Saving space for control cabinet switching

Switching connectors and honeycomb terminals with push-in connection technology

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Optimizing processes in industrial applications puts high demands on automation technology. More sensors and wires need to be integrated and wired into systems. To avoid added costs, switching systems must save space and be quick to install in the control cabinet. Two new switching systems with push-in connections can meet these requirements (Figure 1).

Fast and easy installation

Push-in connections have become standard for convenient, time-saving installation. Compared to conventional modular terminal blocks, push-in terminals have the advantage of connecting conductors to the receptacle quickly and without tools. With insertion forces up to 50 percent lower than those of other connection designs on the market, push-in connectors minimize work fatigue.

The direct plugging design makes for easier operation and reduces the wiring time. It also allows for faster installation of pre-assembled and rigid conductors with cross sections of 26 to 12 AWG. This provides a safe, gas-tight, vibration-resistant connection that is certified according to DIN 60947-7. Some of the terminal blocks on the market also meet the testing requirements.
requirements of process technology, power engineering, railroad engineering (EN 50155), and shipbuilding.

To release the conductor, the user pushes on the color-coded pushbutton with a standard screwdriver. The color-coded pushbutton is uniquely identifiable, avoiding incorrect conductor connections. This prevents dangerous operating conditions during installation.

Compared to other common designs, the new touch-proof switching systems no longer present any danger from short circuits between the pins or when touching the metal of the installation tool. The design also reduces costs by eliminating the need for installation tools.

**Customized color-coding**

For both new switching components – the switching connector as well as the honeycomb terminals – color-coding can be applied to meet individual requirements. Standardized coding systems, such as the color-coding of installation cables specified by DIN EN 69100 or VDE 0815, can also be used. This makes it easy to match the conductor color to the correct terminal point. Specific areas can also be coded according to color. Installation according to color not only saves time, but avoids wiring errors from the outset. Even when errors do occur, color-coding has its advantages: Because the terminal description indicates the conductor and terminal point color, it is easy to locate and correct wiring errors.

Preparation based on color can be used in several different areas, such as the digital input/output and analog input/output sections. Similarly, the Pump 1, Pump 2, etc. application types can be structured according to color. This customized structuring keeps the control cabinet clearly organized at all times. Companies that operate across national borders can define in-house standards for specific applications to simplify the work of technicians and maintenance personnel around the world.

**Switching connectors simplify front wiring**

The switching connectors, which are primarily used for front installation (Figure 2), have a pitch of only 8.3 mm and a total length of 100 mm. They allow the use of up to 960 signals per control cabinet meter. This is great to know during planning, as the control cabinet space can be reduced right from the outset. These dimensions make the terminals the most compact push-in switching connectors on the market.

To save even more space, mount a wire guide strip on the terminal to accommodate the cable duct cover. This eliminates the need for a separate cable duct.

The test socket in the middle of the switching connector prevents incorrect connections and measurements because the test probe is placed very clearly between the conductor openings. The 2.3-mm opening for the test probe can also be used with conventional probes as it is not obstructed by any conductors. This makes it possible to connect measuring devices and set up test circuits without any issues.

The switching connector also offers an option for voltage distribution. It distributes currents of up to 17.5 A to a maximum of 32 terminal points. For the power supply and larger cross-sections, even currents of up to 32 A can be distributed, and up to 17.5 A per terminal point can be absorbed using a bridgeable terminal. At this terminal, conductor cross-sections of up to 6 mm² (including ferrules) can be inserted.

Pre-printed labeling is available for the switching connector, which has four or eight levels. The contiguous labeling area fits between the switching connectors, saving further space. It also allows better orientation and separation of individual areas.
Honeycomb terminals for modular design

If short revision times are crucial, honeycomb terminals are the ideal choice. Their uniform design makes it possible to work on both sides of the control cabinet, ensuring a strict separation of the automation and field and the switching side.

The new, honeycombed switching system (Figure 3) also allows deviation from the 19-inch standard according to the DIN 60297. Instead, a user-defined standard can be implemented. Users can develop their own marshalling distributor concepts with high-packing densities to accommodate their own specific requirements. By snap-locking the elements, the installer can precisely match the existing signals to the pin count, so that no space goes unused. The honeycomb terminal accepts both flange and rail mounting, so it can also be used for microcontrollers in the control cabinet or in the machine housing.

The individual elements of the honeycomb terminal are available in 11 colors (Figure 4). The terminals can be configured and installed according to a simple snap-lock principle. In a self-configured honeycomb terminal, the distances between drill holes and snap-in positions can also be customized. Sufficient fastening materials are included, and users can mount the terminals themselves without any issues.

Fully prefabricated solutions with pin counts of 32, 48, and 80 are available in both the compact and the 19-inch sizes. The vertical wire guide clearly organizes the cabling process. The clamping mechanism is always freely accessible because it is not obstructed by any connected conductors. The honeycomb terminal’s 2.3-mm test socket also allows convenient measurement and testing using standard equipment.

Switching systems featuring push-in connections

Switching terminals
- For simple front wiring
- Space requirements slashed by up to 20 percent
- Coding of terminal points with eleven colors of your choice
- Freely accessible test sockets between connection points
- Extensive matrix labeling area

Honeycomb terminals
- For modular designs
- Up to 20 percent higher signal density
- Application-specific construction with precise pin counts
- Coding of terminals with eleven colors of your choice
- Convenient testing with standard test accessories
Conclusion: Clearer layout and greater flexibility during signal wiring

Phoenix Contact’s new switching systems with push-in connections offer greater added value than older designs such as Wire-Wrap, Termi-Point, and other conventional switching systems. Switching connectors and honeycomb terminals offer an innovative color guidance system where the connection point colors can be freely assigned. This facilitates both a clearer layout and a higher degree of flexibility during signal wiring.