

Elevators

*The OEM and Installers Guide to Control
Components for Elevators and Escalators*



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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

American Society of Mechanical Engineers:
ASME is a global organization that develops and publishes safety standards and codes relating to mechanical engineering.

ASME 17.1:
The safety code for elevators and escalators that covers design, construction, installation, operation, inspection, testing, maintenance and repair.

Battery Backup:
An emergency power source installed to ensure operation during power outages.

Call Button:
A user interface with buttons that communicate with the control system to deliver elevator service to a desired floor.

Car:
The car, or cabin, is the compartment suspended within the hoistway that houses passengers and/or goods.

Car Operating Panel:
The user interface within the car that includes floor buttons, status lights, emergency buttons and more.

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

Controller:
The controller, or control system, contains electrical circuits responsible for managing the operation of the elevator car and associated equipment, ensuring top safety and performance.

Counterweight:
A series of weights connected to the car that balance weight in order to reduce the load on the motor and improve efficiency.

Door Operator:
An automatic mechanism that utilizes sensors and motors for the safe and efficient opening and closing of the car door.

Drive System:
A mechanism responsible for moving the car between floors. Components include a motor (AC or DC), gearbox and hoist system.

Elevator:
A vertically traveling platform enclosed in a hoistway designed to transport passengers and/or goods between floors in buildings.

Escalator:
A moving sidewalk or staircase inclined between floors, that transports passengers continuously in one direction.

Freight Elevator:
A large elevator specifically designed for transporting heavy materials and machinery. Small freight elevators are dumbwaiters.

Hoistway:
A vertical, enclosed shaft through which the elevator travels. Common hoist systems are hydraulic and traction.

Hydraulic Hoist System:
A mechanism in which pressurized hydraulic fluid acts like a piston to raise and lower the car.

Landing:
A designated floor in which passengers and/or goods can board or exit the car.

Machine Room:
A centralized space that houses the drive system and electrical controls responsible for operating the elevator. Machine room-less (MRL) systems eliminate the need for a separate room by integrating equipment into the hoistway.

Passenger Elevator:
An elevator specifically designed for transporting people between different floors in a building.

Pit:
The foundation or recessed area at the bottom of the shaft that provides a buffer for elevator support components.

Safety System:
A set of controls such as switches, relays, and emergency stop buttons that ensure safe operation and protect passengers.

Service Disconnect:
The main power switch or breaker that isolates the entire electrical supply during maintenance and emergencies.

Traction Hoist System:
A pulley mechanism in which the car is raised and lowered by ropes/cables attached to a motor. Can be geared or gearless.

-Elevators – Ascending to New Heights

The elevator industry plays a vital role in modern infrastructure, providing vertical transportation essential for high-rise buildings, commercial centers, residential complexes and transportation hubs worldwide. Elevators have revolutionized the way we navigate our environment by enabling efficient movement between floors with the ability to overcome mobility challenges. In the United States alone, there are over one million elevators which, in conjunction with escalators, take over 280 billion trips for a total of over 2.8 billion miles each year. That's more than all rail and air travel combined and over 75% of total highway trips in the US.

Through urbanization, rising infrastructure funding and increased demand for high-rise buildings in emerging economies, the global elevator market will grow further in the coming years. There will be a focus on key trends such as technological advancement, sustainability, energy efficiency, and an improved user experience. However, the center of attention remains—safety. Critical for passenger protection and operational reliability is continuous investment in safety standards, protocols, and features such as:

- Redundant braking
- Emergency communication
- Comprehensive monitoring
- & more!

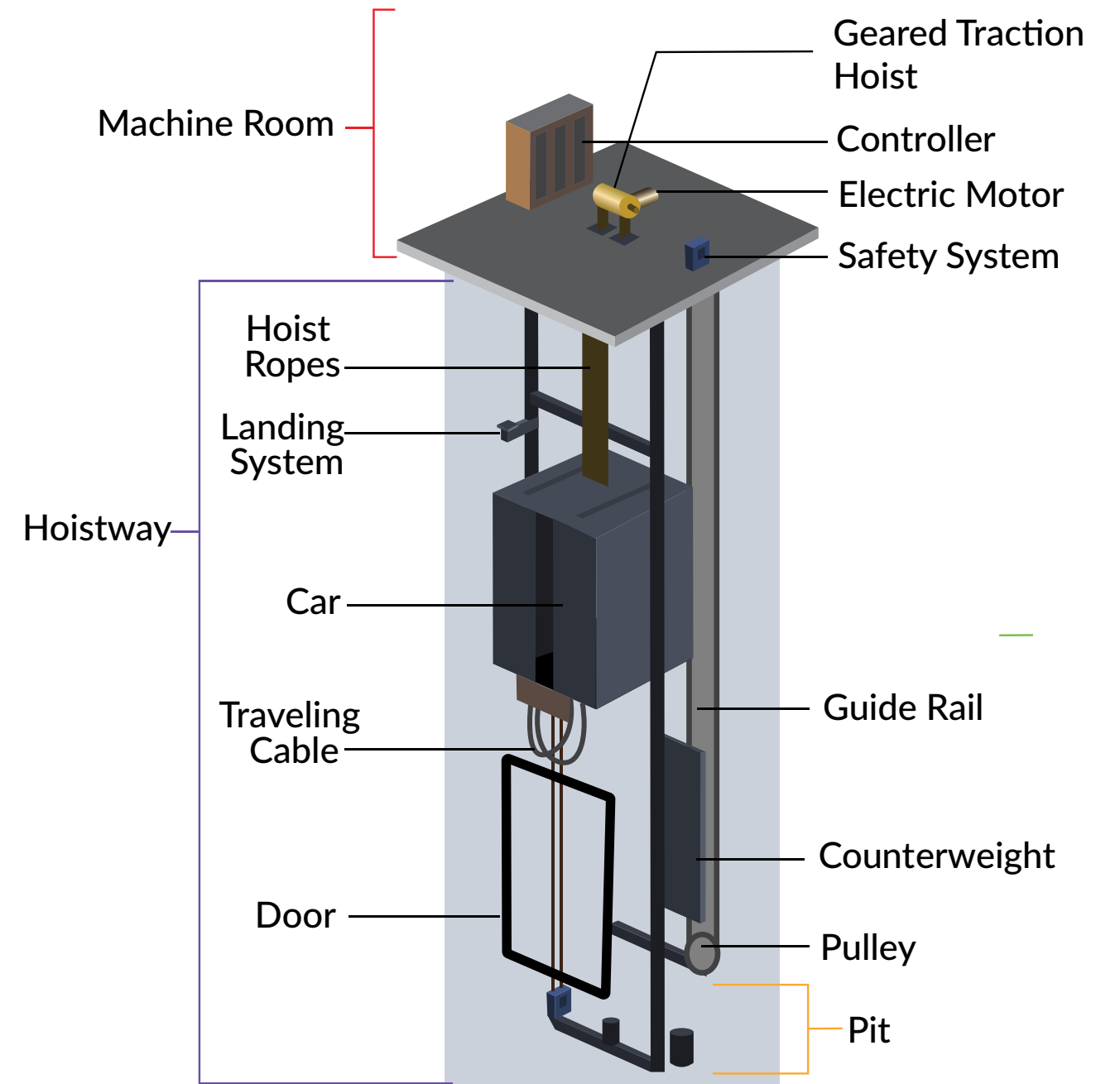
Safety is where c3controls comes in—it's what we do. As a leading manufacturer of electrical controls for almost 50 years, c3 has contributed to the elevator industry being statistically the safest form of transportation ever (including walking). This is possible because of push-pull emergency stop buttons (required by ASME 17.1!) and many other controls for all types of elevator and escalator systems.

c3controls has over seventeen million product configurations and a complete UL508A panel shop to help you elevate your elevator systems! Safety, savings and same-day shipping guaranteed.



-Elevator Isometric

Here's a simple example of components in a traction, passenger elevator system:




Elevator Products

c3controls can support all key function areas in your elevator and escalator applications:


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

Direct-On-Line Starters (+ enclosed)



3

Contactors and Control Relays




4

Overload Relays

Human Machine Interface


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



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Pilot Devices

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



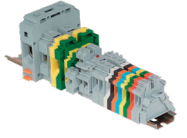
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Control Stations (+ E-Stops)

***NOTE: Push-pull emergency stop buttons are required by ASME 17.1!**


Control Logic

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




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IEC Terminal Blocks




8

NEMA Terminal Blocks



9

General Purpose Relays

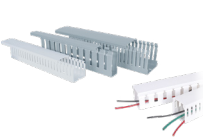


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Industrial Power Supplies


Panel Solutions

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




11

Wire Duct




12

DIN Rail













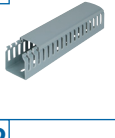

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Enclosures



12

Electrical Panels

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		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		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		Bimetallic Overload Relays	Current Adjustment Range of 0.28 - 112 Amps	FLC ratio of 1:1.5	100kA SCCR @ 480V and 600V with Class J fuses	Trip Class 10	Single phase sensitivity
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 (+ E-Stops)	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		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		NEMA Terminal Blocks	Options available in Fusible and Feed Through in modular, flat top, and box type with copper collar	Rated 600V, 25-50 amperes	Accommodates #22 to two #12 AWG wires (0.34-4mm ²) per terminal	Simple mounting onto 35mm DIN rails	Terminal markers available for easy circuit identification
9		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
10		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
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 c3controls 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>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>ENCLOSED POWER SUPPLIES</p>	 <p>INDUSTRIAL POWER SUPPLIES</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:



Replacing VFDs with Motor Starters

Replacing VFDs with Motor Starters

Unable to source variable frequency drives (VFDs) and soft starters due to the shortages of raw materials? You have a variety of choices when selecting an electric motor starter. Download our paper to see how you might be able to use standard motor control in place of a VFD.

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



Are Fuses Actually Cheaper Than Circuit Breakers in Control Applications?

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



AC versus DC MCBs The Difference is More Than a Letter!

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

The Basics of a Contactor & Different Types of Contactor Devices

The Basics of a Contactor & Different Types of Contactor Devices

A contactor is a relay for switching an electrical circuit on or off. Most commonly used with electric motors and lighting applications, they provide a level of isolation away from the high electric currents.

READ WHITEPAPER



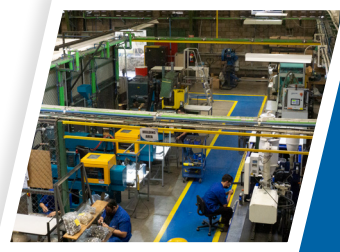
PANEL ESSENTIALS 3: UL508A Control Panel Design Considerations

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

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.

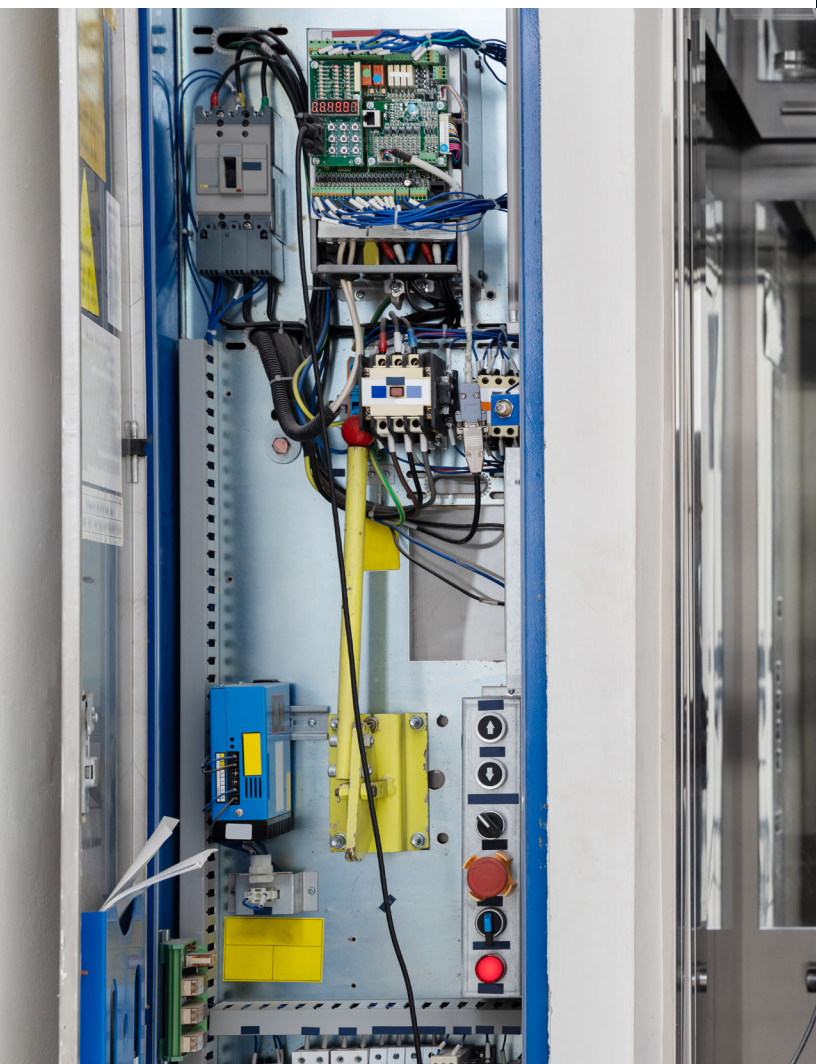
Customer First

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

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Everything under control.