

Product Story

Environment hardened inductors for industrial robotics applications



Inductors are essential electronic components, used to support proper operation in a wide range of devices. TAIYOYUDEN, a manufacturer of electronics components with a 70-plus year history, produces the MCOIL™ LBEN and LBCN series of metal power inductors for industrial markets. These inductors have been proven out over many years in North American automotive applications, as well

as European and Asian industrial automation, and can provide an optimal and rugged solution for robotics systems.

In addition to robust industrial/automotive components, TAIYOYUDEN's expertise also extends to inductors for consumer markets. Their consumer grade inductors are designed for optimum magnetic performance, while their industrial components feature enhanced reliability that is able to withstand the rigors of challenging environments.



Figure 1. Car assembly line. Source: Salman2/Adobe Stock

In order to provide high reliability, and balance high performance with enhanced insulation specs, LBEN series inductors use an iron-based amorphous alloy, coated with thermally stable oxides. Even with such enhanced features, these hardened industrial components feature DC resistance ratings that are still comparatively low, even at high inductance levels. DC bias saturation characteristics are also excellent compared to competitors.

Typical consumer grade inductors feature a single connection point on each side of the surface-mount component. To facilitate enhanced connection integrity, MCOIL™ LBEN and LBCN series inductors instead feature electrodes on five sides. This allows for a greatly increased solder contact area, and correspondingly increased overall bonding strength.

Harsh industrial robotics environments may include elevated temperatures, and LBEN series inductors perform very well here. This component's insulation is designed to break down slowly, taking 500 hours at 200°C (392°F) to degrade from higher values to a single megohm (MΩ) of resistance. Consumer grade inductors take around 50 hours to degrade well into the single-MΩ range, and at 100 hours they show degradation to .01MΩ. With insulation breakdown comes inductance loss, and a corresponding decrease in power supply efficiency.

The performance difference compared to competing thin film type inductors is even more stark, as this type of component will break down into the sub-MΩ range in under 20 hours. LBEN series inductors are also very durable when exposed to electrostatic discharge (ESD), with a high survival rate, even up to nearly 1000 volts. Thin film type inductors rarely survive ESD testing, even at lower voltage ranges.

MCOIL™ LBEN series inductors feature a metal resin composite structure, containing enameled flat copper wire that forms the inductive element itself. MCOIL™ LBCN series inductors are formed using a multi-layer screen printing process, allowing for an extremely flexible case size. LBCN series inductors implement a proprietary TAIYOYUDEN metal formulation, as well as silver internal and external conductors. This structure and metal material produces greatly enhanced inductive performance versus similar ferrite-based alternatives.

MCOIL™ inductors have long been used and proven out in the North American automotive sector and are already broadly applied in European and Asian robotics and industrial automation markets. TAIYOYUDEN stands ready to help specify and fulfill inductor needs for industrial automation in North America. You can get in contact via TAIYOYUDEN's website for more technical information on TAIYOYUDEN's inductor offerings.

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The names of series noted in the text are excerpted from part numbers that indicate the types and characteristics of the products, and therefore are

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