

# Oil & Gas

*The OEM and Installers Guide to Control Components for Oil and Gas Operations*



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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 Terms

**American Petroleum Institute (API):**  
The leading trade association that develops standards and advocates for all aspects of America’s oil and gas industry.

**Class 1, Division 2:**  
A hazardous area classification for locations where flammable liquids and gasses are present. Electrical equipment used in Class 1, Div. 2 locations must be designed and certified to prevent ignition and ensure safety.

**Crude Oil:**  
Also known as petroleum, an unrefined liquid fossil fuel consisting of a mixture of hydrocarbons. Extracted from underground reservoirs, it is the primary raw material used in the production of fuels.

**Downstream:**  
The final stage of oil and gas production where impurities are removed in order to create final products for consumers.

**Drilling Rig:**  
A large, complex mechanical structure that facilitates the drilling process, essential for accessing and extracting oil and gas.

**Exploration:**  
Conducting geological research to identify underground reservoirs of crude oil and natural gas for drilling and extraction.

**Extraction:**  
Retrieving crude oil and natural gas from underground reservoirs and bringing them to the surface for processing and distribution.

**Fracking:**  
Also known as ‘hydraulic fracturing’, the process of injecting fluid underground at a high pressure to enhance the flow of hydrocarbons.

**Gas Processing Plant:**  
An industrial plant designed to treat and purify natural gas. Impurities and natural gas liquids are removed to produce dry natural gas.

**Hydrocarbons:**  
Molecules of carbon and hydrogen in different combinations form the basis of fossil fuels like crude oil and natural gas.

**Lockout / Tagout (LOTO):**  
Safety practices and procedures that protect workers from unexpected releases of energy during maintenance and repair of equipment.

**Midstream:**  
The middle stage of oil & gas production in which raw materials are transported to refineries for storage and processing.

**Natural Gas:**  
A naturally occurring gaseous fossil fuel consisting of a mixture of hydrocarbons, primarily methane. It is often found alongside crude oil in underground reservoirs.

**Offshore:**  
Any oil and gas operations that take place beneath the seabed, away from the mainland.

**Oil Refinery:**  
An industrial plant where crude oil is transformed and refined into useful products such as gasoline, diesel, jet fuel, and petrochemicals.

**Onshore:**  
Any oil and gas operations that take place on land, away from bodies of water.

**Petrochemicals:**  
Chemical compounds derived from crude oil and/or natural gas through refining. Used as raw materials for producing plastics, textiles, electronics, and more.

**Pipeline:**  
An interconnected system of pipes used to transport oil and gas to refineries, distribution centers, and/or end users. Pipelines can be over or underground and on or offshore.

**Production:**  
The complete process of finding oil and gas resources and turning them into final consumable products. Stages include upstream, midstream, and downstream.

**Reservoir:**  
A subsurface accumulation of hydrocarbons in rock formations acting as natural storage.

**Transmission:**  
The transportation of oil and gas over long distances using pipelines and other infrastructure.

**Upstream:**  
The initial stage of oil and gas production which includes site exploration, drilling, and extraction.



# Industry Outlook

The last decade has seen many significant technological advances that have made finding and producing oil and gas far more efficient. A shift made to ensure that the industry remains competitive as a primary energy resource among competition from expanding renewable energy sources. Harnessing new technologies to lower costs, optimize production, and remain a responsible steward of the environment and its natural resource, continue to be top-of-mind in the oil and gas industry.

To sustain the supply of crude oil and natural gas, producers must balance the challenges of extending the life of mature sites while seeking new locations and sources to ensure future viability. Optimizing the key processes of extraction, transportation, and refining helps reduce costs to remain competitive and fund further exploration. Maintaining plant reliability, with no unplanned shutdowns and consistent throughput and complete compliance and transparency in environmental management, is also essential.



With more extreme demands being placed on equipment, selecting control components that are built to exceed the daily rigors in the industry is critical to achieving trouble-free performance. That means products supporting operations in each stage of the oil and gas production process:

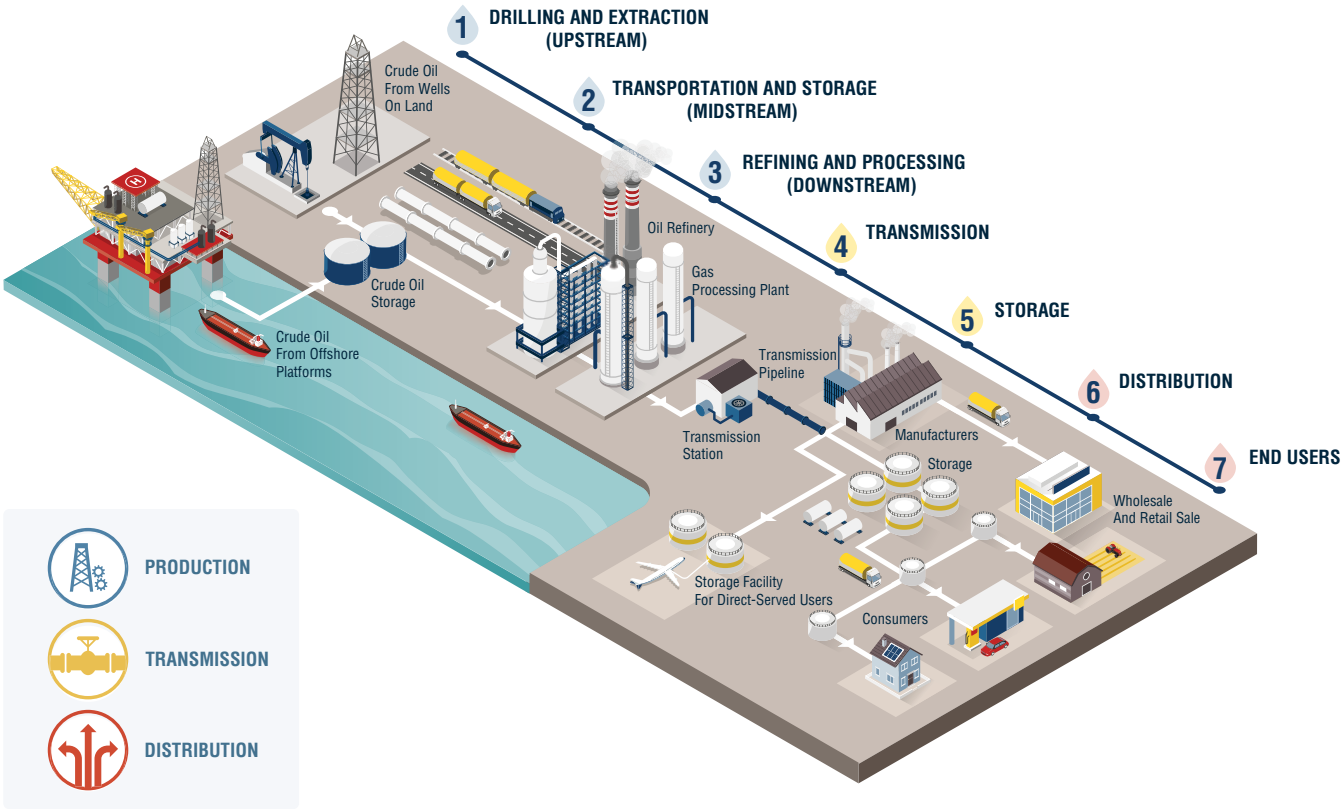
- **Upstream:** Drilling and Extraction
- **Midstream:** Transportation and Storage
- **Downstream:** Refining and Processing

Each of these stages involves electrical controls and control panels to safely carry out operations. That’s where c3controls can help you succeed! As a leading manufacturer of oil and gas controls for almost 50 years, vertical integration allows us to operate more efficiently, respond to market conditions quicker, and provide fast delivery.

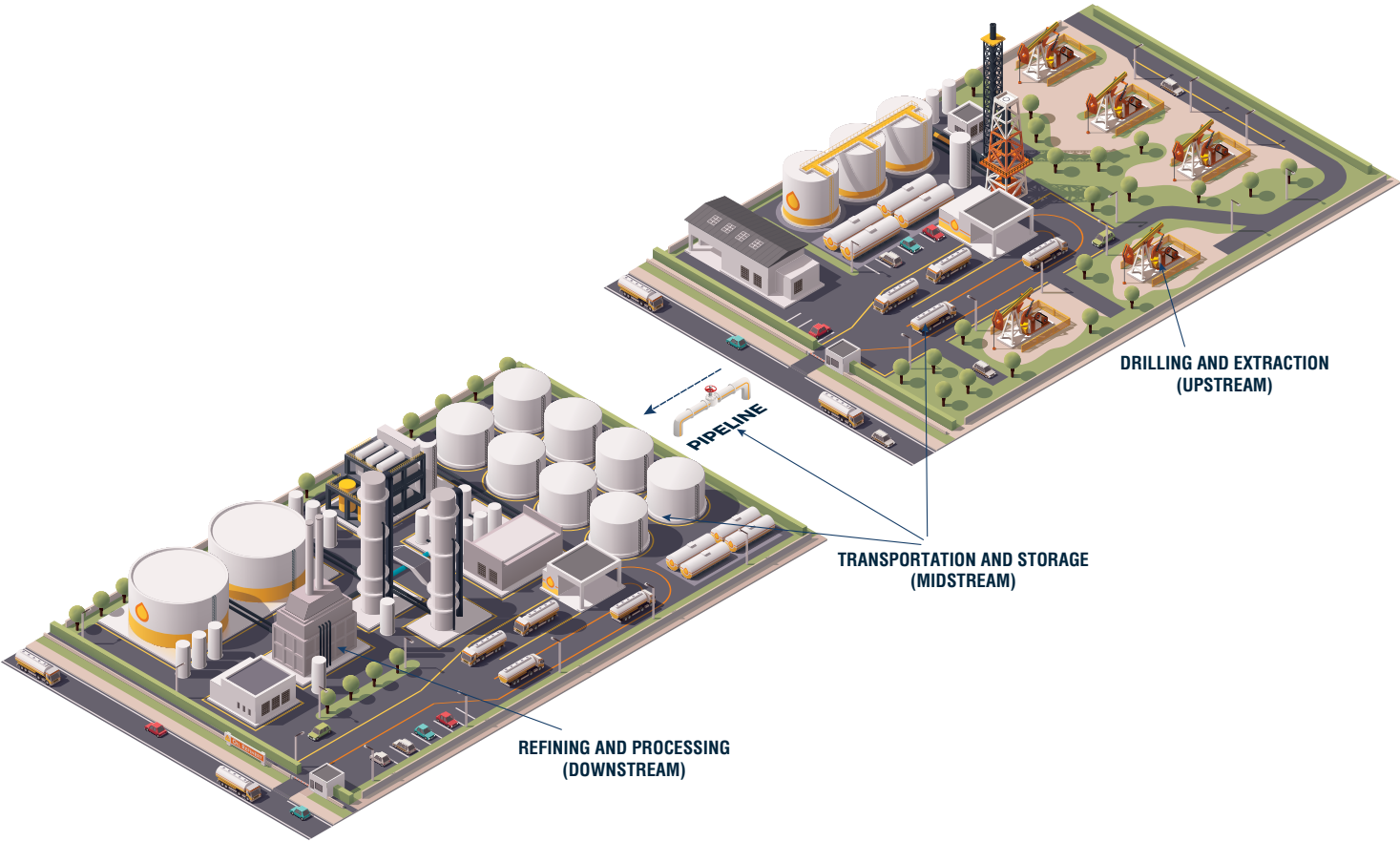
Now is the ideal time to upgrade your oil and gas equipment, and c3controls has over fifteen million product configurations, a complete UL508A panel shop, and other resources to help you meet challenging regulations and demands while capitalizing on your oil and gas business opportunities!

# Oil & Gas Isometrics

Here’s a layout of the oil and gas supply chain:



A closer look at an onshore production process:



# Oil & Gas Products

c3controls can support all key function areas in your oil and gas operation:

## Power & Actuation

Disconnect, control, and/or protect a circuit from a ground fault, short-circuit, or overload current.

1



Disconnect Switches

2



Miniature Circuit Breakers (+ Bus Bars)

3



Motor Protection Circuit Breakers

4



Contactors and Control Relays

5



Overload Relays

6




Direct-On-Line Starters (+enclosed)

## Control Logic


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

7




IEC Terminal Blocks

8



NEMA Terminal Blocks

9



General Purpose Relays

## Panel Solutions


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

12



Wire Duct

12




DIN Rail

12



Enclosures

12



Electrical Panels

## Human Machine Interface

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

10















30mm Hazardous Location Pilot Devices

11



Control Stations (+E-Stops)

1		<b>UL 508 Disconnect Switches</b>	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
2		<b>Miniature Circuit Breakers</b>	UL 489 & UL 1077 in 1, 2 and 3 pole combinations	Rated 60VDC single pole and 125VDC two pole (wired in series)	10kA SCCR @ 480Y/277VAC	Current ratings up to 63 Amps (non-derated)	B, C and D curve ratings
3		<b>Motor Protection Circuit Breakers</b>	Multi-Function: Manual Motor Controller, Motor Disconnect, Group Motor Installations		50kA SCCR @ 480V	Self-protected Type E up to 50kA @ 460V	Trip Class 10 Thermal and Magnetic Elements
4		<b>IEC Contactors and Control Relays</b>	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
5		<b>Bimetallic Overload Relays</b>	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
6		<b>Direct-On-Line Starters (+enclosed)</b>	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		
7		<b>IEC Terminal Blocks</b>	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		<b>NEMA Terminal Blocks</b>	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 <sup>2</sup> ) per terminal	Simple mounting onto 35mm DIN rails	Terminal markers available for easy circuit identification
9		<b>General Purpose Relays</b>	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		<b>30mm Hazardous Location Pilot Devices</b>	Push buttons, pilot lights, and selector switches	All-polyester construction and nickel-plated or stainless steel metal parts for superior corrosion resistance	Specially engineered for Class 1, Division 2 and Zone 2 with a wide selection of hermetically sealed reed and factory sealed contact blocks	UL Listed and CE Marked	Rated for Type 1, 2, 3, 3R, 4/4X, 12 and 13
11		<b>Control Stations (+E-Stops)</b>	Available as standard pre-configured assemblies of 30mm, 22mm IEC and 22mm NEMA	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
12		<b>Wire Duct &amp; DIN Rail</b>	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

Disclaimer: For illustration purposes only. Other solutions may be applicable depending on your application design requirements.



# c3controls 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.



DISCONNECT SWITCHES



ENCLOSED DISCONNECT SWITCHES



MINIATURE CIRCUIT BREAKERS



DEFINITE PURPOSE CONTACTORS



CONTACTORS



MINIATURE CONTACTORS & CONTROL RELAYS



OVERLOAD RELAYS



DIRECT-ON-LINE STARTERS  
CONTACTOR + OVERLOAD RELAY



ENCLOSED DIRECT-ON-LINE STARTERS  
CONTACTOR + OVERLOAD RELAY



MOTOR PROTECTION CIRCUIT BREAKERS



ENCLOSED MOTOR PROTECTION CIRCUIT BREAKERS



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



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




30MM INDUSTRIAL PILOT DEVICES



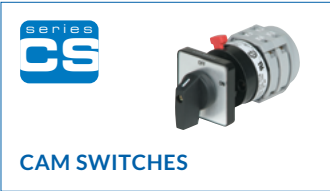
30MM PILOT DEVICES FOR HAZARDOUS LOCATION



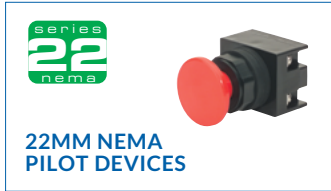
22MM IEC PILOT DEVICES



WORLD TOWER LIGHTS



CAM SWITCHES



22MM NEMA PILOT DEVICES



16MM PILOT LIGHTS



13MM PILOT LIGHTS



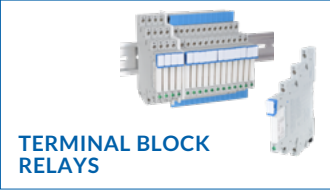
CONTROL STATION ENCLOSURES



ENCLOSED UL508A COMBINATION MOTOR STARTERS



TERMINAL BLOCKS



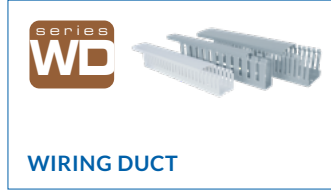
TERMINAL BLOCK RELAYS



ELECTRONIC TIMING RELAYS



GENERAL PURPOSE RELAYS



WIRING DUCT

# White Papers

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



Industrial Burners Industry - New Trends in Technology

We often talk about the industrial revolution, and what allowed it to happen. It was steam powered, long before the electrification of the planet. Much has changed since then, and evolution of burner technology continues. Check out our latest paper to find out what the latest trends are in Industrial Burners.

READ WHITEPAPER



Commercial Boiler Industry - New Trends in Technology

Boilers are perhaps the largest unseen, unknown and therefore, under appreciated 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



US Oil & Gas / Petrochemical Industry - New Trends in Technology

While lithium-ion batteries have transformed portable electronics, they do have limitations when it comes to utility-scale energy storage applications. In this white paper, we assess lithium-ion batteries in terms of energy density, cost, cycle life, safety, charge/discharge, capacity fade, and more.


READ WHITEPAPER



Controlling Hazardous Energy with OSHA Lockout/Tagout (LOTO) Procedures

Discover the essential insights and strategies in our in-depth white paper on Lockout/Tagout (LOTO). Gain an understanding of the standard, explore the latest compliance devices, and learn how to safeguard your employees while avoiding citations and hefty fines.


READ WHITEPAPER



Compressor Control System Basics: An Overview

Do you need to know more about compressor controls? Click here to get a white paper covering compressor control system basics!

READ WHITEPAPER



Is your hazardous location solution optimized?

No one sets out to over engineer a Class 1, Division 2 application. And yet, it happens a lot, and with good reason. Why? Because lives are at stake when you design equipment for hazardous environments. Read how...

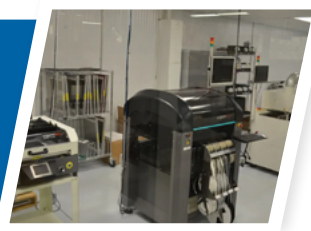
READ WHITEPAPER

10.

*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  
c3controls.com



**c3controls®**  
*Everything under control.*