

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) 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 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 built to withstand the daily rigors of the oil and gas industry is critical to achieving reliable, trouble-free performance. c3controls provides electrical control products supporting operations across every stage of the oil and gas production process:

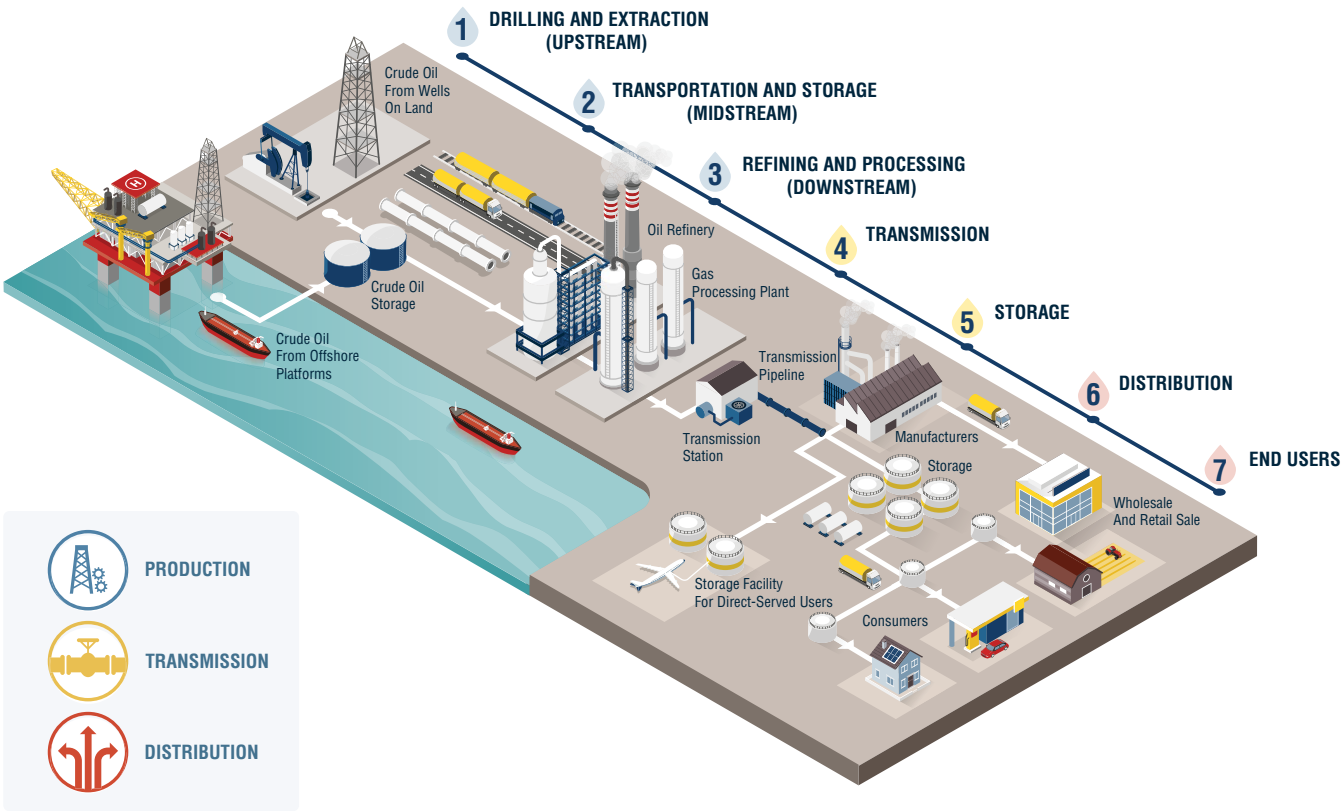
- **Upstream:** Drilling and Extraction
- **Midstream:** Transportation and Storage
- **Downstream:** Refining and Processing

Each stage relies on electrical controls and control panels to help operate equipment safely and reliably. That's where c3controls can help you succeed. With more than 50 years of experience manufacturing electrical controls for demanding applications, our vertically integrated approach allows us to operate efficiently, respond quickly to changing market conditions, and provide reliable products with fast delivery.

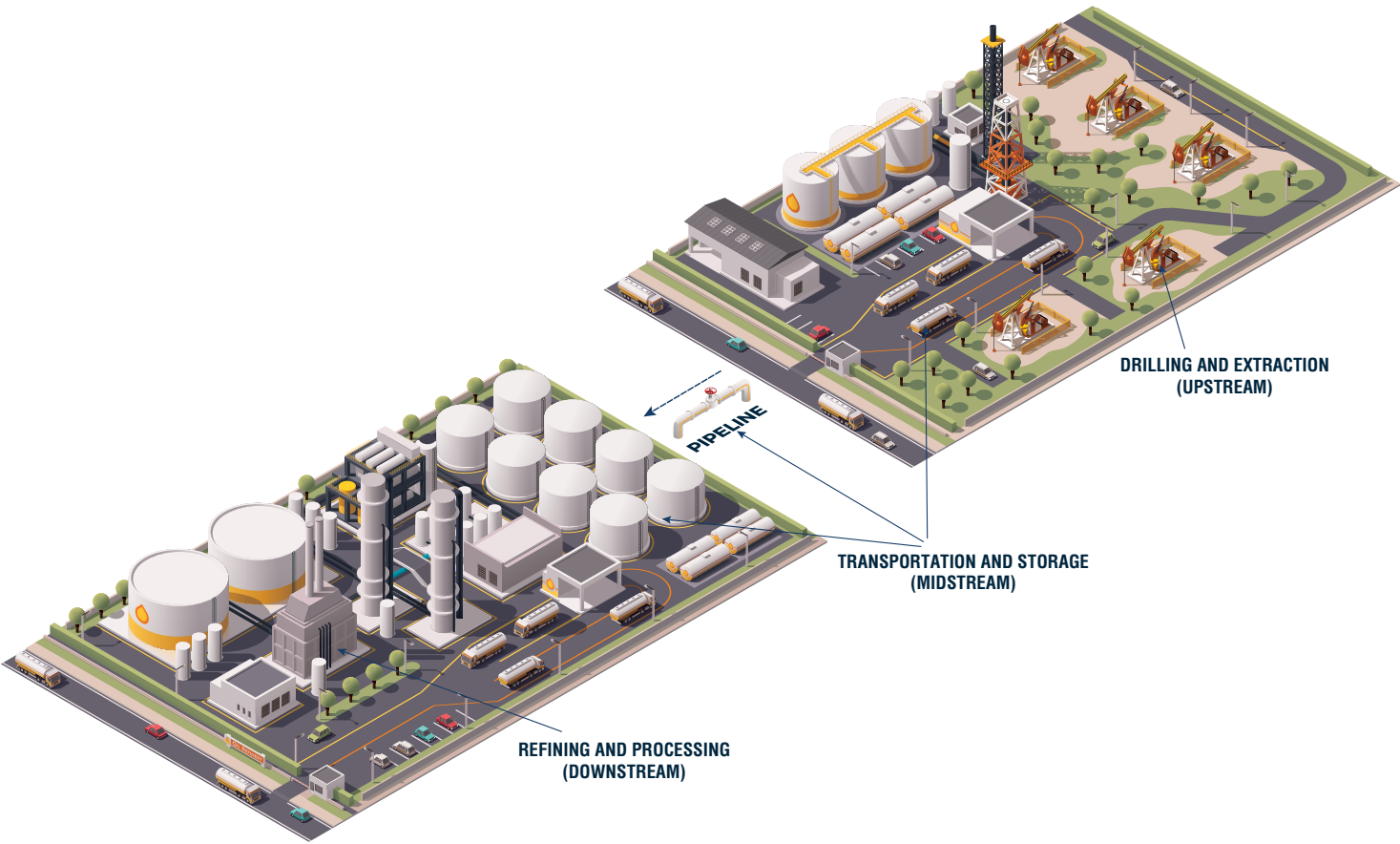
With over seventeen million product configurations from c3controls and custom UL 508A-certified panel solutions from Covenant Panelworks (CPW), you have a trusted source for complete electrical control solutions. Contact us today and discover how our expertise can help you meet demanding requirements while improving the safety, reliability, and performance of your oil and gas operations.

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:

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



- UL 489 & UL 1077
- 1, 2 and 3 Pole combinations
- 10kA SCCR @ 480V/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

General Purpose Relays



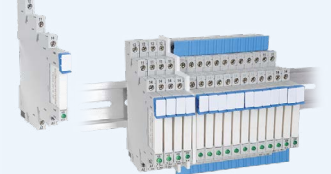
- Octal Base with pin terminals and Square Base with blade-style terminals
- Various pole combinations and coil voltages
- Color-coded push buttons for distinguishing AC and DC
- Built-in retainer clips in relay sockets
- Marking plates on relays and sockets

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

Terminal Block Relays



- Rated load: 6A, 250VAC/30VDC
- Single-Pole, Double-Throw contacts
- Screw termination
- Most common AC/DC coil voltages: 12V, 24V, 110-125V, 220-240V

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



- 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

30mm Hazardous Location Pilot Devices



- 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

Tower Lights



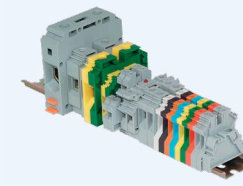
- Stackable design for up to 5 modules in a single assembly
- Mounting options in three styles: 50mm direct mount, 50mm panel-mount short base, and 50mm panel-mount tall base
- Voltage options available in 24V AC/DC, 120V AC, and 240V AC
- Three styles of illumination: continuous, flashing and rotary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

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

IEC Terminal Blocks



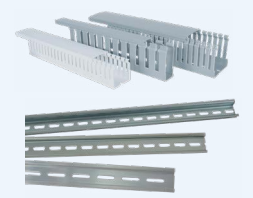
- Screw Clamp, Spring Clamp, and Miniature
- 5mm - 25mm widths
- 25 - 230 Amps
- Feed Through, Ground, Multi-Conductor, Double & Triple Level, Fuse Holder, Power Distribution, and more
- DIN Rail mounting: snap-on, snap-off assembly

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



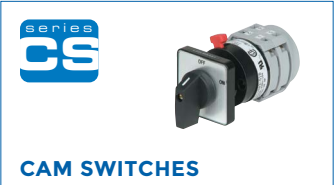
30MM PILOT DEVICES
FOR INDUSTRIAL & HAZARDOUS LOCATION



22MM PILOT DEVICES
IEC & NEMA



WORLD TOWER LIGHTS



CAM SWITCHES



16MM PILOT LIGHTS



13MM PILOT LIGHTS



CONTROL STATION ENCLOSURES



ENCLOSED UL508A COMBINATION MOTOR STARTERS



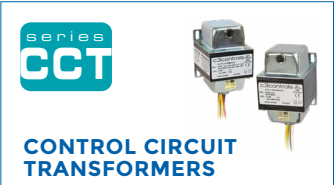
ENCLOSED POWER SUPPLIES



VFD BYPASS PANELS



INDUSTRIAL POWER SUPPLIES



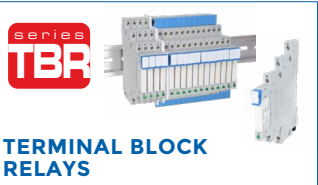
CONTROL CIRCUIT TRANSFORMERS



CONTROL POWER TRANSFORMERS



TERMINAL BLOCKS



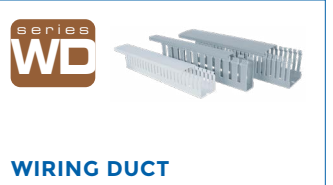
TERMINAL BLOCK RELAYS



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:



Industrial Burners Industry
New Trends in Technology

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

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

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

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

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?

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](#)

Why choose c3controls

Notes



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

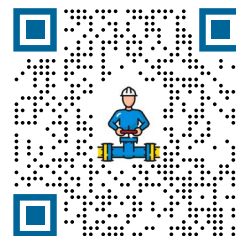
Total control means lower overhead and direct sales. For our customers, this translates to savings of up to 40+% on c3controls premium products.

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.



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c3controls®
Everything under control.