

TAIYO YUDEN Power Inductors for Industrial Robotics

Automated, programmable robots continue to improve in an era of smart manufacturing. Industrial robots perform a wide range of tasks in industrial facilities, supporting humans in tasks that might be too cumbersome, overly arduous, or even too precise for traditional workers. Industrial robots are now favored by manufacturers across multiple industries due to benefits such as increased efficiency, higher quality products, lower operational costs, and reduced material wastage. Industrial robots can be utilized in low-volume production runs as well as complex mass-production operations. With the adoption of cloud technologies and the ability to monitor and perform industrial operations remotely, traditional manufacturing facilities are quickly becoming intelligent production hubs.

The key driver of industrial robotics applications is the Industrial Internet of Things (IIoT) which provides intelligent connectivity between sensors, processors, software, and industrial machines. For example, robotic arms situated on automotive plant floors transport individual vehicle parts along multiple axes during assembly. Other applications for industrial robots include packaging, arc welding, and material inspection. Human-robot interactions also contribute to safer industrial workplaces as robots are typically embedded with sensors that can detect the presence of humans and adjust their course to prevent hazards, near misses, and accidents.

Power inductors are utilized in the switched-mode power supplies (SMPS) of industrial robots to step up or step down the input voltage to required levels as well as minimize core losses that occur during voltage regulation. Due to high operating temperatures in industrial environments, power electronics must be designed to withstand a wide range of temperatures and ensure reliable operation as downtimes can be very costly. Low direct current resistance (DCR) in power inductors is also essential for reduced power dissipation and allows these components to be designed in smaller footprints for space-constrained or component-dense industrial robotics applications.

TAIYO YUDEN's LBEN and LBCN series power inductors are suited to today's industrial robotics applications. LBEN series is designed using a high-integrity metal resin composite for structural robustness and improved heat resistance. It features five-sided electrodes with low DCR suitable for low-voltage and high-current applications. LBCN series power inductors provide a balance of small footprint and flexibility over case sizes with stable temperature performance and low magnetic flux. These components use original metal magnetic materials, ensuring better temperature resistance compared to conventional ferrite inductors.

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