

# Ensemble<sup>®</sup> Epaq Series

## Stand-Alone, Multi-Axis Motion Controllers

Up to six integrated drives in one stand-alone controller

Additional external drive axes can be added to provide up to nine 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<sup>™</sup> with the IDE, Microsoft .NET including C#, VB.NET<sup>®</sup>, C++/CLI, LabVIEW<sup>®</sup>, and MATLAB<sup>®</sup>

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

CE approved; follows the 2011/65/EU RoHS 2 Directive

Advanced Windows<sup>®</sup>-based remote diagnostics, tuning, and programming interface software

Front panel display and control pad for convenient menu-driven axis control and status checking

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

Allen-Bradley EtherNet/IP<sup>™</sup> interface provides full integration with the Ensemble; program the Ensemble directly from RSLogix<sup>™</sup> 5000



The Ensemble<sup>®</sup> Epaq 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.

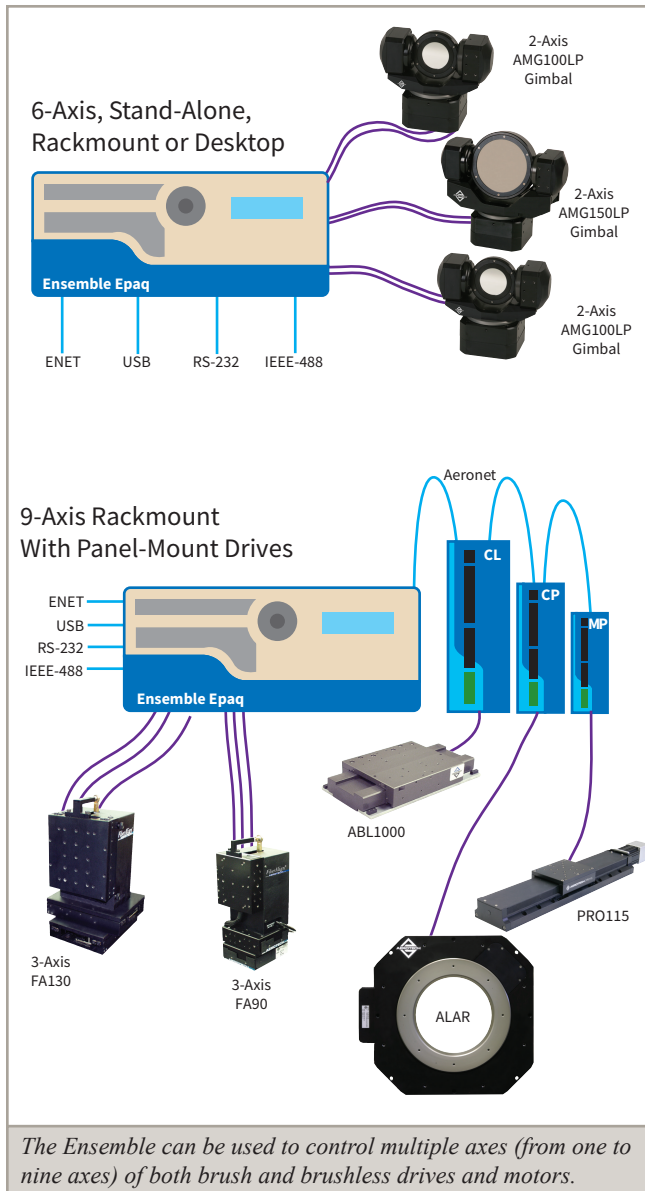
### Versatile, Stand-Alone, Multi-Axis Control

The Ensemble Epaq is offered in a 6-axis desktop (rack-mount optional) version with display and jog pad. It 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 using the high-speed AeroNet serial interface for a total of nine 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 Epaqs can be controlled from one Windows PC through Ethernet or USB. 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

## Ensemble Epaq DESCRIPTION



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 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 through the front panel or by remote control through Ethernet or USB, the full functionality of the Ensemble Epaq is available. On-board configuration and monitoring utilities simplify remote communications. To allow easy serial connectivity and ease of use, the Epaq features an RS-232 port (additional RS-232 port is an option).

### Advanced DSP Control

The Ensemble Epaq uses the processing power of multiple

## Ensemble Epaq/Epaq MR Integrated Amplifier SPECIFICATIONS

Integrated Amplifier Electrical Specifications		MP	ML
Output Voltage	VDC	24 V, 48 V, 54 V, 90 V options	10-40 V (Bipolar)
Peak Output Current	A	10	10 <sub>(1)</sub>
Continuous Output Current	A	5	5 <sub>(1)</sub>
PWM Switching Frequency	kHz	20	N/A
Power Amplifier Bandwidth	kHz	Software Selectable	Software Selectable
Minimum Load Inductance	mH	0.1 @ 54 VDC	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
Standards		CE approved, NRTL safety certification, EU 2015/863 RoHS 3 directive	

Note:

1. Actual current ratings dependent on motor resistance.

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 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 compact frame. The Epaq can control any combination of up to six integral drives, while the Ensemble architecture is capable of further expansion (with external stand-alone, single-axis drive units) to up to nine total axes. Because the Epaq 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

Each Epaq features an optional second RS-232 port, and an axis expansion port. On a per axis basis the Epaq also features an optional I/O package offering eight digital inputs and outputs, one 12-bit  $\pm 10$  VDC analog input, one 16-bit  $\pm 5$  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.

### 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.

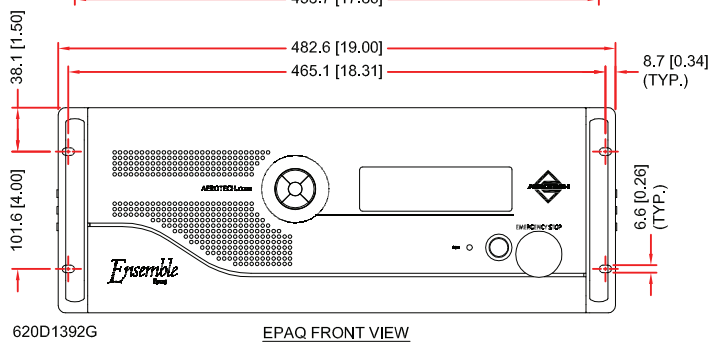
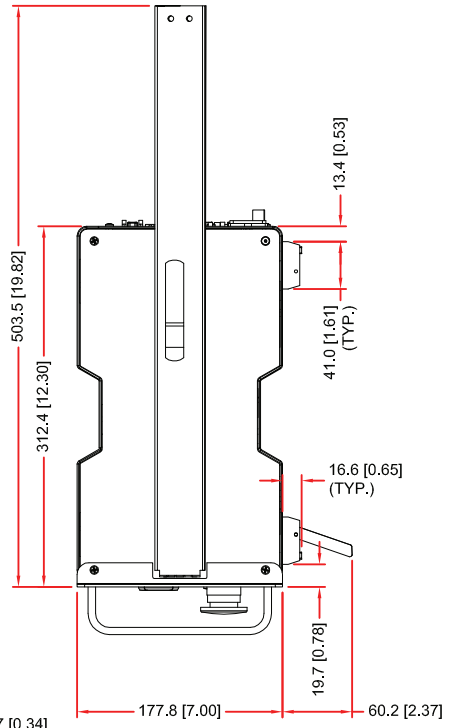
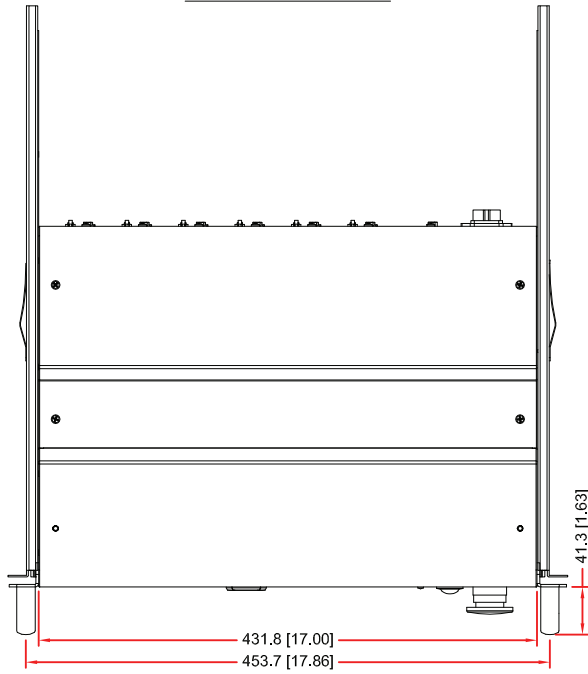
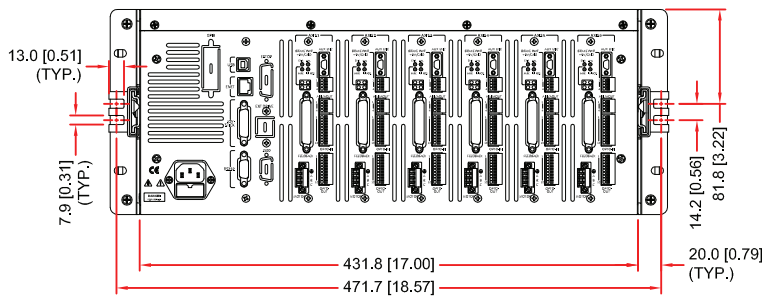
## Ensemble Epaq SPECIFICATIONS

	Units	Epaq
Number of Axes		1 to 6
Encoder Inputs		1 to 6
Motor Style		Brush, Brushless, Stepper
Power Supply	VAC	100/115/200/230 VAC; 50/60 Hz (Factory Configured)
Bus Voltage	VDC	40, 40LP, 80, 80LP, 10B, 20B, 30B, 40B
Peak Output Current (1 sec) <sup>(1)</sup>	A <sub>pk</sub>	10
Continuous Output Current <sup>(1)</sup>	A <sub>pk</sub>	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 <sup>(2)</sup>	—	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 <sup>(2)</sup>
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 <sup>(3)</sup>	—	x4096 (MXU); x65536 (MXH)
Resolver Interface	—	No
Internal Shunt Resistor		No
External Shunt		No
Ethernet	—	Yes
USB		Yes
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 (second RS-232 port optional)
		ESTOP to Stop All Axes
		Display: Backlit 8 x 40 Character LCD
		Keypad: 5-Key Input Pad
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)	10 (22)
Package		Desktop or Rackmount

## Notes:

1. Peak value of the sine wave; rms current for AC motors is 0.707 \* A<sub>pk</sub>.
2. Requires I/O option.
3. Effective multiplication factor after quadrature decoding (if applicable).

# Ensemble Epaq DIMENSIONS



## Epaq ORDERING INFORMATION

Ensemble Epaq	-S	/A	40	/1-MP10I	/2-MP10	/3-MP10	/4-MP10	/5-MP10	/6-MP10
Base	Package	Line Voltage	Bus Power Supply	Axis 1 Amp	Axis 2 Amp	Axis 3 Amp	Axis 4 Amp	Axis 5 Amp	Axis 6 Amp
	-S -R	/A /B /C /D	40 40LP 80 80LP 10B 20B 30B 40B	/1-MP10I /1-MP10MI /1-ML10I /1-ML10MI /1-ML10HI	/2-MP10 /2-MP10I /2-MP10M /2-MP10MI /2-BLANK /2-BLANKW /2-ML10 /2-ML10I /2-ML10MI /2-ML10M /2-ML10HI /2-ML10H	/3-MP10 /3-MP10I /3-MP10M /3-MP10MI /3-BLANK /3-BLANKW /3-ML10 /3-ML10I /3-ML10MI /3-ML10M /3-ML10HI /3-ML10H	/4-MP10 /4-MP10I /4-MP10M /4-MP10MI /4-BLANK /4-BLANKW /4-ML10 /4-ML10I /4-ML10MI /4-ML10M /4-ML10HI /4-ML10H	/5-MP10 /5-MP10I /5-MP10M /5-MP10MI /5-BLANK /5-BLANKW /5-ML10 /5-ML10I /5-ML10MI /5-ML10M /5-ML10HI /5-ML10H	/6-MP10 /6-MP10I /6-MP10M /6-MP10MI /6-BLANK /6-BLANKW /6-ML10 /6-ML10I /6-ML10MI /6-ML10M /6-ML10HI /6-ML10H

### Ordering Example (continued)

/US-115VAC	/Brake-2	/RS232-2
Line Cord	Brake Options	Options
/ENGLAND /GERMANY /ISRAEL /Australia /INDIA /US-115VAC /US-230VAC /NO-LINECORD	/Brake-1 /Brake-2 /Brake-3 /Brake-4 /Brake-5 /Brake-6	/ESTOP0 /ESTOP1 /EXTAMP /SLIDE /RS232-2

### Ensemble Epaq 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](http://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 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.
- 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 or USB; 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.

## Epaq Software ORDERING INFORMATION

### Controller Options

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-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

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-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
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### Motion Composer (MC) Options

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-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

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

### Epaq

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Epaq-S	<p>Six axis, desktop, 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.</p> <ul style="list-style-type: none"> <li>-Up to 10 kHz servo update rate for all axes</li> <li>-Digital servo loop</li> <li>-One 10/100 base T Ethernet port, one USB 2.0 port, one RS-232 port</li> <li>-Dedicated I/O per axis includes: CW, CCW, and home limits, marker, Hall effect sensors, enable, fault, for each axis</li> </ul> <p>User defined I/O 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</p>
Epaq-R	<p>Six 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.</p> <ul style="list-style-type: none"> <li>-Up to 10 kHz servo update rate for all axes</li> <li>-Digital servo loop</li> <li>-One 10/100 base T Ethernet port, one USB 2.0 Port, one RS-232 port</li> <li>-Dedicated I/O per axis includes: CW, CCW, and home limits, marker, Hall effect sensors, enable, fault, for each axis</li> </ul> <p>User defined I/O 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</p>

## Epaq ORDERING INFORMATION

### Standard or Blank Front Panel (must select one)

-FPB	Blank front panel (without display or keypad)
-FPD	Standard front panel (with display and keypad)
-FPBE	Blank front panel with ESTOP switch (without display or keypad)
-FPDE	Standard front panel with ESTOP switch (with display and keypad)

### Line Voltage (must select one)

/A	115 VAC line voltage
/B	230 VAC line voltage
/C	100 VAC line voltage
/D	200 VAC line voltage

### Bus Power Supply

40	40 VDC motor supply, 600 W
40LP	40 VDC motor supply, 300 W
80	80 VDC motor supply, 600 W
80LP	80 VDC motor supply, 300 W
10B	±10 VDC bipolar motor supply, 400 W
20B	±20 VDC bipolar motor supply, 400 W
30B	±30 VDC bipolar motor supply, 400 W
40B	±40 VDC bipolar motor supply, 600 W

### Axis 1 Amplifier Options (must select one)

/1-MP10I	Digital PWM amplifier, 10 A peak, 5 A continuous with I/O option
/1-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/1-ML10I	Digital linear amplifier, 10 A peak, 5 A continuous with I/O option
/1-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/1-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup> with I/O option

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

### Axis 2 Amplifier Options (must select one)

/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 <sup>(1)</sup>
/2-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/2-BLANK	No amplifier
/2-BLANKW	No amplifier, pre-wired only
/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 <sup>(1)</sup>
/2-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/2-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup>
/2-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup> with I/O option

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

### Axis 3 Amplifier Options (must select one)

/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 <sup>(1)</sup>
/3-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/3-BLANK	No amplifier
/3-BLANKW	No amplifier, prewired only
/3-ML10	Digital linear amplifier, 10 A peak, 5 A continuous
/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 <sup>(1)</sup>
/3-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/3-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup>
/3-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup> with I/O option

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



## Epq ORDERING INFORMATION

### Axis 4 Amplifier Options (must select one)

/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 <sup>(1)</sup>
/4-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous with x4096 MXU <sup>(1)</sup> with I/O option
/4-BLANK	No amplifier
/4-BLANKW	No amplifier, prewired only
/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 <sup>(1)</sup>
/4-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/4-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup>
/4-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup> with I/O option

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

### Axis 5 Amplifier Options (must select one)

/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 <sup>(1)</sup>
/5-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/5-BLANK	No amplifier
/5-BLANKW	No amplifier, prewired only
/5-ML10	Digital linear amplifier, 10 A peak, 5 A continuous
/5-ML10I	Digital linear amplifier, 10 A peak, 5 A continuous with I/O option
/5-ML10M	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup>
/5-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/5-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup>
/5-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup> with I/O option

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

### Axis 6 Amplifier Options (must select one)

/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 <sup>(1)</sup>
/6-MP10MI	Digital PWM amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/6-BLANK	No amplifier
/6-BLANKW	No amplifier, prewired only
/6-ML10	Digital linear amplifier, 10 A peak, 5 A continuous
/6-ML10I	Digital linear amplifier, 10 A peak, 5 A continuous with I/O option
/6-ML10M	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup>
/6-ML10MI	Digital linear amplifier, 10 A peak, 5 A continuous; x4096 MXU <sup>(1)</sup> with I/O option
/6-ML10H	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup>
/6-ML10HI	Digital linear amplifier, 10 A peak, 5 A continuous; x65536 MXH <sup>(1)</sup> with I/O 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

## Epaq ORDERING INFORMATION

### Brake Options (up to 2 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 2 wired for 24 V, 1 A brake (amp must have “I” or “MI” option)
/BRAKE-4	Axis 2 wired for 24 V, 1 A brake (amp must have “I” or “MI” option)
/BRAKE-5	Axis 2 wired for 24 V, 1 A brake (amp must have “I” or “MI” option)
/BRAKE-6	Axis 2 wired for 24 V, 1 A brake (amp must have “I” or “MI” option)

### Options (multiple selections allowable)

/JBV	Joystick with 5 ft cable
/JI	Industrial joystick with 5 ft cable
/ESTOP0	Provides user with a mushroom switch on front panel to stop motion, disable, and disconnect AC to motor power supply; requires -FPDE or -FPBE options
/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; not compatible with -FPBE or FPDE; user must provide external ESTOP switch and wiring to the Epaq
/EXTAMP	External amplifier interface connector
/SLIDE	Rack-mount slides to be used with Epaq-R
/RS232-2	Second RS-232 interface port

### 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

### Accessories

/JBV	Joystick with 5 ft cable
/JI	Industrial joystick with 5 ft cable

### 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.