Beckhoff — AL Linear Motors

AL2412-0001-0001



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The **AL2412-0001-0001** coil unit is a linear servo motor element manufactured by Beckhoff for the AL Linear Motors series. The module delivers direct electromagnetic thrust along a magnet track, eliminating rotary-to-linear conversions and minimizing mechanical wear. This product is installed in motion stages that require fast acceleration, repeatable positioning, and tight coordination with EtherCAT drives commonly used in Beckhoff automation environments.

The coil houses twelve windings and connects through M23 power and D-Sub feedback connectors, allowing direct connection to a matching drive. Under nominal load, the phase conductors carry a continuous current of **6.15 A**, generating a steady thrust of **240 N** while dissipating 197 W of copper losses. Thermal efficiency is supported by a motor constant of **380 N²/W**, so a large portion of the input current is converted into usable force. The iron core has a pole pitch of **24 mm**; this geometric period establishes the commutation wavelength and matches standard Beckhoff magnet plates. Application axes can travel at speeds of up to **12 m/s**, which is suitable for high-speed carton erectors, electronic component handlers, and labeling heads. The 50 mm frame width and 1.6 kg mass allow several coils to be mounted side by side without exceeding typical gantry payload limits. The lack of water cooling also simplifies cable and hose routing around the motion stage.

For rapid indexing, the winding supports a peak current of **16.40 A**, enabling a short-term thrust of **480 N** to overcome static friction or accelerate heavier loads. A magnetic attraction force of 900 N must be accommodated by the selected bearings, but it also helps preload the guidance system for increased stiffness. The thermal time

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constant of **75 s** delays the rise toward steady-state temperature during short operating bursts. A thermal resistance of 0.38 °C/W helps keep the coil below its insulation limit under the intended operating conditions. Dynamic response is supported by a winding inductance of **18 mH** and a resistance of 2.7 ?, allowing the winding to regulate current quickly while limiting switching losses.

Specifications

Coil Unit Weight:	1.6 kg	**Connection:**	With M23 and D-Sub Connectors	**Continuous Current:**	6.15 A
Continuous Force:	240 N	**Continuous Power Loss:**	197 W	**Magnetic Attraction Force:**	900 N
Max Velocity:	12 m/s	**Motor Constant:**	380 N²/W	**Num. of Coils:**	12
Peak Current:	16.40 A	**Peak Force:**	480 N	**Pole Pitch:**	24 mm
Power Constant:	39 N/A	**Product Range:**	Linear servo motors	**Thermal Resistance:**	0.38 °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	**Winding Inductance:**	18 mH
Winding Resistance:	2.7 ?	**Last Verified:**	11/23/2026 2:03 AM		

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