

# Food & Beverage Processing

*The OEM and Installers Guide to Control Components for Food & Beverage Processing Equipment*



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## About c3controls

Since 1976 c3controls ([c3controls.com](http://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 Processing Terms

## Baking / Roasting:

The process of heating food to change texture/flavor or preserve. Equipment includes ovens.

## Blanching:

The process of using heated water or steam to improve item quality by reducing microorganisms/enzymes that cause spoilage. Equipment includes blanchers.

## Cleaning:

The process of removing contaminants from raw materials. Equipment includes washers, sterilizers, and separators.

## Dehydration:

The process of using heat to evaporate water from an item in order to increase shelf life. Equipment includes vacuums and dryers.

## Food & Beverage Processing:

Transforming raw agricultural commodities into consumer-ready food & beverage products.

## Food and Drug Administration (FDA):

Government agency responsible for protecting public health by regulating food and beverage products.

## Frying:

The process of heating food directly in fat or oil in order to change texture and increase shelf life. Equipment includes fryers.

## Heat Processing Equipment:

Equipment used to direct heat towards or away from a material which can result in physical and/or chemical changes. Operations include baking/roasting, blanching, dehydration, frying, pasteurization, and sterilization.

## Homogenization:

The process of reducing particle size but increasing the consistency of an item. Equipment includes emulsifiers, homogenizers, mixers, and mills.

## HVAC System:

System that provides heating, ventilation, and/or air conditioning to food and beverage processing plants.

## Mechanical Processing Equipment:

Equipment used to change a material's physical form in any way. Operations include size reduction or enlargement, homogenization, and mixing.

## Mixing:

The process of combining components to create a uniform mixture. Equipment includes mixers, tanks, and blenders.

## Packaging and Material Handling Equipment:

Equipment designed to provide containment, protection, convenience, communication, and distribution. Examples include printers (for material creation), fillers (for filling), seamers (for sealing), checkweighers (for quality control), and conveyors (for distribution).

## Pasteurization:

The process of placing an item under medium heat in order to inactivate most microorganisms/enzymes that cause spoilage. Best for products with a limited shelf life. Equipment includes pasteurizers and heat exchangers.

## Peeling:

The process of removing undesirable material from a product. Equipment includes pressure vessels, blades, rollers, and conveyors.

## Preparation Equipment:

Equipment that prepares materials for future processes. Operations include cleaning, sorting & grading, and peeling.

## Preservation Equipment:

Equipment designed to prevent or limit spoilage and increase shelf life. Examples include smokers (chemical preservation), heat exchangers (heat processing preservation), accelerators (irradiation preservation), and chillers/freezers (refrigeration preservation).

## Processing Plant:

A factory where raw materials are turned into goods for human consumption.

## Size Reduction or Enlargement:

The process of reducing or enlarging the size of an item. Equipment includes mills and grinders (for reduction) and extruders and molders (for enlargement).

## Sorting & Grading:

The process of sorting materials based on a measurable characteristic. Equipment includes processors, conveyors, and separators.

## Sterilization:

The process of placing an item under high heat in order to inactivate all microorganisms/enzymes that cause spoilage. Best for products with a long shelf life. Equipment includes sterilizers and heat exchangers.

# Overcoming Industry Challenges

For 50 years, c3controls has been a leading manufacturer of quality electrical controls for food & beverage processing. Our experience serving the processing industry, one of the oldest and largest industries in the world, has provided a deep understanding of challenges and how to solve them. The post-pandemic food & beverage processing industry we see today presents a variety of hurdles such as:

- **Supply chain issues** that bring long lead times for critical system components and subsequent production delays.
- **Workforce shortages** that limit productivity and increase the need for automation.
- **High regulations** that ensure that production practices, machines, and their components are up to code.
- **Health and safety demands** that cover everything from cleaning to HVAC systems.
- **Calls for energy efficiency** that demand innovation in processing, material handling, packaging, and more.

With these great challenges come great opportunities for the industry and your business. With the right parts, people, and processes, your food and/or beverage processing 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 for your industrial control product needs.

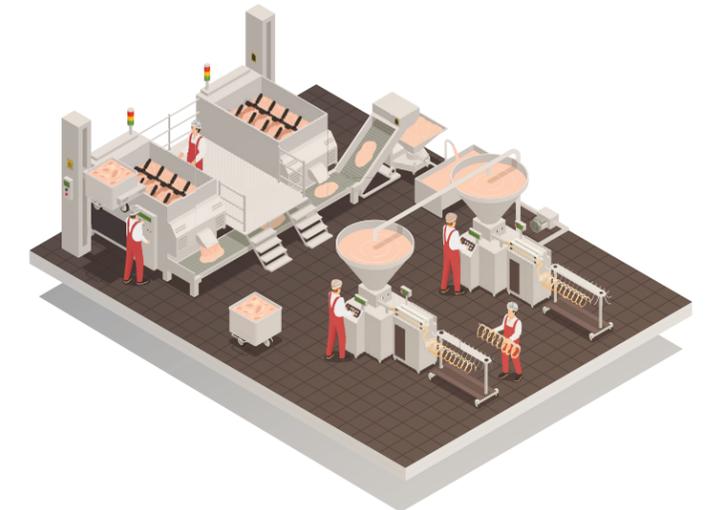
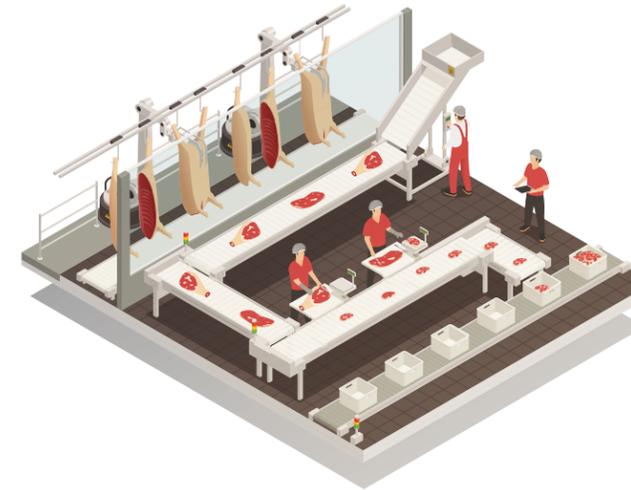
Vertical integration also allows us to guarantee top quality – all products are UL certified, CE marked, and backed with a limited lifetime warranty. Premium performance for the most demanding applications, without the premium price.

With over 17 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 food and/or beverage processing business opportunities!

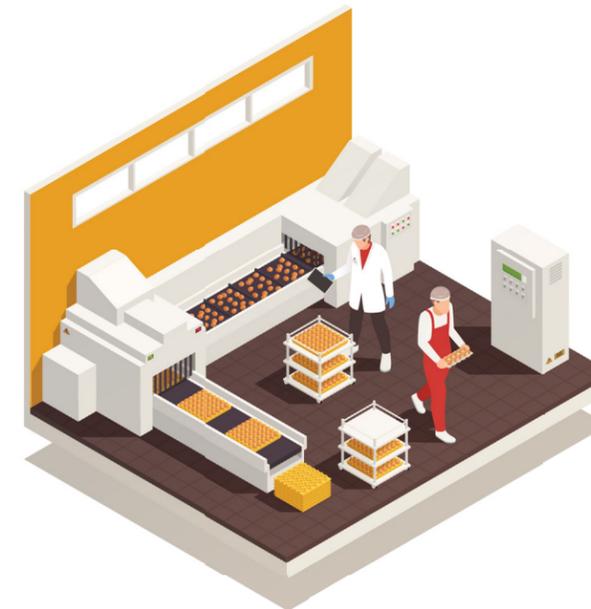
# Processing Isometrics

*c3controls has electrical component solutions for meat, poultry, eggs, dairy, and all your food & beverage processing needs!*

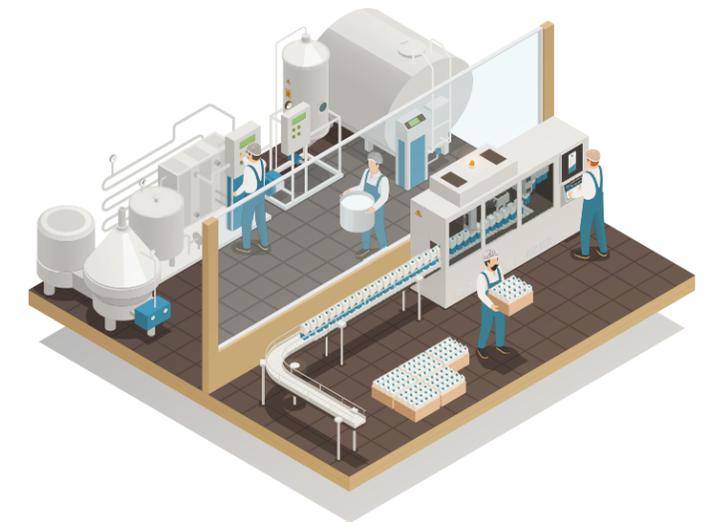
Meat



Eggs



Dairy



# Products for Processing Applications

## 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

## 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

## Overload Relays



- Available in five frame sizes with a current adjustment range of 0.28 - 112A
- High fault SCCR of 100kA @ 480V and 600V with Class J fuses
- Full load current adjustment ratio of approx. 1:1.5 enables relay to be set to exact FLA of motor
- Single phase sensitivity to protect motors against damaging phase loss conditions
- Manual or automatic reset and test modes, and stop button all in a single device

## Relays



- General Purpose Relays: Octal base w/pin terminals and square base w/blade-style terminals
- General Purpose Relays: Color-coded push buttons for distinguishing AC and DC
- General Purpose Relays: Built-in retainer clips in relay sockets
- Electronic Timing Relays: Sizes in 17.5mm, 22.5mm, and 45mm widths
- Electronic Timing Relays: Single, dual and multi-functions with timing ranges from 0.01 seconds to 9,999 hours

## Industrial Power Supplies



- Designed to deliver the power with up to 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

## Control Power Transformers



- Open-type control transformers ranging from 50 to 5000VA
- Integrated terminal blocks and a finger-safe terminal guard, with IP20 protection on primary and secondary sides
- Each transformer variant features a Class H insulation system
- Capable of handling dynamic loads effectively, suitable for applications with fluctuating power demands
- Ability to provide multiple voltage outputs from a single unit

## Motor Protection Circuit Breakers



- Multi-Function: Manual Motor Controller, Motor Disconnect, Group Motor Installations
- 50kA SCCR @ 480V
- Self-protected Type E up to 50kA @ 460V
- FLC up to 32 Amps
- Trip Class 10 Thermal and Magnetic Elements

## 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

## 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

## Control Circuit Transformers



- Ratings from 20 to 300VA
- Operating voltages from 120V to 480V on primary side, and 24V on secondary side
- Over-current protection options; inherent or non-inherent, or manual resettable circuit breaker
- Integrated grounding system and space-saving footprint
- Versatile for Class 2, Class 3, and general purpose applications

## Enclosed Power Supplies



- 24VAC power with on/off control, power indication and equipment overcurrent protection
- Transformer steps down the input voltage to 24VAC at the output
- 100VA Ungrounded Class 2 rating per output circuit
- Optional voltage separation compartments and convenient receptacle outlets
- Durable, Type 1 metallic enclosure

## VFD Bypass Panels



- Can be installed as either a temporary replacement to a VFD or as a system backup
- Each assembly includes: fused disconnect switch, contactors, control transformer, a variety of 22mm IEC pilot devices, and power and control terminal blocks
- Optimized width to save wall space

## Pilot Devices



- Modular range of 30mm, 22mm, 16mm, 13mm, and cam-operated rotary switches
- Maintained and momentary operations in both non-illuminated, illuminated, and keyed versions
- Type 1, 2, 3, 3R, 4/4X, 12, and 13
- Color-coded, snap-on contact blocks
- Full voltage, multi-voltage, resistor, and dual input light units in a wide range of voltages up to 600VAC/VDC
- Cam switch operators are certified as Manual Motor Controllers per UL

## Control Stations & Enclosures (+ E-Stops & Alarm Silence Stations)



- Standard pre-configured assemblies of 30mm and 22mm pilot devices (customizable configurations available)
- 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

## 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

## Electrical Panels



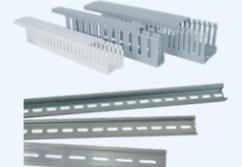
- Our UL508A certified panel shop excels in specialty panels from complete finished solutions to simple value-added projects.

## 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

## Wire Duct & DIN Rail



- Wire Duct: 13 dimensions from 25mm wide up to 80mm, and up to 2m in length
- Wire Duct: Narrow and Wide Slot
- DIN Rail: 35mm rails in steel and aluminum
- DIN Rail: 1m (3.28ft) or 2m (6.56ft) lengths
- DIN Rail: Standard package quantities, or pallet options available

# c3controls 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.

 <p><b>DISCONNECT SWITCHES</b> NON-FUSED &amp; ENCLOSED</p>	 <p><b>MINIATURE CIRCUIT BREAKERS</b></p>	 <p><b>CONTACTORS &amp; CONTROL RELAYS</b></p>	 <p><b>OVERLOAD RELAYS</b></p>
 <p><b>DIRECT-ON-LINE STARTERS</b> CONTACTOR + OVERLOAD RELAY</p>	 <p><b>ENCLOSED DIRECT-ON-LINE STARTERS</b> CONTACTOR + OVERLOAD RELAY</p>	 <p><b>MOTOR PROTECTION CIRCUIT BREAKERS</b> OPEN &amp; ENCLOSED</p>	 <p><b>DIRECT-ON-LINE STARTERS</b> MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR</p>
 <p><b>ENCLOSED DIRECT-ON-LINE STARTERS</b> MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR</p>	 <p><b>30MM PILOT DEVICES</b> FOR INDUSTRIAL &amp; HAZARDOUS LOCATION</p>	 <p><b>22MM PILOT DEVICES</b> IEC &amp; NEMA</p>	 <p><b>WORLD TOWER LIGHTS</b></p>
 <p><b>CAM SWITCHES</b></p>	 <p><b>16MM PILOT LIGHTS</b></p>	 <p><b>13MM PILOT LIGHTS</b></p>	 <p><b>CONTROL STATION ENCLOSURES</b></p>
 <p><b>ENCLOSED UL508A COMBINATION MOTOR STARTERS</b></p>	 <p><b>ENCLOSED POWER SUPPLIES</b></p>	 <p><b>VFD BYPASS PANELS</b></p>	 <p><b>INDUSTRIAL POWER SUPPLIES</b></p>
 <p><b>CONTROL CIRCUIT TRANSFORMERS</b></p>	 <p><b>CONTROL POWER TRANSFORMERS</b></p>	 <p><b>TERMINAL BLOCKS</b></p>	 <p><b>TERMINAL BLOCK RELAYS</b></p>
 <p><b>ELECTRONIC TIMING RELAYS</b></p>	 <p><b>GENERAL PURPOSE RELAYS</b></p>	 <p><b>WIRING DUCT</b></p>	 <p><b>DIN RAIL</b></p>

# White Papers

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

## How to Size a Disconnect Switch for Your Project

### How to Size a Disconnect Switch for Your Project

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.

[READ WHITEPAPER](#)

## Selecting and Installing Machine Tower Lights

### Selecting and Installing Machine Tower Lights

Tower lights are important when the status of a machine or process needs to be known. Learn about their functions, features, configurations, and more.

[READ WHITEPAPER](#)

## Cost Considerations for Industrial Automation

### Cost Considerations for Industrial Automation

Automation is taking over, including the industrial world. If you're investing in industrial automation, here are some cost considerations.

[READ WHITEPAPER](#)

## Understanding UL Standards for Industrial Electrical Controls

### Understanding UL Standards for Industrial Electrical Controls

Searching for information about UL standards? Our complete guide will inform you of everything you need to know.

[READ WHITEPAPER](#)

## Material Handling Applications Overview

### Material Handling - Applications Overview

As a process, material handling incorporates a wide range of manual, semi-automated and automated equipment and systems that support logistics and make the supply chain work. We have written a paper on the ABC's of a material handling conveyor system to help you understand or review the concepts behind this science. We hope you find it moving!

[READ WHITEPAPER](#)

## Consumer Packaged Goods Industry New Robotic Advancements

### Trends in Consumer Packaged Goods Industry

The Consumer Packaged Goods Industry has always had to deal with the issue of people in close proximity to, or being involved in the packaging process. One impact of COVID-19 has been further automating packaging processes to mitigate the issues. Read our latest paper to find out how automation and robotics will keep things moving.

[READ WHITEPAPER](#)



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*Everything under control.*