I/O Expansion Board (-EB1)	<p>1x additional PSO connection point 16x digital inputs, optically isolated 16x digital outputs, optically isolated 3x analog inputs, 16-bit, differential, ± 10 V 3x analog outputs, 16-bit, single-ended, ± 10 V</p>
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
HyperWire Connections	2x HyperWire small form-factor pluggable (SFP) ports
Automatic Brake Control	Standard; 24 V at 1 A
Absolute Encoder	BiSS C Unidirectional; EnDat 2.1; EnDat 2.2
Current Loop Update Rate	20 kHz
Servo Loop Update Rate	20 kHz
Operating Temperature	0 to 50 °C
Storage Temperature	-30 to 85 °C
Weight	11.31 kg (24.93 lb)
Compliance	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 _{pk}	20 A _{pk}	10 A _{pk}	10 A _{pk}
Continuous Output Current @ 25°C ⁽¹⁾⁽²⁾		5 A _{pk} / 5 A _{pk}	5 A _{pk} / 9 A _{pk}	3.2 A _{pk} / 6 A _{pk}	2.5 A _{pk} / 4.5 A _{pk}
Continuous Output Current @ 35°C ⁽¹⁾⁽²⁾		4 A _{pk} / 5 A _{pk}	4 A _{pk} / 8 A _{pk}	2 A _{pk} / 5.5 A _{pk}	2 A _{pk} / 4 A _{pk}
Maximum Continuous Total Power Dissipation ⁽²⁾⁽³⁾⁽⁴⁾		340 W / 585 W			
Peak Amplifier Power Dissipation per Phase ⁽⁵⁾		1200 W			
Effective Heatsink Thermal Resistance ⁽²⁾		.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}) · 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

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

Peak Current

- 10 10 A Peak Current (Default)
- 20 20 A Peak Current

Bus Voltage

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

Input Line Voltage

- 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

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

Multiplier

- 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)

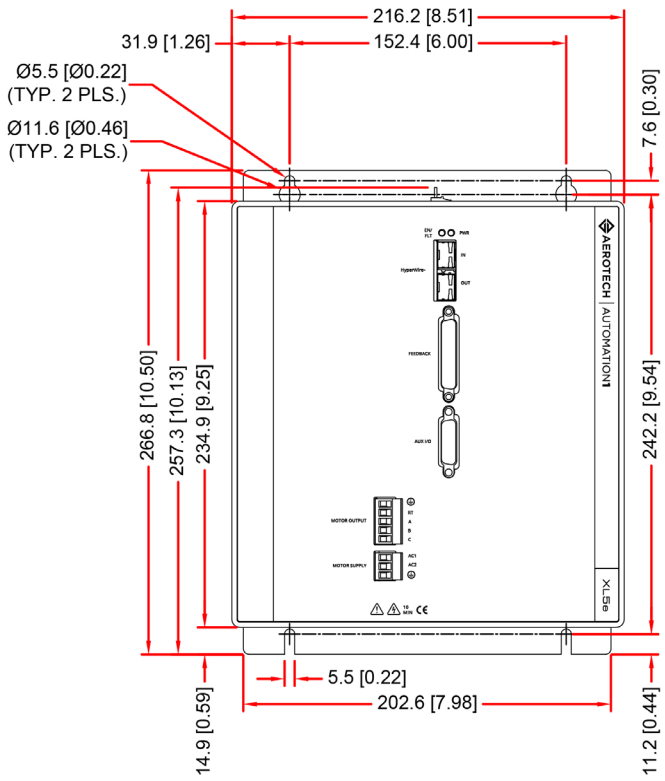
PSO

- 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

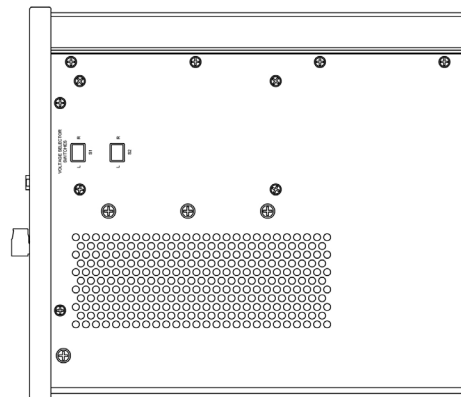
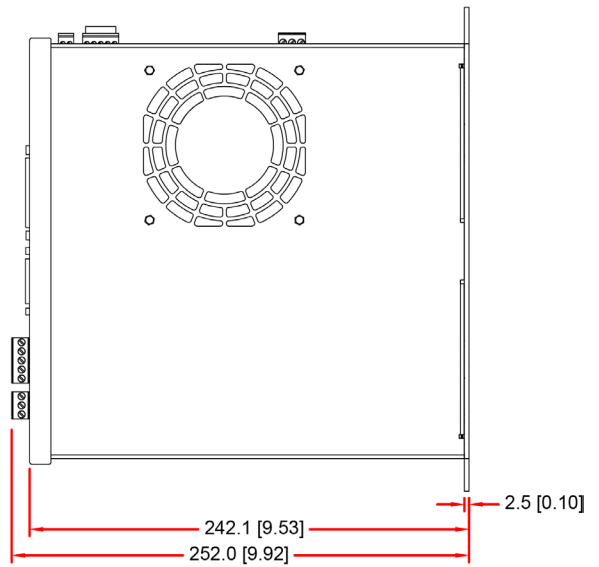
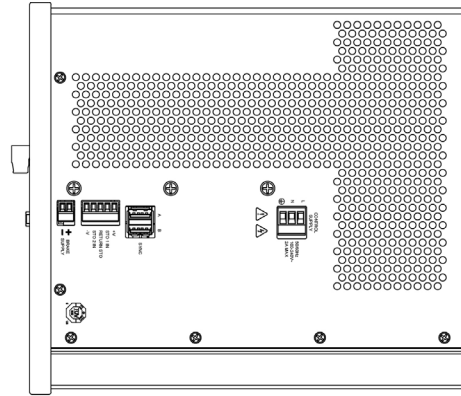


AUTOMATION1 XL5e DIMENSIONS

AUTOMATION1 XL5e, -EB0 OPTION

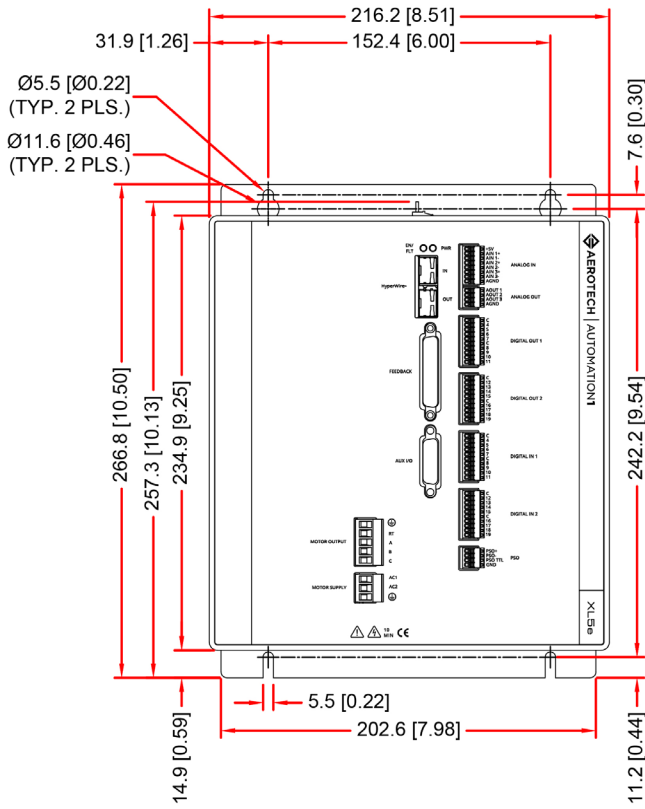


REC. MTG. HDWR: M5 [#10]



AUTOMATION1 XL5e DIMENSIONS

AUTOMATION1 XL5e, -EB1 OPTION



REC. MTG. HDWR: M5 [#10]

