

Use case
Eaton LD2-HV high voltage drum core inductors



Eaton LD2-HV high voltage drum core inductors for industrial automation

The proliferation of industrial automation equipment has transformed the industrial landscape. Today, robotics and software are used to automate many tasks that are too arduous, dangerous, or precise for humans to perform reliably. For example, fixed automation (such as machining transfer lines and assembly machines) is used to pick, transport, and assemble vehicle parts in a highly repeatable process. Similarly, many manufacturing plants utilize programmable robotics, such as computer numerical control (CNC) machines for mass production of parts. Ultimately, industrial automation helps to enhance productivity/safety, lower costs, and maintain the quality of products and processes.

With industrial automation systems consuming

higher amounts of power, components rated for high voltage are ideal to handle higher voltage isolation. Inductors are commonly integrated into switched-mode power supplies (SMPS) of automation systems as energy storage components. However, engineers designing the latest DC-DC converters are facing lower power consumption requirements under varying load conditions and space constraints, all while ensuring platform flexibility to expand into multiple products or future platforms. These requirements are driving the need for high-power density magnetic solutions. In many cases, industrial automation systems utilize switched mode power supplies requiring high-voltage rated inductors up to 500 V.

Unlike shielded and semi-

shielded types, unshielded inductors offer higher power density, are highly reliable, and come at a lower cost. One reason for this is that shielded and semi-shielded inductors are constructed using additional magnetic materials. Unlike inductors used for EMI filtering, inductors intended for energy storage will withstand differential voltages equal to or in excess of the peak input voltage, which after rectification, typically exceeds 400 V. A wide range of inductance values are required for many types of buck and boost converters and power filtering designs. However, these components must be compact, lightweight and capable of performing reliably under high-temperature conditions typical in harsh industrial environments.

Eaton offers the LD2-HV line of drum core power inductors with a wide inductance range (1.0 to 2200 μ H) and small footprints for industrial automation devices and equipment. The high saturation current means engineers can benefit from higher inductance performance at higher current levels without magnetic saturation roll-off concerns. The LD2-HV's ferrite core material offers high power density performance and low core losses at higher frequencies. Its unshielded core construction provides engineers greater flexibility at the lowest cost in industrial automation applications with low EMI immunity requirements. These inductors are designed to withstand high-voltage potentials from 500 to 1000 V.

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