



## Panel Essentials Series 4: Electrical Control Components

### Introduction








To commence our Panel Essentials series, we've discussed some of the most fundamental elements of a control panel — DIN Rail, Wire & Cable Management and UL508A Design (these previous editions are linked at the end of this paper).

Having covered basic structural components and design, we can now go over the different types of electrical control products that bring your design to life. There are many important product features that will need to be considered such as environmental and current ratings, applications, certifications and of course cost. However, one critical non-negotiable is *reliability* in all key function areas of your control panel. To ensure reliability, it is important to have an understanding of the products in your panel.

Let's now proceed with an overview of which products fall under certain key function areas. Use the heading links to access each product's showcase page for a more in-depth view of features, benefits and options.

# Power & Actuation Products


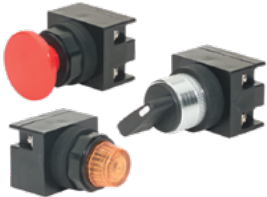

The principal functions of power & actuation electrical controls are to disconnect, control and/or protect a circuit from a ground fault, short-circuit or overload current. Power circuits have a significant electrical capacity (commonly 240-600 VAC 3-Phase) and rely on components such as the following:

<u>Disconnect Switches</u>	<u>Miniature Circuit Breakers</u>	<u>Contactors and Control Relays</u>	<u>Definite Purpose Contactors</u>
			
<u>Overload Relays</u>	<u>Motor Protection Circuit Breakers</u>	<u>Direct On-Line-Starters</u>	
			

Other common power & actuation products include molded case circuit breakers, fuses and fuse holders.

# Human Machine Interface (HMI) Products


HMI products are devices that are actuated by a person to direct the operation of another device and/or indicate the status of an operating system. The interface may be touch, sight, sound or any physical or cognitive function. HMI products in a control circuit deal at a lower electrical capacity (commonly 240-600 VAC 3-Phase) and are used to control the power components. Common HMI components include:

<a href="#"><u>30mm Industrial Pilot Devices</u></a>	<a href="#"><u>30mm Hazardous Location Pilot Devices</u></a>	<a href="#"><u>22mm IEC Pilot Devices</u></a>	<a href="#"><u>22mm NEMA Pilot Devices</u></a>
			
<a href="#"><u>16mm Pilot Lights</u></a>	<a href="#"><u>13mm Pilot Lights</u></a>	<a href="#"><u>Cam Switches</u></a>	<a href="#"><u>Enclosures</u></a>
			

Other common HMI products include beacons, audible alarms, electronic operator interfaces and meters.

# Control Logic Products

Control logic products are devices that control other products in a control circuit in a logical sequence or based on a defined period of time. This control is carried out by electrical actuation rather than by a person. Control logic products also include devices that distribute electricity throughout a control panel. Common voltages for control logic products are 120VAC or 24VDC and typical components are:

<u>Terminal Blocks</u>	<u>Terminal Block Relays</u>	<u>Electronic Timing Relays</u>	<u>General Purpose Relays</u>
			

Other common control logic products include programmable relays, programmable logic controllers, power supplies, and control transformers.

## Product Reliability - Key Points

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You may know the type of product that you need, but are you looking for the right product/company features? If you want reliability, here are some key points to consider:

- **Safety & Compliance:** A reliable product goes a long way in ensuring the safety of your team and machinery, as well creating a smooth approval and marketing process. It is always a good choice to make sure a product meets global standards for quality and safety. Key standards include UL, CSA and IEC for products and NFPA, CSA and IEC for installation. Compliance also speaks to product design fabrication, performance and competency – creating an end product you can trust.
- **Durability:** A reliable product will also provide durability. Construction, material and testing play large roles in delivering a product with optimal performance and life even when utilized within demanding applications and varying environments. In addition to knowing product applications, you may also need to consider whether the product will be exposed to and be able to withstand moisture, extreme temperatures, corrosive chemicals and contaminants, noise and vibration.
- **Efficiency:** A reliable product will be well-crafted yet efficient in design as a result of excellent and innovative engineering and product development. While delivering optimum performance, an efficient product can also deliver lightweight material and a minimal footprint within your control panel. The benefits can include space and performance optimization, increased productivity, inventory reduction, ease of installation/maintenance, cost savings and improved cash flow. You'll also want to consider versatility, which creates additional efficiency benefits including multiple applications, range of operation, seamless compatibility and the sharing capability of common accessories.
- **Service & Support:** A reliable product is backed by a customer-centered warranty, a knowledgeable and responsive support team and a shipping policy that allows you to get your product when you need it. You'll want to consider how your partnering supplier stands behind their product.

As you consider your needs for control panel electrical control components, check out all of c3controls' Product Showcase pages and online product configurators to explore the many ways c3controls can provide products that perform, streamline and help you protect your biggest investments.

## Panel Solutions

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For your complete panel needs, c3controls operates a UL508A certified panel shop serving the OEM and panel builders across a wide variety of industries. Check out our [enclosed panel solutions](#)!



## c3controls Panel Essentials Papers

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- **Series 1:** [DIN Rail](#)
- **Series 2:** [Wire Duct and Terminal Blocks](#) *(for wire and cable management)*
- **Series 3:** [UL508A Control Panel Design Considerations](#)
- **Series 4:** [Electrical Control Components](#)
- **Series 5:** [Control Panel Industry Trends](#)

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