Beckhoff — AL Linear Motors

AL2403-0001-0001



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The **AL2403-0001-0001** is a primary-section linear servo motor developed by Beckhoff for the AL Linear Motors series. As part of a modular ironless drive system, it produces electromagnetic thrust without a mechanical transmission, allowing precise position and velocity control directly on the payload carriage. This motor is intended for compact pick-and-place stations, gantry axes, and packaging machinery where rapid, repeatable motion is required.

The motor draws a continuous current of **1.54 A**. At this rating, the three copper windings deliver a continuous force of **60 N** when cooled by ambient air. For short accelerations, the drive can supply **4.10 A**, raising instantaneous thrust to **120 N** and permitting high-jerk motion without demagnetization. A phase-to-phase inductance of **70 mH** influences the electrical time constant and current-loop bandwidth, while the 10.8 ? phase resistance limits steady-state copper losses. The voltage constant of 22.63 V/m/s indicates the back electromotive force generated per unit of speed and helps with DC-bus sizing. Three coils are arranged on a 24 mm pole pitch, and their active width of 50 mm matches standard guide-rail footprints.

During nominal operation, the motor generates **49 W** of heat, which is transferred to the mounting surface through a thermal path rated at **1.5 °C/W**. Because the assembly lacks water cooling, airflow around the magnet track must dissipate this energy within the 75-second thermal time constant. The force-to-loss ratio is represented by a motor constant of **95 N²/W**, while a force constant of 39 N/A indicates the relationship between drive current and linear thrust. Permanent magnets exert a holding attraction of **300 N** on the steel backing, so the mechanical design must

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accommodate this preload when the carriage is installed. Electrical connections are provided through an M23 power connector and a D-Sub feedback connector. The speed-winding configuration supports high-velocity axis applications.

Specifications

Connection:	With M23 and D-Sub Connectors	**Continuous Current:**	1.54 A	**Continuous Force (air):**	60 N
Continuous Power Loss:	49 W	**Magnetic Attraction:**	300 N	**Motor Constant:**	95 N²/W
Num. of Coils:	3	**Peak Current:**	4.10 A	**Peak Force:**	120 N
Ph-ph Inductance:	70 mH	**Ph-ph Resistance:**	10.8 ?	**Pole Pitch:**	24 mm
Power Constant:	39 N/A	**Product Range:**	Linear servo motors	**Thermal Resistance:**	1.5 °C/W
Thermal Time Constant:	75 s	**Voltage Constant:**	22.63 V/m/s	**Water Cooling:**	Without Water Cooling
Width:	50 mm	**Winding:**	Speed Winding	**Last Verified:**	11/23/2026 12:25 AM

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