

Commercial Cooking

The OEM and Installers Guide to Control Components for Kitchen Equipment



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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

Auxiliary Equipment:
Equipment not directly involved in the cooking process that improves commercial kitchen performance. Examples include beverage dispensers, ice makers, and dishwashers.

Beverage Dispenser:
Machines with nozzles and controls used to dispense beverages at a desired temperature. Types include coffee, soda, and beer dispensers.

Commercial Cooking:
Using specialized equipment in a professional kitchen to produce and serve food to others at scale. Equipment can include ovens, fryers, grills/griddles, roasters, and smokers.

Commercial Kitchen:
A facility in a public location, such as a restaurant, with heavy-duty appliances in which food is prepared for sale at scale.

Department of Health:
Government agency at the city or state level that is responsible for inspecting and approving commercial kitchens.

Dishwasher:
An appliance used to clean and sanitize large volumes of kitchen equipment. More effective and efficient than sink washing stations.

Electric Doors:
Automated or motorized doors designed to open and close electronically for kitchen safety and convenience.

Floor Cleaning Equipment:
Machines such as scrubbers, sweepers, and vacuums that are used to clean and maintain kitchen floors.

Food Preparation:
Actions taken to turn raw ingredients into a form that can be consumed safely. Equipment can include mixers, slicers, and food processors.

Food Processor:
A motor-driven device used to quickly and efficiently chop, shred, grind, and/or blend ingredients to aid in food preparation.

Food Storage:
Keeping cooked and/or raw materials in appropriate conditions for future use. Equipment can include refrigerators and freezers.

Freezer:
An appliance, or a walk-in unit, that dispels heat to keep cooking ingredients within a space frozen for quality, safety, and longevity.

Fryer:
An appliance which holds and heats oil. Food is placed in a basket and submerged into the oil for fry cooking.

Grill / Griddle:
An appliance with a grate that allows food to cook over a heat source. Griddles replace grates with a smooth, flat surface.

HVAC System:
System that provides heating, ventilation, and/or air conditioning to a commercial kitchen.

Ice Maker:
An appliance that produces and stores large quantities of ice as water is pumped in and its heat is absorbed to form ice in a mold.

Mixer:
A device that uses a gear mechanism to quickly combine wet and/or dry ingredients into a desired consistency.

NFPA 96:
The National Fire Protection Agency (NFPA) standard for ventilation control and fire protection in commercial cooking operations.

Occupational Safety and Health Administration (OSHA):
Government agency that provides regulations that promote safety around commercial kitchen equipment.

Oven:
An appliance used for baking, heating, or drying food in a chamber. Types include commercial, convection, combination, and conveyor ovens.

Packaging & Material Handling Equipment:
Equipment designed to provide containment, protection, convenience, communication, and distribution. Equipment can include vacuum sealers and conveyors.

Refrigerator:
An appliance, or walk-in cooler, that dispels heat from a space in order to keep cooking ingredients cool for quality and safety.

Slicer:
A device with a rotating blade that is used to create uniform slices of various types of food.

UL 197:
The Underwriters Laboratories (UL) standard for safety commercial electric cooking appliances rated 600V or less.

Industry Outlook

For over 45 years, c3controls has been a leading manufacturer of quality electrical controls for commercial kitchen equipment. Our experience serving the industry, one of the largest in the world, has provided a deep understanding of challenges and how to solve them. The commercial cooking industry we see today must offer solutions for in-person dining, takeout, and delivery while overcoming hurdles such as:

- **Supply chain issues** that bring long lead times for critical system components and subsequent delays.
- **Workforce shortages** that limit productivity and increase the need for automation.
- **High regulations** that ensure that processes, machines, and their components are up to code.
- **Health and safety demands** that cover everything from food to cleaning and HVAC systems.
- **Calls for energy efficiency** that demand innovation in the form of flexible, multi-purpose equipment.

With these great challenges come great opportunities for your business. As the industry continues to grow and return to stability post-pandemic, now is the ideal time to upgrade systems to capitalize on industry trends, technological advancements, and changing consumer preferences.

With the right parts, people, and processes, your application can stand out from the rest.

c3controls can help you succeed. We manufacture our products and do not source any major products from China. This allows us to operate more efficiently and respond to market conditions quicker. That means faster delivery on your equipment components supporting:

- **Food Storage**
- **Food Preparation**
- **Cooking**
- **Cleaning**
- **& more!**

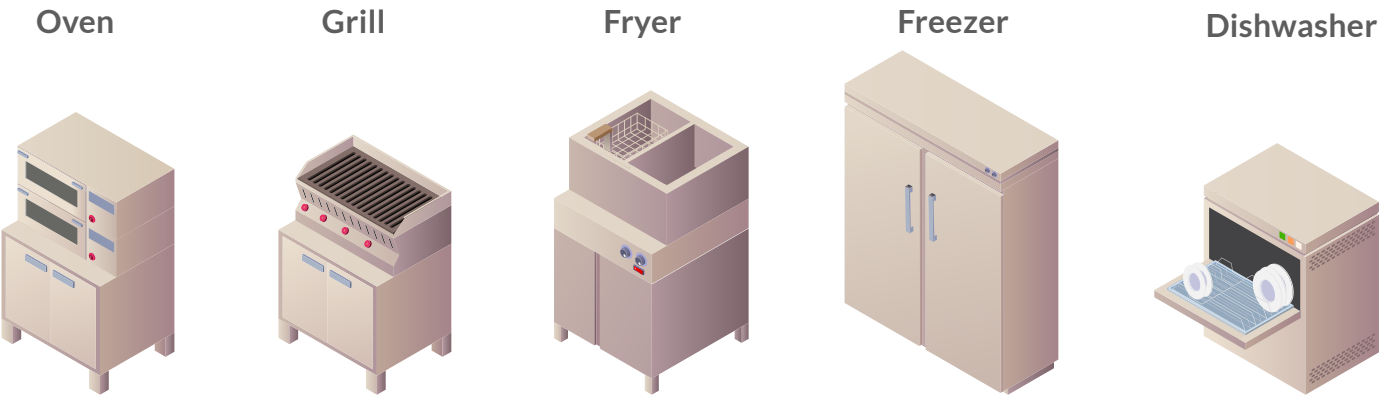
With over fifteen million available product configurations, and our own UL508A panel shop, c3controls has the resources you need to meet challenging regulations and demands while capitalizing on your commercial cooking business opportunities!

Kitchen Isometrics

Here is an example of a commercial kitchen layout and some common appliances:



Appliances

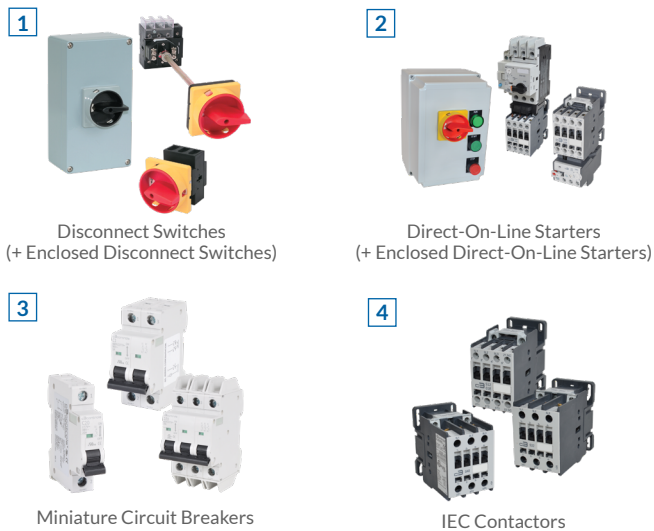


Products for Cooking Applications

c3controls has component and finished solutions for all key function areas in your commercial kitchen application.

Power & Actuation

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



Human Machine Interface

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



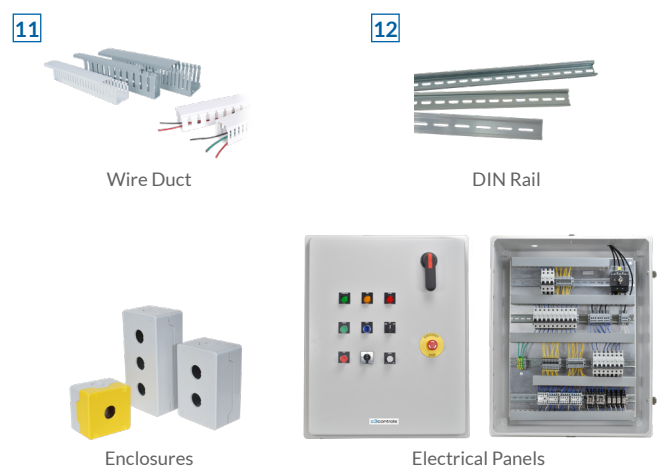
Control Logic

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



Panel Solutions

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



1		UL 508 Disconnect Switches (+enclosed)	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
2		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		
3		Miniature Circuit Breakers	UL 489 & UL 1077	1, 2 and 3 Pole combinations	10kA SCCR @ 480Y/277VAC	Current ratings up to 63 Amps	B, C and D curve ratings
4		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)
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		Tower Lights	Stackable design for up to 5 modules in a single assembly	Mounting options in three styles: 50mm direct mount, 50mm panel-mount short base, and 50mm panel-mount tall base	Voltage options available in 24V AC/DC, 120V AC, and 240V AC	Three styles of illumination: continuous, flashing and rotary	Continuous or intermittent sound modules with 80dB or 100dB sound output
8		Cam Switches	Certified as Manual Motor Controllers per UL	Rated 10A to 32A up to 690V AC	Switch configurations in 45°, 60° & 90°, and up to 6 poles	A variety of operator types including key lock, lever, and lockable lever	Operators mount in a standard 22.5mm hole
9		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
10		General Purpose Relays	Octal base, square base, flange mounted, and miniature	SPDT, DPDT, 3PDT, 4PDT with a current rating of 5A to 25A	24-240VAC and 12-110VDC	Optional indicating light and/or mechanical actuator	Relays available in convenient multi-packs
11		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	
12		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	

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



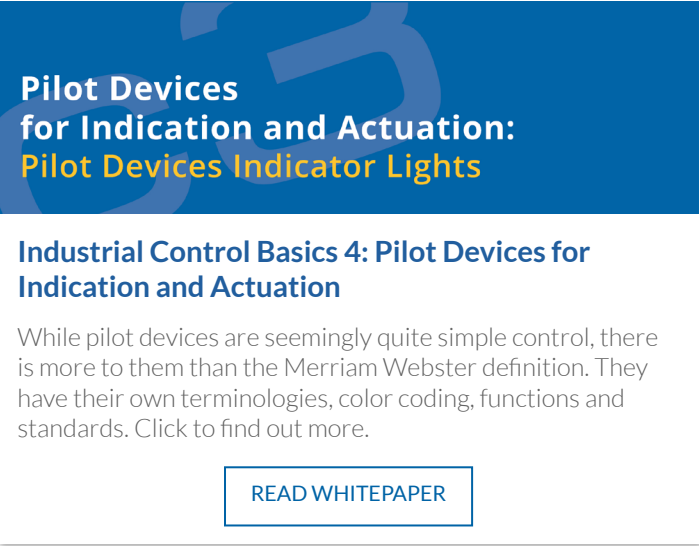



Product Portfolio

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>What is UL Certification? The Difference Between UL Recognized and UL Listed</p> <p>What is UL Certification? The Difference Between UL Recognized and UL Listed</p> <p>Learn why and when your products need to meet UL and the difference between UL recognized vs UL Listed.</p> <p>READ WHITEPAPER</p>	 <p>How to Size a Disconnect Switch for Your Project</p> <p>How to Size a Disconnect Switch for Your Project</p> <p>Is your project calling for a disconnect switch? Check out this guide to learn how to find the perfect fit disconnect switch for your needs.</p> <p>READ WHITEPAPER</p>
 <p>Pilot Devices for Indication and Actuation: Pilot Devices Indicator Lights</p> <p>Pilot Devices for Indication and Actuation</p> <p>While pilot devices are seemingly quite simple control, there is more to them than the Merriam Webster definition. They have their own terminologies, color coding, functions and standards. Click to find out more.</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>
 <p>Commercial HVAC Industry New Trends in Technology</p> <p>Commercial HVAC Industry - New Trends in Technology</p> <p>HVAC has evolved and grown over the past 120 years and there are numerous facets of developing technology still emerging. In this paper, we touch on how Smart Systems, Smart Sensors, and Internet of Things (IoT) are changing many aspects of how the industry will conduct business today. Click to learn about some of these advancements.</p> <p>READ WHITEPAPER</p>	 <p>Commercial Boiler Industry New Trends in Technology</p> <p>Commercial Boiler Industry - New Trends in Technology</p> <p>Boilers are perhaps the largest unseen, unknown and therefore, underappreciated part of the lives of nearly everyone on the planet. Besides the boiler that sometimes stopped working in elementary school, few people appreciate their importance. Check out our paper to find out what trends are emerging in boilers and boiler control.</p> <p>READ WHITEPAPER</p>

10.



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