Drive-Based Motion Controller

Automation1 iXC4e

Motion. Control. Together.

The Automation1-iXC4e, a hardware platform for running the Automation1-iSMC intelligent software-based motion controller, features an enhanced performance servo motor drive. That means it can run your entire machine's control, act as a servo drive for a single axis and control up to 11 added axes of motion over our fiber-optic HyperWire motion bus. Combining this technology on a single hardware device lowers your machine costs, reduces machine size and increases reliability.

The iSMC, which runs on the iXC4e, is programmable in AeroScript from the Automation1 Studio application and several available APIs.

Automation1

The iXC4e 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:

- Unlock the full **MOTION CONTROL** power of our Automation1-iSMC intelligent software-based motion controller
- Features **COMPLETE CONFIGURATION & PERFORMANCE** capability of XC4e servo motor drive
- **ELIMINATE THE PC** from your control scheme
- Enjoy up to **12 AXES OF CONTROL** by connecting more Automation1 drives over the HyperWire fiber-optic bus
- **EXPAND YOUR I/O** by adding expansion board to the iXC4e or other connected drives

AUTOMATION1 iXC4e CONTROLLER SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Motion Controller[1]	Aerotech's Automation1-iSMC Intelligent Software-Based Motion Controller (version 2.00 and above)
Maximum Axes of Control[1]	Up to 12 axes
I/O Points[1]	See "26-Pin Auxiliary Feedback Connector" & "I/O Expansion Board (-EB1)" 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) • EPICS (cross-platform Linux support) see EPICS.anl.gov
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]
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.

AUTOMATION1 iXC4e DEVICE SPECIFICATIONS

SPECIFICATION	DESCRIPTION
Motor Style	Brush, brushless, voice coil, stepper[1]
Motor Supply	Single-phase 0-240 VAC; 50/60 Hz
Control Supply	100-240 VAC; 50/60 Hz
Bus Voltage[2]	0-340 VDC
Peak Output Current (1 sec)[3]	10 A_{pk} I 20 A_{pk} I 30 A_{pk}
Continuous Output Current[3]	5 A_{pk} I 10 A_{pk} I 10 A_{pk}
Position Synchronized Output (PSO)	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
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
26-Pin Auxiliary Feedback Connector	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 *This channel is bidirectional and can be used to echo out encoder signal
Multiplier Options	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.

chart continued on next page

AUTOMATION1 iXC4e DEVICE SPECIFICATIONS

SPECIFICATION	DESCRIPTION
I/O Expansion Board (-EB1)	1x additional PSO connection point 1x PSO synchronization input 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
Drive Array Memory	16,777,216 32-bit elements (67 MB)
High-Speed Data Capture	Yes (50 ns latency)
Safe Torque Off (STO)	Yes, SIL3/PLe/Cat 4
HyperWire Connections	1x HyperWire small form-factor pluggable (SFP) ports
Automatic Brake Control	Standard; 24 V at 1 A
Absolute Encoder	Renishaw resolute BiSS; EnDat 2.1; and EnDat 2.2
Current Loop Update Rate	20 kHz
Servo Loop Update Rate	20 kHz
Power Amplifier Bandwidth	Selectable through software (85-95% efficiency)
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

Note:

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 depends on input voltage.
3. Peak value of the sine wave; rms current for AC motors is 0.707 * A_{pk}.

Controller Configuration

To configure and load the motion controller on the iXC4e drive, please configure and order an Automation1-iSMC intelligent controller with your iXC4e drive. The Automation1-iSMC configuration should include the iXC4e as the “hardware platform.”

Automation1-iXC4e

Automation1-iXC4e	Enhanced PWM Servo Drive with Motion Controller

Peak Current

-10	10 A peak, 5 A cont. current (default)
-20	20 A peak, 10 A cont. current
-30	30 A peak, 10 A cont. current

Expansion Board

-EB0	No expansion board (default)
-EB1	IO expansion board

Multiplier

-MX0	No encoder multiplier (default)
-MX2	2 MHz x65536 multiplier (primary), no multiplier (auxiliary)
-MX3	2 MHz x65536 multiplier (primary), 450 kHz x16384 multiplier (auxiliary)

PSO

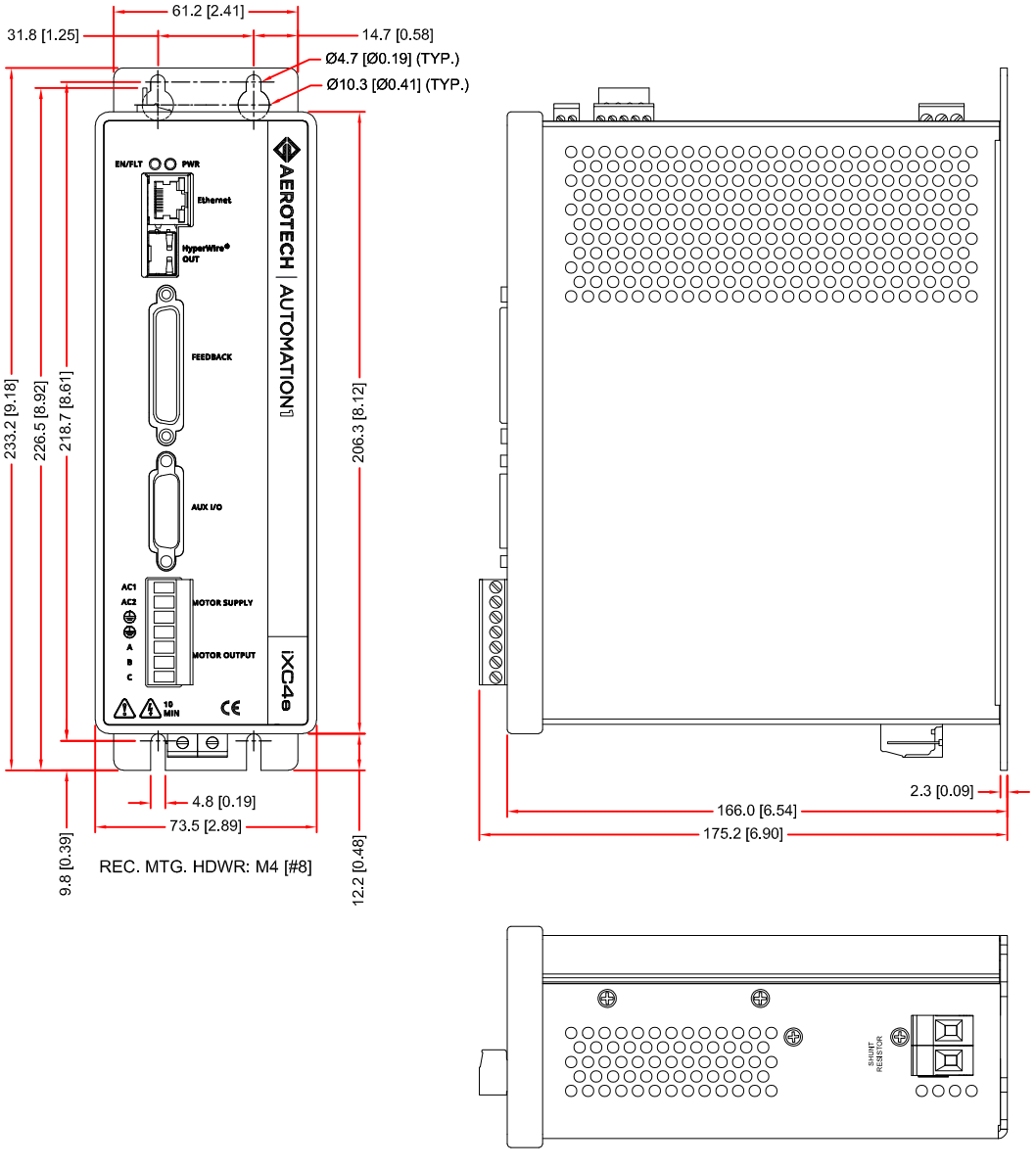
-PSO1	One-axis PSO (default)
-PSO2	Two-axis PSO
-PSO3	Three-axis PSO
-PSO5	Two-axis Part-Speed PSO
-PSO6	Three-axis Part-Speed PSO

External Shunt

-SX0	No 2-pin connector for external shunt (default)
-SX1	2-pin connector for external shunt

AUTOMATION1 iXC4e DIMENSIONS

AUTOMATION1-iXC4e WITH -EBO (NO EXPANSION BOARD) OPTION



AUTOMATION1 iXC4e DIMENSIONS

AUTOMATION1-iXC4e WITH -EB1 (EXPANSION BOARD) OPTION