Coil symbol

Ladder logic symbols are the basic building blocks for ladder diagrams. Right here you will find all the ladder diagram symbols which are described in IEC The symbols are available for download in all formats and in a PDF-file. Each symbol represents a certain ladder instruction. In ladder logic, these symbols are also known as bit logic instructions. The reason for this is that the programming language ladder diagram is designed for boolean signals. The ladder diagram graphical programming language is standardized by the PLCopen organization , and thereby the symbols used in ladder diagrams. Since ladder logic is a graphical programming language, the PLC programs written in ladder logic are a combination of ladder logic symbols. All the symbols can be found in the standard defining ladder diagram programming: IEC But, those standards are quite expensive if you are just looking for the symbols used in ladder diagrams. Finally, all the symbols will be available as one file containing all the ladder diagram symbols from IEC. You can use this as a ladder logic cheat sheet to learn the basic symbols bit logic instructions of ladder logic. Although the ladder logic symbols are standardized in the IEC standard, the symbols can vary. Depending on the PLC programming software you are using, you will be presented with variations of the symbols. The biggest difference is the letters in the coils. The name probably comes from the electrical engineering aspect of the function of these contacts and coils. As the name of the ladder logic symbols also tells, these functions are made to register either positive or negative changes. The function of these contacts is to check for a positive or negative change in the input signal. In electronic signals that change is called a positive or negative edge. If you look at the two signals negative and positive edge plotted over time below, it is clear why the term edge is used to name those two. Positive Transition-Sensing Contact â€" P â€" or â€"I Negative Transition-Sensing Contact â€" N â€" or â€"I One other reason is that in the old days, ladder diagrams were made one line after another with ASCII characters as building blocks. The early days of the graphical user-interface were just an extension of the command-line and would typically be made up of characters. All the ladder logic symbols were made out of s series of characters. They are available for you to download and use whenever you want. No rights reserved. Even though it is very basic it is great to be able to simplify things like this again. Going back to basics is never a bad idea, the older I get the more it seems I forget! Hello sir, I just done my graduation with electronic and I have passion about plc programming especially Siemens. How to start what software I use so on. Please give me advice so I can do something. Firstly, thanks for the post. I will of course give full credit back here. Thanks for your comment! May I ask what the paper will be about? You might also like. Read More. Hi Peter, Firstly, thanks for the post. Regards, Colin. Hey Collin, Thanks for your comment! Cheers, Peter. Leave a Response Cancel reply. Follow Us. Latest Articles. This comes at no additional cost to you, and helps me keep the lights on. Thank you for your support! We are a participant in the Amazon Services LLC Associates Program, an affiliate advertising program designed to provide a means for us to earn fees by linking to Amazon. Full disclaimer here. You can read our privacy policy here. Copyright PLC Academy. Generic Fixed Inductor. This is the symbols used for representing a generic inductor whose inductance value is fixed. An inductor is also known by many names such as coil , choke etc. Variable Inductor. This type of inductor has variable inductance. Its inductance can be changed during the operation of the circuit such as in radios. Step Variable Inductor. The inductance of such variable inductor can be varied in steps rather than in a continuous manner. They have designed fixed value of resistance per step. Inductor with polarity. Such inductors have a dot on one side of its terminal. Iron Core Inductor. This is a type of inductor whose core is made up of iron Ferromagnetic material. The iron core increases the inductance of the inductor due to its high magnetic permeability. Ferrite Core Inductor. As the name suggests, these inductors have ferrite core. The ferrite material provide high magnetic permeability as well as low electrical conductivity to reduce the losses inside the core. They are used in high frequency applications. Variable Ferrite Core Inductor. It is a type of ferrite core that has variable inductance. Preset Ferrite Core Inductor. The preset inductors are also variable inductor but there inductance is varied at the time of manufacturing or tuning a circuit. Their inductance is not changed during normal use of the circuit. Shielded Inductor. Such type of inductors core is designed to contain its magnetic field inside. There is little to know leakage flux that could interfere with other nearby components. These are used in compact PCBs where space managing is the utmost requirement. Electromagnet Solenoid. A solenoid is a cylindrical coil made of a conductor which produces magnetic field when electricity passes through it. It is also known as Electromagnet. Electromagnetic Deflection Coil. Such type of coil is used in CRT cathode ray tube where it produces the magnetic field to deflect or change direction of the electron beam both vertically and horizontally. Bifilar Inductor. The coil of bifilar inductor is made up of two conductors running in parallel with each other. The winding conductors can be antiparallel reverse direction of current to cancel the magnetic field produced by each other. They can be in

parallel to double fold the magnetic field produced by the coil. The variometer is a variable inductor that provide a continuous change in inductance by moving the two coils inside one another that are connected in series. Saturable Core Inductor. This results in high AC current carrying capability. Electric Motor Inductor. It is the graphical representation of the coil winding used inside AC machines which converts the electrical energy into mechanical energy through induction. Analog Delay Line. It is a coil designed to produce a time delay or phase change in the analog signal. Just like digital buffers are used to produce time delay in digital signal. Related Electrical and Electronic Symbols:. Your email address will not be published. Electrical Technology 0 2 minutes read. Show More. Related Articles. Step by Step Procedure with Solved Example. Leave a Reply Cancel reply Your email address will not be published. Check Also. Difference between Electric Field and Magnetic Field. Close Search for. Adblock Detected Our website is made possible by displaying online advertisements to our visitors. Please consider supporting us by disabling your ad blocker. We depends on ad revenue to keep creating quality content for you to learn and enjoy for free. The most elementary objects in Ladder Diagram programming are contacts and coils, intended to mimic the contacts and coils of electromechanical relays. Contacts and coils are discrete programming elements, dealing with Boolean 1 and 0; on and off; true and false variable states. Each contact in a Ladder Diagram PLC program represents the reading of a single bit in memory, while each coil represents the writing of a single bit in memory. Discrete input signals to the PLC from real-world switches are read by a Ladder Diagram program by contacts referenced to those input channels. In legacy PLC systems, each discrete input channel has a specific address which must be applied to the contact s within that program. In modern PLC systems, each discrete input channel has a tag name created by the programmer which is applied to the contact s within the program. Similarly, discrete output channels â€" referenced by coil symbols in the Ladder Diagram â€" must also bear some form of address or tag name label. To illustrate, we will imagine the construction and programming of a redundant flame-sensing system to monitor the status of a burner flame using three sensors. If only one sensor indicates flame or if no sensors indicate flame , the system will declare the burner to be un-lit. Each flame sensor outputs a DC voltage signal indicating the detection of flame at the burner, either on 24 volts DC or off 0 volts DC. To make the ladder program more readable, we will assign tag names symbolic addresses to each input and output bit in the PLC, describing its real-world device in an easily-interpreted format. A ladder program to determine if at least two out of the three sensors detect flame is shown here, with the tag names referencing each contact and coil:. Series-connected contacts in a Ladder Diagram perform the logical AND function, while parallel contacts perform the logical OR function. Thus, this two-out-of-three flame-sensing program could be verbally described as:. An alternate way to express this is to use the notation of Boolean algebra, where multiplication represents the AND function and addition represents the OR function:. Yet another way to represent this logical relationship is to use logic gate symbols:. To illustrate how this program would work, we will consider a case where flame sensors B and C detect flame, but sensor A does not Note1. In fact, this is a good reason for using a 2-out-of-3 flame detection system rather than a simplex 1-out-of-1 detector scheme; to make the system more tolerant of occasional sensor problems without compromising burner safety. Note that the color highlighting does not indicate a virtual contact is conducting virtual power, but merely that it is able to conduct power. Contacts and relays are not just useful for implementing simple logic functions, but they may also perform latching functions as well. As before, this functionality will be illustrated by means of an hypothetical example circuit and program:. In this system, two push-button switches are connected to discrete inputs on a PLC, and the PLC in turn energizes the coil of a motor contactor relay by means of one of its discrete outputs. An overload contact is wired directly in series with the contactor coil to provide motor over-current protection, even in the event of a PLC failure where the discrete output channel remains energized note 2. The ladder program for this motor control system would look like this:. Note the seal-in contact bearing the exact same label as the coil: OUT contactor. The coil labeled OUT contactor writes the status of that bit, while the contact labeled OUT contactor reads the status of that same bit. However, this is a false association. In reality, contacts and coils are read and write instructions, and thus it is possible to have the PLC read one of its own output bits as a part of some logic function. What would be truly strange is to label a coil with an input bit address or tag name, since the PLC is not electrically capable of setting the real-world energization status of any input channels. This programming technique is known as feedback, where an output variable of a function in this case, the feedback variable is OUT contactor is also an input to that same function. The path of feedback is implicit rather than explicit in Ladder Diagram programming, with the only indication of feedback being the common name shared by coil and contact. Other graphical programming languages such as Function Block have the ability to

show feedback paths as connecting lines between function outputs and inputs, but this capacity does not exist in Ladder Diagram. A step-by-step sequence showing the operation and status of this simple program illustrates how the seal-in contact functions, through a start-up and shut-down cycle of the motor:. This sequence helps illustrate the order of evaluation or scan order of a Ladder Diagram program. In other words, the PLC does not make any decision on how to set the state of a coil until all contacts providing power to that coil have been read, Step 5 in the previous sequence is particularly illustrative. However, the OUT contactor feedback contact does not update until the next scan, which is why you still see it color-highlighted during step 5. Some applications, this failure mode would not be a severe problem. Many applications, though, it is quite dangerous to have a running motor that cannot be stopped. This keeps discrete input channel 7 activated when the pushbutton is unpressed. The IN switch Stop virtual contact is programmed to be normally-open NO , but yet it is typically found in the closed state. Just because a switch is configured as normally-open does not necessarily mean it will be typically found in the open state! The status of any switch contact, whether real or virtual, is a function of its configuration NO versus NC and the stimulus applied to it. Another concern surrounding real-world wiring problems is what this system will do if the motor contactor coil circuit opens for any reason. An open circuit may develop as a result of a wire falling off a screw terminal, or it may occur because the thermal overload contact tripped open due to an over-temperature event. Wondering why this may be, he or she goes to look at the overload relay to see if it is tripped. Having the motor start up as soon as the thermal overload is reset may come as a surprise to operations personnel, and this could be quite dangerous if anyone happens to be near the motor-powered machinery when it starts. Now, the PLC is able to sense the real-time status of the contactor via input channel 5. We may modify the PLC program to recognize this status by assigning a new tag name to this input IN contactor aux and using a normally-open virtual contact of this name as the seal-in contact instead of the OUT contactor bit:. These usually come in two forms: a set coil and a reset coil. Otherwise, the bit is allowed to retain its last value. Note the use of a normally-open NO pushbutton switch contact again! The concept of retentive and non-retentive instructions will appear again as we explore PLC programming, especially in the area of timers. Here, with latching coils, there is no conflict because each of the coils only writes to the OUT contactor bit when its respective contact is energized. So long as only one of the pushbutton switches is actuated at a time, there is no conflict between the identically-named coils. This raises the question: what would happen if both pushbutton switches were simultaneously pressed? Multiple non-retentive output coils with the same memory address are almost always a programming faux pax for this reason, but even retentive coils which are designed to be used in matched pairs can cause trouble if the implications of simultaneous energization are not anticipated. The following example shows a wiring diagram, Ladder Diagram program, and a timing diagram demonstrating how each type of transition-sensing contact functions when stimulated by a real electrical input signal to a discrete channel:. It should be noted that the duration of a single PLC program scan is typically very short: measured in milliseconds. If this program were actually tested in a real PLC, you would probably not be able to see either test lamp light up, since each pulse is so short-lived. Contacts and coils represent only the most basic of instructions in the Ladder Diagram PLC programming language. Credits : by Tony R. Kuphaldt â€" Creative Commons Attribution 4, Save my name, email, and website in this browser for the next time I comment. This website uses cookies to improve your experience. We'll assume you're ok with this, but you can opt-out if you wish. Accept Read More. Primary Menu Inst Tools. Search for: Search. Previous Article. Next Article. Related Articles. S Bharadwaj Reddy January 18, February 4, Ramon Fernandez August 28, at pm Excellent instruction, Thanks. Leave a Comment Cancel Reply Save my name, email, and website in this browser for the next time I comment. PLC Tutorials. WordPress Image Lightbox. Send this to a friend. Send Cancel. Solenoid operated Relay. The solenoid operated relay has a coil wound around a core that produces magnetic field when the coil is energised by the current flowing through it. The magnetic field pulls the lever movable contact to either make or break the contact. Solenoid Relay with Pushbutton. This relay has a push button instead of a lever. The energized coil pulls in the pushbutton either making or breaking the contact. Generic Relay. The control terminals is operated by a single or multiple control signals to swtich the contact terminals. They are used for switching relatively high power circuits using low power signals. Double Coil Relay. These type of relays has two coils. Each coil has separate control terminals. Either of the two coils are used for making or breaking contact. When coil 1 is energized, it makes contact while energizing coil 2 breaks the contact. Double coil relay are mostly latching devices whose contacts remains in their position even after de-energizing the coil. Double coil relay with opposite direction of windings. Such type of double coil relay has windings in opposite direction to each other. The magnetic field produced by one coil is

opposite to another. Each coil changes the contact position when energized. Overcurrent Relay. Overcurrent relay is a protective relay that activates when the current exceeds a limit to protect the system. It basically isolates the system from the fault current by breaking the contact in between. Under Current Relay. It is also a current protection relay used to protect system or circuit from low current. It is activated when the current decreases from a specified limit. Differential Current Relay. If there is any difference that means there is presence of fault current thus it starts switching. Fast Deactivation Relay. As the name suggests, such type of relays has a very fast deactivation speed. Slow Excitation Relay. Such type of Relays has a slow operating coil. There is a time delay during the excitation of the coil to switch the contact terminals. Slow Deactivation Relay. Such type of relay has a time delay when the power supply is removed from its control terminals. There is capacitor connected in parallel that keeps the coil energized for a specific time depending on its characteristics. Fast Switching Relay. The coil of such relay energizes or de-energizes as soon as the power supply is applied or removed respectively. They are used for instant switching applications. Defective Voltage Relay. Such type of protection relay is activated by defective voltage in line. When there is a voltage fault in the line that could cause damage to the equipment, the relay activates to prevent such damage. Card Access Relay. This is an electronic relay that operates on special cards. These are used for security purposes. Relay Unaffected by AC. Such type of Relay coil does not get affected by alternating current. Differential Relay. Differential relays operate on the difference between two electrical quantities. They activates when the specified difference exceeds or decrease a fixed limit. Most differential relays are protective relays used to protect the systems. Polarized Relay. Polarized relay is a type of relay whose switching depends on the direction of the current flow through the coil. Some relays are magnetically polarized other by using a diode in series with the coil that prevents the current flow in reverse direction. Magnetically Polarized Relay. Polarized relay are made up of electromagnetic coil and a permanent magnet. The magnetic flux of the coil distorts the magnetic flux of the permanent magnet to switch the contacts in either position. There are mostly three positions in these relays. Electromagnetic Relay. Such type of relay has an electromagnetic coil which is energized by supplying AC or DC current. The coil produces magnetic field which attracts the lever contact to make or break contact. Thermal Relay. Such type of relay operates on the temperature. There is a bimetallic strip that bends when exposed to heat. The heat produce element inside the relay due to heavy current bends the metal strip to break or make the contact. These are used in overload protection for machines. Solid-State Relay. It has no moving or mechanical parts so they have more lifespan as the mechanical contacts wear out with switching. There is no switching noise or effect of vibration or movement on its switching. Stepping Relay. Stepping relay is a type of relay that directs the input current through one of many output terminals using a series of control pulses. The pulses move the contact arm by rotating in steps to connect it one of the multiple output terminals. Remote Control Relay. Such type of relays is operated by a wireless remote control. These relays enable the user or any system to operate it without any physical or electrical connection. Pulse Relay. Pulse relay is a type of latching relay that is activated by a voltage pulse. It retains its position i. Remanance Relay. The remanant or remanance relay is a type of latching relay that retains its position due to the remanance magnetic field in the core. The core is de-energized by current flow in reverse direction. Intermittent Relay. Such type of relay has a time delay function. It repeats the cycle until the power supply is removed. Solenoid Valve. The solenoid valve is an electromechanical valve that is used to regulate the flow of any liquid or switch the flow of liquid into other ports. There are different type of solenoid valves depending on current and its mechanism. AC Relay. As the name suggest, the coil of such relay is only energized by supplying an AC current. The alternating current produces a varying magnetic field in the coil which results in attracting the contact terminal. Flashing light are prime example of time delay relay applications. Mechanical Resonance Relay. Mechanical resonance is the phenomenon when the mechanical frequency becomes equal to the natural frequency of the system. In this case the resonance frequency is 25Hz. Interlock Relay. Reed Relay. The reed relay is made of magnetic contact encapsulated in a tube filled with inert gas. The contacts are enclosed inside an electromagnetic coil. The contact connects when the coil is energized or if there is an external magnetic field. Overvoltage Relay. Such type of protective relay is used for protection against high voltage. It is activated when the voltage exceeds from the specified relay voltage limit. Under voltage Relay. This is also a protection relay but it activates when the voltage level decreases from a pre specified limit. It protects the circuit from low voltage. No Volt Relay. Such type of voltage protection relay detects the presence of the voltage. When the voltage supply is removed, it activates. It is used in motor starters to increase the resistance when the voltage is removed so that the motor does not automatically start with low armature resistance that can damage it. Distance Relay. Once the impedance decreases from the relay

impedance limit, the relay activates. Broken Conductor Protection relay. Such type of protection relays are used for detection of broken conductor in a 3 phase power system. It operates on the ratio of Positive sequence current I1 to negative sequence current. Under Power Relay. Such type of protective relay keeps the power wattage supply in check. As soon as the power decreases from its threshold it activates to break or make contact. Short Circuit Protection Relay in Coils. Reverse Current Relay. Such type of relays breaks the contacts when there is a current flow in reverse direction. It is used in DC generators when the voltage of the battery is higher than the generator, the relay disconnects to stop the discharging of battery. It is a protection relay used for 3 phase load such as motor or other equipment to prevent it from starting because of damage or burnout during an open phase or failure in any phase. Such protection relay is used for protection against low or high current. As long as the current stays in its limit the relay does not activate but as soon as the current crosses any faulty current limit the contacts break to protect the circuit. Motor Stalling Relay. Stalling in motor is a condition when the winding are energized but the rotor does not rotate. During stalling, motor draws huge current that can cause overheating. It is because of heavy load at start or loss of a phase. Stalling relay protects the motor from such condition. Frequency Relay. This type of relay operates on the frequency of the power system. If the frequency exceeds or decreases from the specified limit, it activates to switch the contacts. Automatic Reclosing Relay. Such type of relay can automatically reclose after being open due to a power failure. They are used in power systems where the fault can clear themselves after a failure. If the fault still exists, the relay locks the contacts in open after a few tries. Overcurrent Relay with Time delay. Such type of protection relay against current adds in a time delay function. They are used in power system that can handle high current for a short duration of time. If the current remains high for a specified duration, the relay breaks the contact. Monitoring Relay. The asterisk is replaced with the symbol of that quantity. Electromagnet is a wire wounded in a coil around a magnetic core. The current flow through the coil creates a magnetic field which is amplified by the magnetic core. It is used in relays to actuate the contact terminals. Open Contacts. These are the symbols used for representing the open contacts of a relay. Closed Contacts. These symbols represent closed contacts or make contact. Normally Open Contact. This symbol represents the contacts of a relay that are open under no power supply. Normally Closed Contact. It is the contact of relay that is in closed position when there is no power supplied. Changeover Contact. Your email address will not be published. Electrical Technology 0 9 minutes read. Show More. Related Articles. Step by Step Procedure with Solved Example. Leave a Reply Cancel reply Your email address will not be published. Check Also. Electrical Wiring Installation. Close Search for: Adblock Detected Our website is made possible by displaying online advertisements to our visitors. Please consider supporting us by disabling your ad blocker. We depends on ad revenue to keep creating quality content for you to learn and enjoy for free. This is the Glow Plug Indicator symbol , which is found only in diesel-powered vehicles, sedans or trucks. Diesel engines require heat in the cylinders to operate, which is supplied initially by glow plugs when the engine is cold. This light will be illuminated when the ignition is turned on until the plugs are heated sufficiently to start the engine. The image will

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 look like a coil or loops in amber or yellow. Remember that only proper service and repair procedures will ensure the safe and reliable operation of your car. These posts are for information sharing purposes only, and should not be used in lieu of an OEM service manual or factory authorized service procedure. We are not in the auto repair business nor do we publish automotive service manuals. Nothing we include on these pages and posts has been reviewed, approved or authorized by any vehicle manufacturer. Technology is always changing and what is current and accurate today may be literally out-of-date and inaccurate tomorrow. And when it comes to the current state of flux in the auto industry, nothing is more true. Made with by Graphene Themes. Toggle search form Search for:. Toggle navigation DashboardSymbols. But moving on, are you sure this is your symbol?? If yes, then continue on. Otherwise you can return to our main Picture Symbols page and scan again! Related posts. Search for:.