Key takeaways:

- Space is at a premium in control cabinets, and components are becoming smaller to meet this demand
- Recent innovations are minimizing the footprint of power distribution
- These new terminals not only save space, but they come in many variations to fit the needs of nearly any control cabinet

Saving space in control cabinet wiring through innovative connectivity solutions

In a world that is ever-changing, new innovations are constantly created to maximize potential, save time, and, in the case of control cabinets, save space. Products across the board, both figuratively and literally, are created to be smaller and more compact, but still need to achieve the same or even higher density level as before. Power supplies, relays, signal conditioners, you name it – all are getting smaller to save space.

But what about the most fundamental products in the entire control cabinet – connectivity products, such as terminal blocks, distribution blocks, and sensor/actuator blocks? Often, these make up the vast majority of connections within a control cabinet, and they are no exception to change.

Over the past decade, the industry has seen countless innovations within the connectivity portfolio to increase the density of wiring and shrink the overall footprint inside the cabinet. Whether through simplifying and condensing power distribution connections, organizing sensor wiring into a unique compact solution, or utilizing multi-connection and multi-level terminal blocks, there are many innovative solutions on the market to explore.

Almost all products inside a control cabinet need power to function properly, but it would be silly to think that each product gets its power from its own separate power source. Typically, a cabinet will have one power supply (or two for redundancy) that is sized large enough to feed power to all the other components within a cabinet. To do so, the main power comes out of the power supply and into a “bank” of terminal blocks. These terminal blocks are then bridged, connecting them electrically, and then the output feeds the rest of the products downstream. This is known as power distribution.

Figure 1: Today's control cabinets demand space-saving components; power distribution terminals have met this challenge.

While power distribution is nothing new, the way that it can be done has seen some innovation recently. As mentioned earlier, a bank of terminal blocks is a common way to achieve power distribution. This could mean 10, 15, 20, or more terminal blocks side by side, depending on the number of connections needed to feed downstream equipment. This can quickly add up, and before you know it, an entire row of the control cabinet is consumed by power distribution. Until now.

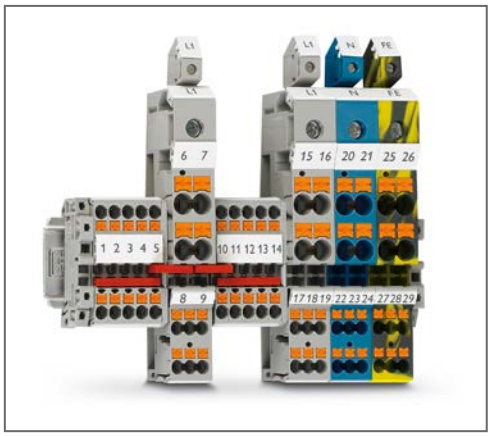

Figure 2: PTU - Potential Collective Terminals from Phoenix Contact.

Over the past few years, there have been a handful of products aimed at minimizing the overall footprint of power distribution. New innovations, known as "potential collective terminals," are quickly increasing the density and decreasing the footprint needed to achieve this task. Figures 2 and 3 show two different ways terminal blocks can do just that.

Figure 2 is an example of a compact terminal block that can be snapped onto a DIN rail and achieve up to 10 positions of output from a single input. Unlike the bank of terminals of old, this block is electrically connected internally and can feed up to 10 outputs (of various wire sizes) with one single input connection. Instead of needing 11 separate terminal blocks (one larger sized for feed-in, and then 10 output blocks), plus a bridge to connect all of them together, you can achieve the same functionality with a single part number. If more outputs are needed, these blocks also have a bridging channel to connect adjacent blocks and achieve even greater density. This will reduce the width from nearly 80 mm to around 16 mm (per 10 connections of output) along the DIN rail.

Figure 3 shows a different variation of power distribution blocks, this time even more compact and with higher density. These nifty little blocks are capable of up to 57 amps (with the largest option) of power distribution. Not bad for a footprint of only 28 mm wide. With a wide range of options, from 6, 12, or 18 positions of output, these distribution blocks are sure to meet your application needs.

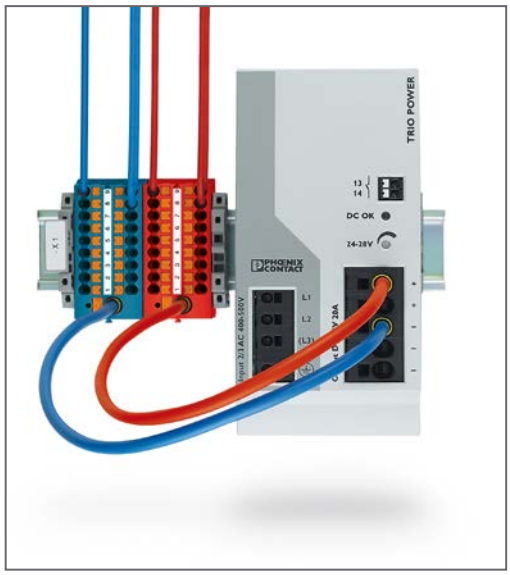

Figure 3: PTFIX distribution blocks have numerous options for fast and flexible mounting.

One unique feature of these distribution blocks is the mounting versatility – the possibilities are almost endless. Mount them to the DIN rail, both vertically or horizontally, direct mount to the panel, or for some niche applications, they even come with a 3M adhesive back that can be stuck just about anywhere. With such a tiny footprint, these small blocks pack a huge punch and are pushing power distribution solutions forward.

Whether you are simply looking to save space in your cabinet, or you aspire to be on the front end of innovation, there are countless products on the market that do just that. While the industry is growing, cabinets are shrinking, and finding the best solutions that fit your application is imperative to success.

Eric Silvestri
Lead Product Specialist –
Industrial Cabinet Connectivity,
Phoenix Contact USA

About Phoenix Contact

Phoenix Contact is a global market leader based in Germany. Since 1923, Phoenix Contact has created products to connect, distribute, and control power and data flows. Our products are found in nearly all industrial settings, but we have a strong focus on the energy, infrastructure, process, factory automation, and e-mobility markets. Sustainability and responsibility guide every action we take, and we're proud to work with our customers to empower a smart and sustainable world for future generations. Our global network includes 22,000 employees in 100+ countries. Phoenix Contact USA has headquarters near Harrisburg, Pa., and employs more than 1,100 people across the U.S.

For more information about Phoenix Contact or its products, visit **www.phoenixcontact.com**, call technical service at **800-322-3225**, or email **us-info@phoenixcontact.com**.