

PWM SERVO MOTOR DRIVE AUTOMATION1 XC2e



Aerotech's Automation1-XC2e panel mount servo motor drive with high-speed optical HyperWire communication bus.

Mightiest Features, Our Smallest Drive.

Part of the Automation1 precision motion control platform, the pulse-width modulation (PWM) servo motor drive (XC2e) is our smallest panel-mount drive. It comes packed with standard features, such as safe torque off (STO), a data more than 16 million 32-bit elements and an enhanced current sense device. Expansion options include analog and digital input/output (I/O), multi-axis position synchronized outputs (PSO), a feedback multiplier and so much more.

Using silicon carbide (SiC) power amplifiers with ultra-precise PWM switching, the XC2e offers excellent in-position, move-and-settle, and contouring motion control performance. Digital and analog outputs are set and inputs are collected at 20 kHz, allowing for ultra-tight process control.

Industry-Leading Data Acquisition Speed and Volume Capability.

No other motion control platform can give you the data acquisition speed and volume you get with the Automation1 XC2e. For applications where data analysis speed is critical to maximizing throughput, the Automation1 platform delivers industry-leading performance.

- Supports Automation1, the most user-friendly platform available for precision motion control
- Connects through the HyperWire® fiber-optic bus, which has 20 times the bandwidth of 100BASE-T Ethernet buses
- Includes drive array with 16 million 32-bit elements
- Collects analog sensor or position data up to 320 kHz (triggered by axis position)
- Provides 10 A peak output current
- Powers brush, brushless, voice coil, or stepper motors
- Includes STO safety circuit
- Offers many optional features, including:
 - Several types of multi-axis PSOs
 - I/O expansion board
 - 65K encoder multiplier for amplified sine wave encoders up to 200 kHz
- Holds Nationally Recognized Testing Lab (NRTL) safety certification and CE approval; follows the EU 2015/863 RoHS 3 directive

BETTER CONTROL. MORE PRECISION.

The XC2e connects to the Automation1 Intelligent Software-Based Machine Controller (iSMC) controller over fiber-optic HyperWire®, the fastest, highest-throughput communication bus in motion control.

You can use the XC2e PWM amplifiers to control brushless AC, brush DC, voice coil and stepper motor types at up to 100 VDC operating voltage and 10 A peak current capability.

With process control features such as additional I/O and Aerotech's ultrafast, low latency Position Synchronized Output (PSO), the XC2e commands your process tool based on the real-time encoder position. This means processes built around the XC2e have better motion and process performance.

FEATURE-FORWARD DESIGN.

Standard features for the XC2e include STO, a data array consisting of more than 16 million 32-bit elements, dedicated home and end-of-travel limit inputs, and an enhanced current sense device. Standard encoder support includes square-wave and absolute encoders.

Add I/O to your XC2e with an expansion board containing analog and digital I/O, an added encoder input, and dedicated PSO.

Upgrade your process control capabilities with one of many multi-axis PSO options. Improve the resolution of amplified sine-wave encoders by adding a feedback multiplier, including dual loop multiplier support.

EFFORTLESS FEEDBACK.

Aerotech's standard feedback connector is a 25-pin DB-25 connector, which enables simple, single-cable connectivity for all feedback signals from a servo motor and precision stage combination. The XC2e is offered with or without an integral encoder multiplier, which enables design flexibility based on the resolution required by your application. Absolute encoder support is a standard feature.

READY TO CONNECT.

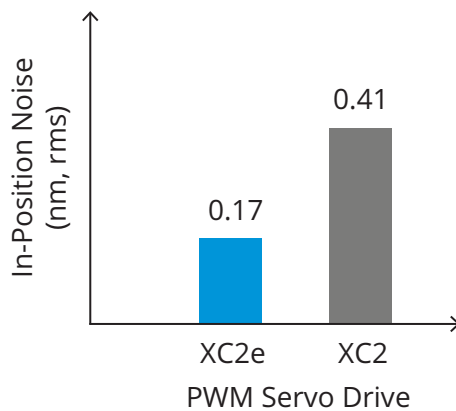
Quickly mount, wire and power XC2e drives by using the Automation1 PS2 power supply. This din rail mounted supply is configurable with 24, 48 and 96 VDC options and can be used to power up to four (4) XC2e drives.

Two HyperWire connections make it simple to connect the XC2e in a multi-axis configuration with other Automation1 drive hardware. A 24-volt one amp brake output is included. The device is CE approved, NRTL safety certified and EU 2015/863 RoHS 3 directive certified. The power amplifier bandwidth is software selectable and up to 95 percent efficient.

Capture Process Data

The XC2e collects multiple signals and data items that provide valuable diagnostic and performance information. When coupled with the two Gbps HyperWire bandwidth, you can pull the required data back to the iSMC for easy access via the Automation1 studio application or the .NET application programming interface (API). Unlike other platforms, you never have to lower your trajectory rates to acquire this valuable data.

From bus voltage to current feedback to position error during part processing, the Automation1 XC2e creates a constant stream of data. You can use this data to monitor your drive's performance.



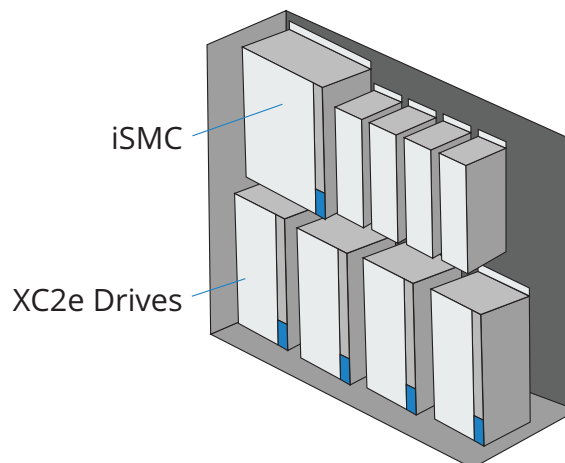
Test performed on a linear motor driven, cross-roller bearing stage with a 4 μm direct encoder.

Excellent In-Position Performance

Thanks to advanced control techniques and feedback signal processing, the XC2e can control stage in-performance to less than 0.2 nanometers rms.

System Integration Made Simple

The small form factor enables compact machine designs, while a four-axis system can be configured with more than 70 I/O points. The XC2e integrates easily with the Automation1 Software-Based Machine Controller (iSMC).



Category	Specification
Motor Style	Brush, brushless, voice coil, stepper ⁽¹⁾
Motor Supply/Bus Voltage ⁽²⁾	15-100 VDC
Control Supply	24 VDC
Peak Output Current (1 sec) ⁽³⁾	10 A _{pk}
Continuous Output Current ⁽³⁾	5 A
Digital Inputs	0 (available with -EB1 I/O expansion board, see below)
Digital Outputs	0 (available with -EB1 I/O expansion board, see below)
Analog Inputs	0 (available with -EB1 I/O expansion board, see below)
Analog Outputs	0 (available with -EB1 I/O expansion board, see below)
Position Synchronized Output (PSO)	<ul style="list-style-type: none"> • One-axis PSO. Command position synchronized output pulses based on distance calculated from a single encoder. Includes one-axis part-speed PSO.* • Two-axis PSO. Command position synchronized output pulses based on distance calculated from two encoders. Includes two-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.
Encoder Multiplier	<ul style="list-style-type: none"> • 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/200 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/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* *Encoders multiplied with this input cannot be echoed out.
I/O Expansion Board (-EB1)	<ul style="list-style-type: none"> • 8x optically isolated digital inputs • 8x optically isolated digital outputs • 1x 16-bit differential, ±10 V analog input • 1x 16-bit single-ended, ±10 V analog input • PSO output connector with up to 12.5 MHz output rate
Available Power Supply	Automation1 PS2
Drive Array Memory	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 0.5 A)
Absolute Encoder	Renishaw Rabsolute BiSS; EnDat 2.1; EnDat 2.2, and SSI
Current Loop Update Rate	20 kHz
Servo Loop Update Rate	20 kHz
Power Amplifier Bandwidth	2500 Hz maximum (software selectable)
Power Amplifier Efficiency	85-95% ⁽⁴⁾
Minimum Load Inductance	0.1 mH
Operating Temperature	0 to 40 °C
Storage Temperature	-30 to 85 °C
Weight	2.36 kg (5.20 lb)
Compliance	CE approved, NRTL safety certification, EU 2015/863 RoHS 3 directive

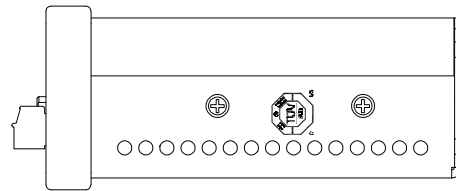
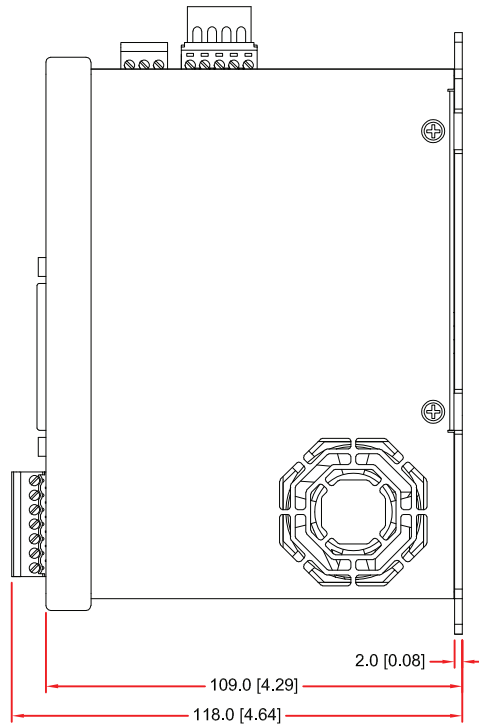
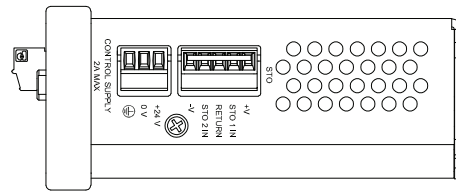
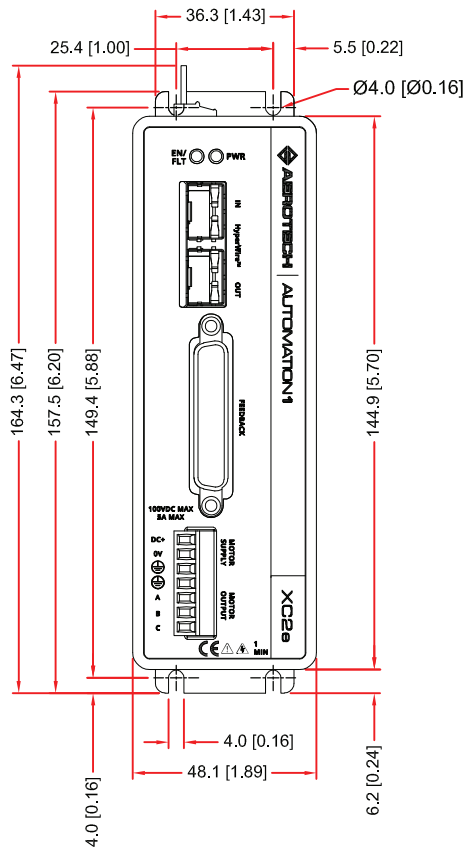
1. For stepper motors only, one-half of bus voltage is applied across the motor (e.g., 80 VDC supply results in 40 VDC across stepper motor).

2. Output voltage dependent upon input voltage.

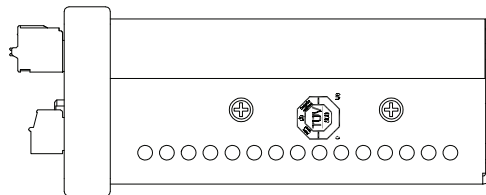
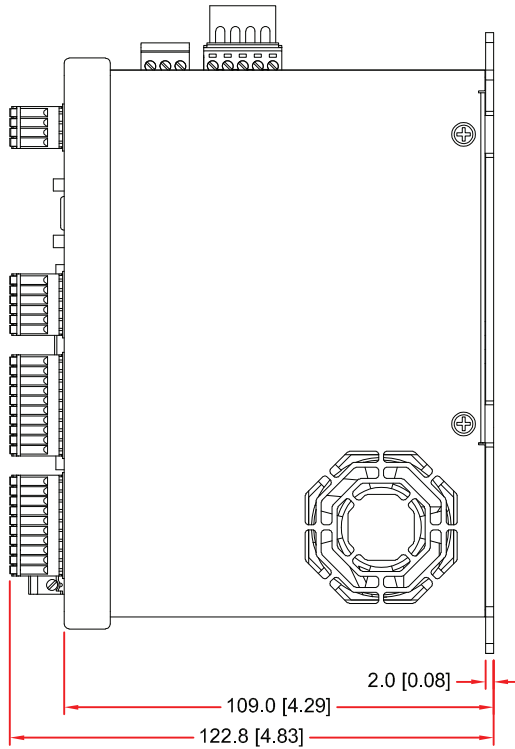
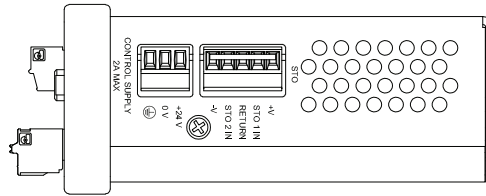
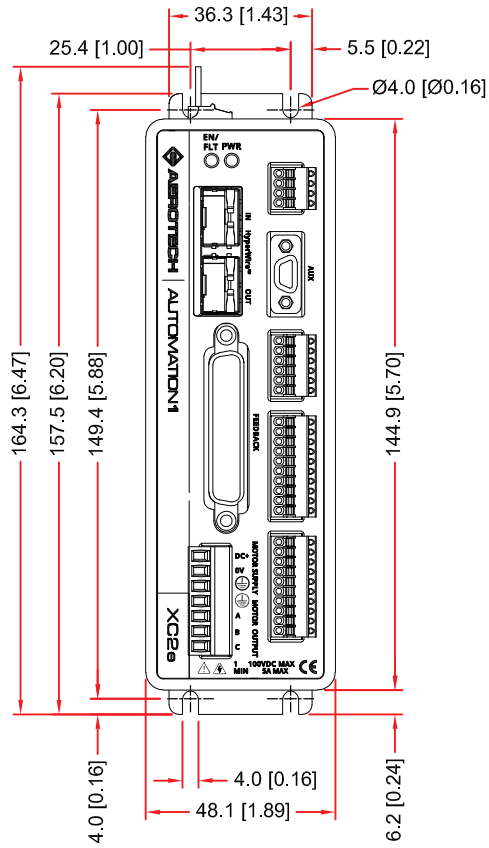
3. Peak value of the sine wave; rms current for AC motors is 0.707 * A pk.

4. Dependent on total output power: efficiency increases with increasing output power.

Automation1 XC2e, -EBO Option



Automation1 XC2e, -EB1 Option



Automation1-XC2e

Automation1-XC2e Automation1-XC2e High-Performance PWM Digital Drive

Peak Current

-10 10 A Peak, 5 A Cont. Current (Default)

Expansion Board

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

Multiplier

-MX0 No Encoder Multiplier (Default)
 -MX2 2 MHz/200 kHz x65536 multiplier (primary), no multiplier (auxiliary)
 -MX3 2 MHz/200 kHz x65536 multiplier (primary), 200 kHz x16384 multiplier (auxiliary)

PSO

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

Automation1 PS2

Automation1 PS2 Automation1 PS2 Power Supply for XC2e, XC2, and future XL2e Digital Drives

Drive Type (Required)

-D1 PS2 for XC2e and XC2 Drives

Power Output (Required)

-P1 240 Watts at 24 VDC
 -P2 240 Watts at 48 VDC
 -P3 480 watts at 48 VDC
 -P4 480 watts at 96 VDC

Number of Axes (Required)

-AX01 1 Axis of Wiring
 -AX02 2 Axes of Wiring
 -AX03 3 Axes of Wiring
 -AX04 4 Axes of Wiring