AERO 5
MOTION CONTROLLER

The Ideal Aerosmith AERO 5 is a next-gen digital controller designed for accurate and user-friendly control of one and two-axis motion simulation table systems utilizing brushless DC motors and precision absolute optical encoders for accurate and reliable motion control. In addition to new motion systems, older systems can be upgraded with an AERO 5 Controller, resulting in better functionality, improved reliability, and an extended support life.

The AERO 5 Controller continues Ideal Aerosmith's philosophy of using COTS (commercial off-the-shelf) technology, resulting in the controller's use of the most advanced technologies and lowest life cycle cost of ownership.

Position, rate, and acceleration, as well as motion profiles, are commanded remotely from a host PC (not provided) via the standard Ethernet or RS-232 communication interface.
For systems with a temperature chamber, the AERO 5 Controller adds temperature control capability to the same 6U high 19-inch rack-mountable chassis.

Users can utilize an Ideal Aerosmith-provided web-based, desktop application (Ideal ATL Client) or their own communication software package with Ideal's software command set to precisely control the AERO 5. The AERO 5 utilizes the latest controller technology with faster processing speed than its predecessor, the AERO 3500 series. ATL Client, standard with all AERO 5 systems, provides easy graphing and data export for various control loop signals, an integrated code engine/editor for ATL scripting, and a simulated view of the table; as well as the familiar command line-style ATL control (now with integrated documentation) and configurable readouts for table position, velocity, acceleration, or interlock status.

Performance

- 64-bit floating point calculations
- 20 kHz frame rate regardless of number of axes
- Feedback error correction for smoother rates and more accurate positioning
- Sinusoidal feedback error correction for smoother rates and more accurate positioning
- Motor commutation with error correction for smoother rates

Ease of Use

- Interface PC based on Windows® 11 IoT Enterprise LTSC 2024 (only with Turnkey or Headless+)
- Graphical User Interface - Ideal ATL Client available for installation on customer-supplied Windows PC (Windows 10 and newer)
- Ethernet (recommended), RS-232, and optional IEEE-488 remote host interface

Rev A

Ideal Aerosmith AERO 5 Key Specifications

General	
Chassis Packaging	• 6U 19-inch industrial rack-mount PC on chassis slides • 19-inch rack-mounted power distribution/switch • Emergency Stop button on front panel • Optional rack-mounted Keyboard, Mouse, Flat-Panel Monitor

Power Requirements	• No Thermal Control:
	  ○ 115 - 230 VAC ± 10%, 1 Ø, 50/60 Hz, 12 A (FLA), 15A Breaker, SCCR 5kA
	• Note: Some systems may require 230 VAC ±10% for full performance, dependent on system configuration and payload
	• With Thermal Control: No Thermal Control:
	  ○ 208 - 230 VAC ± 10%, 3 Ø, 50/60 Hz, 25 A (FLA), 30A Breaker, SCCR 5kA

Axis Configuration	• Configurable for 2-axes • Rotational axes in various configurable units
Controller Type	• Digital PID Loop with velocity & acceleration feedforward • Bi-quad filters can be programmed for various filters such as low-pass, notch, lead, or lag
Controller Frequency	• 20 kHz (Speed fixed within controller) • Control frame period synchronized across all axes. • Optional GPS/10MHz-1pps Enhanced Synchronization Module
Readout	• Automatically poll axis position, velocity, acceleration, and status

Demand	• Position, velocity, and acceleration
	• Selectable Modes
	  ○ Rate
	  ○ Position
	  ○ Profile
	  ○ Signal Generator

Diagnostics/Self-Test	• System check on power-up
Tuning Package Menu	• Gain settings for various payloads can be selected/stored via GUI or remote interface
Signal I/O	

Rate Pulse Output	• Per axis configurable:
	  ○ ≤ 15 arc-sec error at all rates
	  ○ 250 nanosecond (nominal) pulse width, active low, TTL level
	  ○ N (degrees) rounded to nearest integer number of coarse feedback pulses

Capture Input	• Per axis: ○ Asynchronous position capture within 25 microsecond of falling edge, TTL level

Analog Inputs	• Per axis:
	  ○ 1 channel, 16-bit, ±10V
	  ○ Configurable gains, offsets, used to command position or rate

Analog Outputs	• Per axis:
	  ○ 1 channel, 16-bit, ±10V, 1Khz update rate
	  ○ Configurable gains, offsets, and usage from controller. (Position, Rate, Acceleration or position error)

For special requirements or custom specifications, contact Ideal Aerosmith. Specifications are subject to change without notice. Please call for pricing. Rev A

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