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Find the *Aerotech Ensemble CL 10-40-MXU* at our website: ***Click HERE***

Ensemble CL Controller and Linear Digital Drive







Description **Specifications** **Dimensions** **Ordering Information**

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Design Features

- Network drives through a high-speed serial interface to coordinate up to ten axes of motion
- Coordinate motion using up to five independent tasks
- Drive and control linear or rotary brushless, DC brush servo, and micro-stepping motors
- Command various motion types including: point-to-point, linear and circular interpolation, electronic gearing, and velocity profiling
- Program in AeroBasic, Microsoft .NET (C#, VB.NET, C, and Managed C++), LabVIEW, and MATLAB
- Remotely command drives over Ethernet, USB, or RS-232 with an ASCII interface available for both Windows and non-Windows programs (including Linux)
- Diagnose, tune, and program through an advanced Windows-based interface
- NRTL safety certification, CE approved
- Fully compatible with EPICS set of software tools and applications, making Ensemble ideal for use in synchrotron and general laboratory facilities
- Allen-Bradley EtherNet/IP interface provides full integration with the Ensemble; program the Ensemble directly from RSLogix 5000
- Output power range of 10 A peak with ±10 to ±80 VDC bus

The Ensemble™ is Aerotech's next-generation, multi-axis controller for moderate- to high-performance applications. Versatility, power, and affordability make the Ensemble ideal for applications from basic laboratory experimentation and general-purpose positioning to advanced OEM systems.

Versatile, Flexible, Stand-Alone Multi-Axis Control

Network multiple Ensemble HLe/CL/ML combination controllers/drives for up to ten axes of coordinated motion, and seamlessly mix and match amplifiers (linear and PWM) and motor types (brush, brushless, and stepper) within the same positioning system using a common programming and control platform. High-accuracy linear motor air-bearing stages or lower precision stages with servo or stepper motors can be controlled from the linear Ensemble series. Each controller/drive can be reconfigured to accept different motors and feedback devices, allowing customers to adapt to changing system needs. Optional on-board encoder interpolation provides programmable axis resolution, including the ability to change interpolation (multiplication) values through software.

Powerful and Intuitive Programming

Monitor and control all aspects of the positioning system, no matter how complex, through the Ensemble GUI Integrated Development Environment software. An Autotuning utility minimizes startup time by allowing easy optimization of motion axes. Functional programs that can be modified and used in customer applications are included in the online Help. Pre-coded LabVIEW® VIs, AeroBasic™ programming functionality, MATLAB® library, .NET tools for C#, VB.NET and managed C++ or C make the Ensemble even easier to use. See the Ensemble Control home page for detailed information on software capabilities and ordering options.

Advanced DSP Control

The processing power of a 225 MHz double precision, floating-point DSP supplies exceptional performance in a variety of applications including point-to-point motion, linear and circular interpolation, multi-axis error correction, 2D error mapping, direct commutation of linear and rotary brushless servomotors, and on-board servo autotuning. High-speed interrupts and data logging capabilities provide a real-time link to external systems. The Ensemble HLe/CL/ML controller/drive combination also offers highspeed position latching capability and single-, dual-, or triple-axis PSO (Position Synchronized Output), depending on model. Whether the requirement is simple point-to-point motion or complex velocity-profiled contours with output on the fly, Ensemble ensures peak performance for critical operations.

Enhancing a Legacy of Success

Ensemble carries forward a legacy of success that originated in Aerotech's A3200 and Soloist™ controllers. Enhanced capabilities make it an obvious choice for aggressive motion control applications. The Ensemble motion control architecture builds upon the Soloist™ intuitive graphical user interface, while improving multiaxis control through advanced features.

Allen-Bradley Interface

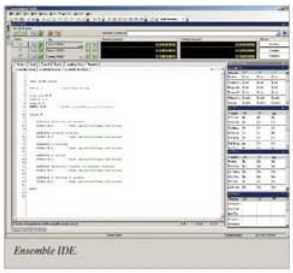
Combine proven PLC with proven motion control for easier integration, startup, and maintenance of medium- and high-end automation projects. The Aerotech EtherNet/IP™ interface enables AB PLCs (MicroLogix, CompactLogix™, or ControlLogix) to be integrated directly with the Ensemble. Motion can

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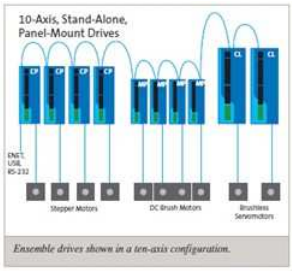
be directly programmed in the RSLogix 5000 environment or separate programs can be written on the controller and triggered from the AB PLC. Aerotech has two interfaces: ASCII and Register. Choose the PLC, motion controller, and interface that best fits your application needs.

EPICS Drivers

Each Ensemble installation includes full compatibility with the EPICS open source distributed control system. EPICS is used worldwide at leading light source (synchrotron) facilities and other government laboratories, allowing Ensemble to seamlessly integrate into applications at all major research institutions.



Ensemble IDE.



Ensemble drives shown in a ten-axis configuration.

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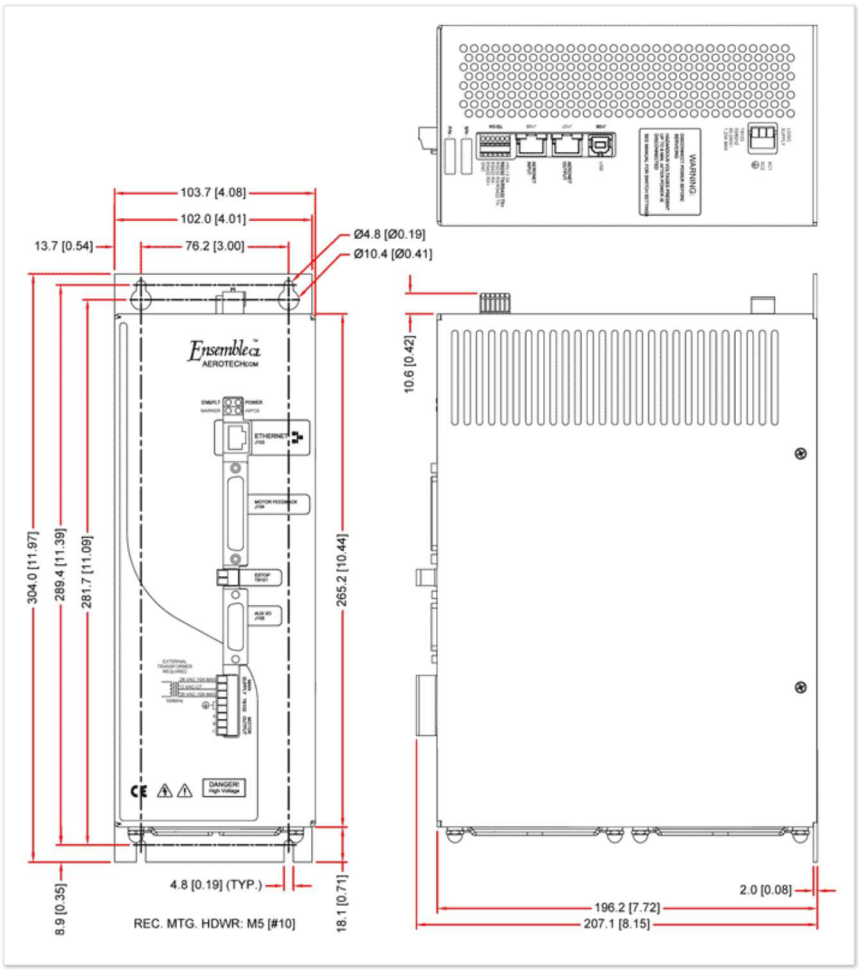
Ensemble CL Specifications

Ensemble CL	Units	
Motor Style		Brush, Brushless, Stepper, Voice Coil
Motor Supply	VAC	56 (center tapped transformer; two 28 VAC windings); Max
Control Supply(1)	VAC	85-240; 50/60 Hz
Bus Voltage(2)	VDC	±40
Peak Output Current (1 sec)(3,4)	A_{pk}	10
Continuous Output Current(3,4)	A_{pk}	5
Digital Inputs		6 Optically Isolated (2 High Speed)
Digital Outputs		4 Optically Isolated
Analog Inputs		One 16-bit Differential; ±10 V
Analog Outputs		One 16-bit SingleEnded
Dedicated Axis I/O on Feedback Connector		Three Limit Inputs (CW, CCW, Home); Three Hall Effect Inputs (A, B, C); Three High-Speed differential Inputs (sin, cos, mkr for encoder); Motor Over-Temperature Input
Dedicated I/O on Auxiliary Feedback Connector		sin, cos, mkr for Aux Enc; Aux Enc can be used for PSO Output
I/O Expansion Board(5)		16/16 Digital Opto-Isolated;1 Analog In (±10 V, 12-bit Differential); 1 Analog Out (±10 V, 12-bit)
High Speed Data Capture		Yes (50 ns Latency)
Automatic Brake Control		Optional
Emergency Stop Sense Input (ESTOP)(6)		Standard; 24 V Opto-Isolated
Position Synchronized Output (PSO)		Single Axis Only
Can Output Multiplied Encoder		No
Can Output Square Wave Encoder		Yes
Primary Encoder Input Frequency		32 MHz Square Wave Standard; 400 kHz Sine Wave (MXU)
Secondary Encoder Input Frequency		32 MHz Square Wave
Encoder Multiplication		Up to x8192 (MXU)
Resolver Interface		N/A
Internal Shunt Resistor		N/A
External Shunt		N/A
Ethernet		N/A
USB		No
RS-232		Yes
FireWire		No
Fieldbus		Modbus TCP; Ethernet/IP
Current Loop Update Rate	kHz	20
Servo Loop Update Rate	kHz	10
Power Amplifier Bandwidth	kHz	Selectable Through Software
Minimum Load Inductance	mH	0
Operating Temperature	°C	0 to 50
Storage Temperature	°C	-30 to 85
Weight	kg (lb)	3.54 (7.8)

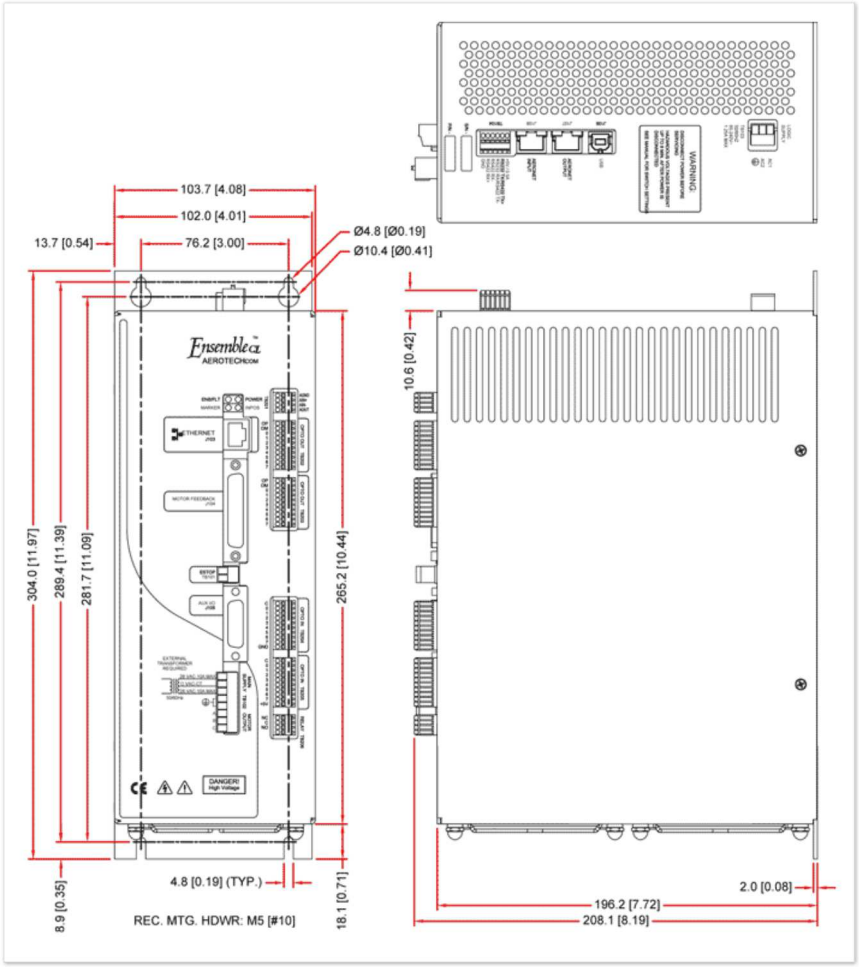
1. "Keep Alive" supply.
2. Output voltage is load dependent.
3. Peak value of the sine wave; rms current for AC motors is 0.707 * Apk.
4. Load dependent.
5. Requires IO option.
6. Requires external relay to remove motor supply power.

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Ensemble CL


103.7 [4.08]
102.0 [4.01]
13.7 [0.54]
76.2 [3.00]
Ø4.8 [Ø0.19]
Ø10.4 [Ø0.41]
304.0 [11.97]
289.4 [11.39]
281.7 [11.09]
265.2 [10.44]
10.6 [0.42]
8.9 [0.35]
4.8 [0.19] (TYP.)
REC. MTG. HDWR: M5 [#10]
18.1 [0.71]
2.0 [0.08]
196.2 [7.72]
207.1 [8.15]

Ensemble CL with additional I/O



Ordering Example

Ensemble HLe	20-40-X	-ENET	RDP1-10K

Ordering Options

Base	Output Current	Control Option	Resolver Options
Ensemble HLe	10-40-X 20-40-X 10-80-X	-IO -DUALPSO -TRIPLEPSO -PSOPTO2 -PSOPTO3 -PSOPTO4 -PSOAH -MXH -ENET	RDP1-10K RDP1-7.5K RDP1-5K RDP2-10K RDP2-7.5K RDP2-5K
Ensemble CL	10-40	-IO -MXU	
Ensemble ML	10-40	-IO -MXU -MXH	

Ensemble HLe/CL/ML Discrete Drives

Option	Description
ENSEMBLE HLe10-40-x	10 A peak, 5 A continuous, ±40 VDC bus, auxiliary 115/230 VAC input to power logic circuitry; supports brushless, brush, and stepper motors; includes: 4 opto-isolated digital inputs (sinking or sourcing), 2 high-speed inputs, 4 opto-isolated digital outputs (sinking only), 1 16-bit analog output, 1 16-bit differential analog input, single-axis PSO capability, 2 quadrature encoder input channels, ESTOP sense input
ENSEMBLE HLe20-40-x	20 A peak, 10 A continuous, ±40 VDC bus, auxiliary 115/230 VAC input to power logic circuitry; supports brushless, brush, and stepper motors; includes: 4 opto-isolated digital inputs (sinking or sourcing), 2 high-speed inputs, 4 opto-isolated digital outputs (sinking only), 1 16-bit analog output, 1 16-bit differential analog input, single-axis PSO capability, 2 quadrature encoder input channels, ESTOP sense input
ENSEMBLE HLe10-80-x	10 A peak, 5 A continuous, ±80 VDC bus, auxiliary 115/230 VAC input to power logic circuitry; supports brushless, brush, and stepper motors; includes: 4 opto-isolated digital inputs (sinking or sourcing), 2 high-speed inputs, 4 opto-isolated digital outputs (sinking only), 1 16-bit analog output, 1 16-bit differential analog input, single-axis PSO capability, 2 quadrature encoder input channels, ESTOP sense input
ENSEMBLE CL10-40	10 A peak, 5 A continuous, 115 VAC logic input power linear digital controller and drive; 56 VAC bus power; includes 4 digital outputs, 6 digital inputs, 1 analog output, 1 analog input, 1 24-VDC 1-amp solid-state brake relay; includes axis calibration, PSO, camming, absolute encoder support
ENSEMBLE ML	10 A peak, 5 A continuous, 10-80 VDC input, linear digital controller and drive with Ethernet interface; supports brush, brushless, and stepper motors; 2 quadrature encoder input channels, ESTOP sense input, and 24-80 VDC logic power input; includes axis calibration and camming

Options (Ensemble CL and ML)

Option	Description
BRAKE24-2	24 volt power supply for brake; 2 A
ENET-CAT6-10	1.0 m (3.2 ft) Ethernet cable
ENET-CAT6-20	2.0 m (6.6 ft) Ethernet cable
ENET-CAT6-30	3.0 m (9.8 ft) Ethernet cable
ENET-CAT6-45	4.5 m (14.7 ft) Ethernet cable

Options (Ensemble CL)

Option	Description
-I/O	Expansion board with 16 opto-isolated inputs (sinking or sourcing), 16 outputs (sinking or sourcing), 1 12-bit analog input, 1 16-bit analog output, and one 24 VDC 1-amp mechanical relay
-MXU	Programmable encoder multiplier up to x1024; no real-time output
-ETHERNET/IP	ODVA certified EtherNet/IP™ module for Allen-Bradley PLC with two APIs – ASCII and Register-to-Register

Software Ordering Example

ENSEMBLE-MC	MACHINE	DYNAMIC CONTROLS TOOLBOX	MOTION DESIGNER	MAINTENANCE-1-0

Software Ordering Options

Software	License	Controller Options	Motion Composer (MC) Options	Maintenance

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Software	License	Controller Options	Motion Composer (MC) Options	Maintenance
ENSEMBLE-MC	-MACHINE	-FIVE AXIS CONTOURING -DYNAMIC CONTROLS TOOLBOX -ENHANCED THROUGHPUT MODULE -ENHANCED TRACKING CONTROL	-MOTION DESIGNER -LABVIEW	-MAINTENANCE-y-m

Ensemble Software

Option	Description
ENSEMBLE-MC	ENSEMBLE: Full installation of Ensemble controller and selected software components on a new system. Full part number includes software options listed below. Pricing is summation of selected software products. Maintenance (software update) included in price for one year from date of purchase. MOTION COMPOSER STANDARD: Includes the Integrated Development Environment, Scope, SystemDiagnostics, and System Maintenance. Ensemble Motion Composer is intended for deployment on desktop or industrial PCs with a minimum Intel Pentium 4 processor, 512 MB RAM, Windows® XP or Windows® Vista Business (without SP1 installed). A full list of PC requirements and recommendations is available at www.aerotech.com. Includes the following software options:

License

Option	Description
-MACHINE	Provides the ability to write, compile, execute, debug programs in AeroBasic; full access to .NET 2.0 and C Library; access full diagnostics, fault, and status information; access and set I/O, registers, and variables; collect, analyze, and save data; view files from machine for analysis and record keeping; connect PC to machine throughEthernet TCP/IP or USB; upgrades can be installed (firmware or controller) using Loader; includes Ensemble-MC Standard; Note: The price of the first MACHINE license is included in the hardware price. The list price of the MACHINE license is used for multiple license copies and/or computing the Maintenance Price.

Controller Options

Option	Description
-FIVE AXIS CONTOURING	More than 4 axes of coordinated motion with a single motion command
-DYNAMIC CONTROLS TOOLBOX	Includes Harmonic Cancellation
-ENHANCED THROUGHPUT MODULE	Includes setup and monitoring screens of the ETM module; included in the price of the hardware modules sold separately
-ENHANCED TRACKING CONTROL	Enhanced tracking control for reduced dynamic following error and settling times

System Options

Option	Description
-ETHERNET/IP	ODVA certified EtherNet/IP™ module provides full integration with Allen Bradley PLC and programmable from RSLogix™. Module has two APIs: ASCII and Register-to-Register

Motion Composer (MC) Options

Option	Description
-MOTION DESIGNER	The Motion Designer is an add-on software component to the Digital Scope that provides the ability to create, import, run, and evaluate motion profiles (trajectories)
-LABVIEW	Includes LABVIEW 8.2 VI samples

Maintenance

Option	Description
-MAINTENANCE	First year of maintenance is included with the initial purchase; additional years can be purchased

Aerotech is a motion control, positioning and automation systems manufacturer.

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