Data Centers

The OEM and Installers Guide to Control Components for Data Centers

c3controls.com

c3controls®
Everything under control.

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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

Aisles:
Organized rows separating server racks, alternating between hot (exhausting heat) and cold (supplying cool air) aisles.

ASHRAE:
The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) provides standards and guidelines for environmental conditions within data centers.

Automatic Transfer Switch:
An electrical device that automatically switches power sources between the main utility and backup generator during an outage.

Building Management System (BMS):
An integrated control system that monitors, manages and optimizes various building infrastructure systems such as power, cooling and security.

Busway:
A flexible and efficient power distribution system using prefabricated busbars to deliver electricity to server racks and equipment.

Circuit Breaker:
A device that protects electrical circuits by automatically interrupting current in the event of an overload or short circuit.

Cooling System:
A system that is used to maintain optimal cool temperatures of air or liquid for operation.

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

Cybersecurity:
The protection of sensitive data, systems and infrastructure from digital attacks.

Data Center:
A facility equipped with computing and telecommunications equipment to process, store and manage large amounts of data.

Energy Storage System:
Technology that captures and stores energy for later use to help balance supply and demand.

Fire Suppression System:
A system that automatically detects and extinguishes fires, minimizing damage and protecting equipment.

Generator:
A reliable backup power source that automatically provides electricity in the event of an outage to prevent downtime.

Load Bank:
A testing device used to simulate electrical loads, allowing for the assessment of power systems under controlled conditions.

Metering:
The continuous monitoring of electrical usage and environmental parameters for efficient resource management.

National Electric Code (NEC):
The NEC, or National Fire Protection Association (NFPA 70), is the adoptable standard in the United States for safe electrical design, installation and inspection.

Power Distribution Unit (PDU):
A low-voltage unit that supplies and manages power within individual equipment racks.

Racks:
Standardized modular structures that securely house and organize IT equipment for efficiency.

Servers:
A dedicated hardware device that processes requests and delivers data or services over a network.

Substation:
A facility with a transformer and switchgear combination used to distribute electricity at different voltage levels.

Switchgear:
A set of low, medium, or high voltage electrical equipment that is used to control, protect, and isolate electrical circuits.

Switchboard:
A large panel that distributes electrical power from the main supply to various circuits. Typical maximum voltage rating is 600 VAC / VDC.

Transformer:
A device that changes voltage levels and transfers electricity from one circuit to another.

Uninterruptible Power Supply (UPS):
Secure uptime in data centers by providing battery back-up power to IT equipment during an outage or disturbance.

Uptime Institute Tier Standard:
Classifies data centers based on their infrastructure reliability, providing a benchmark for performance and availability.

Data Centers Overview

Data Centers are integral components of modern information technology infrastructure, providing centralized hubs for storing, processing and distributing digital data. Filled with a vast array of IT, power, cooling and security systems, these facilities are scalable to allow small businesses or tech giants such as Amazon, Google and Microsoft to securely manage their digital assets.

Trends such as cloud computing, big data analytics, the Internet of Things (IoT) and artificial intelligence (AI) are driving the need for even more computing power and storage capacity. As businesses rely on data-driven insights to gain a competitive edge, the importance of robust and scalable data center infrastructure will only continue to grow.

Industry growth will be accompanied by challenges related to security requirements, improving energy efficiency and finding new sources for power and cooling. However, a bright future lies ahead for data center providers and equipment manufacturers who can adapt and evolve to the highest standards of reliability, safety and sustainability.

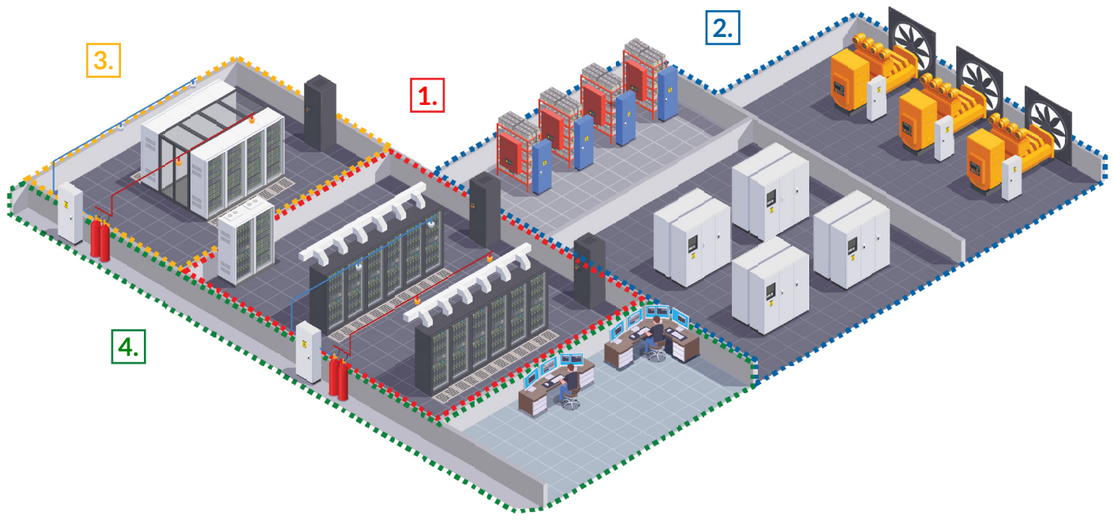
c3controls has solutions to address the evolving demands of data center operations. For almost 50 years, c3controls has specialized in manufacturing high-quality electrical controls required in data centers. Vertical integration allows us to operate more efficiently and respond to market conditions quicker. That means lightning quick delivery for electrical control products supporting the following data center systems:

- **IT**
- **Power**
- **Cooling**
- **Security**
- **& more!**

With over seventeen million product configurations and a complete UL508A panel shop, c3controls stands ready to help you seize every dynamic data center landscape! Contact us today and discover how we can help power your digital future.

Data Center Isometric

Here's an example of a data center facility and its function:



1. IT
The server room houses and protects critical IT infrastructure, including server racks, networking equipment and storage systems.

2. POWER
Power equipment such as switchgear, transformers, switchboards and PDUs manage and distribute electricity. Generators and UPS provide backup power sources during outages and disturbances.

3. COOLING
Data centers rely on a combination of HVAC units and targeted cooling strategies (such as aisle containment, low and high air distribution, and liquid cooling) to maintain optimal temperature, humidity, air flow and air filtering.

4. SECURITY
Fire suppression systems, video surveillance, cybersecurity and BMS are just a few of the systems that integrate to secure physical infrastructure, data, personnel and everything within a data center facility.

Data Center Products

c3controls can support all key function areas in your data center:

Power & Actuation

Disconnect, control, and/or protect a circuit from a ground fault, short-circuit, or overload current.

1

AC & DC Miniature Circuit Breakers (+ Bus Bars)

2

Disconnect Switches

3

Contactors and Control Relays

4

Direct-On-Line Starters (+ enclosed)

Human Machine Interface

Actuated by a person to direct the operation of another device and/or indicate the status of an operating system.

5

Pilot Devices

- 13mm
- 16mm
- 22mm IEC & NEMA
- 30mm Industrial & Hazardous Location

6

Control Stations (+ E-Stops and Alarm Silence Stations)

Control Logic

Devices that control other products in a control circuit in a logical sequence or based on a defined period of time.

7

Terminal Blocks

8

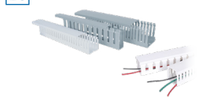
General Purpose Relays

9

Industrial Power Supplies

Panel Solutions

Support and protect electrical components that control and monitor a number of mechanical processes.

10

Wire Duct

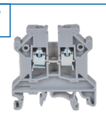
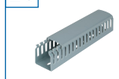
11

DIN Rail


Enclosures


Electrical Panels

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

1 	**AC & DC Miniature Circuit Breakers (+ Bus Bars)**	UL489 & UL1077 in 1, 2, and 3 pole configurations. Rated 60Vdc single pole and 125Vdc two pole	UL489B (DC) in 1, 2, 3 and 4 pole configurations. Rated 250Vdc per pole for up to 1000Vdc	Compact 17.5mm per pole construction with both thermal and magnetic trip elements	Operating current configurations from 0.5 to 63 Amps	10kA SCCR on all constructions
2 	**UL 508 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	Motor loads up to 40HP @ 480V (55kW @ 400V)	Operating handles rated for Type 1, 2, 3, 3R, 4/4X, 12, 13, IP55, and IP65
3 	**Contactors and Control Relays**	Contactors: 9 to 105 Amps	Contactors: 100kA SCCR @ 480V and 600V with Class J fuses	Contactors: AC and DC - electronic coil control on DC devices	Control Relays: Bifurcated contacts	Control Relays: Rated 16A AC-1, A600, and Q600 for applications up to 600V
4 	**Direct-On-Line Starters** (+enclosed)	Open-style starters consist of either a Contactor & Overload Relay, or a 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		
5 	**Pilot Devices**	Modular range of 30mm, 22mm, 16mm, and 13mm	Type 1, 2, 3, 3R, 4/4X, 12, and 13	Non-Illuminated, Illuminated and Keyed Operators in both maintained and momentary operations	Color-coded, snap-on contact blocks with angled captive screws and pressure plates	Full voltage, multi-voltage, resistor, and dual input light units in a wide range of voltages up to 600Vac/Vdc
6 	**Control Stations**	Available as standard pre-configured assemblies of 30mm and 22mm pilot devices	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
7 	**Terminal Blocks**	IEC: Screw, spring clamp and miniature connections from 5-25mm, rated from 25-230A	NEMA: Screw clamp connections rated 600V from 25-50A	HDTB: 4, 6 and 12 point in a single molded housing. 6-point shorting block available.	HDTB: Rated for 600V, 30A continuous service	All: Integrated DIN rail snap and panel mounting construction
8 	**General Purpose Relays**	Square base, flange mounted and miniature	Only 14mm wide	Transparent housing	Pole combinations available in SPDT, DPDT, 3PDT and 4PDT	Carrying current rating 5A-25A
9 	**Industrial Power Supplies**	Leading 93% efficiency	Adjustable voltage options in 12, 24, and 48V	Output power range from 60W to 480W	DC OK relay contacts are standard on 240W and 480W	Compact design - 43mm wide, up to 60mm
10 	**Wire / Cable Duct**	13 Selectable dimensions from 25mm wide up to 80mm, and up to 2m in length	Narrow and Wide Slot	Rigid “U” shaped duct with non-slip-cover in gray or white	Optional adhesive backing	
11 	**DIN Rail**	35mm rails in steel and aluminum	1m (3.28ft) or 2m (6.56ft) lengths	Each simply fasten by screws to the mounting surface	Standard package quantities, or pallet options available	

Product Portfolio

Our 17 million+ product configurations deliver durability and reliability—even in the most punishing environments—meeting and exceeding global standards for quality and safety.

- series DS — DISCONNECT SWITCHES
- series DS — ENCLOSED DISCONNECT SWITCHES
- series 1100 / series 1110 — MINIATURE CIRCUIT BREAKERS
- series 300 (non-reversing) / series 310 (reversing) — CONTACTORS & CONTROL RELAYS
- series 320 — OVERLOAD RELAYS
- series 620 — DIRECT-ON-LINE STARTERS (CONTACTOR + OVERLOAD RELAY)
- series E620 — ENCLOSED DIRECT-ON-LINE STARTERS (CONTACTOR + OVERLOAD RELAY)
- series 330 — MOTOR PROTECTION CIRCUIT BREAKERS
- series E330 — ENCLOSED MOTOR PROTECTION CIRCUIT BREAKERS
- series 630 — DIRECT-ON-LINE STARTERS (MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR)
- series E630 — ENCLOSED DIRECT-ON-LINE STARTERS (MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR)
- series 30 industrial — 30MM INDUSTRIAL PILOT DEVICES
- series 30 hazardous — 30MM PILOT DEVICES FOR HAZARDOUS LOCATION
- series 22 iec — 22MM IEC PILOT DEVICES
- series WTL — WORLD TOWER LIGHTS
- series CS — CAM SWITCHES
- series 22 nema — 22MM NEMA PILOT DEVICES
- series 16 — 16MM PILOT LIGHTS
- series 13 — 13MM PILOT LIGHTS
- series EC — CONTROL STATION ENCLOSURES
- series ECP 300 — ENCLOSED UL508A COMBINATION MOTOR STARTERS
- series EPS — ENCLOSED POWER SUPPLIES
- series IPS — INDUSTRIAL POWER SUPPLIES
- series TB — TERMINAL BLOCKS
- series TBR — TERMINAL BLOCK RELAYS
- series ETR — ELECTRONIC TIMING RELAYS
- series GR — GENERAL PURPOSE RELAYS
- series WD — WIRING DUCT

White Papers

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

Is "Fatal Heat" Murdering Your Components?

Discover the benefits of liquid cooling technology and optimize your high-performance computing system's performance. Our whitepaper explores advanced solutions such as immersion and direct-to-chip cooling, as well as liquid cooling infrastructure and energy efficiency. Download now to revolutionize your data center cooling with sustainable, innovative liquid cooling solutions.

READ WHITEPAPER

Panel Essentials Series 3: UL508A Control Panel Design Considerations

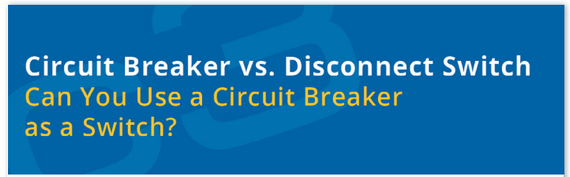
Find out the basic design considerations you need to know when building a UL 508A panel.

READ WHITEPAPER

MCBs vs MCCBs: When Can I use a MB in place of an MCCB?

Discover the key differences between MCBs and MCCBs, including their applications, capacities, and installation requirements. Learn which circuit breaker is best suited for your electrical protection needs.

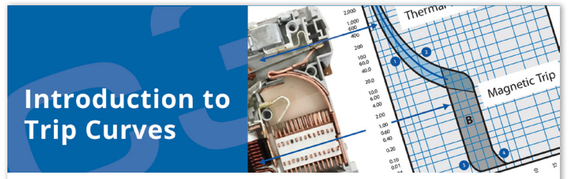
READ WHITEPAPER



Circuit Breaker vs. Disconnect Switch

Can a circuit breaker be used as a disconnect switch? Should you use it as a switch and when shouldn't you? Here's what you need to know about the swap.

READ WHITEPAPER



Understanding Trip Curves

Trip Curves or Time Current Curves, are an intimidating topic. This paper will introduce you to trip curves and explain how to read and understand them.

READ WHITEPAPER

Understanding SCCR

It's critical to ensure that electrical panels are designed and built with the proper SCCR to maintain the system. Learn how to calculate it here!

READ WHITEPAPER

Why choose c3controls

Integrated Manufacturing

Vertical integration is the cornerstone of c3controls as it places innovation, development, design, manufacturing, testing, and shipping all within our control. With Everything Under Control, we can ensure the highest quality and customer satisfaction.

Innovation

Product innovation is in our DNA. We approach our products as solutions. Unlike our competition, our business model allows us to provide customers with premium controls without the premium price.

Same-Day Shipping

Reduce inventory. Improve cash-flow. Save money. Our customers enjoy peace of mind knowing they'll get what they need, when they need it. Our promise, guaranteed!

Limited Lifetime Warranty

With total control over engineering and manufacturing, we are able to guarantee the highest quality products on the market—products free of defects in material, workmanship, and design.

Advantage Pricing

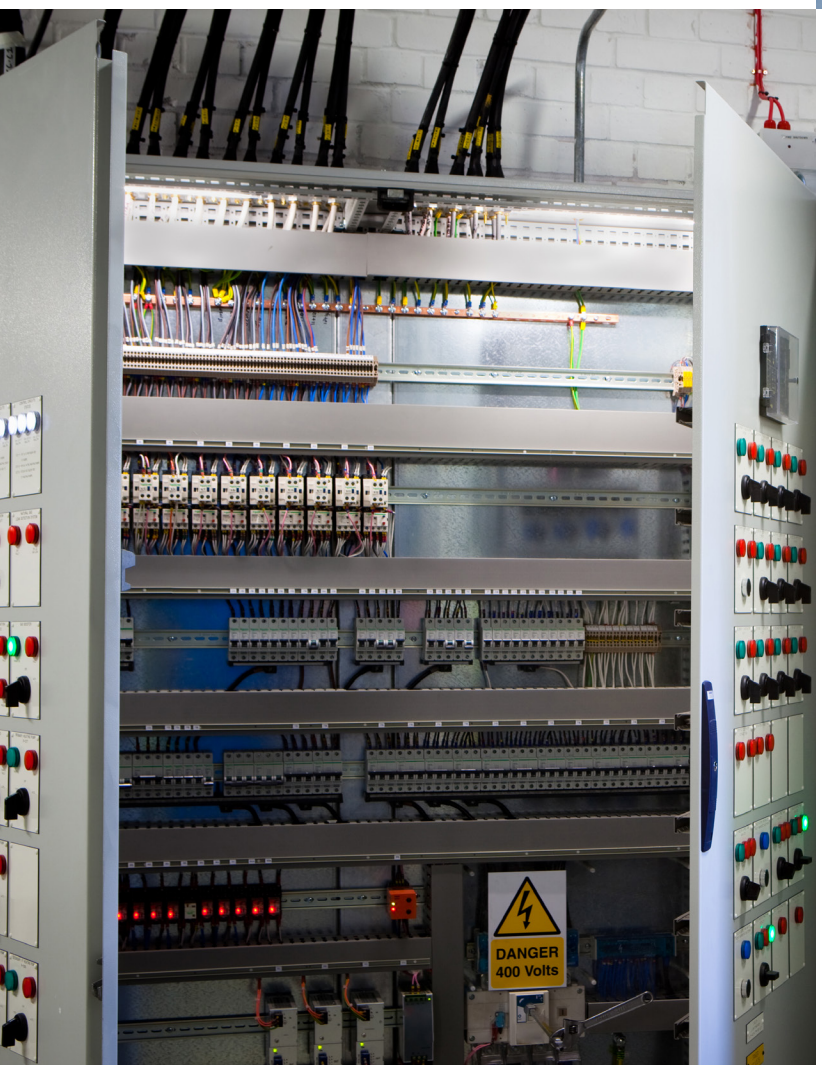
Total control means lower overhead and direct sales. For our customers, this translates to savings of up to 40+% on c3controls premium products.

Customer First

Commitment to the success of our customers is a core value and the driving force behind all we do. We promise concierge style service that makes doing business easy, personalized, and responsive.

Notes

724.775.7926
www.c3controls.com



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