

Panel Solutions

*Complete Guide to c3controls'
UL508A Certified Panel Shop*

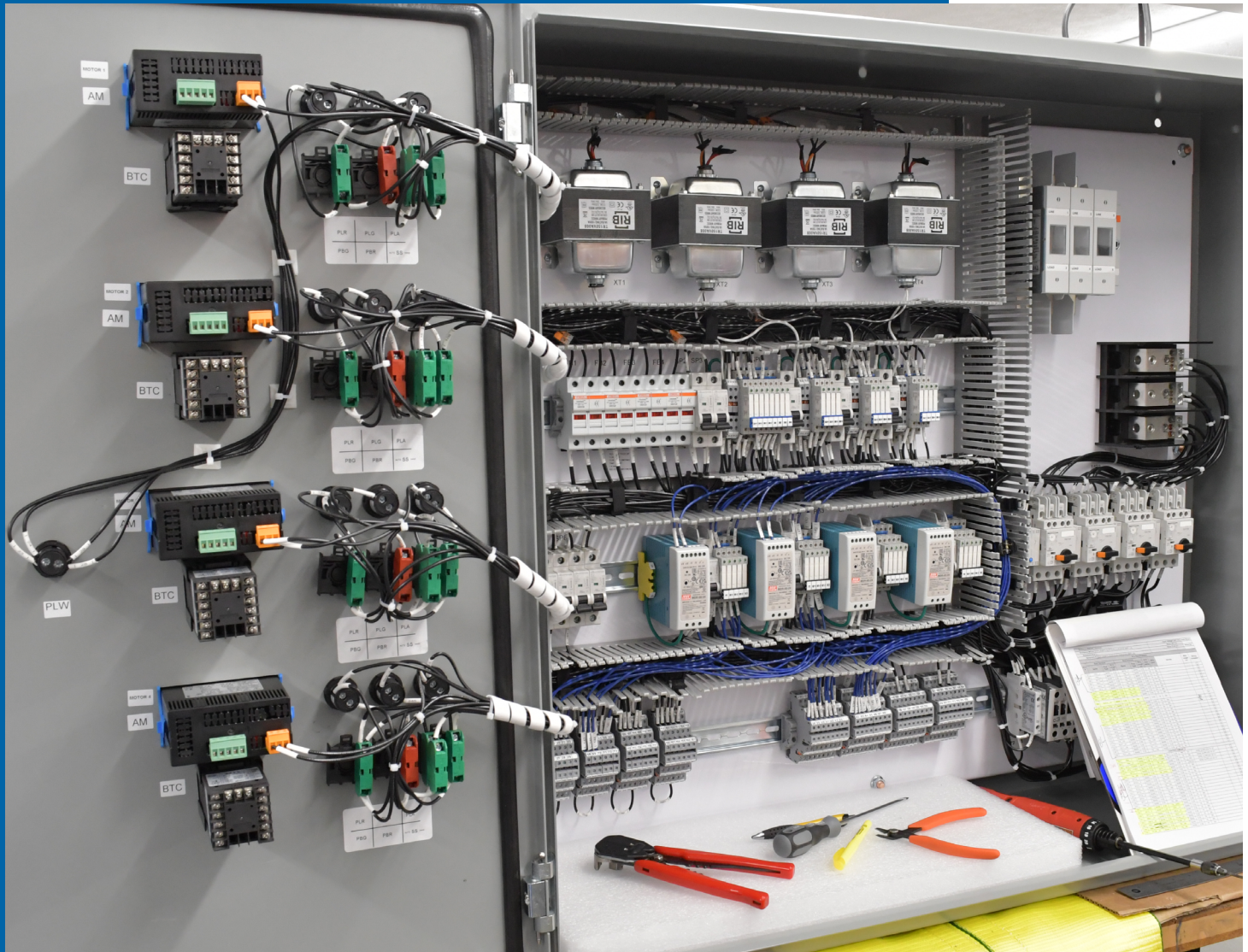


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About c3controls

Since 1976 c3controls (c3controls.com) has provided OEMs and electrical equipment builders a comprehensive portfolio of industrial control products that meet the most demanding applications. By maintaining strict control over the development and manufacturing of all products, c3 can provide customers extraordinary value through unmatched quality, competitive pricing, same-day shipping and a lifetime product warranty. This vertically integrated approach coupled with a direct sales model brings c3 closer to the end-user, fostering a degree of innovation that leads the industry.



Glossary of Terms

Control Logic Products:

Devices that control other products in a control circuit in a logical sequence or based on a defined period of time. Examples include terminal blocks, electronic timing relays, and general purpose relays.

Control Station:

A designated electrical enclosure which operators use to monitor and control processes and equipment within a system or facility.

Enclosure:

The protective cabinet that houses electrical components providing protection, safety, and organization. Common constructions include polyester, polycarbonate, and die-cast aluminum.

Human Machine Interface (HMI) Products:

Devices that are actuated by a person to direct the operation of another device and/or indicate the status of an operating system. Examples include control stations, pilot devices, and cam switches.

Industrial Control Panel:

An enclosure with an assembly of switches, indicators, and other control devices used to operate and monitor electrical equipment.

International Electrotechnical Commission (IEC):

An international organization that sets performance-based standards for all electrical and related technologies.

Legend Plates:

Customizable identification labels that provide essential information about the functions or status of switches, buttons, indicators, or other devices on a control panel.

Motor Starter:

A device used to control the starting, stopping, and protection of electric motors. Common assemblies include contactor + overload relay and motor protection circuit breaker + contactor.

National Electric Code (NEC):

The NEC, or NFPA 70, is a widely used regulation that ensures safe design, installation, and inspection of electrical equipment.

NEC Article 409:

The National Electric Code (NEC) article that provides guidelines for the construction, installation, and maintenance of industrial control panels intended for general use.

NEC Article 430:

The National Electric Code (NEC) article that covers design, installation, and protection of motors, motor circuits, and

controllers.

NFPA 79:

The National Fire Protection Agency (NFPA) safety standard that provides regulations pertaining to electronic industrial machinery components, specifically targeting those operating at or below 600V.

Power & Actuation Products:

Devices that disconnect, control, and/or protect a circuit from a ground fault, short circuit, or overload current. Examples include motor starters, disconnect switches, circuit breakers, contactors, and overload relays.

Short-Circuit Current Rating (SCCR):

The maximum short-circuit current an electrical component can safely withstand without causing a shock or fire hazard.

Underwriters Laboratories (UL):

A third-party certification company that tests and sets industry standards for electrical products with the aim to make the world a safer place for both workers and consumers.

UL508A:

The Underwriters Laboratories (UL) standard for an industrial control panel. UL508A certification does not mean the completed panel has been tested to UL508A standards. It means that the design, panel, components, and construction method meet the UL508A standard.

Wiring Solutions:

Components that ensure efficient installation, maintenance, and organization of wiring in a control panel. Examples include DIN rail for mounting components, wire duct for protecting wires, and terminal blocks for secure wire connections.

Panel Shop Overview

A UL508A panel shop refers to an electrical panel fabrication facility that has obtained certification from Underwriters Laboratories (UL) for building industrial control panels in compliance with UL508A. The standard sets forth specific safety requirements and guidelines — covering various aspects of panel design and construction including enclosure selection, component ratings, wiring practices, grounding, overcurrent protection, insulation requirements, and labeling.

Control panel builders and integrators look for UL508A compliance to guarantee benefits such as:

- **Third-Party Certification** that provides evidence that the enclosures meet nationally recognized safety standards.
- **UL Certified Components** that certify that UL508A enclosures include only quality, tested controls.
- **Periodic Audits** that ensure that manufacturers employ consistent techniques in order to meet UL508A requirements.
- **Proper Labeling and Technical Ratings** that limit risks and verify that standards are met.

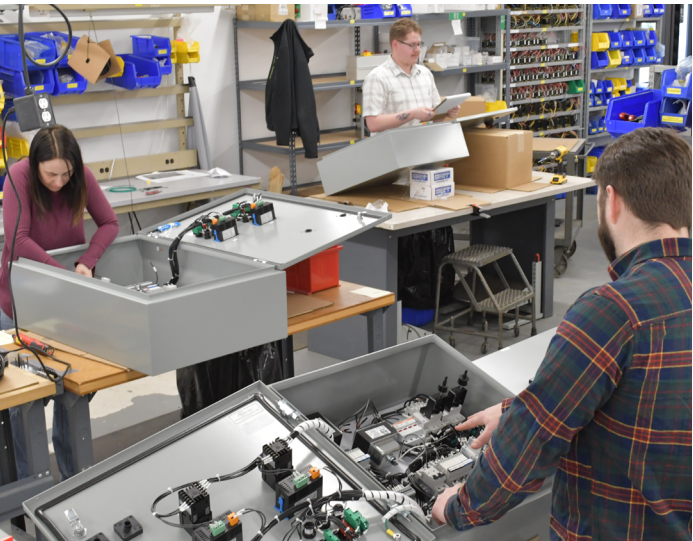
Looking for a UL508A solution? c3controls has expanded USA operations to include a complete UL508A panel shop. A resource for OEMs looking to supplement inhouse manufacturing, the certified panel shop ensures the highest level of safety and reliability for electrical control panels serving a wide range of industries. And, panels from c3controls are equipped with our own manufactured electrical products — over 15 million configurations that perform essential control panel functions.

Whether it is an order for 10 panels, hundreds, or thousands — c3 systems, equipment, and personnel are flexible and can be adapted to meet your expectations. Our experienced team will work with you directly to ensure quick turnaround on custom or specialty panels such as:

- **Direct-On-Line Starters**
- **Combination Motor Starters**
- **Control Stations**
- **& much more!**

c3controls has been a leading manufacturer of panel components for almost 50 years. Now equipped with a UL508A certified panel shop, we look forward to helping you succeed better than ever before!

Facility Images




Panel Solutions

c3controls offers custom and finished panel solutions serving a wide range of industries.


Motor Starters

1



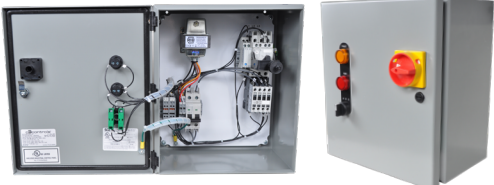
Enclosed Direct-On-Line Starters (Contactor + Overload Relay)

2



Enclosed Direct-On-Line Starters (Motor Protection Circuit Breaker + Contactor)


3



Enclosed UL508A Combination Motor Starters


Control Stations

4




Pre-Configured Control Stations

5



Alarm Silence Control Stations


6



Emergency Stop Control Stations

Custom Panels

c3controls' systems, equipment, and personnel are flexible and can be adapted to meet your expectations.




Electrical Panels

Have a specific design?
Inquire about our custom panel capabilities!


Enclosures

7




Enclosed Disconnect Switches

8












Enclosed Motor Protection Circuit Breakers

9



Enclosures

1		Enclosed Direct-On-Line Starters (contactor + overload relay)	Open-style starter consists of Contactor & Overload Relay	Enclosed starters come pre-wired with a variety of pilot device options	Factory assemblies provide the convenience of a single catalog number and shorter control panel bill of material	
2		Enclosed Direct-On-Line Starters (motor protection circuit breaker + contactor)	Open-style starter consists of Motor Protection Circuit Breaker & Contactor	Enclosed starters come pre-wired with a variety of pilot device options	Factory assemblies provide the convenience of a single catalog number and shorter control panel bill of material	
3		Enclosed UL508A Combination Motor Starters	UL508A Type E Combination Starters	Available in Polycarbonate (Type 4/4X) and two versions of Carbon Steel (Type 1 or Type 3R, 4)	Pre-wired control circuit for quick and easy field installation	Includes: motor protection circuit breaker, contactor, UL489 circuit breaker, a variety of 22mm IEC pilot devices, and external operating handle Factory assemblies provide the convenience of a single catalog number and shorter control panel bill of material
4		Pre-Configured Control Stations	Available as standard pre-configured assemblies of 30mm, 22mm IEC and 22mm NEMA	Enclosure constructions in Polycarbonate, Polyester, and Die Cast Aluminum	Operator options in both non-illuminated and illuminated	Each assembly comes with laminated, laser engraved legend plates Fully assembled and ready to use out of the box
5		Alarm Silence Control Stations	Pre-wired with a red pilot light, alarm buzzer (80dB sound output) and red momentary push button	Voltage options available in 120VAC (50/60Hz), 24VAC (50/60Hz), 24VDC	Rated for Type 4 & IP65	Polycarbonate 3-hole enclosure (L: 7.09" x W: 3.15" x D: 3.35") Factory assemblies provide the convenience of a single catalog number and shorter control panel bill of material
6		22mm IEC Emergency Stop Control Stations	Non-Illuminated and Illuminated versions	UL Listed Polycarbonate enclosure rated for Type 1, 2, 3, 3R, 4/4X, 12, 13, and IP66	Meets EN418 Safety of Machinery global compliance standards	Operating temperatures from -40 to +55° C (-40 to + 131° F) UV and corrosion resistant
7		Enclosed Disconnect Switches	Door mount, panel-base mount, and panel mount with integral operator	Certified for use in Manual Motor Controller applications suitable as Motor Disconnects	16 - 125 Amps in 3-, 4-, and 5-pole configurations	Variety of operating handle styles and colors rated for Type 1, 2, 3, 3R, 4/4X, 12, and 13, IP55 and IP65 ABS plastic, polycarbonate, and carbon steel enclosures with Type 1, 4X, 12, 13 and IP65 ratings
8		Enclosed Motor Protection Circuit Breakers	Multi-Function: Manual Motor Controller, Motor Disconnect, Group Motor Installations	32A Circuit Breaker with Thermal and Magnetic Trip Elements	ABS Plastic enclosure designed with integrated ground and neutral connections, and four standard PG16 knockouts	The lift off ABS Plastic enclosure has an IP55 environmental rating and is CE certified
9		Enclosures	Available in three rugged constructions: polyester, polycarbonate and die-cast aluminum	Options up to four holes, or unpunched	Accommodations available for 22mm and 30mm pilot devices, and disconnect switches	A variety of seals keep dust and moisture out of the enclosures UL Listed and CSA certified

Disclaimer: For illustration purposes only. Other solutions may be applicable depending on your application design requirements.


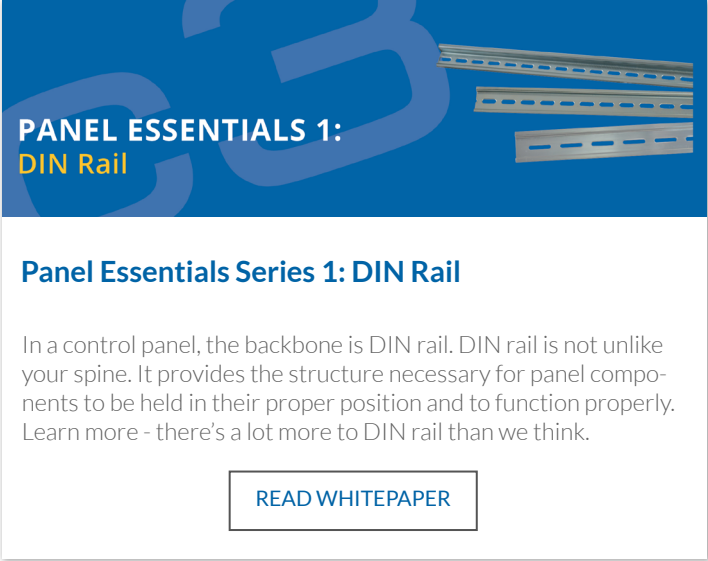
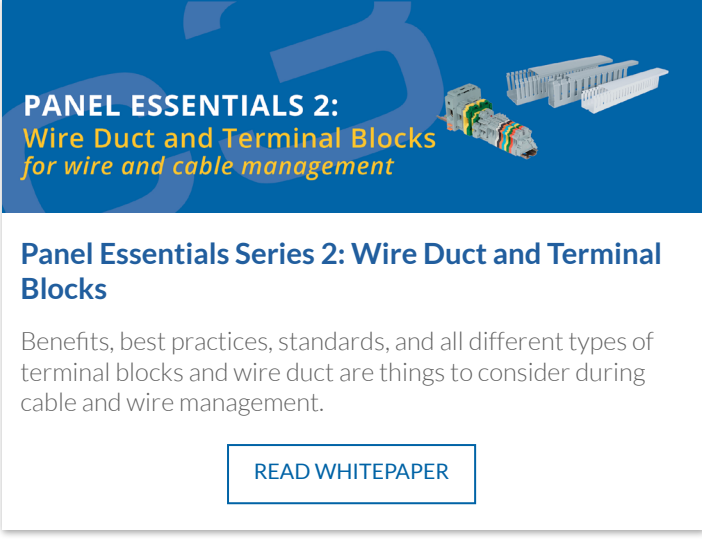
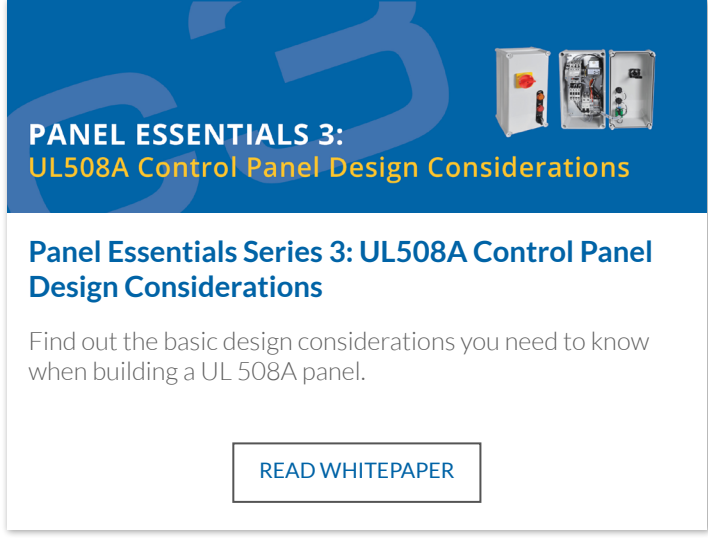
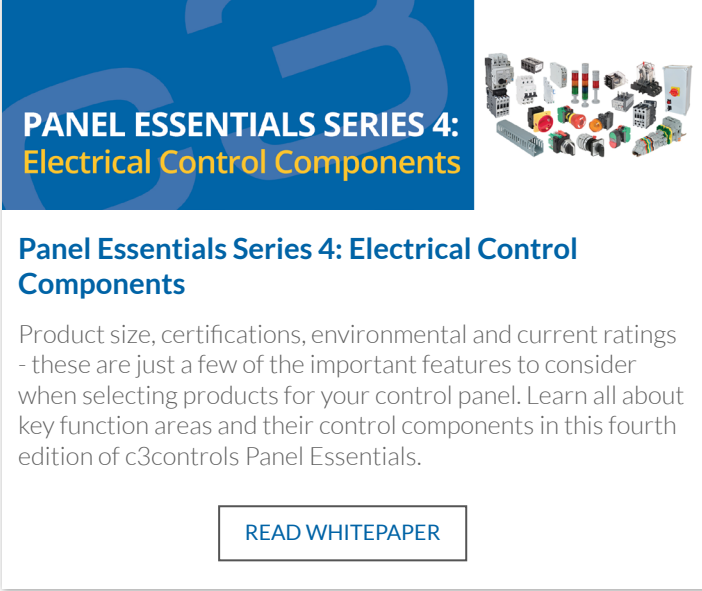
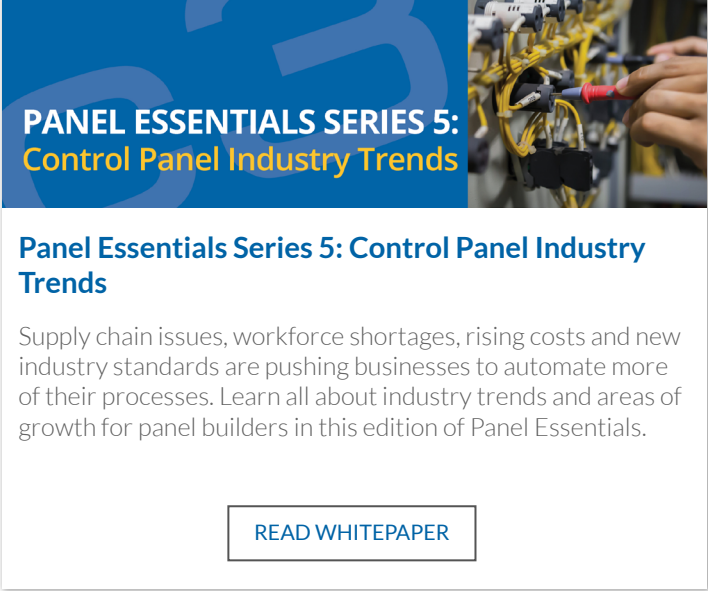
Product Portfolio

Our 15 million+ product configurations deliver durability and reliability—even in the most punishing environments—meeting and exceeding global standards for quality and safety.

 <p>DISCONNECT SWITCHES</p>	 <p>ENCLOSED DISCONNECT SWITCHES</p>	 <p>MINIATURE CIRCUIT BREAKERS</p>	 <p>DEFINITE PURPOSE CONTACTORS</p>
 <p>CONTACTORS</p>	 <p>MINIATURE CONTACTORS & CONTROL RELAYS</p>	 <p>OVERLOAD RELAYS</p>	 <p>DIRECT-ON-LINE STARTERS CONTACTOR + OVERLOAD RELAY</p>
 <p>ENCLOSED DIRECT-ON-LINE STARTERS CONTACTOR + OVERLOAD RELAY</p>	 <p>MOTOR PROTECTION CIRCUIT BREAKERS</p>	 <p>ENCLOSED MOTOR PROTECTION CIRCUIT BREAKERS</p>	 <p>DIRECT-ON-LINE STARTERS MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR</p>
 <p>ENCLOSED DIRECT-ON-LINE STARTERS MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR</p>	 <p>30MM INDUSTRIAL PILOT DEVICES</p>	 <p>30MM PILOT DEVICES FOR HAZARDOUS LOCATION</p>	 <p>22MM IEC PILOT DEVICES</p>
 <p>WORLD TOWER LIGHTS</p>	 <p>CAM SWITCHES</p>	 <p>22MM NEMA PILOT DEVICES</p>	 <p>16MM PILOT LIGHTS</p>
 <p>13MM PILOT LIGHTS</p>	 <p>CONTROL STATION ENCLOSURES</p>	 <p>ENCLOSED UL508A COMBINATION MOTOR STARTERS</p>	 <p>TERMINAL BLOCKS</p>
 <p>TERMINAL BLOCK RELAYS</p>	 <p>ELECTRONIC TIMING RELAYS</p>	 <p>GENERAL PURPOSE RELAYS</p>	 <p>WIRING DUCT</p>

White Papers

Product professionals AND subject experts!
Check out c3controls' extensive library of white papers:

 <p>A Quick Guide: UL 489 or UL 1077 in Control Panels and Equipment</p> <p>UL 489 or UL 1077 in Control Panels and Equipment - A Quick Guide</p> <p>How do I know when to use UL 1077 or UL 489 breakers? The answer is seemingly simple, but like most simple questions, there is usually some confusion.</p> <p>READ WHITEPAPER</p>	 <p>PANEL ESSENTIALS 1: DIN Rail</p> <p>Panel Essentials Series 1: DIN Rail</p> <p>In a control panel, the backbone is DIN rail. DIN rail is not unlike your spine. It provides the structure necessary for panel components to be held in their proper position and to function properly. Learn more - there's a lot more to DIN rail than we think.</p> <p>READ WHITEPAPER</p>
 <p>PANEL ESSENTIALS 2: Wire Duct and Terminal Blocks for wire and cable management</p> <p>Panel Essentials Series 2: Wire Duct and Terminal Blocks</p> <p>Benefits, best practices, standards, and all different types of terminal blocks and wire duct are things to consider during cable and wire management.</p> <p>READ WHITEPAPER</p>	 <p>PANEL ESSENTIALS 3: UL508A Control Panel Design Considerations</p> <p>Panel Essentials Series 3: UL508A Control Panel Design Considerations</p> <p>Find out the basic design considerations you need to know when building a UL 508A panel.</p> <p>READ WHITEPAPER</p>
 <p>PANEL ESSENTIALS SERIES 4: Electrical Control Components</p> <p>Panel Essentials Series 4: Electrical Control Components</p> <p>Product size, certifications, environmental and current ratings - these are just a few of the important features to consider when selecting products for your control panel. Learn all about key function areas and their control components in this fourth edition of c3controls Panel Essentials.</p> <p>READ WHITEPAPER</p>	 <p>PANEL ESSENTIALS SERIES 5: Control Panel Industry Trends</p> <p>Panel Essentials Series 5: Control Panel Industry Trends</p> <p>Supply chain issues, workforce shortages, rising costs and new industry standards are pushing businesses to automate more of their processes. Learn all about industry trends and areas of growth for panel builders in this edition of Panel Essentials.</p> <p>READ WHITEPAPER</p>

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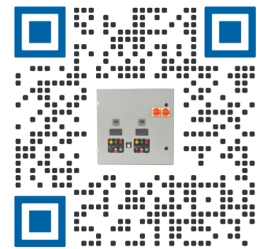
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