Utilities

The OEM and Installers Guide to Control Components for Electrical Utilities



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 36-month 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

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

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

Cooperative Utilities (Co-ops):
Non-profit organizations owned and operated by their user-members who own and govern the utility.

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

Distribution:
The final stage of delivering electricity to end-users, involving the lower-voltage movement of power through local networks, substations, and transformers to homes and businesses.

Electrical Utilities:
Companies or entities that generate, transmit and distribute electricity to residential, commercial and industrial consumers.

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

Federal Energy Regulatory Commission (FERC):
A U.S. government agency responsible for regulating the interstate transmission of electricity.

Fuse:
A device used for overcurrent protection that contains a wire or filament that melts when current exceeds a certain level to break the circuit and protect the equipment.

Generation:
The process of producing electricity through the conversion of an energy source into electrical power.

High Density Terminal Block:
A compact device designed to facilitate the organization and connection of numerous electrical wires or cables.

Investor-Owned Utilities (IOUs):
Utility companies that are privately owned by shareholders or investors, operating for profit.

Load:
The amount of electricity consumed by all devices and systems connected to a power grid. Base load represents minimum demand and peak load refers to maximum demand.

Microgrid:
A localized, smaller-scale electrical grid that can operate independently or in conjunction with the main power grid.

Pilot Devices:
Devices such as lights, buttons and switches that are used in control systems to initiate or indicate specific functions.

Power Grid:
A large-scale network of interconnected electrical components that facilitates the generation, transmission and distribution of electricity across a region.

Public Utility Districts (PUDs):
Government-owned entities that provide utility services to members of a certain area for community benefit.

Relay:
A device used to control larger electrical loads by detecting abnormal conditions in a circuit and initiating proper control actions.

Renewable Energy:
Energy derived from naturally replenishing sources, such as solar or wind, for minimal environmental impact.

Smart Grid:
A digitally enhanced electrical grid that utilizes modern communication and control technologies to optimize utility processes.

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.

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

Transmission:
The movement of electricity over long distances through power lines and infrastructure from generation sources to distribution networks or directly to consumers.

Utilities Overview

The electrical utilities industry is the backbone of modern society, delivering power for everything from smartphones to factories. It encompasses a complex web of activities, from generating electricity at power plants to transmitting it across vast distances and distributing it to individual consumers. This electrical ecosystem faces the constant challenge of delivering reliable, affordable power to homes and businesses.

The industry has embarked on a dramatic transformation. The rise of renewable energy sources is disrupting traditional fossil fuel-based generation, driven by concerns over costs and sustainability. This, coupled with rapidly increasing demand for electricity due to electric vehicles and smart technologies, is pushing utilities to innovate. As electrical utility infrastructure is designed, manufactured and installed, there must be a focus on trends and challenges such as:

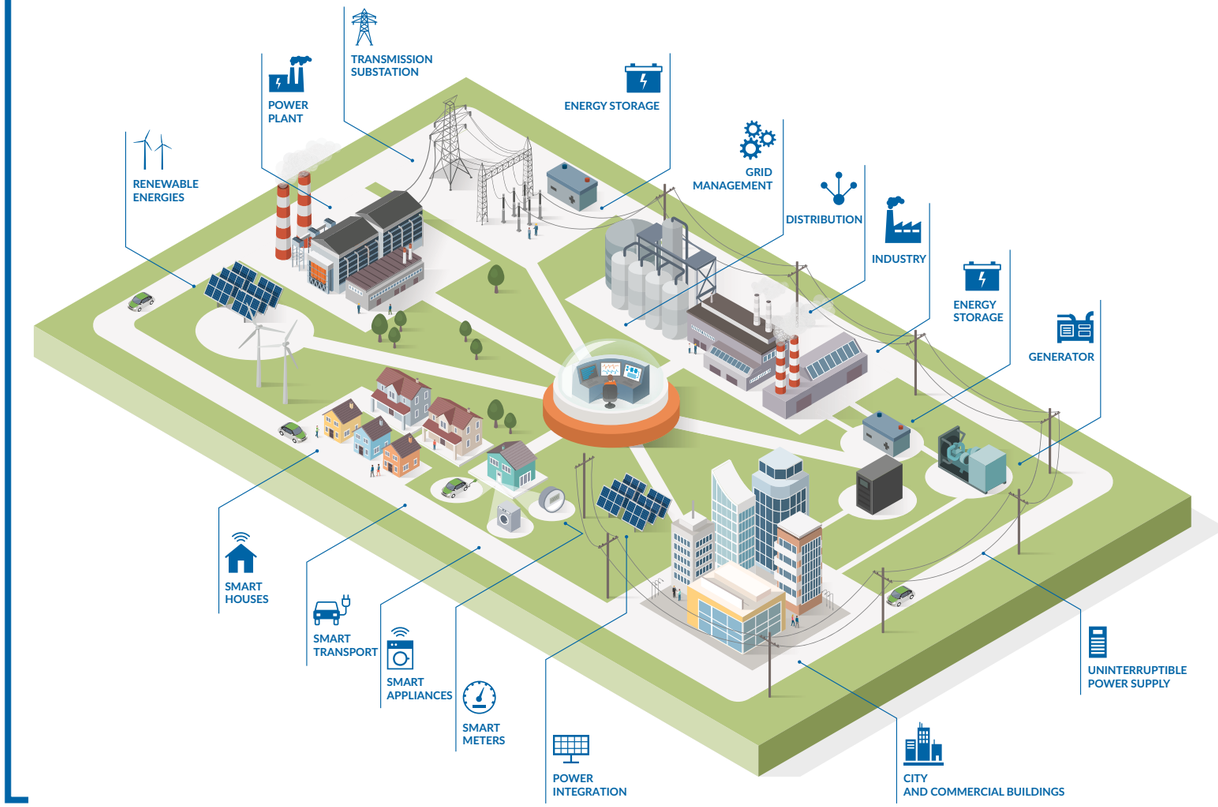
- **Grid Modernization:** In conjunction with new developments, aging infrastructure must be replaced for a more resilient and adaptable electrical grid as demand is projected to triple by 2050.
- **Decentralization:** Solar panels, energy storage and microgrids are blurring the lines between consumer and producer, changing the traditional utility model and necessitating smart grid technologies.
- **Cybersecurity:** As utilities become more reliant on automation and digital systems, they become targets for cyberattacks and must have proactive risk management to avoid power outages.

The future of the electrical utilities industry lies in embracing these trends and challenges head-on. This will require collaboration between utilities, governments and original equipment manufacturers. Moving forward, OEMs must specify robust control components that provide the necessary long term reliability.

With over seventeen million product configurations from c3controls and custom UL 508A-certified panel solutions from Covenant Panelworks (CPW), you have a trusted source for complete electrical control solutions. With more than 50 years of experience and a vertically integrated approach, we operate efficiently, respond quickly to changing market demands, and deliver the products and solutions you need when you need them. Contact us today and discover how our expertise can help you modernize your utility systems while improving safety, reliability, and efficiency.

Smart Grid Isometric

Here's a layout of an advanced and modernized electricity generation, transmission and distribution system:



Electrical Utility Products

c3controls can support all key function areas in your electrical utility application:

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



IEC Contactors

4



Control Relays

Human Machine Interface

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

5



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

Pilot Devices



Check out our industry leading 16mm lights!

Control Logic

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

6



High Density Terminal Blocks (+ Shorting Block)

7



IEC Terminal Blocks

8



General Purpose Relays

9

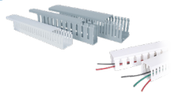


Industrial Power Supplies

Panel Solutions

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

10



Wire Duct

11



DIN Rail



Enclosures



Custom Electrical Panels through CPW

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 	**IEC Contactors**	9 to 105 Amps	100kA SCCR @ 480V and 600V with Class J fuses	AC and DC - electronic coil control on DC devices	Integral auxiliary	Up to 75 HP @ 400V (55kW @ 400V)
4 	**IEC Control Relays (Miniature)**	Bifurcated contacts	Rated 16A AC-1, A600, and Q600 for applications up to 600V	4 pole with NO and NC contact configurations	Printed circuit board mounting with an accessory link module	Universal ratings and markings
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 	**High Density Terminal Blocks**	4, 6, and 12 point in a single molded housing. 6-point shorting block available.	Rated for 600V, 30A continuous service	Replacement for GE CR151 and EB27B06S terminal blocks	Integrated 35mm DIN rail snap and panel mounting construction	Captive screws with spring-return open terminals
7 	**IEC Terminal Blocks**	Screw Clamp, Spring Clamp, and Miniature	5mm - 25mm widths	25 - 230 Amps	Feed Through, Ground, Multi-Conductor, Double & Triple Level, Fuse Holder, Power Distribution, and more	DIN Rail mounting; snap-on, snap-off assembly
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.

DISCONNECT SWITCHES
NON-FUSED & ENCLOSED



MINIATURE CIRCUIT BREAKERS



CONTACTORS & CONTROL RELAYS



OVERLOAD RELAYS



DIRECT-ON-LINE STARTERS
CONTACTOR + OVERLOAD RELAY



ENCLOSED DIRECT-ON-LINE STARTERS
CONTACTOR + OVERLOAD RELAY



MOTOR PROTECTION CIRCUIT BREAKERS
OPEN & ENCLOSED



DIRECT-ON-LINE STARTERS
MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR



ENCLOSED DIRECT-ON-LINE STARTERS
MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR



30MM PILOT DEVICES
FOR INDUSTRIAL & HAZARDOUS LOCATION



22MM PILOT DEVICES
IEC & NEMA



WORLD TOWER LIGHTS



CAM SWITCHES



16MM PILOT LIGHTS



13MM PILOT LIGHTS



CONTROL STATION ENCLOSURES



ENCLOSED UL508A COMBINATION MOTOR STARTERS



ENCLOSED POWER SUPPLIES



VFD BYPASS PANELS



INDUSTRIAL POWER SUPPLIES



CONTROL CIRCUIT TRANSFORMERS



CONTROL POWER TRANSFORMERS



TERMINAL BLOCKS



TERMINAL BLOCK RELAYS



ELECTRONIC TIMING RELAYS



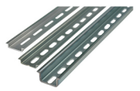
GENERAL PURPOSE RELAYS



WIRING DUCT



DIN RAIL



White Papers

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



The Smart Grid & Grid Modernization - New Trends in Technology

The increasing demand for electric power continues to accelerate. Read our paper for an overview of what is needed to strengthen the Smart Grid and ensure that the future electricity needs for the US are fulfilled.

READ WHITEPAPER



Pilot Devices for Indication and Actuation: Pilot Devices Indicator Lights

Pilot devices are types of selector switches, pushbuttons, pilot lights, signal beacons, and toggle switches and are used in industrial applications where human-to-machine interface is required.

READ WHITEPAPER



AC vs DC MCBs: The Difference is More Than a Letter!

Discover the critical distinctions between AC and DC Miniature Circuit Breakers (MCBs) in our in-depth whitepaper. Explore their workings, applications, and crucial considerations for optimal electrical safety and system integrity. Learn how to choose the right MCB for your specific needs.

READ WHITEPAPER



Are Fuses *Actually* Cheaper Than Circuit Breakers in Control Applications?

Discover the differences between MCBs (Miniature Circuit Breakers) and fuses and Arm yourself with knowledge for a secure and efficient electrical system. Make informed decisions for electrical safety.

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



Utility-Scale Energy Storage

Delve into the whitepaper that explores the future of utility-scale energy storage technologies. Discover how we are addressing the limitations of lithium-ion batteries, from energy density to cost-effectiveness and safety, to usher in a new era of sustainable energy storage solutions.

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!

36-Month 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

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