Plastics Manufacturing

The OEM and Installers Guide to Control Components for Plastics Machinery

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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 Plastics Terms

Auxiliary Equipment:
Peripheral equipment used to improve or optimize any part of the plastics manufacturing process.

Blow Molding:
Creating hollow plastic parts by inflating a heated plastic inside of a mold until it forms the intended shape.

CNC Lathe:
A Computer Numerical Control (CNC) lathe machine is a form of subtractive manufacturing. A moving cutting tool follows a digital path in order to remove material from a solid block of plastic and reach an intended shape.

Compounding:
Adding additives to raw material plastics in order to achieve color, property, and/or performance. Machines include kneaders, mixers, pelletizers, blenders and grinders.

Extrusion:
Pushing a heated plastic through a die to create a continuous form. The shape of the die is a cross section of the final product.

Film Blowing:
Heating and melting plastic particles which are then blown into a film.

Heating & Cooling:
Temperature control essential for the creation and solidification of plastic molds. Machines include chillers, dryers, cooling towers, and heat exchangers.

Injection Molding:
The most common manufacturing method for solid plastic parts in which molten plastic is injected into a mold to form an intended shape.

Machinery:
Any mechanical or electrical operated device used in the plastics manufacturing process. Common categories include compounding, molding, secondary processing, and auxiliary.

Manufacturing Process:
Any method used to turn raw material plastics into finished parts or products. Common processes include 3D printing, CNC machining, casting, and molding.

Material Handling:
Using equipment to move, protect, store, and control materials throughout the plastics manufacturing process. Machines include feeders and conveyors.

Molding:
Entering liquid plastic into a negative cavity with force in order for it to eventually form an intended shape. Common processes include blow, injection, rotational, extrusion, and thermoforming molding.

Plastics:
A synthetic or semi-synthetic material made from a wide range of polymers. Common types are thermoplastics (can be melted) and thermosets (cannot be melted).

Polymer Casting:
Entering liquid plastic into a negative cavity and allowing atmospheric pressure to eventually form an intended shape.

Recycling:
Reprocessing plastic waste into new parts or products.

Resin:
A common substance in the plastics industry that is combined with a hardening agent to produce plastic.

Rotational Molding:
Rotating a heated mold until the material inside sticks to the walls of the mold and forms a hollow part.

Scrap Reclaim:
Plastic that is reused in its same form. The industry typically targets 20-25% or less for blending regrind into virgin resin.

Secondary Processing:
A post-processing step in which plastic parts or products are customized to specific needs. Machines include welders, stampers, and printers.

Thermoforming:
Transforming a plastic sheet into a three dimensional shape in a mold by using heat, a vacuum, and pressure.

3D Printing:
A form of additive manufacturing in which a printer follows a computer-aided design (CAD) in order to create a three dimensional object layer by layer.

Plastics Industry Outlook

c3controls has been manufacturing quality electrical controls for plastics manufacturing for more than 50 years. Our experience serving one of the world's largest manufacturing industries has given us a deep understanding of the challenges plastics manufacturers face—and the control solutions needed to overcome them.

Today's plastics manufacturers continue to navigate a variety of challenges:

- **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.
- **Cost pressures** that demand improved materials, inventory tracking, and purchasing.
- **Complex controls** that call for the technological advancement of electronics.
- **Calls for sustainability** that demand innovation in processing, material handling, packaging, recycling and more.

Growing demand for plastic parts and products, combined with these challenges, makes it more important than ever to have reliable control solutions and a responsive manufacturing partner.

With the right products, people, and processes, plastics manufacturers can achieve the efficiency, flexibility, and scalability needed for both mass production and mass customization.

c3controls can help you succeed. Our vertically integrated approach allows us to operate efficiently, respond quickly to changing market conditions, and provide the reliable electrical control products you need with fast delivery. Our solutions support a wide range of plastics manufacturing applications, including:

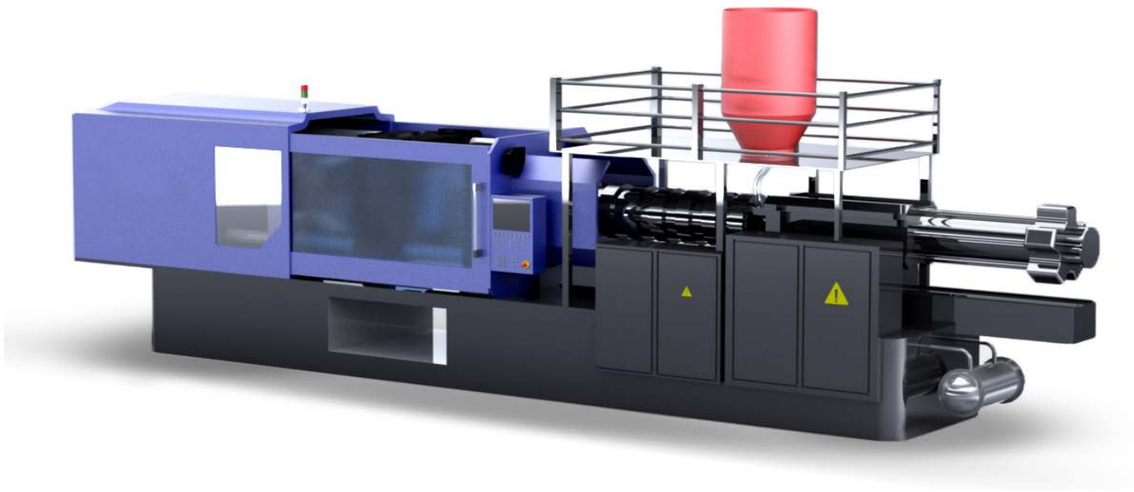
- Injection & Blow Molding
- Extrusion & Thermoforming
- 3D Printing
- Process Cooling
- Auxiliary Equipment
- & more!

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. Contact us today and discover how our expertise can help you improve productivity, reliability, and efficiency across your plastics manufacturing operation.

Machinery Example

Here is an example of an injection molding machine, the most common type of plastics machinery:

Injection Molding Machine



Mold

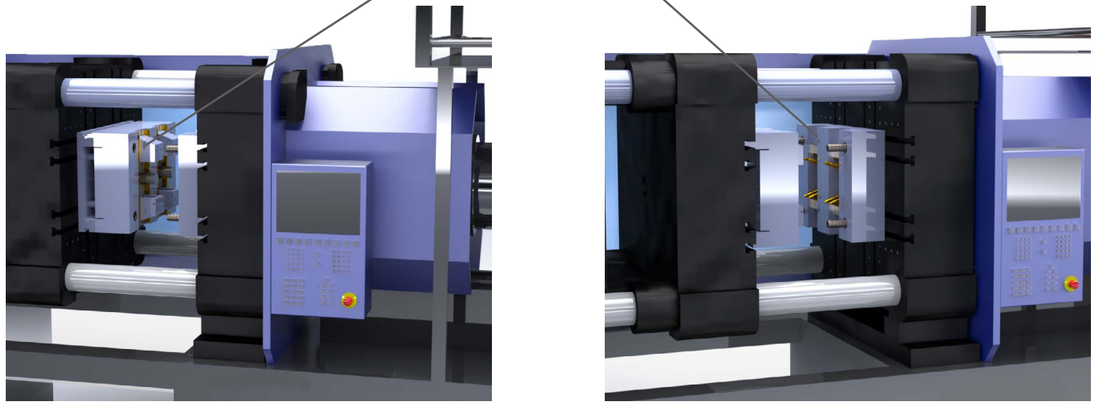


Image Source: GrabCAD

Products for Plastics 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

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

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)

Control Stations (+ E-Stops and 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

Enclosures

- Available in polyester, polycarbonate and die-cast aluminum
- Options up to four holes, or unpunched
- Accommodates 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

Electronic Timing Relays

- Compact design, sizes in 17.5mm, 22.5mm, and 45mm wide
- Single, dual and multi-functions
- Timing ranges from 0.01 seconds to 9,999 hours
- DIN Rail, Panel, Socket, and enclosure door mountings
- Voltage inputs 20-240 VAC and 12-240 VDC

Control Relays

- 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

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

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

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 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

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

Pilot Devices

- Modular range of 30mm, 22mm, 16mm & 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

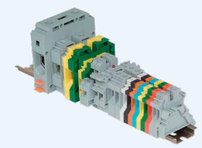
Cam Switches

- 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

Tower Lights

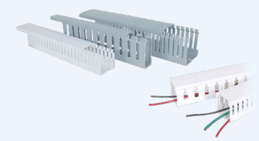
- Stackable design for up to 5 modules in a single assembly
- Mounting options in three styles: 50mm direct mount, 50mm panel-mount short base, and 50mm panel-mount tall base
- Voltage options available in 24V AC/DC, 120V AC, and 240V AC
- Three styles of illumination: continuous, flashing and rotary
- Continuous or intermittent sound modules with 80dB or 100dB sound output

IEC Terminal Blocks



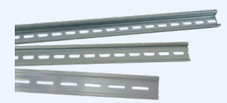
- Screw Clamp, Spring Clamp, and Miniature
- 5mm - 25mm widths
- 25 - 230 Amps
- Feed Through, Ground, Multi-Conductor, Double & Triple Level, Fuse Holder, Power Distribution, and more
- DIN Rail mounting; snap-on, snap-off assembly

Wire / 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

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

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.

series DS — DISCONNECT SWITCHES
NON-FUSED & ENCLOSED

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 series E330 — MOTOR PROTECTION CIRCUIT BREAKERS
OPEN & ENCLOSED

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) series 30 (hazardous) — 30MM PILOT DEVICES
FOR INDUSTRIAL & HAZARDOUS LOCATION

series 22 (iec) series 22 (nema) — 22MM PILOT DEVICES
IEC & NEMA

series WTL — WORLD TOWER LIGHTS

series CS — CAM SWITCHES

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 ECP BP — VFD BYPASS PANELS

series IPS — INDUSTRIAL POWER SUPPLIES

series CCT — CONTROL CIRCUIT TRANSFORMERS

series CPT — CONTROL POWER TRANSFORMERS

series TB — TERMINAL BLOCKS

TERMINAL BLOCK RELAYS

series ETR — ELECTRONIC TIMING RELAYS

series 200 series 210 — GENERAL PURPOSE RELAYS

series WD — WIRING DUCT

series DIN — DIN RAIL

White Papers

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

What is Reverse Logistics?
Hint: It's Probably Not What You Think

What is Reverse Logistics?

Everyone likes to reuse products and materials. So, what is reverse logistics and how does it help you do that? Get your questions answered, today!

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

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

Control Panel Industry Trends

Supply chain issues, workforce shortages, rising costs and new industry standards are pushing businesses to automate more of their processes. Increased automation means increased opportunities for control panel builders. It's a simple formula: More automation = more control panels = more business! Learn all about industry trends and areas of growth for panel builders.

READ WHITEPAPER

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

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

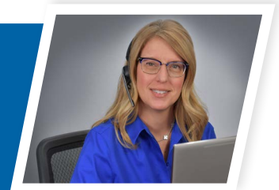
With total control over engineering and manufacturing, we are able to guarantee the highest quality products on the market—products free of defects in material, workmanship, and design.

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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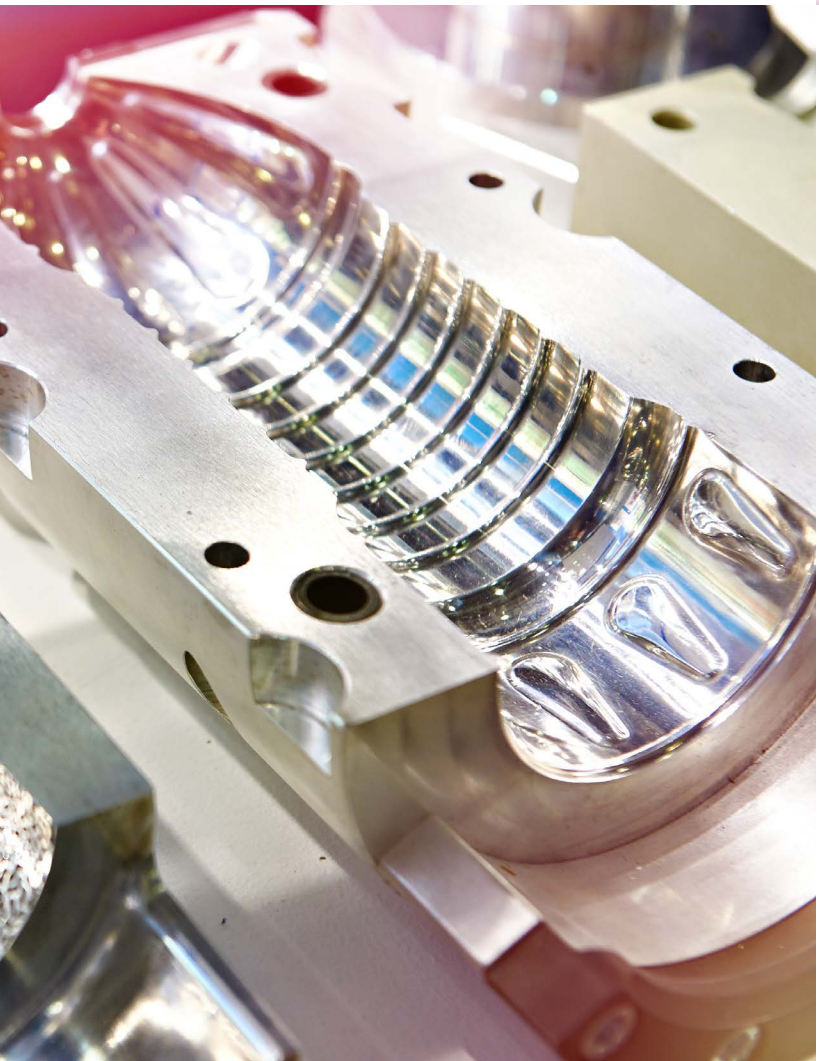

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