Soloist™

Position Controller and Servo Amplifier – PWM

- Single axis digital servo controller with integral power supply and amplifier
- Advanced software architecture shortens customer development time; use C#, VB.Net, C, and LabVIEW® combined with our full IDE and multitasking operating system
- Host-mode operation allows you to send commands with your PC via Ethernet or USB for immediate execution
- Ethernet or USB permits networked Soloists for remote access
- Ideal for simple applications with minimal setup or complex applications that use the full flexibility and scalability
- Positioning control for brushless, DC brush-type, or stepping motors
- Available in models up to 150 A peak current
- Allen-Bradley EtherNet/IP™ interface provides full integration with the Soloist; program the Soloist directly from RSLogix™ 5000

Soloist HPe

Soloist CP

Soloist MP

Introduction

Aerotech's Soloist™ PWM series are single-axis servo controllers that combine a power supply, amplifier, and position controller in a single package. The Soloist can control up to five tasks simultaneously, as well as handle variables and manage I/O, making it well-suited for demanding production applications. The Soloist has high-speed position latch inputs and advanced data logging capabilities, making it ideal for laboratory, test instrument, and industrial applications. The advanced software architecture shortens customer development time, while including support for C#, VB.Net, C, and LabVIEW®, combined with our full IDE and multitasking operating system. Host-mode operation allows you to send commands with your PC via Ethernet or USB for immediate execution.

The Soloist MP offers the same advanced software as the CP but in a smaller package designed for OEMs that can supply bus power from existing power supplies.

The Soloist HPe can be used for larger systems requiring up to 150 A peak current.

Motion Composer, the common integrated development environment for all Aerotech controllers, provides users with Windows®-based software with powerful diagnostic, debug, and analysis tools for OEMs and end users alike.

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 Soloist. 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.

Total Solution

The controllers are fully tested and ready to run right out of the box. Aerotech can integrate the Soloist into a complete motion system, removing the burden of parameter setup and axis tuning.

Soloist DESCRIPTION

Practical Power

Each series is capable of driving a wide range of motors including brushless, DC servo, and steppers. Brushless motors are sinusoidally commutated to minimize torque ripple.

Using a digital servo loop with feedforward, the Soloist tightly tracks velocity and position trajectories with virtually zero error. On-board autotuning and built-in calculators make servo tuning simple.

Variables, Math and More

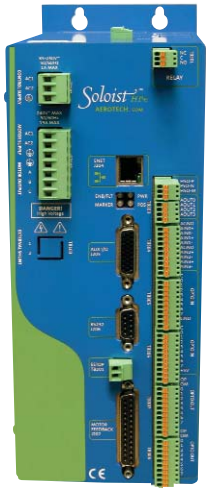
With variables and math capability, one program can be used to produce a variety of parts by simply prompting the user for new application data.

Application Versatility

The Soloist has other built-in features such as axis calibration and backlash compensation, so you can maximize your machine's accuracy and precision. The "user units" feature makes it easy to customize the Soloist to your specific machine, allowing custom units for both linear and rotary applications.

The controller is equipped with dual encoder inputs, so you can tackle master-slave applications or achieve higher accuracies with dual-loop control. Precise registration-based moves are also possible because of the fast 0.1 microsecond acknowledge time of the Soloist. The Soloist easily handles complex functions such as output-on-the-fly and velocity profiling.

Soloist Series COMPARISON



Soloist HPe
Width: 99 mm
Height: 232.4 mm

Soloist CP
Width: 63.5 mm
Height: 198.2 mm

Soloist MP
Width: 41.1 mm
Height: 141.2 mm

Soloist Comparison Chart	Soloist HPe	Soloist CP	Soloist MP
PC Interface	Ethernet TCP/IP or USB	Ethernet TCP/IP or USB	Ethernet TCP/IP
Current Output, Peak(1)	10-200 A	10-30 A	10 A
Current Output, Continuous(1)	5-75 A	5-10 A	5 A
Bus Voltage	±10-320 VDC	±10-320 VDC	±40 VDC
Amplifier Type	PWM	PWM	PWM
Motor Supply Voltage	2 or 3 Phase AC	2 Phase AC	DC
Standard I/O(2)	4-DO/6-DI 1-AO/1-AI	4-DO/6-DI 1-AO/1-AI	1-AI
Expansion I/O(2) **(Additional to Base I/O)**	16-DO/16-DI 3-AO/3-AI	16-DO/16-DI 1-AO/1-AI	8-DO/8-DI 1-AO/1-AI
Single Axis PSO(3)	Yes	Yes	Yes
Dual Axis PSO(3)	Yes	No	No
Triple Axis PSO(3)	Yes	No	No
Ethernet Capable for Third-Party I/O	Yes	Yes	Yes

Notes:
1. Peak value of the sine wave; rms current for AC motors is 0.707 * A_{pk}.
2. DO = Digital Output; DI = Digital Input; AO = Analog Output; AI = Analog Input.
3. PSO not available on Ndrive CP/MP when using integral MXU.

Soloist HPe SPECIFICATIONS

Ensemble HPe	Units	10	20	30	50	75	100	150	200
Motor Style		Brush, Brushless, Stepper[1]							
Motor Supply	**VAC**	Single-Phase 7-240 V; 50/60 Hz			Single- or Three-Phase 115 or 230 V; 50/60 Hz				
Control Supply[2]	**VAC**	85-240 VAC; 50/60 Hz							
Bus Voltage[3]	**VDC**	10-320[3]							
Peak Output Current (1 sec)[4]	**A_{pk}**	10	20	30	50	75	100	150	200
Continuous Output Current[4]	**A_{pk}**	5	10	10	25	37	50	75	100
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 Single-Ended; ±10 V							
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; 3 Analog In (±10 V, 16-bit Differential); 3 Analog Out (±10 V, 16-bit)							
High Speed Data Capture		Yes (50 ns Latency)							
Automatic Brake Control		Standard; 24 V at 1 A							
Emergency Stop Sense Input (ESTOP)[6]		Standard; 24 V Opto-Isolated							
Position Synchronized Output (PSO)		Single Axis Standard, Two/Three Axis Optional							
Can Output Multiplied Encoder		Yes							
Can Output Square Wave Encoder		Yes							
Primary Encoder Input Frequency		500 kHz Amplified Sine Wave Standard (for onboard multiplier); 40 MHz TTL Square Wave							
Secondary Encoder Input Frequency		32 MHz Square Wave							
Encoder Multiplication		Up to x65536 with Quadrature Output (MXH)							
Absolute Encoder		Renishaw Resolute BiSS; EnDat 2.1; EnDat 2.2							
Resolver Interface		Optional; 1 or 2 Channel; 16-bit							
Internal Shunt Resistor		40 W Continuous; 400 W Peak (5 seconds)			440 W Continuous				
External Shunt		Optional							
Ethernet		Yes							
USB		Yes							
RS-232		Yes							
FireWire		No							
Fieldbus		Modbus TCP; Ethernet/IP							
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 @ 160 VDC (1.0 mH @ 320 VDC)							
Operating Temperature	**°C**	0 to 50							
Storage Temperature	**°C**	-30 to 85							
Weight	**kg (lb)**	2.36 (5.2)			6.64 (14.6)			11.06 (24.4)	

Notes:
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. "Keep Alive" supply.
3. Output voltage dependent upon input voltage.
4. Peak value of the sine wave; rms current for AC motors is 0.707 * A_{pk}.
5. Requires IO option.
6. Requires external relay to remove motor supply power.

Soloist CP SPECIFICATIONS

Soloist CP	Units	10	20	30
Motor Style		Brush, Brushless, Stepper(1)		
Motor Supply	VAC	Single-Phase 7-240 VAC; 50/60 Hz		
Control Supply(2)	VAC	85-240 VAC; 50/60 Hz		
Bus Voltage(3)	VDC	10-320(3)		
Peak Output Current (1 sec)(4)	A_{pk}	10	20	30
Continuous Output Current(4)	A_{pk}	5	10	10
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 Single-Ended; ±10 V		
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, 16-bit)		
High Speed Data Capture		Yes (50 ns Latency)		
Automatic Brake Control	—	Standard; 24 V at 1 A		
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		200 kHz Amplified Sine Wave Standard (for onboard multiplier); 40 MHz TTL Square Wave		
Secondary Encoder Input Frequency		32 MHz Square Wave		
Encoder Multiplication	—	Up to x4096 (MXU)		
Absolute Encoder		Renishaw Resolute BiSS; EnDat 2.1; EnDat 2.2		
Resolver Interface	—	N/A		
Internal Shunt Resistor		40 W Continuous; 400 W Peak (5 seconds)		
External Shunt		Optional		
Ethernet	—	Yes		
USB		Yes		
RS-232		Yes		
FireWire		No		
Fieldbus		Modbus TCP; Ethernet/IP		
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 @ 160 VDC (1.0 mH @ 320 VDC)		
Operating Temperature	°C	0 to 50		
Storage Temperature	°C	-30 to 85		
Weight	kg (lb)	1.64 (3.6)		

Notes:
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. "Keep Alive" supply.
3. Output voltage dependent upon input voltage.
4. Peak value of the sine wave; rms current for AC motors is 0.707 * A_{pk}.
5. Requires I/O option.
6. Requires external relay to remove motor supply power.

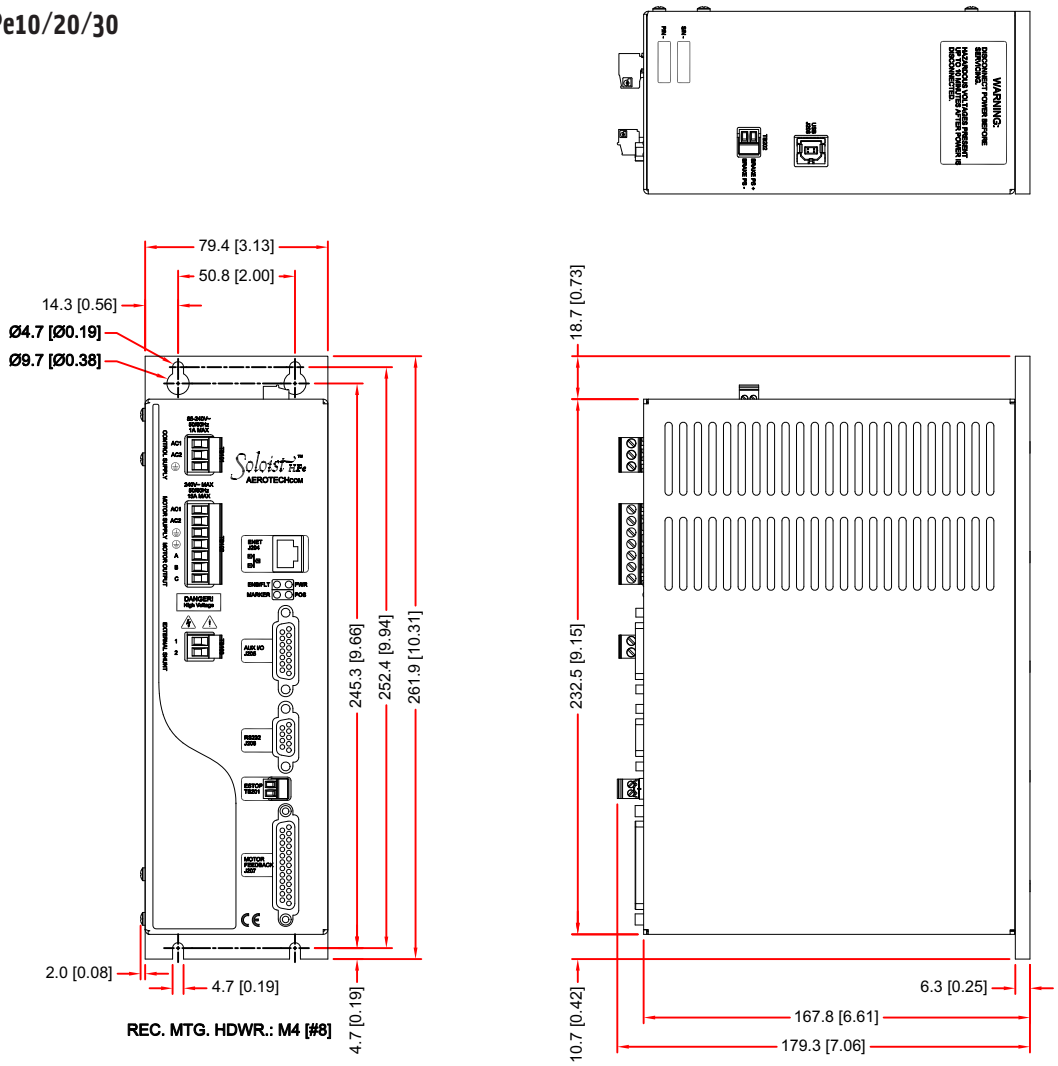
Soloist MP SPECIFICATIONS

Soloist MP	Units	
Motor Style		Brush, Brushless, Stepper(1)
Motor Supply	VDC	10-80
Control Supply(2)	VDC	24-80
Bus Voltage(3)	VDC	10-80
Peak Output Current (1 sec)(4)	A_{pk}	10
Continuous Output Current(4)	A_{pk}	5
Digital Inputs	—	N/A
Digital Outputs	—	N/A
Analog Inputs	—	One 16-bit Differential; ±10 V
Analog Outputs	—	N/A
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		N/A
I/O Expansion Board(5)	—	8/8 Digital Opto-Isolated; 1 Analog In (±10 V, 12-bit Differential); 1 Analog Out (±5 V, 16-bit); sin, cos, mkr for Aux Enc; Aux Enc can be used for PSO Output
High Speed Data Capture		Yes (50 ns Latency)
Automatic Brake Control	—	Optional(6)
Emergency Stop Sense Input (ESTOP)(6)	—	Standard; 24 V Opto-Isolated
Position Synchronized Output (PSO)	—	Optional(5)
Can Output Multiplied Encoder		No
Can Output Square Wave Encoder		No
Primary Encoder Input Frequency		200 kHz Amplified Sine Wave Standard (for onboard multiplier); 40 MHz TTL Square Wave
Secondary Encoder Input Frequency		32 MHz Square Wave
Encoder Multiplication	—	Up to x4096 (MXU)
Resolver Interface	—	N/A
Internal Shunt Resistor		N/A
External Shunt		N/A
Ethernet	—	Yes
USB		No
RS-232		Yes
FireWire		No
Fieldbus		Modbus TCP; Ethernet/IP
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 @ 80 VDC
Operating Temperature	°C	0 to 50
Storage Temperature	°C	-30 to 85
Weight	kg (lb)	0.45 (1.0)

Notes:
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. "Keep Alive" supply.
3. Output voltage dependent upon input voltage.
4. Peak value of the sine wave; rms current for AC motors is 0.707 * A_{pk}.
5. Requires I/O option.
6. Requires external relay to remove motor supply power.

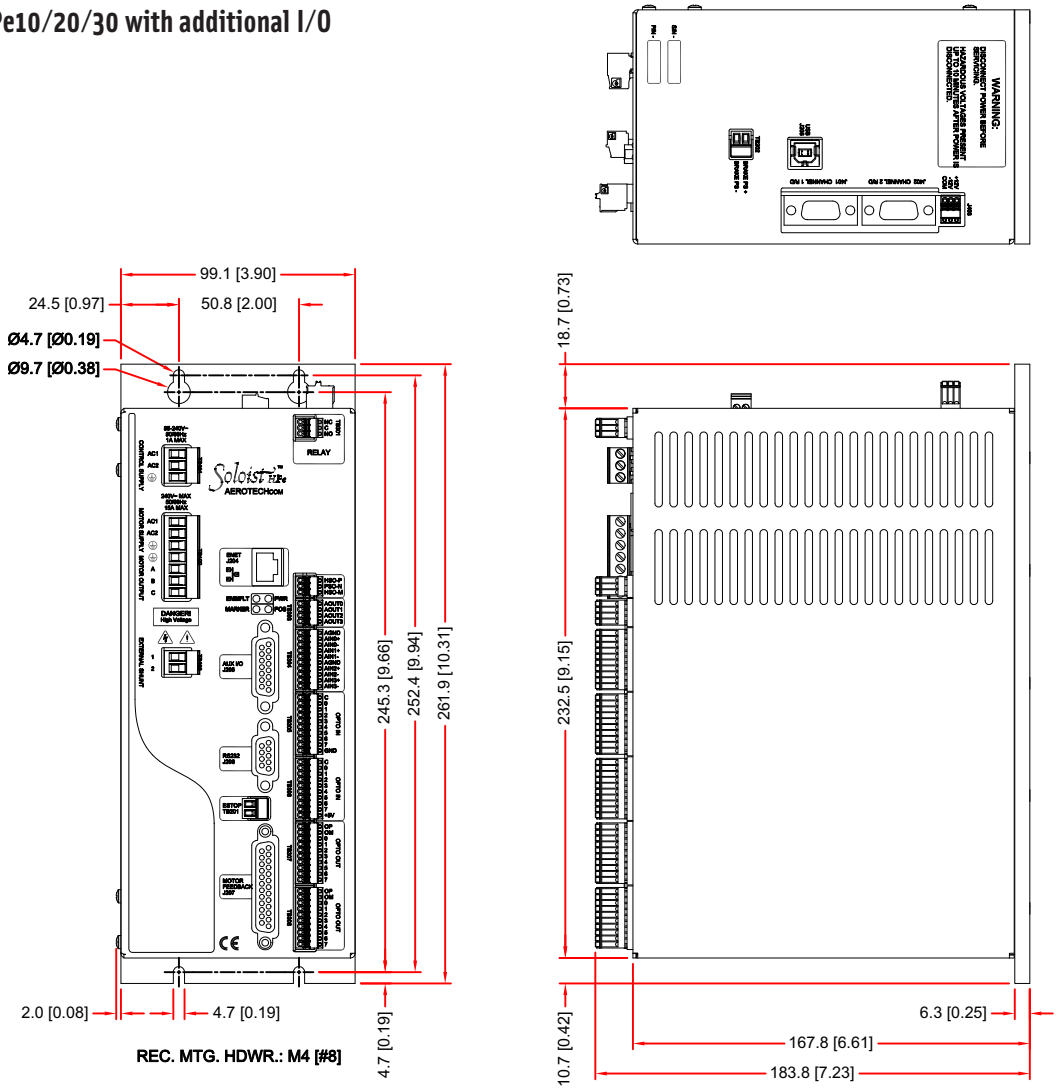
Soloist HPe DIMENSIONS

Soloist HPe10/20/30



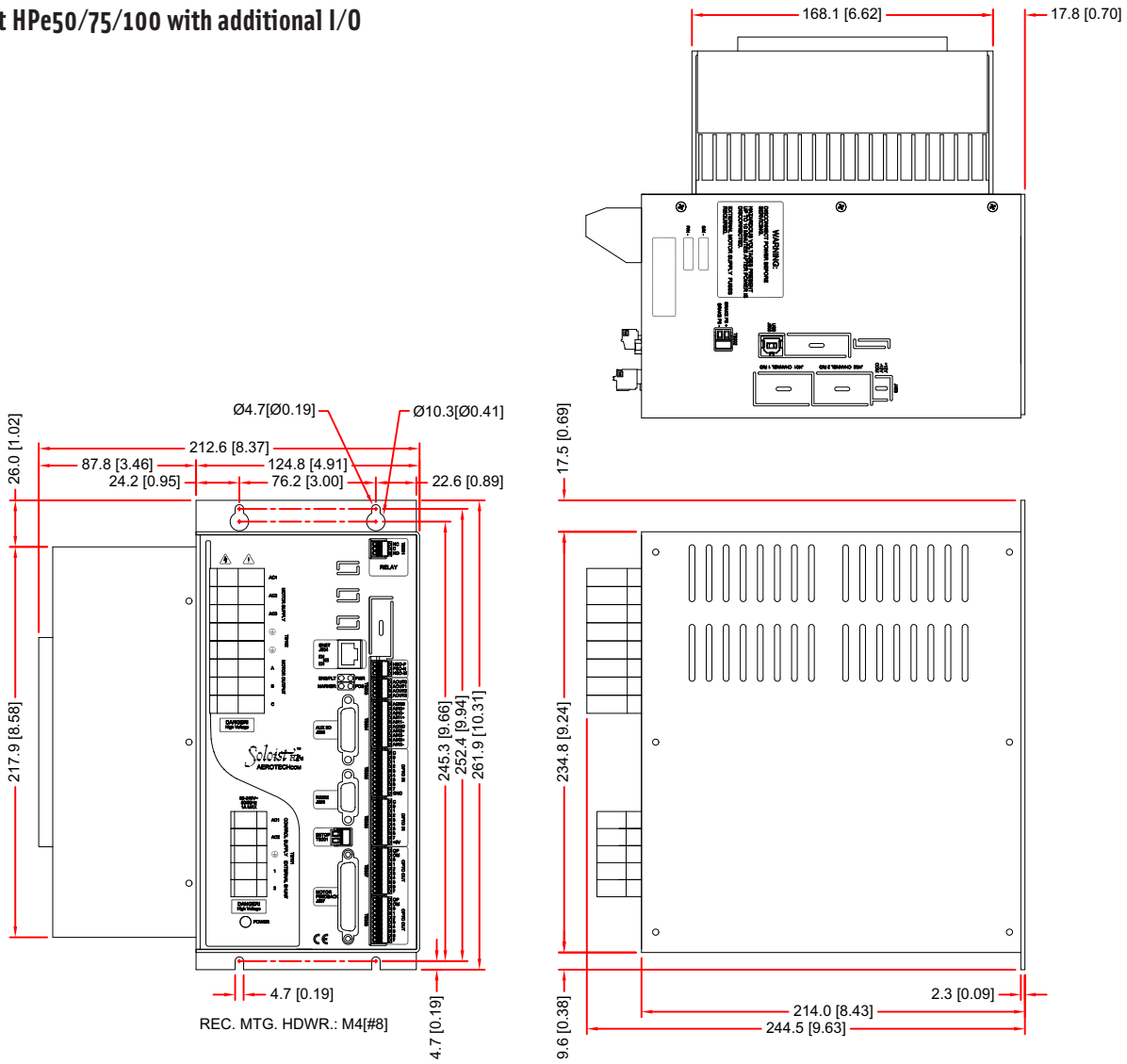
Soloist HPe DIMENSIONS

Soloist HPe10/20/30 with additional I/O



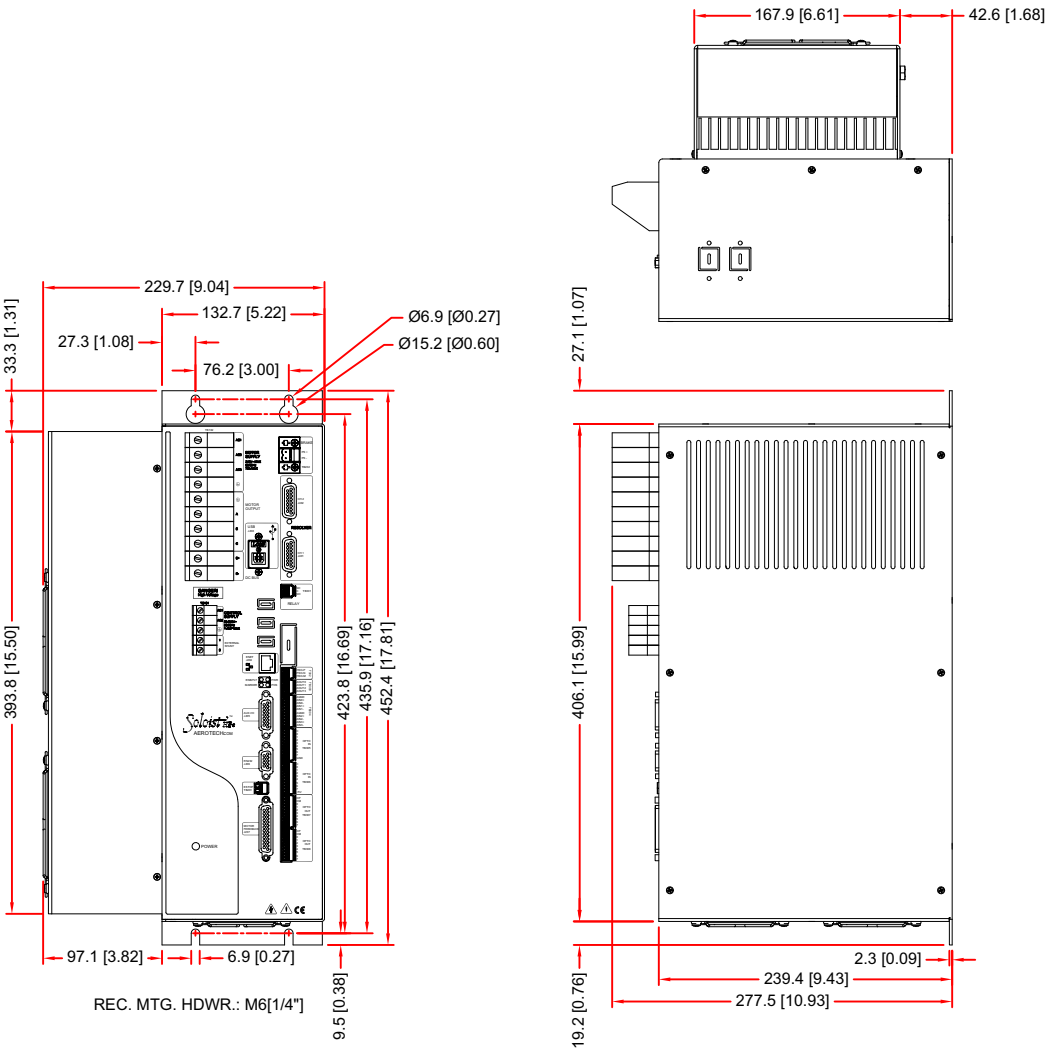
Soloist HPe DIMENSIONS

Soloist HPe50/75/100 with additional I/O



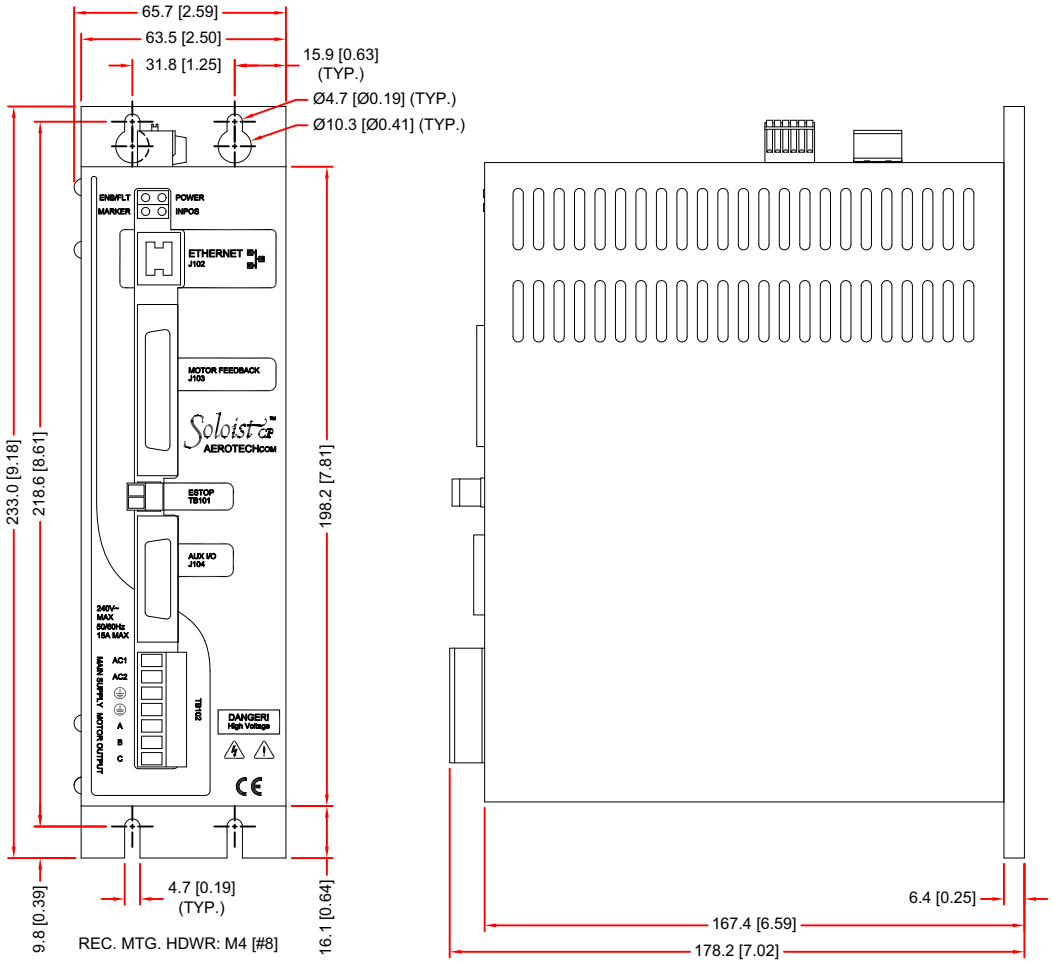
Soloist HPe DIMENSIONS

Soloist HPe150 with additional I/O



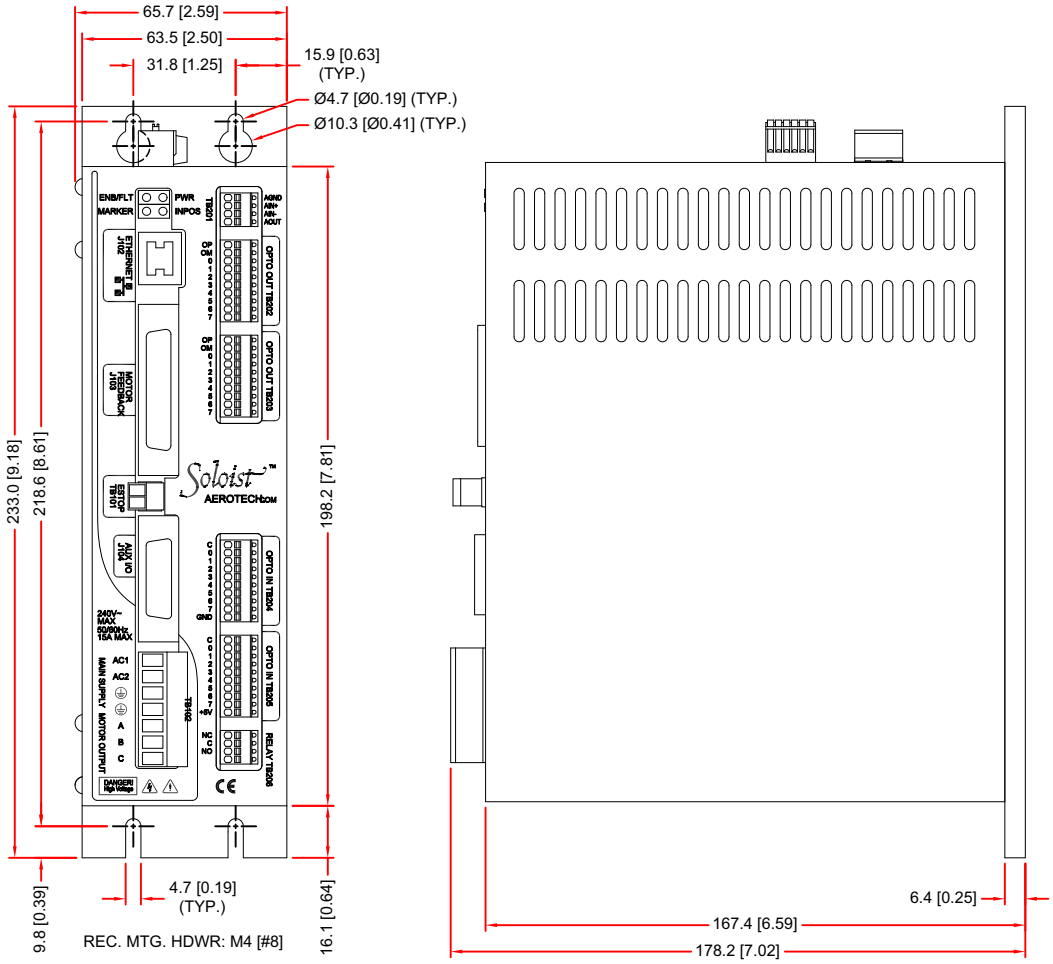
Soloist CP DIMENSIONS

Soloist CP



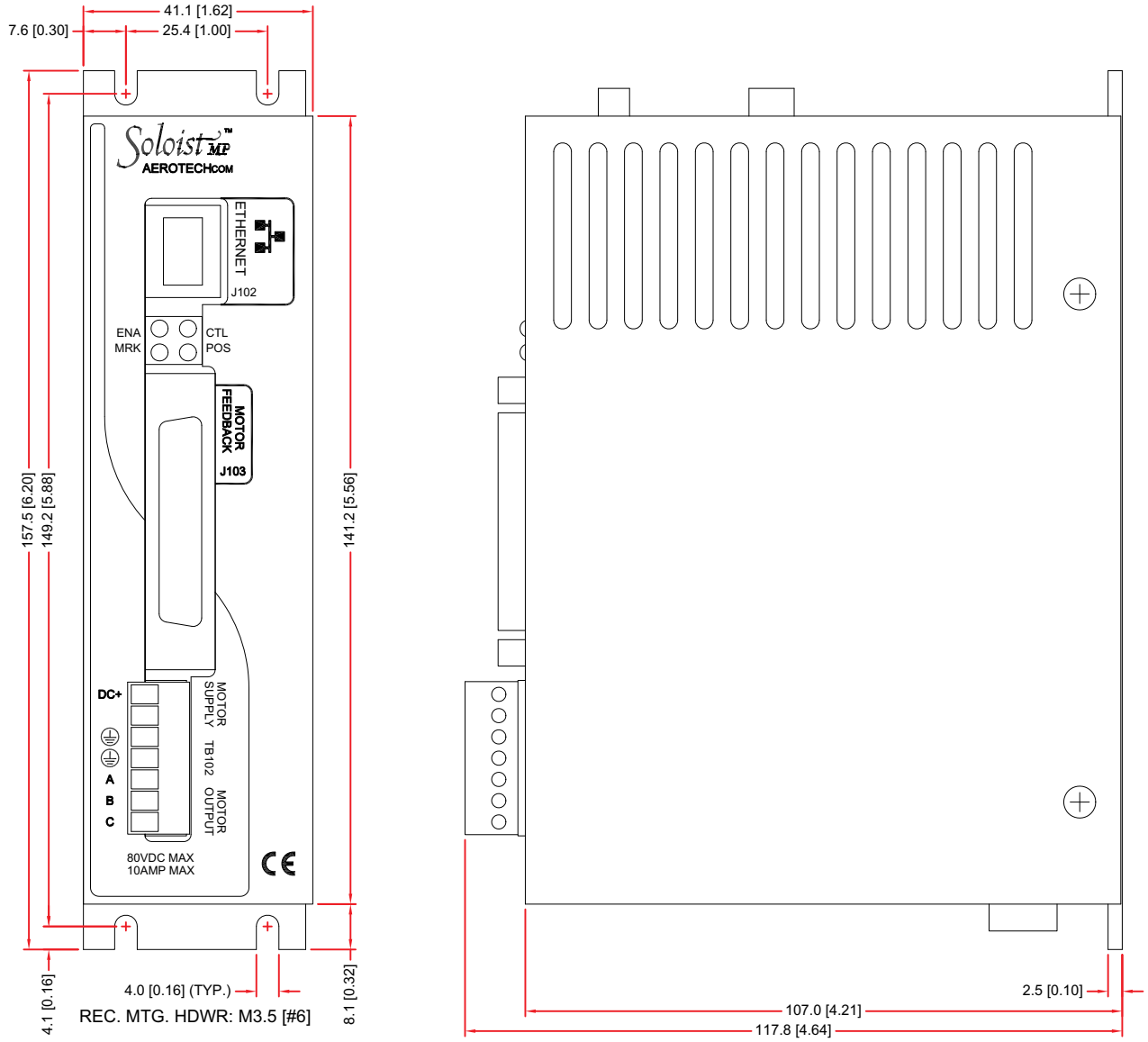
Soloist CP DIMENSIONS

Soloist CP with Additional I/O



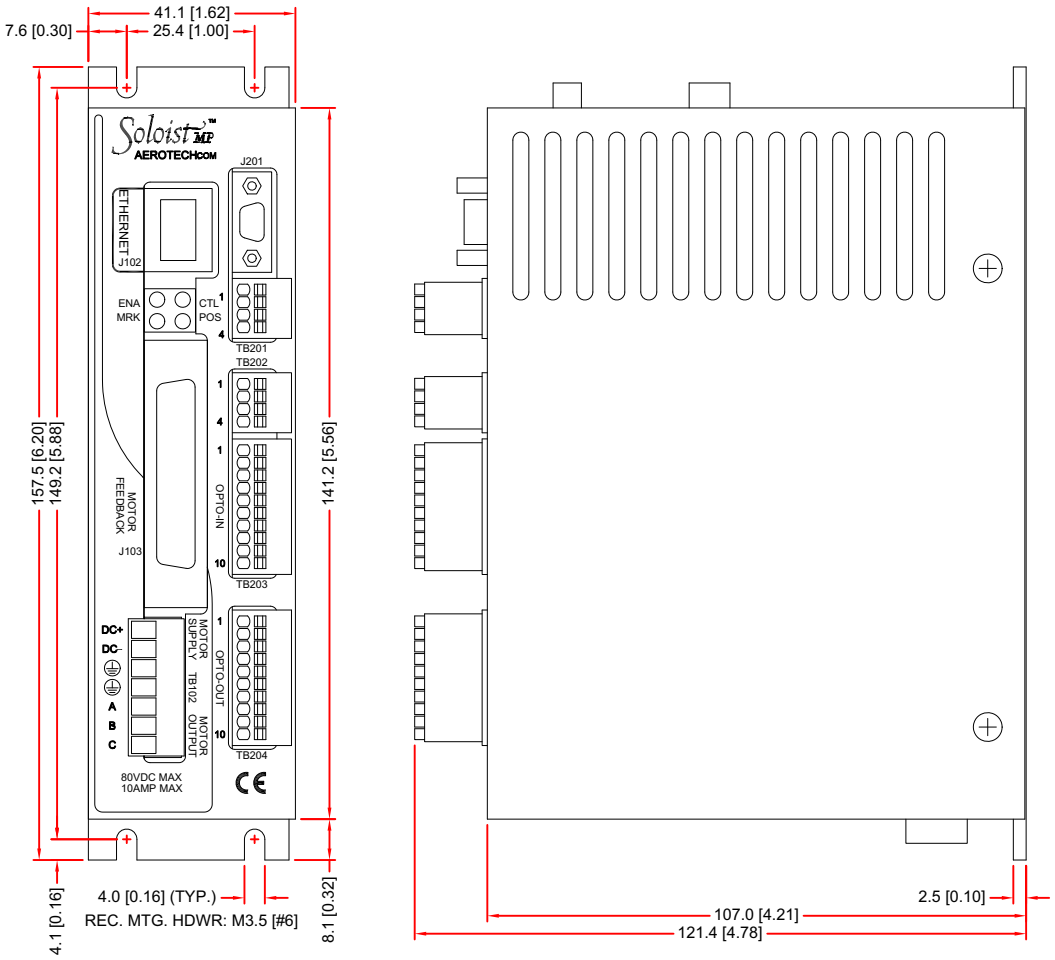
Soloist MP DIMENSIONS

Soloist MP



Soloist MP DIMENSIONS

Soloist MP with additional I/O



Soloist Ordering Information

Visit Aerotech's website for complete ordering information.