Ensemble® Epaq MR Series

Stand-Alone, Multi-Axis Motion Controllers

Up to eight integrated drives in one stand-alone controller

Additional external drive axes can be added to provide up to ten axes of coordinated motion

Controller architecture capable of coordinating motion of up to five independent tasks

Capable of driving and controlling linear or rotary brushless, DC brush servo, and micro-stepping motors

Complete motion capabilities include: point-to-point, linear and circular interpolation, electronic gearing, velocity profiling

Program in AeroBasic™ with the IDE, Microsoft .NET including C#, VB.NET®, C++/CLI, LabVIEW®, and MATLAB®

Remote ASCII interface provided for Windows® or non-Windows® programs (including Linux) to command the Epaq through standard Ethernet or RS-232 port

Advanced Windows®-based remote diagnostics, tuning, and programming interface software

Axis jogging/control with optional joystick

Fully compatible with EPICS set of software tools and applications, making Ensemble ideal for use in synchrotron and general laboratory facilities

CE approved and NRTL safety certification; follows the 2011/65/EU RoHS 2 Directive

Allen-Bradley EtherNet/IP™ interface provides full integration with the Ensemble; program the Ensemble directly from RSLogix™ 5000
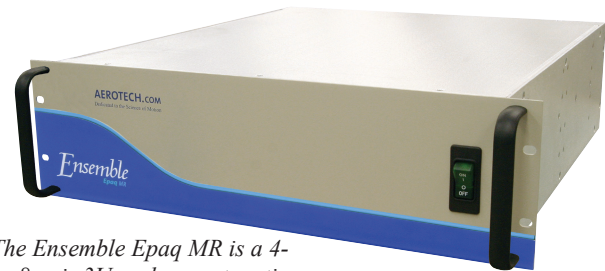
The Ensemble Epaq MR is a 4- or 8-axis 3U rack-mount motion controller.

The Ensemble® Epaq MR is Aerotech's next-generation, stand-alone controller for moderate- to high-performance applications. It offers functionality appropriate for applications from basic laboratory experimentation and general purpose positioning to advanced OEM systems at an affordable price.

Versatile, Stand-Alone, Multi-Axis Control

The Ensemble Epaq MR is offered in a 4- or 8-axis 3U rack-mount version. Each version contains integrated power supplies and pluggable motor and IO connectors. PWM amplifiers are offered to control brush, brushless, and stepper motors. Linear amplifiers are also available for high performance, low noise applications. Higher power external amplifiers may be daisy-chained to the Epaq MR using the high-speed AeroNet serial interface for a total of ten axes of coordinated motion.

This flexible configuration style allows users to seamlessly mix and match drive types (linear versus PWM, brush or brushless, stepper, etc.) within the same positioning system using a common programming and control platform.

Multiple Epaq MRs can be controlled from one Windows® PC through Ethernet. Optional on-board encoder interpolation offers the user programmable axis resolution (assuming a sine-wave encoder input signal), including the ability to change interpolation (multiplication) values through software.

Powerful and Intuitive Programming Functionality

Unlike most controllers on the market today, there is no need to understand a cryptic command set to generate motion. The intuitive interface allows a user to begin programming immediately. Ensemble online help further simplifies writing motion programs and includes many functional examples that can be easily modified for customer applications.

The Ensemble with Integrated Development Environment software offers a graphical user interface in Windows®, featuring an intuitive Program Editor, Variable Output window, Compiler Output window, and Task State monitor. This interface enables users to easily monitor all aspects of their positioning system, no matter how complex. The Axis Control and Diagnostic screens are further supplemented by a fully functional Autotuning utility that minimizes startup time and allows easy optimization

Ensemble Epaq MR DESCRIPTION

of motion axes. System diagnostics are easily read from the interface. The Windows-based remote software package is included with each unit, which allows the user to upload/download programs, modify parameter files, and analyze motion with Aerotech's advanced graphical tuning package, all from the convenience of a remote PC.

Whether operated in stand-alone mode or by remote control through Ethernet, the full functionality of the Ensemble Epaq MR is available. On-board configuration and monitoring utilities simplify remote communications. The Epaq MR also has an RS-232 port for general purpose use.

Advanced DSP Control

The Ensemble Epaq MR uses the processing power of multiple double precision, floating-point DSPs to offer exceptional performance in a variety of applications, including point-to-point motion, linear and circular interpolation, single- and multi-axis error correction, 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 Epaq MR also offers high-speed position latching capability and optional single-axis PSO (Position Synchronized Output). 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 applications.

Integral Drives

Brushless servo, DC brush servo, and microstepping drives are integrated into the Ensemble Epaq MR compact frame. The Epaq MR can control any combination of up to eight integral drives, while the Ensemble architecture is capable of further expansion (with external stand-alone, single-axis drive units) to up to ten total axes. Because the Epaq MR can control many different types of motors, customers have excellent flexibility in their system designs. High accuracy linear motor air-bearings can be controlled from the same controller running lower precision drives with servo or stepper motors. Parameters are easily reconfigured for these various motors and feedback devices, so customers can adapt to changing system needs.

Expanded Input/Output Capability

On a per axis basis the Epaq MR also features an optional I/O package offering eight digital inputs and outputs, one 12-bit ±10 VDC analog input, one 16-bit ±5 VDC output, a configurable brake output, a second TTL encoder input for dual loop control, and either a second marker input or PSO output. This optional I/O package can be added to each axis so numerous I/O can be connected to the Epaq MR.

Enhancing a Legacy of Success

Although Ensemble is envisioned as a general-purpose, stand-alone controller, it carries forward a legacy of success built from Aerotech's hugely successful A3200 and Soloist™ controllers. It offers enhanced capabilities that make it an ideal choice for many aggressive motion control applications. The Ensemble motion control architecture builds upon the Soloist intuitive graphical user interface, while offering advanced features appropriate for multi-axis control. Pre-coded LabVIEW® VIs, AeroBasic™ programming functionality, MATLAB® library, .NET tools for C#, VB.NET and C++/CLI or C make the Ensemble even easier to use. See the **Ensemble Control** home page for detailed information on software capabilities and ordering options.

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 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 Epaq MR Integrated Amplifier SPECIFICATIONS

Integrated Amplifier Electrical Specifications		MP	ML
Output Voltage	VDC	10, 20, 30, 40, 80	10, 20, 30, 40
Peak Output Current	A	10	10(1)
Continuous Output Current	A	5	5(1)
PWM Switching Frequency	kHz	20	N/A
Power Amplifier Bandwidth	kHz	Software Selectable	Software Selectable
Minimum Load Inductance	mH	0.1	0
Operating Temperature	°C	0 to 50	0 to 50
Storage Temperature	°C	-20 to 85	-20 to 85
Weight	kg	0.5	0.5

Notes:
1. Actual current ratings dependent on motor resistance.

Ensemble Epaq MR SPECIFICATIONS

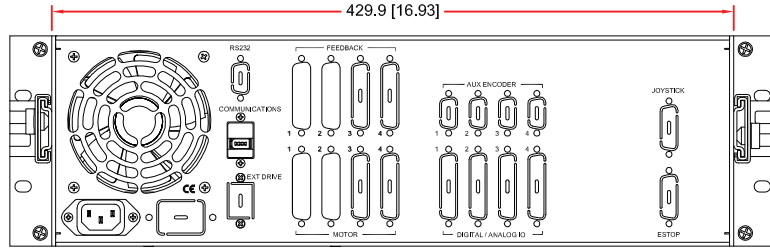|	Units	Epaq MR
Number of Axes		1 to 8
Encoder Inputs		1 Primary and 1 Auxiliary Per Axis
Motor Style		Brush, Brushless, Stepper
Power Supply	VAC	100-240 VAC; 50/60 Hz (Factory Configured)
Bus Voltage	VDC	10-80
Peak Output Current (1 sec)[1]	A_{pk}	10
Continuous Output Current[1]	A_{pk}	5
Digital Inputs	—	No
Digital Outputs	—	No
Analog Inputs	—	One 16-bit Analog Input per Axis
Analog Outputs	—	No
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; One 16-bit Analog 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[2]	—	One 12-bit Differential Analog Input; One 16-bit Analog Output; Eight Digital Inputs, Optically Isolated, Sinking or Sourcing; Eight Optically-Isolated Digital Outputs per Axis
High Speed Data Capture		Yes[2]
High Speed Digital Outputs		No
Bi-Directional Lines		No
Automatic Brake Control	—	Optional
Emergency Stop (ESTOP)	—	Optional
Position Synchronized Output (PSO)	—	Single Axis Standard
Can Output Multiplied Encoder		Yes (only with MXH option)
Can Output Square Wave Encoder		Yes
Primary Encoder Input Frequency with Multiplication		200 kHz (MXU) or 450 kHz (MXH) sine wave
Primary Encoder Input Frequency – Square Wave		10 MHz square wave frequency/40 MHz count rate
Secondary Encoder Input Frequency		10 MHz square wave frequency/40 MHz count rate
Laser Feedback Support		No
Encoder Multiplication[3]	—	x4096 (MXU); x65536 (MXH)
Resolver Interface	—	No
Internal Shunt Resistor		No
External Shunt		No
Ethernet	—	Yes
USB		No
RS-232		Yes
FireWire		No
Fieldbus		Modbus TCP on PC
Joystick		Yes
Additional Interfaces		10/100 Base T Ethernet communication interface for system setup, application networking, Epaq-to-Epaq communications, embedded programming, immediate commands, and Modbus over TCP; USB communication interface for system setup, application networking, Windows® PC control interface; RS-232 port with programmable baud rate, length, parity, stop bits
Other I/O		No
Current Loop Update Rate	kHz	20
Servo Loop Update Rate	kHz	1 to 20
Power Amplifier Bandwidth	kHz	Selectable Through Software
Minimum Load Inductance	mH	0.1 mH with PWM; 0 with Linear
Operating Temperature	°C	0 to 50
Storage Temperature	°C	-30 to 85
Weight	kg (lb)	16 (35)
Package		Rack Mount
Standards		CE approved, NRTL safety certification, EU 2015/863 RoHS 3 directive

Notes:
1. Peak value of the sine wave; rms current for AC motors is 0.707 * A_{pk}.
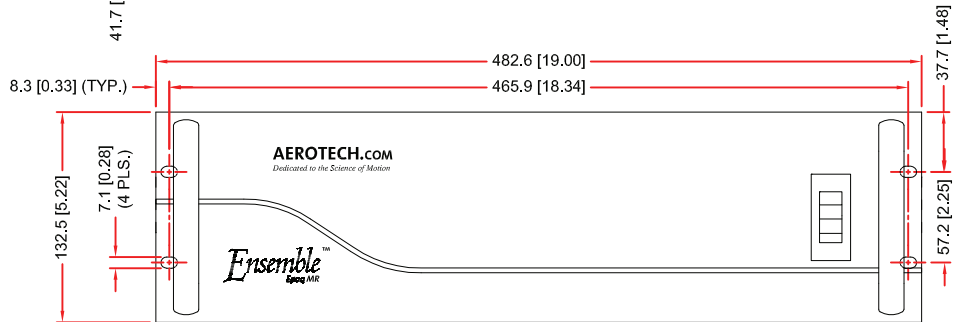2. Requires IO option.
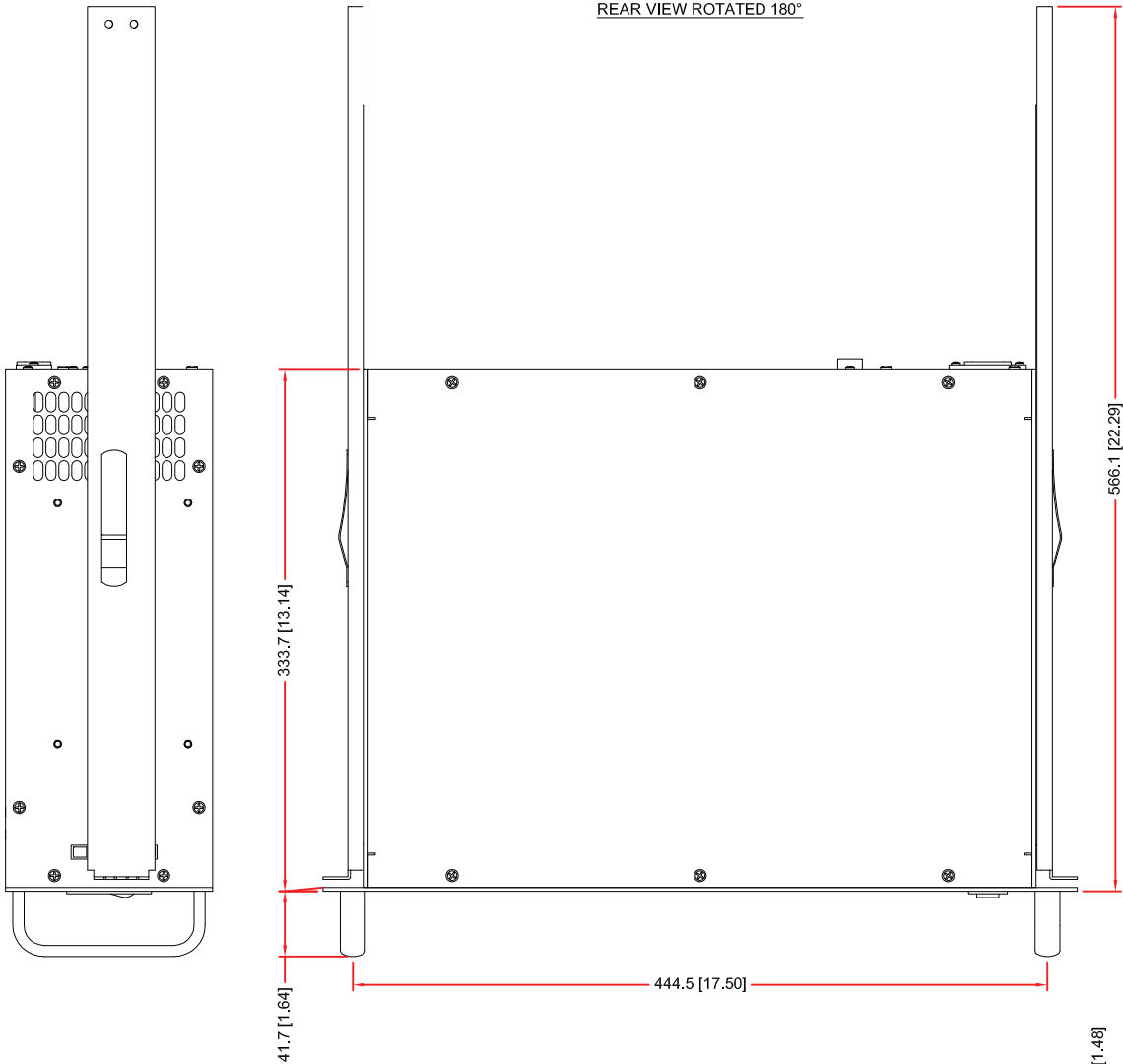3. Effective multiplication factor after quadrature decoding (if applicable).

Ensemble Epaq MR DIMENSIONS

4-Axis Chassis

429.9 [16.93]

REAR VIEW ROTATED 180°

566.1 [22.29]

333.7 [13.14]

41.7 [1.64]

444.5 [17.50]

482.6 [19.00]

465.9 [18.34]

8.3 [0.33] (TYP.)

37.7 [1.48]

7.1 [0.28]
(4 PLS.)

132.5 [5.22]

57.2 [2.25]

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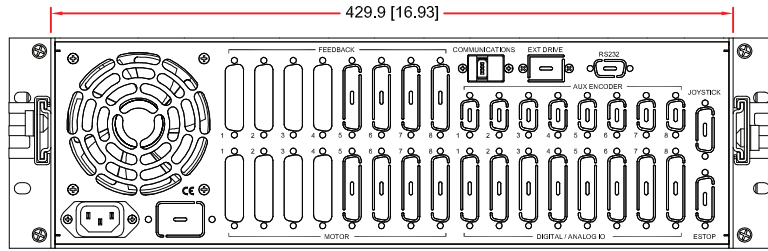Dedicated to the Science of Motion
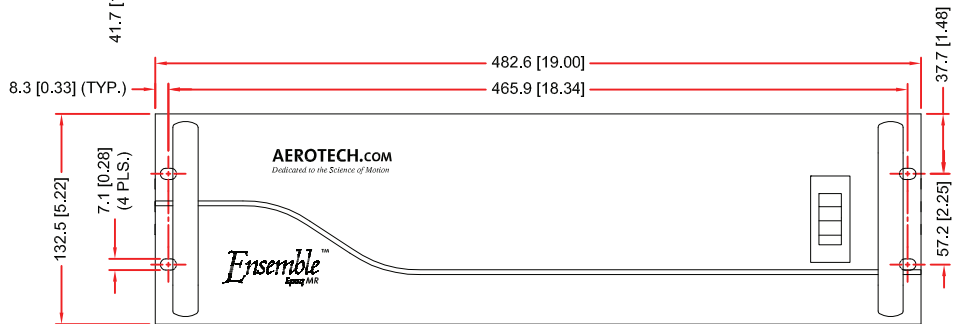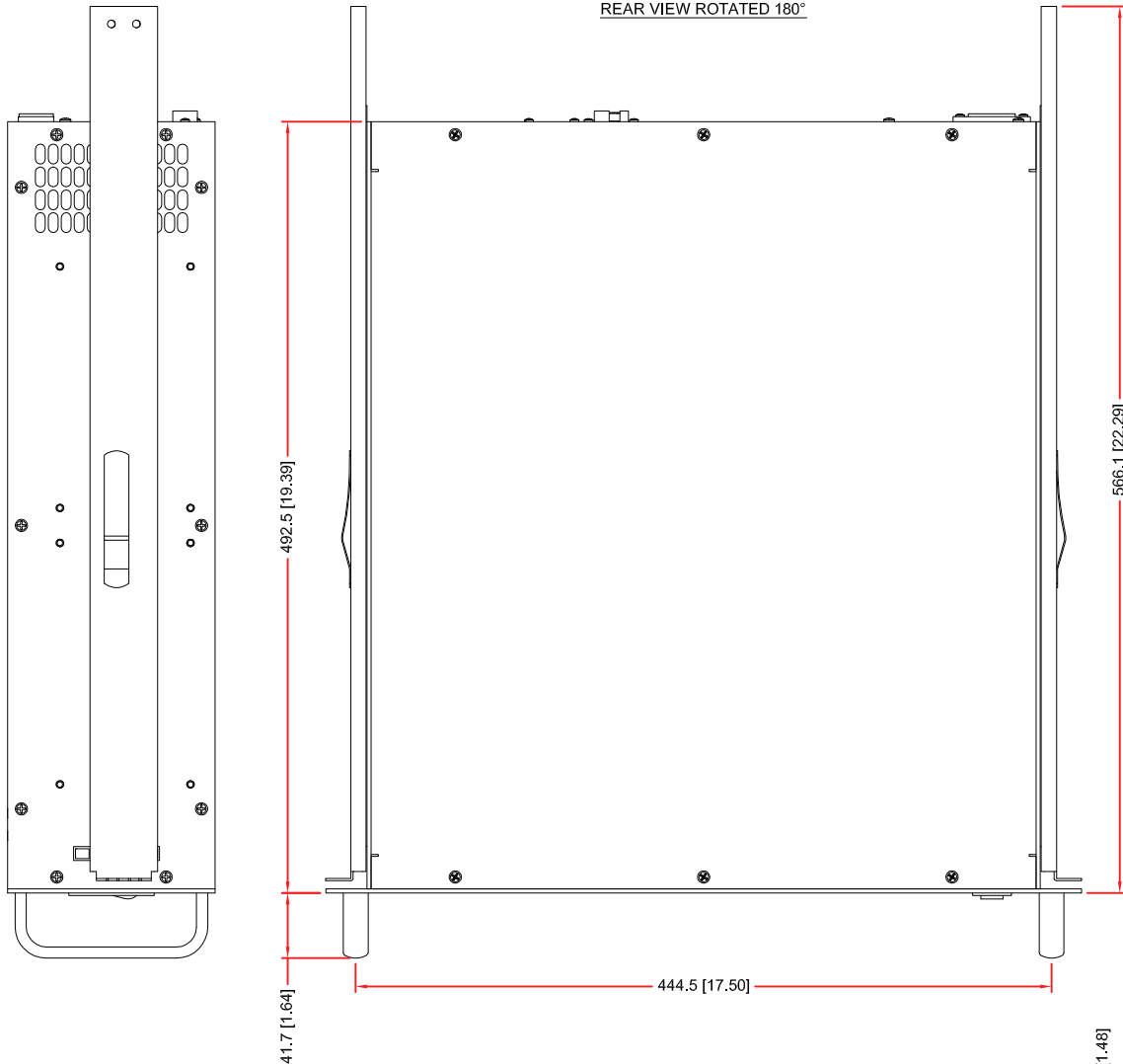
Ensemble™
Epaq MR

620E1408D

Ensemble Epaq MR DIMENSIONS

8-Axis Chassis

REAR VIEW ROTATED 180°

620E1408D

Epaq MR ORDERING INFORMATION

Ordering Example

Ensemble Epaq MR	/4AXIS-BOX	-A	-4-40LP	/1-MP10I	/2-MP10	/3-MP10
Base	Package	Line Voltage	Bus Power Supply	Axis 1 Amp	Axis 2 Amp	Axis 3 Amp
	/4AXIS-BOX /8AXIS-BOX	-A -B -C -D	-4-40LP -4-80LP -4-40 -4-80 -4-10B -4-20B -4-30B -4-40B -8-40LP -8-80LP -8-40 -8-80 -8-10B -8-20B -8-30B -8-40B	/1-MP10 /1-MP10I /1-MP10M /1-MP10MI /1-MP10-HB /1-MP10I-HB /1-MP10M-HB /1-MP10MI-HB /1-ML10 /1-ML10I /1-ML10M /1-ML10MI /1-ML10H /1-ML10HI	/2-MP10 /2-MP10I /2-MP10M /2-MP10MI /2-MP10-HB /2-MP10I-HB /2-MP10M-HB /2-MP10MI-HB /2-ML10 /2-ML10I /2-ML10M /2-ML10MI /2-ML10H /2-ML10HI	/3-MP10 /3-MP10I /3-MP10M /3-MP10MI /3-MP10-HB /3-MP10I-HB /3-MP10M-HB /3-MP10MI-HB /3-ML10 /3-ML10I /3-ML10M /3-ML10MI /3-ML10H /3-ML10HI

Ordering Example (continued)

/4-MP10	/5-MP10	/6-MP10	/7-MP10	/8-MP10	/US-115VAC	/Brake-2
Axis 4 Amp	Axis 5 Amp	Axis 6 Amp	Axis 7 Amp	Axis 8 Amp	Line Cord	Brake Options
/4-MP10 /4-MP10I /4-MP10M /4-MP10MI /4-MP10-HB /4-MP10I-HB /4-MP10M-HB /4-MP10MI-HB /4-ML10 /4-ML10I /4-ML10M /4-ML10MI /4-ML10H /4-ML10HI	/5-MP10 /5-MP10I /5-MP10M /5-MP10MI /5-MP10-HB /5-MP10I-HB /5-MP10M-HB /5-MP10MI-HB	/6-MP10 /6-MP10I /6-MP10M /6-MP10MI /6-MP10-HB /6-MP10I-HB /6-MP10M-HB /6-MP10MI-HB	/7-MP10 /7-MP10I /7-MP10M /7-MP10MI /7-MP10-HB /7-MP10I-HB /7-MP10M-HB /7-MP10MI-HB	/8-MP10 /8-MP10I /8-MP10M /8-MP10MI /8-MP10-HB /8-MP10I-HB /8-MP10M-HB /8-MP10MI-HB	/ENGLAND /GERMANY /ISRAEL /INDIA /AUSTRALIA /US-115VAC /US-230VAC /NO-LINECORD	/BRAKE-1 /BRAKE-2 /BRAKE-3 /BRAKE-4 /BRAKE-5 /BRAKE-6 /BRAKE-7 /BRAKE-8

Ensemble Epaq MR Software

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.
-MC	MOTION COMPOSER STANDARD: Includes the Integrated Development Environment, Scope, System Diagnostics, 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

-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 through Ethernet TCP/IP; 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.

Epaq MR Software ORDERING INFORMATION

-DEVELOPER	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 through Ethernet TCP/IP; CANNOT upgrade firmware or controller software; CANNOT simulate trajectory; includes Ensemble-MC Standard except loader; Note: System and Control Options are not valid for Developer License

Controller Options

-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
-LCK	Locked drive; firmware and calibration data on the drive cannot be modified by the user after the product leaves Aerotech; the drive must be returned to Aerotech if firmware/calibration updates are required; read/write access to parameters and programs is supported

System Options

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

Motion Composer (MC) Options

-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

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

Epaq MR ORDERING INFORMATION

Epaq MR

Epaq MR	Four or eight axis, rack mount, stand-alone motion controller with integrated power supplies, and servo/stepping motor amplifiers. Features include independent or coordinated motion, point to point, linear and circular interpolation, constant velocity, velocity profiled, time based, free-run motion types, electronic gearing, backlash compensation, and 1D or 2D axis calibration. Ensemble Standard HMI Multi-Axis Software included. -Up to 10 kHz servo update rate for all axes -Digital servo loop -One 10/100 base T Ethernet port; one RS-232 port -Dedicated I/O per axis includes: CW, CCW, and home limits, marker, Hall effect sensors, enable, fault, for each axis -User defined I/O on I/O option board includes eight opto-isolated inputs (sinking or sourcing), eight outputs (sinking or sourcing), one 12-bit analog input, one 16-bit analog output and brake relay; this I/O is on Axis 1; optional adder for axes 2-6

Package

/4AXIS-BOX	Supports up to 4 axes of motion
/8AXIS-BOX	Supports up to 8 axes of motion

Line Voltage

-A	115 VAC input voltage
-B	230 VAC input voltage
-C	100 VAC input voltage
-D	200 VAC input voltage

Epaq MR ORDERING INFORMATION

Bus Power Supply

-4-40LP	Four axis rack with 40 VDC bus; up to 300 watts
-4-80LP	Four axis rack with 80 VDC bus; up to 300 watts
-4-40	Four axis rack with 40 VDC bus; up to 600 watts
-4-80	Four axis rack with 80 VDC bus; up to 600 watts
-4-10B	Four axis rack with ±10 VDC bus; up to 400 watts
-4-20B	Four axis rack with ±20 VDC bus; up to 400 watts
-4-30B	Four axis rack with ±30 VDC bus; up to 400 watts
-4-40B	Four axis rack with ±40 VDC bus; up to 600 watts
-8-40LP	Eight axis rack with 40 VDC bus; up to 500 watts
-8-80LP	Eight axis rack with 80 VDC bus; up to 500 watts
-8-40	Eight axis rack with 40 VDC bus; up to 500 watts
-8-80	Eight axis rack with 80 VDC bus; up to 1000 watts
-8-10B	Eight axis rack with ±10 VDC bus; up to 400 watts
-8-20B	Eight axis rack with ±20 VDC bus; up to 400 watts
-8-30B	Eight axis rack with ±30 VDC bus; up to 400 watts
-8-40B	Eight axis rack with ±40 VDC bus; up to 600 watts

Axis 1 Amplifier Options

/1-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/1-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/1-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/1-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/1-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/1-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/1-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/1-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option
/1-ML10	Digital linear amplifier, 10 A peak, 5 A continuous
/1-ML10I	Digital linear amplifier, 10 A peak, 5 A continuous with I/O option
/1-ML10M	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/1-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/1-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH[1]

Axis 2 Amplifier Options

/2-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/2-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/2-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/2-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/2-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/2-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/2-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/2-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option
/2-ML10	Digital linear amplifier, 10 A peak, 5 A continuous
/2-ML10I	Digital linear amplifier, 10 A peak, 5 A continuous with I/O option
/2-ML10M	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/2-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/2-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH[1]
/2-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH[1] with I/O option

Note: 1. Effective multiplication factor specified after quadrature decoding (if applicable).

Axis 3 Amplifier Options

/3-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/3-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/3-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/3-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/3-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/3-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/3-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/3-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option
/3-ML10	Digital linear amplifier, 10 A peak, 5 A continuous

Epaq MR ORDERING INFORMATION

/3-ML10I	Digital linear amplifier, 10 A peak, 5 A continuous with I/O option
/3-ML10M	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/3-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/3-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH[1]
/3-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH with I/O option

Note: 1. Effective multiplication factor specified after quadrature decoding (if applicable).

Axis 4 Amplifier Options

/4-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/4-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/4-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/4-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/4-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/4-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/4-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/4-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option
/4-ML10	Digital linear amplifier, 10 A peak, 5 A continuous
/4-ML10I	Digital linear amplifier, 10 A peak, 5 A continuous with I/O option
/4-ML10M	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/4-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/4-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH[1]
/4-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH[1] with I/O option

Note: 1. Effective multiplication factor specified after quadrature decoding (if applicable).

Axis 5 Amplifier Options

/5-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/5-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/5-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/5-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/5-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/5-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/5-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/5-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option

Note: 1. Effective multiplication factor specified after quadrature decoding (if applicable).

Axis 6 Amplifier Options

/6-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/6-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/6-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/6-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/6-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/6-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/6-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/6-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option

Note:1. Effective multiplication factor specified after quadrature decoding (if applicable).

Axis 7 Amplifier Options

/7-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/7-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/7-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/7-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/7-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/7-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/7-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/7-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option

Note: 1. Effective multiplication factor specified after quadrature decoding (if applicable).

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Axis 8 Amplifier Options

/8-MP10	Digital PWM amplifier, 10 A peak, 5 A continuous
/8-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/8-MP10M	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1]
/8-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O option
/8-MP10-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with half bus option
/8-MP10I-HB	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O and half bus option
/8-MP10M-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] and half bus option
/8-MP10MI-HB	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU[1] with I/O and half bus option

Note: 1. Effective multiplication factor specified after quadrature decoding (if applicable).

Line Cord (must select one)

/ENGLAND	UK compatible line cord
/GERMANY	German compatible line cord
/ISRAEL	Israel compatible line cord
/INDIA	India compatible line cord
/AUSTRALIA	Australia compatible line cord
/US-115VAC	US 115 VAC line cord
/US-230VAC	US 230 VAC line cord
/NO-LINECORD	No line cord

Brake Options (up to 4 selections allowable)

/BRAKE-1	Axis 1 wired for 24 V, 1 A brake
/BRAKE-2	Axis 2 wired for 24 V, 1 A brake (amp must have "I" or "MI" option)
/BRAKE-3	Axis 3 wired for 24 V, 1 A brake (amp must have "I" or "MI" option)
/BRAKE-4	Axis 4 wired for 24 V, 1 A brake (amp must have "I" or "MI" option)
/BRAKE-5	Axis 5 wired for 24 V, 1 A brake (amp must have "I" or "MI" option)
/BRAKE-6	Axis 6 wired for 24 V, 1 A brake (amp must have "I" or "MI" option)
/BRAKE-7	Axis 7 wired for 24 V, 1 A brake (amp must have "I" or "MI" option)
/BRAKE-8	Axis 8 wired for 24 V, 1 A brake (amp must have "I" or "MI" option)

Options (multiple selections allowable)

-ESTOP1	Controller stops motion, then disables servo control. Internal positive guided relay with monitor contact disconnects AC power source from motor. Operator risk assessment is the responsibility of the end user or integrator
-ESTOP2	Same as ESTOP1 but uses two relays
-ESTOP3	Same as ESTOP2 but contains 1 second bus discharge resistors
-SLIDE	Rackmount slides

Standard Motor Power and Combination Power/FeedBack Cables (order as separate line items)

C21481-50	CABLE: BL MTR-4TS-4MS-LP1-MAX450DM: MS motor power cable, Epaq 4-terminal connector to 4-pin MS connector; 5 A continuous current (5 meters long)
C21491-50	CABLE: BL MTR-4TS-4DU-LP1-MAX450DM: HPD motor power cable, Epaq 4-terminal connector to 4-pin High Power D connector; 5 A continuous current (5 meters long)
C21511-50	CABLE: BL MTR-4TS-4DU-LP1-HF-MAX450DM: Hi Flex HPD motor power cable, Epaq 4-terminal connector to 4-pin High Power D connector; 5 A continuous current (5 meters long)
C21501-50	CABLE: BL MTR & FB-4TS-25DU-25DU-MAX107DM: 25-pin D stage to split Epaq 4-terminal strip motor power and 25D feedback cable (5 meters long)
C21521-50	CABLE: SM MTR & FB-25DU-4TS-23B-MAX107DM: 23-pin stepper motor connector to split Epaq 4-terminal strip motor power and 25D feedback cable (5 meters long)
C22091-50	Motor power cable, high flex, 5.0 meters long, for use with Epaq; 4 A continuous current rating; to be used with 10 A peak drives ONLY -Motor type: brushless -Motor/stage connector: 4-pin high power D -Amplifier connector: 4-pin terminal strip Epaq connector -Maximum cable length: 45 meters -Minimum bend radius 60 mm (2.36") -Rated for continuous flex -BL MTR-FLB-4DU-HF60-4ARMS-MAX 450DM

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Integration (Required)

Aerotech offers both standard and custom integration services to help you get your system fully operational as quickly as possible. The following standard integration options are available for this system. Please consult Aerotech if you are unsure what level of integration is required, or if you desire custom integration support with your system.

-TAS   Integration - Test as system
Testing, integration, and documentation of a group of components as a complete system that will be used together (ex: drive, controller, and stage). This includes parameter file generation, system tuning, and documentation of the system configuration.

-TAC   Integration - Test as components
Testing and integration of individual items as discrete components that ship together. This is typically used for spare parts, replacement parts, or items that will not be used together. These components may or may not be part of a larger system.