

allen bradley 700 relay wiring diagram

allen bradley 700 relay wiring diagram is a critical piece of information for anyone working with industrial automation, control systems, or electrical panels. Understanding the intricate connections within these relays ensures safe, efficient, and reliable operation of machinery and processes. This comprehensive guide will delve deep into the world of Allen-Bradley 700 series relays, providing clear explanations and practical insights into their wiring diagrams. We will cover the fundamental principles of relay operation, explore common configurations, discuss the importance of deciphering specific model diagrams, and offer tips for troubleshooting. Whether you are a seasoned electrician, a maintenance technician, or an aspiring automation professional, mastering the allen bradley 700 relay wiring diagram will empower you to work with confidence and precision. Prepare to demystify these essential components and unlock their full potential in your applications.

Understanding the Allen-Bradley 700 Relay Family

The Allen-Bradley 700 series relays represent a cornerstone in industrial control. These electromechanical devices are fundamental for switching electrical circuits, acting as intermediaries between control signals and higher-power loads. Their versatility and robustness have made them a popular choice across a vast spectrum of industries, from manufacturing and material handling to HVAC and building automation. The nomenclature of Allen-Bradley relays, particularly the 700 series, often provides clues about their capabilities and intended applications. Understanding the basic types of relays within this family, such as general-purpose, latching, and timing relays, is the first step towards interpreting their associated wiring diagrams.

The Core Functionality of Control Relays

At their heart, control relays operate on the principle of electromagnetism. When a control voltage is applied to the coil of a relay, it generates a magnetic field. This magnetic field attracts an armature, which in turn actuates a set of contacts. These contacts can be normally open (NO), meaning they are open when the relay coil is de-energized, or normally closed (NC), meaning they are closed when the relay coil is de-energized. The action of the magnetic field closes the NO contacts and opens the NC contacts, or vice versa, allowing for the control of various electrical circuits. The allen bradley 700 relay wiring diagram meticulously illustrates how these contacts are arranged and interconnected for specific functionalities.

Types of Allen-Bradley 700 Relays

The Allen-Bradley 700 family encompasses several key relay types, each with its unique purpose and wiring considerations. General-purpose relays are the most common, used for simple on/off switching. Latching relays, on the other hand, maintain their contact state even after the control signal is removed, requiring a separate pulse to change their state. Timing relays introduce a time delay into the switching operation, either on energization or de-energization, crucial for sequencing operations. Each of these types will have distinct symbols and connection points represented within their

respective allen bradley 700 relay wiring diagram.

Decoding the Allen-Bradley 700 Relay Wiring Diagram

Interpreting an allen bradley 700 relay wiring diagram requires a systematic approach and a good understanding of standard electrical symbols. These diagrams are not just blueprints; they are precise instructions for connecting components safely and correctly. The diagram will typically show the relay's internal structure, including the coil, contacts, and terminals. It will also illustrate how these components are to be wired into the overall control circuit, including power sources, control signals, and loads.

Essential Symbols and Terminals Explained

A common allen bradley 700 relay wiring diagram will feature standardized symbols. The relay coil is usually represented by a circle or a rectangle with a label indicating the coil voltage. Contacts are depicted as lines that open or close. NO contacts are shown as a gap between two lines, which close when energized. NC contacts are shown as a continuous line, which open when energized. Terminals are typically numbered or lettered, providing specific connection points for wiring. Familiarizing yourself with these symbols is paramount before attempting any wiring based on an allen bradley 700 relay wiring diagram.

Reading Schematic vs. Wiring Diagrams

It's important to distinguish between schematic diagrams and wiring diagrams. A schematic diagram illustrates the logical flow and function of a circuit using abstract symbols. It focuses on what the circuit does. A wiring diagram, on the other hand, shows the physical connections between components, including wire routing and terminal designations. The allen bradley 700 relay wiring diagram is typically a wiring diagram, providing the practical details needed for installation. Understanding both types of diagrams, and how they relate, is crucial for comprehensive system design and maintenance.

Common Allen-Bradley 700 Relay Configurations and Wiring

The allen bradley 700 relay wiring diagram can vary significantly depending on the specific model and its intended application. However, certain common configurations emerge frequently in industrial control systems. These configurations leverage the relay's capabilities to perform essential functions such as interlocking, sealing in control signals, and initiating timed sequences.

Basic Control Circuit Wiring

A fundamental application involves using an allen bradley 700 relay to switch a load. In a typical setup, the control voltage is applied to the relay coil. When the coil is energized, its contacts change state, closing an NO contact to energize the load or opening an NC contact to de-energize it. The allen bradley 700 relay wiring diagram will clearly show the connections for the coil power and the load connections to the appropriate contacts.

Interlocking Circuits

Relays are frequently used to create interlocking circuits, preventing two conflicting operations from occurring simultaneously. For example, a motor starter relay might have an NC contact wired in series with the coil of another motor starter to prevent them from running at the same time. The allen bradley 700 relay wiring diagram for such a setup will illustrate how these safety interlocks are implemented using the relay's contacts.

Sealed-In (Holding) Circuits

A sealed-in circuit, also known as a holding circuit, allows a control signal to remain active even after the initial initiation signal is removed. This is achieved by using a NO contact from the relay itself, wired in parallel with the start button. Once the relay energizes, its own contact closes, providing a path for the control voltage to keep the coil energized. The allen bradley 700 relay wiring diagram will clearly depict the wiring for this self-holding functionality.

Navigating Specific Allen-Bradley 700 Relay Models

While general principles apply, each specific allen bradley 700 relay model comes with its own datasheet or manual containing its unique wiring diagram. These diagrams are indispensable for correct installation and troubleshooting. Failing to consult the specific diagram for your particular relay can lead to incorrect wiring, component damage, or safety hazards.

Identifying Relay Model Numbers

The first step in finding the correct allen bradley 700 relay wiring diagram is to accurately identify the relay's model number. This number is usually printed on the relay's housing. Common prefixes include 700-N, 700-PK, 700-HA, and others, each denoting a specific series with differing features and specifications. Once the model number is known, you can typically find the corresponding documentation on the manufacturer's website or through authorized distributors.

Understanding Terminal Designations and Coil Voltages

Within any given allen bradley 700 relay wiring diagram, pay close attention to terminal designations. These are the physical connection points on the relay. They are often numbered sequentially or grouped by function (e.g., coil terminals, contact terminals). Equally important is verifying the coil voltage rating of the relay and ensuring it matches the control voltage supply. Mismatching coil voltages is a common cause of relay failure.

Troubleshooting with the Allen-Bradley 700 Relay Wiring Diagram

When a control system malfunctions, the allen bradley 700 relay wiring diagram becomes an invaluable tool for diagnosis. By systematically tracing the circuit according to the diagram, technicians can pinpoint the source of the problem, whether it's a faulty relay, incorrect wiring, or a problem with the control signal.

Step-by-Step Diagnostic Process

A common troubleshooting approach involves verifying power at the coil terminals when the control signal is active. If power is present but the relay doesn't energize, the coil may be damaged. If the relay energizes but the load doesn't activate, check the continuity of the relay's contacts using a multimeter when energized and de-energized. The allen bradley 700 relay wiring diagram guides this process by showing expected voltage levels and contact states at different points in the circuit.

Common Wiring Errors and Pitfalls

- Incorrectly identifying NO and NC contacts.
- Connecting the wrong coil voltage.
- Misinterpreting terminal numbers.
- Forgetting to wire the common terminal for multi-pole relays.
- Overlooking the importance of safety interlocks as depicted in the diagram.

By diligently following the allen bradley 700 relay wiring diagram and being aware of these common mistakes, many troubleshooting scenarios can be resolved efficiently and safely.

Frequently Asked Questions

What is the primary function of an Allen Bradley 700 relay in a control system?

An Allen Bradley 700 relay acts as an electrically operated switch. It uses a low-power control signal to switch a higher-power circuit, providing isolation and enabling control of various devices like motors, lights, and solenoids.

Where can I find the wiring diagram for my specific Allen Bradley 700 relay model?

The wiring diagram is typically located on the relay's housing, a label affixed to it, or in the product's technical documentation or manual. You can also usually find it on the manufacturer's website (Rockwell Automation) by searching for the specific part number.

What are the common symbols used in an Allen Bradley 700 relay wiring diagram?

Common symbols include those for the coil (representing the electromagnet that operates the relay), normally open (NO) contacts (closed when the coil is energized), normally closed (NC) contacts (open when the coil is energized), and sometimes common (COM) terminals.

How do I interpret the contact configurations (e.g., 2 N.O., 2 N.C.) on an Allen Bradley 700 relay diagram?

This refers to the number and type of contacts the relay has. '2 N.O., 2 N.C.' means the relay has two sets of normally open contacts and two sets of normally closed contacts. The diagram will show which terminals correspond to these configurations.

What is the purpose of the 'common' (COM) terminal in an Allen Bradley 700 relay wiring diagram?

The common terminal is the shared connection point for sets of contacts. For NO contacts, the COM terminal connects to the NO terminal when the relay is energized. For NC contacts, the COM terminal connects to the NC terminal when the relay is de-energized.

How do I wire the control circuit (coil) of an Allen Bradley 700 relay?

The coil is wired to the control voltage source. One terminal of the coil connects to the positive or live side of the control supply, and the other terminal connects to the negative or neutral side (or a control output from a PLC/switch).

What is the importance of matching the control voltage to the Allen Bradley 700 relay's coil voltage?

It's crucial to match the control voltage to the coil voltage to prevent damage to the relay. Supplying too high a voltage can burn out the coil, while too low a voltage may prevent the relay from energizing and operating correctly.

Can I use an Allen Bradley 700 relay to switch AC and DC loads?

Yes, many Allen Bradley 700 relays are designed to switch both AC and DC loads. However, you must verify the relay's specifications to ensure it's rated for the voltage and current of the load you intend to switch. The wiring can differ slightly for AC and DC.

What safety precautions should I take when working with Allen Bradley 700 relay wiring diagrams?

Always de-energize the control circuit before making any connections. Verify the correct voltage and current ratings. Use appropriate wire gauges. If unsure, consult a qualified electrician. Follow lockout/tagout procedures.

Additional Resources

Here are 9 book titles related to Allen-Bradley 700 relay wiring diagrams, presented in a numbered list with short descriptions:

1. Understanding Allen-Bradley 700 Series Relay Applications

This book delves into the practical applications of Allen-Bradley 700 series relays within various industrial control systems. It focuses on interpreting and utilizing wiring diagrams to troubleshoot and design basic relay logic circuits. Readers will learn about different relay types and their specific functions, making it an ideal resource for technicians and engineers working with these components.

2. Mastering Industrial Control: Allen-Bradley Relay Diagrams Explained

This comprehensive guide demystifies industrial control systems, with a strong emphasis on Allen-Bradley relays. It meticulously breaks down the components and symbols found in 700 series relay wiring diagrams, providing step-by-step instructions for understanding complex schematics. The book aims to equip readers with the skills to confidently read, interpret, and even modify these critical diagrams.

3. Troubleshooting Relay Logic with Allen-Bradley 700 Diagrams

Designed for those facing common electrical control issues, this book specifically addresses troubleshooting techniques using Allen-Bradley 700 relay wiring diagrams. It highlights common failure points and provides systematic methods for diagnosing problems based on the provided schematics. The content is practical and solution-oriented, helping to minimize downtime in industrial settings.

4. Fundamentals of Allen-Bradley 700 Relay Control Systems

This introductory text lays the groundwork for understanding Allen-Bradley 700 relay control systems.

It covers the basic principles of relay operation, electrical safety, and the fundamental building blocks of relay logic. The book uses clear and concise language, making it accessible to beginners who need to grasp the essentials of relay wiring diagrams.

5. Advanced Wiring Techniques for Allen-Bradley 700 Relays

For those with a foundational understanding, this book explores more complex wiring configurations and advanced applications of Allen-Bradley 700 relays. It examines specialized control circuits and offers insights into optimizing performance and reliability through proper diagram interpretation. The focus is on building more sophisticated relay logic for demanding industrial tasks.

6. Interpreting Allen-Bradley 700 Relay Schematics: A Practical Manual

This practical manual serves as a go-to resource for quickly and accurately interpreting Allen-Bradley 700 relay schematics. It provides a wealth of examples, covering a wide range of typical industrial scenarios and their corresponding wiring diagrams. The book emphasizes hands-on learning through illustrative diagrams and clear explanations.

7. Building Industrial Control Panels with Allen-Bradley 700 Relay Diagrams

This title guides readers through the process of designing and building industrial control panels specifically using Allen-Bradley 700 relays. It emphasizes the crucial role of accurate wiring diagrams in panel layout, component selection, and assembly. The book aims to bridge the gap between theoretical knowledge and the practical construction of functional control systems.

8. The Essential Guide to Allen-Bradley 700 Series Relay Wiring

This is an indispensable reference for anyone working with Allen-Bradley 700 series relays and their wiring diagrams. It offers a comprehensive overview of common wiring practices, best practices, and essential considerations for successful implementation. The guide is packed with practical tips and clear illustrations to aid understanding and application.

9. PLC Integration and Allen-Bradley 700 Relay Logic

This book explores the transition from traditional relay logic to modern Programmable Logic Controllers (PLCs), with a specific focus on how Allen-Bradley 700 relay wiring diagrams inform this integration. It discusses how to migrate relay-based control strategies to PLC programs and how to interface existing relay systems with PLCs. The content is valuable for understanding the evolution of industrial automation.

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