

# How Standex Edge Supports Industrial Systems

with High-Reliability Magnetics



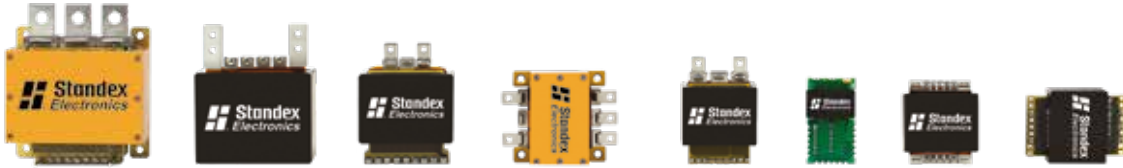


**Standex Edge played a key role in providing outsourced planar magnetics components engineering and production services for an established industrial production systems OEM.**

Industrial power systems are the prototypical area where large amounts of power are used in a wide variety of systems. Many industries rely on highly reliable, fully customized power products that balance functionality and safety, where power handling circuitry and components are built into a larger system. Some common application areas where highly reliable power electronics are needed include capital equipment for manufacturing, power conversion and regulation systems, industrial networking and computing systems, and even smaller IoT modules used to create connected factories. Magnetics are key components in these products, and these components must meet a myriad of electrical, mechanical, and safety requirements to be suitable for use in industrial systems.

Standex Edge is a leading supplier of industrial power electronics components and magnetics, providing a broad product line that meets demand in multiple industries and application areas. Standex Edge produces components with reliability at top-of-mind, especially in industrial systems that require perpetual uptime. Companies developing high reliability power products need a partner like Standex Edge, who can comprehensively manage the magnetics design and production process, as well as modernize components in legacy systems to help extend the lifetime of legacy products.

In a recent engagement with an established industrial production systems OEM, Standex Edge played a key role in providing outsourced engineering and production services for planar magnetics components. Standex Edge staff leveraged their expertise in power electronics and safety compliance to redesign legacy components with a new material system, which could then be produced at scale while complying with industry-standard safety constraints. Standex Edge’s vertically integrated process ensured the end customer could continue producing their products at scale while still complying with UL standards, something which can be challenging when working with an outsourced contract manufacturer.



## Background

Standex Edge began its recent engagement with an industrial equipment OEM with the goal of providing outsourced production services for planar magnetics components. These components carried a set of stringent pulsed power handling, isolation, and reliability requirements that were impossible to balance with off-the-shelf components. While custom components could possibly meet and balance the important design targets, custom component designs cannot be easily outsourced to an external vendor due to processing and material differences. Qualified planar magnetics vendors would have to offer a suitable substitute in the same form factor, or design a custom component with a safe, reliable material system in a compatible process.

The outsourced planar magnetics components needed to fulfill a small list of specific design and performance goals to ensure functionality and reliability:

**Power Handling:** Planar magnetics are capable of providing among the highest power densities while maintaining high power conversion efficiency thanks to their low profile. The high conversion efficiency in these devices is aided by their compact packaging, lower resistive losses, strong pri-sec coupling, and small leakage inductance.

**Form Factor:** The components needed to fit within a tight space in an enclosure; planar magnetics are ideal as their stacked design requires a lower z-axis height compared to a typical board-mount transformer. The form factor is also useful for thermal management as a heatsink can be mounted directly to the packaging if needed, something which can't be done with standard transformers.

**Mechanical Reliability:** Because the client's system was designed to be mobile, the outsourced magnetics needed to be resilient against mechanical disturbance. Planar magnetics sit lower on the board, so they are less vulnerable to low-frequency mechanical vibration and mechanical shock.

In order for an outsourced manufacturer to comply with these design and performance requirements, the manufacturer would have to reverse engineer the components and implement a complete redesign. The goal was to ensure the designs would be highly reliable and manufacturable at scale within the outsourced vendor's manufacturing process.



## Safety Challenges

Unfortunately, an outside contract manufacturer cannot simply copy a client's design and material set, and then attempt to use this existing component design data in their process. In general, the prior materials will not be process-compatible or tooling-compatible. The redesign must meet the customer's performance specifications and insulation system requirements as defined by UL, and the redesigns can be very significant.

Once a substitute material system is determined, the vendor must qualify this material system against electrical performance and safety standards. After compatible materials are qualified, the form factor of the device needs to be redesigned within the limits of material compatibility and the customer's electrical performance specifications. Planar magnetics are modularized in terms of their design and construction, so they were a natural choice to meet the client's needs while also meeting UL and regulatory requirements.





## Coordinated Manufacturing and Assembly

The client needed more than just a contract manufacturer, they needed a vendor that could coordinate production efforts for the entire assembly and deliver finished products. Most outsourced component manufacturers cannot deliver re-engineered components, safety testing and validation, proof of a UL-compliant material system, full-scale production, and assembly. A company like Standex Edge can provide this level of service thanks to its vertically integrated process, allowing the company to function as a single point of contact for all engineering and manufacturing matters.

Ultimately, the client required a collaborative manufacturer and engineering partner that could oversee all aspects of engineering, sourcing, production, assembly, qualification, and delivery. Standex Edge was the ideal partner to lead in this project thanks to its expertise as a planar magnetics vendor and manufacturer. By leveraging its existing supply chain and extensive modular product line, Standex Edge delivered a custom product that provided exceptional results.



## Results

Standex Edge produced a new customized set of planar magnetics components with a redesigned core and packaging from suitable materials. These components met or exceeded the customer's expectations and requirements in terms of power handling and form factor, both of which are important specifications on planar magnetics used for power delivery in compact systems.

In addition to redesigned components, Standex Edge positioned itself as an important element in the customer's supply chain by implementing a coordinated process for manufacturing and delivery of product. Standex Edge leveraged its vertically integrated engineering and production process to ensure these new components could be manufactured at scale using its standard processing capabilities. Standex Edge coordinated with multiple vendors to source raw materials for the new designs, as well as implement comprehensive evaluation and testing processes. Most importantly, the new designs and the implemented material system was compliant with safety regulations and UL standards.

### Materials sourcing and qualification

Before implementing a redesign of the customer's components, the list of governing materials in the UL insulation system were selected and qualified by Standex Edge. The goal was to ensure safety and manufacturability within Standex Edge's standard manufacturing process, while also ensuring the final design would hit the customer's efficiency and operating temperature targets. Standex Edge leveraged its raw material vendors to source materials and coordinate production within the required scheduling and production constraints. The new material system and packaging included the required UL insulation system and other materials needed to hit the required electrical performance specifications.

### Compliant design and packaging

After material qualification, Standex Edge implemented a redesign of the components with the newly qualified materials. Specifically, Standex Edge redesigned cores for use in planar magnetics packaging using suitable materials that hit the client's specifications. The finalized design matched the customer's original z-axis profile and would fit in the customer's enclosure. However, the new design carried a higher ampacity limit and could operate at lower temperature than the customer's original components. Standex Edge exceeded expectations in this area.

### Tooling and production

Following a complete redesign and evaluation, Standex Edge took steps to tool its process to support the client's volume and lead time requirements for the new components. Standex Edge engineered and tooled a production process specifically for the client's design based on its existing production and assembly capabilities. These steps ensured the client could outsource production of planar magnetics and would be assured their components would comply with regulatory and safety requirements. This also positioned Standex Edge to quickly respond to future requirements changes or requests for new component designs from the client when needed.



## Summary

Standex Edge played a unique role in this engagement by acting as the client's go-to subject matter expert on power magnetics design and production. In addition to providing high-value design and process engineering services, Standex Edge acts as an important element in the power magnetics supply chain and can ensure long-term production capacity. The customer now has a design and manufacturing partner that they can trust to deliver products that comply with performance, safety, and reliability standards. Standex Edge's approach to design, sourcing, and production allows it to take an agile approach that continuously addresses new client needs as they arise.

Standex Edge is regarded as an authority on design for manufacturing (DFM) of power magnetics components, particularly for high-reliability planar transformers. Standex Edge leverages this expertise in other areas, including critical defense and aerospace systems, utilities, medical, automotive, and much more. Standex Edge also supports custom component designs for legacy systems in these areas, providing reverse engineering and redesign services targeting older components that may not comply with modern safety/performance requirements or that have become obsolete.

OEMs who need to outsource production of compliant, high-reliability power magnetics should look to a design and manufacturing partner like Standex Edge. The power electronics products from Standex Edge are designed to provide high efficiency power conversion and regulation with high power and current limits in power electronics designs. Contact Standex Edge today to learn more about its line of high power, high-reliability planar magnetics components or to inquire about design and engineering services to support industrial power electronics.



A Standex **Electronics** Business

The pathway to usable electrical power begins with generation, continues through high-voltage transmission to urban and industrial centers, and extends to the distribution of lower-voltage electricity to businesses and homes, where it's ultimately consumed in countless applications.

At the **Edge** of this energy cycle, Standex Electronics engineers open up a virtually infinite range of possibilities to power the world's most demanding electrical devices. From concept to production, we deliver custom magnetic solutions that convert, condition, and control energy with precision and reliability.

Our expertise spans transformers, inductors, current sensors, and other advanced magnetic components used across industries, from automotive and industrial to medical and aerospace. Combining decades of engineering innovation with global manufacturing capabilities, Standex Electronics stands at the **Edge** of innovation, where energy meets possibility.

Welcome to **Standex Edge**.

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