Water/ Wastewater

The OEM and Installers Guide to Control Components for Water/Wastewater Treatment

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

Water

Pump Stations:
Devices used to move water from a collection system to and/or through treatment. Common types include booster, centrifugal, stormwater, and submersible pumping stations.

Water Treatment:
The process of taking water, typically from the environment, and improving its quality for a desired end use. Common steps include coagulation, flocculation, sedimentation, filtration, and disinfection.

Coagulation & Flocculation:
Chemicals are added to water to neutralize the charge of dirt (coagulation) and bind particles together so they can be more easily removed (flocculation).

Sedimentation:
Using the effect of gravity to allow particles suspended in water to settle to the bottom of a tank prior to removal.

Filtration:
Passing water through a medium in order to remove any remaining small particles.

Disinfection:
Treating water with chemicals to eliminate any microorganisms and prepare for distribution and consumption.

Wastewater

Lift Stations:
A type of pump station designed to move wastewater, or sewage, to higher elevation using a collection system.

Wastewater Treatment:
The process of taking wastewater from a community, removing and eliminating contaminants, and releasing back into the environment. Common steps include primary, secondary, and tertiary treatment.

Primary Treatment:
Filtering out large solids from wastewater and then performing coagulation, flocculation, and sedimentation to separate 'sludge' and lighter substances.

Secondary Treatment:
Utilizing aerobic bacteria to biologically remove contaminants from wastewater, also known as 'activated sludge.'

Tertiary Treatment:
Filtration and disinfection processes increase the final quality of water and prepare it for discharge back into the environment.

Water/Wastewater

Department of Environmental Quality (DEQ):
Administers state and federal laws and regulations for water quality, water supply, and land protection.

Environmental Protection Agency (EPA):
Responsible for standards and the inspection of collection and treatment systems. The EPA OW (Office of Water) includes divisions such as the OWM (Office of Wastewater Management).

Pump Control Panels:
Also known as pump controllers, these panels manage the power components that control a pump motor, permitting easy and automatic pump operation and monitoring.

Treatment Plant:
A facility which takes water/wastewater from a collection system and performs a series of processes to prepare water/wastewater for a desired end use.

Industry Outlook

Essential for life, clean water is one of the most important resources on the planet. Treatment of water and wastewater has a critical impact on our health, ecosystem, economy, and so much more. This treatment comes at a premium as water and wastewater services utilize almost 50% of the energy in a municipality, of which 90% is used by pumps. As factors such as population growth strain aging infrastructure, an industry focus is finding new solutions that offer energy efficiency without sacrificing reliability.

For almost 50 years, c3controls has been a leading manufacturer of electrical controls for water/wastewater treatment equipment. Our experience serving the industry has provided a deep understanding of challenges 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.
- **Complex controls** that call for the technological advancement of electronics.
- **Calls for sustainability and efficiency** that demand innovation in the form of flexible, multi-purpose equipment.

With these challenges come great opportunities for your business. As the industry continues to grow and evolve, now is the ideal time to upgrade systems to capitalize on industry trends and technological advancements. 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 for your industrial control products serving:

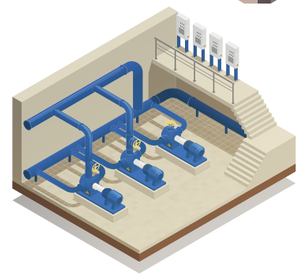
- **Pump Control Panels**
- **Pump Stations**
- **Lift Stations**
- **& more!**

With over seventeen million available product configurations, and our own UL508A panel shop, c3controls has the resources you need to adapt and capitalize on your water/wastewater business opportunities!

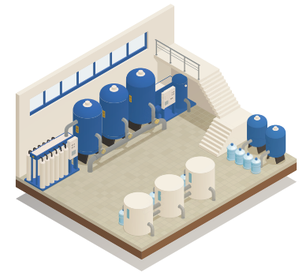
Treatment Plant Isometrics

Here is an example layout of a treatment facility with a look inside at some common processes:

Treatment Facility

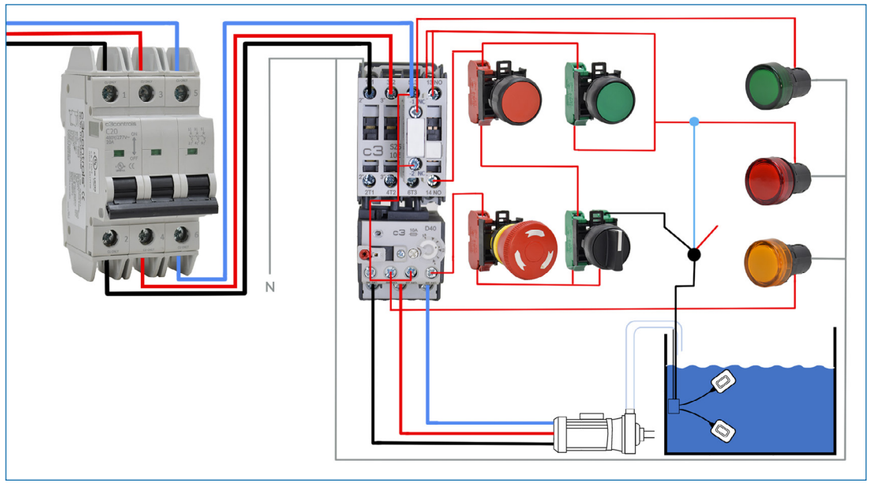


Pumping



Filtration

Wiring a 3-Phase Starter to a Pump Motor



Products for Water/Wastewater Applications

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

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

22mm IEC E-Stops

- Non-Illuminated and Illuminated versions
- UL Listed Polycarbonate enclosure rated for Type 1, 2, 3, 3R, 4/4X, 12, 13, and IP66
- Meets EN418 Safety of Machinery global compliance standards
- Operating temperatures from -40 to +55° C (-40 to + 131° F)
- UV and corrosion resistant

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

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

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

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

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

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

Electrical Panels

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

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

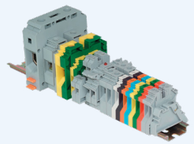
Overload Relays

- 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

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

IEC Terminal Blocks

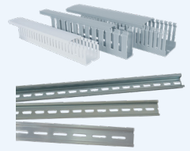


- Screw Clamp, Spring Clamp, and Miniature
- 5mm - 25mm widths
- 25 - 230 Amps
- Feed Through, Ground, Multi-Conductor, Double & Triple Level, Fuse Holder, Power Distribution, and more
- DIN Rail mounting; snap-on, snap-off assembly

High Density & CT Shorting Terminal Blocks

- 2, 4, 6, and 12-point in a single molded housing
- Rated for 600V, 30A continuous service
- Replacement for GE CR151 and EB27B06S terminal blocks
- Integrated 35mm DIN rail snap and panel mounting construction
- Captive screws with spring-return open terminals

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.

DISCONNECT SWITCHES
NON-FUSED & ENCLOSED

MINIATURE CIRCUIT BREAKERS

CONTACTORS & CONTROL RELAYS

OVERLOAD RELAYS

DIRECT-ON-LINE STARTERS
CONTACTOR + OVERLOAD RELAY

ENCLOSED DIRECT-ON-LINE STARTERS
CONTACTOR + OVERLOAD RELAY

MOTOR PROTECTION CIRCUIT BREAKERS
OPEN & ENCLOSED

DIRECT-ON-LINE STARTERS
MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR

ENCLOSED DIRECT-ON-LINE STARTERS
MOTOR PROTECTION CIRCUIT BREAKER + CONTACTOR

30MM PILOT DEVICES
FOR INDUSTRIAL & HAZARDOUS LOCATION

22MM PILOT DEVICES
IEC & NEMA

WORLD TOWER LIGHTS

CAM SWITCHES

16MM PILOT LIGHTS

13MM PILOT LIGHTS

CONTROL STATION ENCLOSURES

ENCLOSED UL508A COMBINATION MOTOR STARTERS

ENCLOSED POWER SUPPLIES

VFD BYPASS PANELS

INDUSTRIAL POWER SUPPLIES

CONTROL CIRCUIT TRANSFORMERS

CONTROL POWER TRANSFORMERS

TERMINAL BLOCKS

TERMINAL BLOCK RELAYS

ELECTRONIC TIMING RELAYS

GENERAL PURPOSE RELAYS

WIRING DUCT

DIN RAIL

White Papers

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

Applying Motor Controls in a Water/Wastewater Pumping Application

Click here to learn more about the basic understanding of pump control for water and wastewater!

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

Industrial Control Basics 4: Pilot Devices for Indication and Actuation

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.

READ WHITEPAPER

Pump Control for Water, Wastewater, and Irrigation

Each application to control a pump is unique. Click here for the types of control methods and what to consider when selecting pump control.

READ WHITEPAPER

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

Commercial Boiler Industry - New Trends in Technology

Boilers are perhaps the largest unseen, unknown and there-fore, 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.

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

724.775.7926
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c3controls®
Everything under control.