

MODULAR DIN ENCLOSURES PROVIDE FLEXIBLE DESIGN CAPABILITIES



Modular DIN Enclosures Provide Flexible Design Capabilities

Industrial control and operational electrical and electronics systems engineers must continually adapt their designs to the needs of a wide range of applications. Modular DIN enclosure systems have been developed to help make these designs adapt more easily.

Today's industrial designs are more varied and complex than ever before. Everything from industrial machines and equipment to electronic control system applications requires specific approaches that allow engineers to design more compact systems without sacrificing capabilities. When dealing with a variety of engineers in different industries, a modular approach to DIN enclosures can become a real benefit, allowing for the broadest amount of flexibility through the use of snap-together designs.

The flexibility of modular DIN enclosures, such as the KV 4600 from Altech, supports the extensive capabilities design engineers require in the market. DIN enclosure applications are limitless and are available to work with all electromechanical devices including relays, sensing and monitoring devices, transducers, and printed circuit boards. Once your design team decides the parameters needed for your application, enclosure configuration can match those requirements.

Enclosure Design



Figure 1: Shown is the modular enclosure design approach used to provide flexibility to the design engineer.

Altech's KV 4600 is available where the enclosure bottom is separated into two functional units (see Figure 1). This approach allows users to install an additional PCB within the bottom assembly. Manufacturers gain the ability to use this additional board to create independent interfaces or communications components for module networking.

Additional modifications can be incorporated through separate milling or molding-in of custom openings for different types of connectors or ports that are needed for a range of standard or future communications interfaces. The overall aim in the design of these DIN enclosures is to provide simple integration into the front face or the side of the enclosure, depending on application requirements.

Light conductors, grounding springs, and tiltable front covers can also help manufacturers that need to provide status indication or manipulation protection to their systems. For example, when light conductors are incorporated with terminal connections, device faults can easily be located. Using flexibility as the focus, the KV 4600 modular DIN enclosures were designed with the broadest number of options and capabilities.

Connection Variations

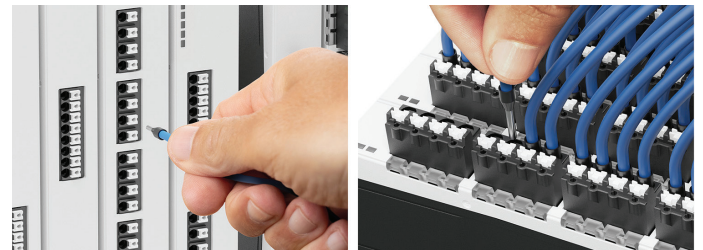


Figure 2: Capable of incorporating fixed push-in terminals and pluggable push-in terminals allows these enclosures to fit into multiple applications.

DIN enclosures must be able to accommodate a wide range of functions and formats, including the handling of both fixed push-in terminals and pluggable push-in terminals (see Figure 2). Adapting to the needs of the latest applications often means that terminals must

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offer high signal densities to the user while taking up the least amount of real estate. Fixed push-in terminals, for example, provide more connection with minimal width—up to 40 pins per 22.5mm module. Available for use with reflow soldering processes, the terminals come in 4-, 6-, 8-, and 10-pin versions in 3.5mm or 5.08mm pin spacing.

Pluggable terminal connections can be arranged in a line to permit the user to incorporate prewired leads to be created. This approach saves installation time and improves connection handling during maintenance and repair operations. Optionally available coding of the individual terminal blocks further aids in avoiding wiring errors.

Tool-free conductor installation technology supports the modular terminal technology making wiring quicker, easier, and more reliable. The KV 4600 system of DIN enclosures also provide an optional integrated plug removal aid that allows for convenient unlocking of terminal blocks individually. Integrated terminal-to-connection wires from outside the enclosure to the PC boards inside the enclosure are also possible.

While most industrial DIN enclosures provide only side-facing terminal blocks that can be hard to reach during installation, maintenance, and analysis, the KV 4600 provides front accessibility of the terminal blocks instead. The large front area provides space for engineers to design-in easy access for more flexible arrangement of terminals including common communications interfaces such as RJ45, D-Sub, USB, light conductors, radio, and NFC. Quick and easy diagnosis is supported through the use of integrated test points for each terminal. Furthermore, the space-saving solution offers sufficient space for the individual labeling of the terminal points.

PC Boards



Figure 3: *The open design allows for maximum PCB surface use.*

Because the PC boards are mounted perpendicular to the DIN rail, design engineers are able to integrate up to two circuit boards inside a single enclosure. Also, the location of the PC boards permits the entire surface to be available for layout—they are not blocked by the terminals. Circuit boards offer a surface area of up to 9500 mm², which allows for multiple applications within a cost-effective design (see Figure 3). Engineers can easily design-in features not possible when using other enclosure systems. An optional rail bus that uses the company's In-Rail-Bus mounting design quickly snaps into place, providing power, signal, and data transfer capabilities.

Making common bus concepts available for incorporating into the assembly, the enclosures support integrated test points for on-site analysis access. A variant of the KV 4600 series, the I/O electronics enclosure, offers a compact module width of 12.5mm and a depth of 66mm. This is perfect for modern control systems as well as industrial IoT applications in

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process engineering, discrete manufacturing, or other situations where space is limited. The I/O electronic enclosure offers up to 20 I/O per module with five slots per board. The enclosure also allows for connecting elements that are separately available, making it possible to link the individual modules if device systems are managed in a decentralized manner.

When considering your application's environmental needs—including shock and vibration—be sure to focus on every component. For example, designs that tout vibration-resistant mounts for the PC board may not include that same protection in their fixed or pluggable interconnections. The KV 4600 includes vibration-resistant connection of the conductors as well as the PC boards.

Marking Capabilities

Marking capabilities for the modular DIN enclosure system are varied.



Figure 4: Printing can be added to the enclosure housing and cover to provide terminal marking, specifications or other information for application specific customization.

Since these enclosures offer a large surface area to work with, they provide an unusual amount of space for abrasion-resistant laser markings and pad or digital printing processes depending on user needs. Various methods can be used to code the individual terminal blocks incorporated into the system to eliminate wiring errors. In addition, Altech offers enclosures molded in custom colors when ordered in OEM quantities.

Conclusion

Working with the right supplier gives your engineers the greatest number of options, providing the design flexibility necessary in today's shifting markets. When it comes to adapting to a wide variety of customer requirements, having a single source will save time and money. The modular approach to enclosure design and development puts creativity back into the hands of the engineers rather than the supplier.