Elevators

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

c3controls.com

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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 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:

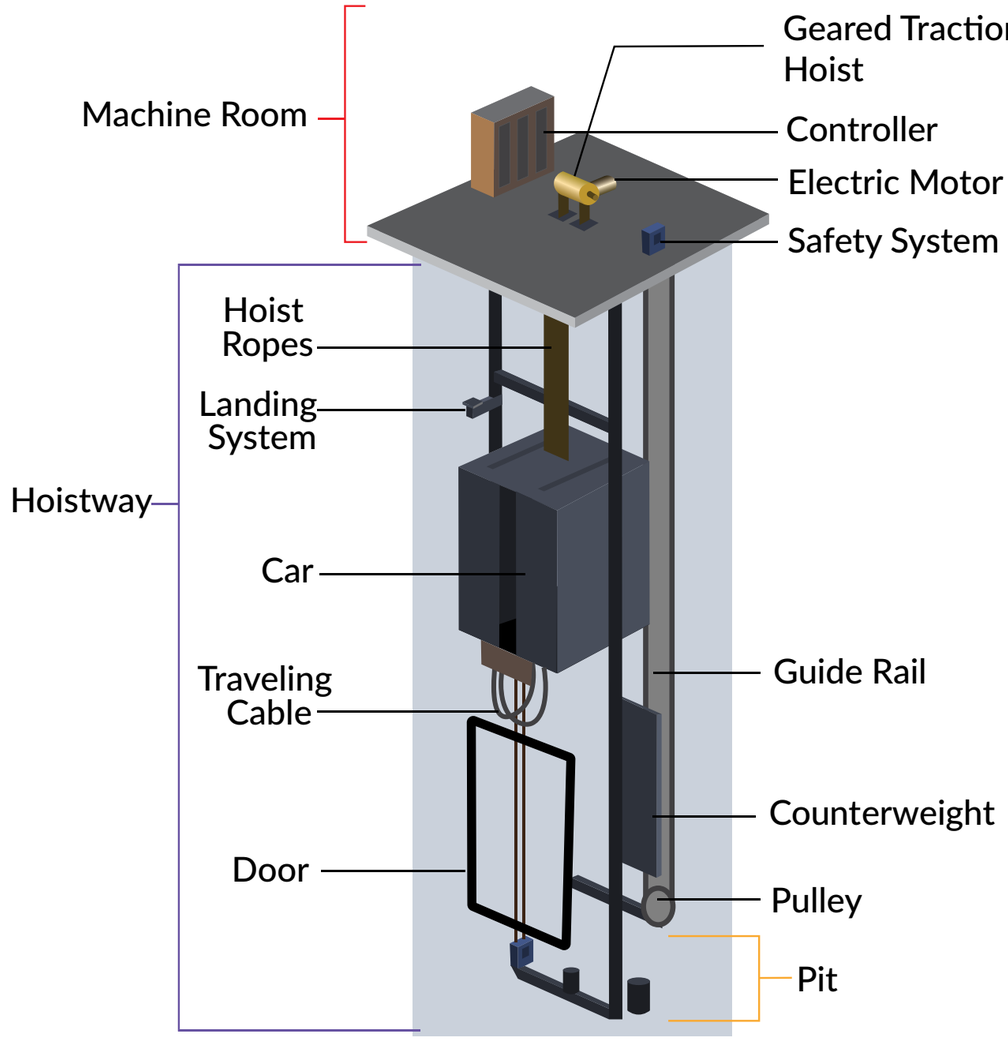
- **Redundant braking**
- **Emergency communication**
- **Comprehensive monitoring**
- **& more!**

Safety is where c3controls comes in—it's what we do. As a leading manufacturer of electrical controls for 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:



Products for Elevator and Escalator Applications

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

22mm Emergency Push Button

- 22mm NEMA 2-position maintained open and close style button
- Meets ASME A17.1 standards for safety and functionality in elevator car and pit applications
- The red mushroom cap is clearly and permanently marked with “PUSH TO STOP PULL TO RUN”
- Audible alarm integration

Control Stations (+ E-Stops)

- 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

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

Miniature Circuit Breakers (+ Bus Bars)

- 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

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

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

General Purpose Relays

- Octal Base with pin terminals and Square Base with blade-style terminals
- Various pole combinations and coil voltages
- Color-coded push buttons for distinguishing AC and DC
- Built-in retainer clips in relay sockets
- Marking plates on relays and sockets

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

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

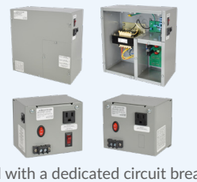
Control Circuit Transformers

- 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

Enclosed Power Supplies

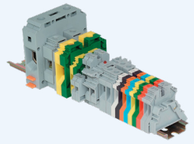


- Equipped with a dedicated circuit breaker, an easily visible, illuminated on-off switch, and
- powered by a robust transformer
  Up to five 24VAC class 2 output circuits from a
- single 120VAC input source
  Transformer configurations in single and dual
- Ready for installation on your perforated subpanel
- Conveniently pre-packaged in a metal enclosure

VFD Bypass Panels

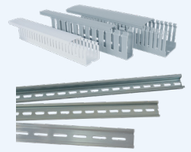
- Can be installed as either a temporary replacement to a VFD or as a system backup
- Each assembly includes: fused disconnect switch, contactors, control transformer, a variety of 22mm IEC pilot devices, and power and control terminal blocks
- Optimized width to save wall space

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

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.

White Papers

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

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

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?

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 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

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 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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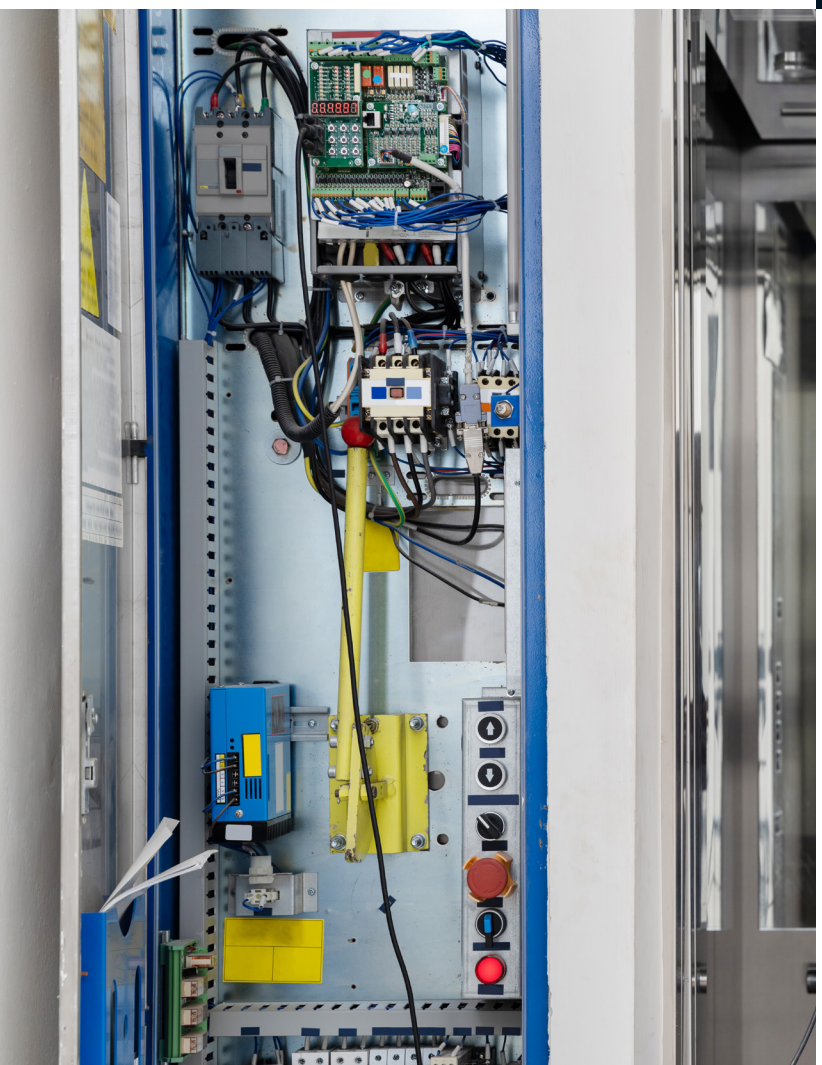

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