Reading a wiring diagram

A wiring diagram is a type of schematic that uses abstract pictorial symbols to show all the interconnections of components in a system. Wiring diagrams are made up of two things: symbols that represent the components in the circuit, and lines that represent the connections between them. Therefore, from wiring diagrams, you know the relative location of the components and how they are connected. It's a language engineers need to learn when they work on electronics projects. Wiring diagrams are often used in engineering and educational fields to illustrate how electronic devices are built. Wiring diagrams are easy to draw and understand. Professionals can study wiring diagrams to determine if electronic devices have been set up properly and safely. In addition, they allow anyone to understand how devices are made up, and can facilitate repairs as well. A schematic , or schematic diagram, represents the elements of a system with abstract and graphic symbols instead of realistic pictures. A schematic diagram focuses more on comprehending and spreading information rather than doing physical operations. For this reason, a schematic usually omits details that are not relevant to the information that it intends to convey and may add simplified elements to help readers understand the features and relationships. A wiring diagram also named electrical diagram, elementary diagram, and electronic schematic is a graphical representation of an electrical circuit. Wiring diagrams are widely used for circuit design, construction, and maintenance of electrical and electronic equipment. Wiring diagrams can be divided into two categories - pictorial wiring diagram and schematic wiring diagram. Start a wiring diagram design using industry-standard symbols that everybody understands. Here are the symbols that are often used when creating wiring diagrams. The symbols below all come from Edraw. It shows partially from the built-in electrical symbol library. Wiring diagrams use simplified symbols to represent switches, lights, outlets, etc. Here is the wiring symbol legend, which is a detailed documentation of common symbols that are used in wiring diagrams, home wiring plans, and electrical wiring blueprints. To read a wiring diagram, you should know different symbols used, such as the main symbols, lines, and the various connections. To read a wiring diagram, first, you have to know what fundamental elements are included in a wiring diagram, and which pictorial symbols are used to represent them. The common elements in a wiring diagram are ground, power supply, wire and connection, output devices, switches, resistors, logic gate, lights, etc. A list of electrical symbols and descriptions can be found on the "electrical symbol" page. A line represents a wire. Wires are used to connect the components. All points along the wire are identical and connected. Wires on some places need to cross each other, but that does not necessarily mean that they connect. A black dot is used to indicate the injunction of two lines. The main lines are represented by L1, L2, and so on. Usually, different colors are used to distinguish the wires. There should be a legend on the wiring diagram to tell you what each color means. Usually, circuits with more than two components have two basic types of connections: series and parallel. A series circuit is a circuit in which components are connected along a single path, so the current flows through one component to get to the next one. In a series circuit, voltages add up for all components connected in the circuit, and currents are the same through all components. In a parallel circuit, each device is directly connected to the power source, so each device receives the same voltage. The current in a parallel circuit flows along each parallel branch and re-combines when the branches meet again. How to make an electrical wiring diagram easily? Using EdrawMax to create your own electrical wiring diagram. Also, you can use massive wiring design diagram symbols and elements from libraries in left menu to customize your wiring design diagram. Step 5: Besides, you can share your diagram with others via social media and web page. Or publish your diagram in EdrawMax template gallery to show your work with others. If you are still confused the steps of how to create a wiring diagram in EdrawMax, here is a video guide to help you understand how to create a professional wiring diagram in detail. EdrawMax is a powerful but easy-to-use wiring diagram software that makes it easy to create professional-looking wiring diagrams based on pre-formatted wiring diargams templates and examples - with no drawing required. The smart wiring diagrams symbols are designed with auto generation arrows, allowing users to add and connect shapes easily. The tool has several categories for almost all types of industries, and each category further has numerous templates to choose from, thus saving you a lot of time that you would otherwise waste in structuring a diagram, wiring diagram for this example, from scratch. Here are some examples showing brilliant works done by Edraw wiring diagram software. This harness wiring diagram shows how to match up the wires for each connection to the wiring harnesses. Create an electrical wiring diagram to display wire connections and the physical layout of an electrical system or circuit. Semiconductors are used extensively in eletrical circuits and most of them are crystals that are made of silicon. According to this article, there are mainly four parts to illustrate what is the wiring diagram, to tell you the symbols of wiring diagram design diagram, and to show you how

cleared up a few questions. By aplauche Follow. More by the author:. Did you make this project? Share it with us! I Made It! Easy Zoom Quit Button by randofo in Arduino. Light Up Clock 2. Mars Clock by prdassonville in Clocks. GabB4 Question 1 year ago. Answer Upvote. Kcmohr Question 1 year ago on Step 4. BM46 2 years ago on Step 4. Reply Upvote. Nice, Easy to understand and neatly organised content. Very Helpful. KeithS 2 years ago. YukiS10 Question 2 years ago. Could you help decode this diagram. I'm struggling to do so. MbataE 3 years ago. SwattA 3 years ago. Mohawk6spd 3 years ago. Shoaibl4 4 years ago. OmerG7 4 years ago. W2 4 years ago. An electrical wiring diagram could be a single page schematic of how a ceiling fan should be connected to the power source and its remote switches. A wiring diagram may include the wirings of a vehicle. For example, how the horns are powered and connected to the controller on your steering wheel. Or an electrical wiring diagram can be a page document including all the electrical wirings of an electrical control panel in a huge factory or plant. Wiring diagrams may follow different standards depending on the country they are going to be used. So, when you see a wiring diagram for the first time, you may need some time to analyze it and become familiar with its layout and symbols. Normally the very first step to learn reading a wiring diagram is becoming familiar with the symbols of the equipment and each wiring diagram is supposed to have a page or two for this purpose. Remember that these symbols may have some minor differences in different wiring diagrams depending on the ECAD software they have been designed with. First of all, there is a rule of thumb in standard wiring diagrams that you should read the diagram from left to right and from top-down. So as an exception, we should start from the downside and this is where the three-phase power enters the panel. The terminal strip is a mark that refers to a group of terminal blocks with the same voltage level or the same purpose. From these terminal blocks, we move on to a three-pole circuit breaker with thermal and short circuit protection capability. This means that all of the contacts, contactors, circuit breakers, etc. Therefore, when you see a closed contact in an electrical wiring diagram, that is a normally closed contact and the rest of the contacts should be open. We have a great article about NO and NC contacts and their actual application examples that you can read it here. After closing this circuit breaker manually, the power flows toward some power distributer bars, from which some branches can be taken. Wire Tags are the combination of some letters and numbers installed on the wire or cable and are used to show you to which device or terminal block a wire or a cable should be connected. Wire tags are very helpful in case of troubleshooting so that when a wire gets out of its connection point, you can easily look at the wiring diagram and figure out where it should be connected again. It is used to feed the power receptacle or socket, the heater, and the fan. Before we continue to the next page, you may ask what these numbers on top of the page are. This is a very good question! Actually, these are the column numbers and they have divided each page of this drawing to 10 columns. As you see, there are some devices in each column and we can use these column numbers in combination with the page number to address different devices, contacts, terminal blocks, and so on, in other pages. For instance, the main three-phase power is shown with some arrows and numbers on the top right-hand side of the page. And there you go! And how do I know that?! Below the coil, you see the contact NO Contact of page two and also the other NO and NC contacts of this relay with the addresses they have been used in this drawing. On page two, the mains power source is feeding a volt power supply and it provides us with a voltage of 24 with 10 amps of capacity. From there, we have extended this voltage using some terminal blocks so that we can deliver the power to different instruments, PLC cards, PLC CPU, or whatever device which needs 24 volts to power on. But wait! There are a variety of terminal blocks in the market. In this case, to save some space in the panel, we have used some double-Level terminal blocks. They occupy the same space as the ordinary terminal blocks but we can connect two wires to each side of them. In the following, we have a branch that delivers the 24 volts power to page 12 column zero, but with two interlocks! For example, here, without having those interlocks enabled, our 24 v cannot reach page 12, column 0. In fact, reading the datasheet of the equipment is a very important and inevitable stage of designing a wiring diagram. In this way, our volt power will be transferred to page 12, column zero. You can read Part 2 of this article here. Thanks for reading another article. Please spread the word by sharing this article:. Join Us Free! Hey Mateo! Happy you liked this blog post. Thanks for the good stuff. Indeed I have been looking for something like this. Am glad to meet you. God bless you all. Hey Emmanuel! Thank you very much for your visit. Please stay tuned for future videos. Your email address will not be published. Save my name, email, and website in this browser for the next time I comment. Submit Comment. Before you continue, let's join to our newsletter to receive more free content. How to Read Electrical Diagrams? Spend Some Time on Understanding the Standards! They may have different layouts depending on the company and the designer who is designing that. First Things First! Wiring Diagram Symbols. Every wiring diagram includes: â€" Hardware

components, â€" Power sources, â€" Ground chassis, â€" Terminals, â€" Some wires of course! This page is known as Legend and abbreviation page. In the Legend and Abbreviation page you can see: â€" A three-phase AC electric motor symbol â€" A solenoid valve symbol â€" An MCCB with thermal and short circuit protection â€" A contactor the coil and its contacts and all the other electrical symbols you need to read the wiring diagram. But in AutoCAD electrical, it looks like this:. Wiring Diagram Rules of Thumb! Exactly like reading a book! But sometimes, designers make some exceptions to have a better layout such as this page. For example: â€" In England or Austria, the voltage level is volts with 50 hertz of frequency â€" In the United States, a three-phase power source will produce volts with 60 hertz of frequency. Every standard wiring diagram should be drawn in the neutral condition. How to Read Wiring Diagrams. One of the branches goes into a two-pole circuit breaker. What is a Wire Tag? And Device Tag. There are the tags for the devices within the panel as well. This transformer converts the volts to a single-phase volts. How to Address a Component in Wiring Diagrams. Let me explain it by some examples! All of them have a 2. As another example, the number below this contact says page and column 6. And there it is! The same tag, KA as we had expected. It looks like a coil. But not the coil of a contactor; the coil of a relay. What are Double-Level Terminal Blocks? What is Electrical Interlocking? An interlock means a condition. This is the only way we have to take to fully understand these drawings. Remember that the designer of this wiring diagram had to refer to the datasheet of this equipment to complete his job. We should always do the same thing for all of the equipment used in the process. Name Email Join Us Free! Our YouTube Channel. Subscribe Now! Bitebo Numbere on December 24, at PM. Amirhossein on December 25, at PM. Hi there! The upcoming video is the next part of this video series. Stay tuned! Mateo Mwale on December 29, at AM. Amirhossein on December 29, at AM. Ahmed on January 17, at AM. Please the video and pics on page are very small to see and its not zoomable in both tab and pc Reply. Amirhossein on January 18, at AM. Hi Ahmed, we are trying to add them to this blog post shortly. Emmanuel N on February 8, at PM. Amirhossein on February 9, at AM. Submit a Comment Cancel reply Your email address will not be published. Contact Us Have a question or suggestion? Follow Us. Youtube channel. Subscribe Me! Close this module. Hey, wait! Email Enter your email address. Ongoing donations help keep the site running. Contribute to this website by clicking the Donate button. Many thanks to all who have donated. Home Beginners Read Circuit Diagram. This articles shows how to read circuit diagrams for beginners in electronics. Learn to read electrical and electronic circuit diagrams or schematics. A drawing of an electrical or electronic circuit is known as a circuit diagram, but can also be called a schematic diagram, or just schematic. Circuit or schematic diagrams consist of symbols representing physical components and lines representing wires or electrical conductors. In order to learn how to read a circuit diagram, it is necessary to learn what the schematic symbol of a component looks like. It is also necessary to understand how the components are connected together in the circuit. Probably the simplest circuit that can be drawn is one that you may have seen in a school science class: a battery connected to a light bulb as shown below. Each electronic or electrical component is represented by a symbol as can be seen in this simple circuit diagram. Lines used to connect the symbols represent conductors or wires. Each symbol represents a physical component that may look as follows. The physical circuit for the above circuit diagram may look something like the image below, although a more practical physical circuit would have a light bulb holder and clamps that connect to the battery terminals. A light bulb holder would have screw terminals to connect the wires to, and a socket to screw the light bulb into. Battery clamps would allow the wires to easily be connected between the battery and light bulb holder. Typically the actual battery type and bulb type would be specified in a component list that accompanies the circuit diagram. More information on the bulb and battery type could also be included in the circuit as text. For example, the battery may be specified as a The light bulb may be specified as a 12V 5W incandescent bulb, or 9V 0. Components in a circuit should always have references, also called reference designators used to identify the components in the circuit. This allows the components to easily be referenced in text or a component list. A battery may have the reference designator "BAT" and a light bulb may have a reference "L". Because there could be more than one battery or light bulb in a circuit, reference designators will usually always end with a number, e. BAT1 and L1 as shown in the circuit below. A second light bulb in the circuit would then have the reference designator L2. Circuit diagrams or schematic diagrams show electrical connections of wires or conductors by using a node as shown in the image below. A node is simply a filled circle or dot. When three or more lines touch each other or cross each other and a node is placed at the intersection, this represents the lines or wires being electrically connected at that point. If wires or lines cross each other and there is no node, as shown at the bottom of the above image, the wires are not electrically connected. In this case the wires are crossing each other without

connecting, like two insulated wires placed one on top of the other. In the circuit below, two light bulbs are connected in parallel to a battery power source. It can be seen that the top terminals of the two light bulbs are connected together and to the positive terminal of the battery. We know this because the three terminals or connection points have a node where they intersect. The bottom terminals of the bulbs are connected to each other and to the negative terminal of the battery, because the second node shows these connections. In the series circuit below, two light bulbs are connected in series. No nodes are necessary in this circuit to show the bulbs connecting to each other and to the battery because single wires are connecting straight to each other. Nodes are only placed if three or more wires are connected. When starting to learn to read electronic circuit diagrams, it is necessary to learn what the schematic symbol looks like for various electronic components. The Start Electronics Now electronics course for beginners consists of a series of tutorials for beginners in electronics. Following the course explains how to read basic electronic circuit diagrams while building the circuits on electronic breadboard. The course includes a list of basic electronic components with their schematic symbols where beginners can learn what the physical components and their symbols look like. After a four part introduction, the first tutorial in the electronics course shows the circuit diagram of a simple LED and resistor circuit and how to build it on breadboard. Basic components for this tutorial include an LED, resistor and battery which can all be found in the beginner's component reference. The best way for beginners to continue learning how to read circuit diagrams is to follow the course and build the circuits from each tutorial. Recent Donors: Donations Received. Blog YouTube Donate. Beginner's Articles About Electronics. How to Read Circuit Diagrams. Using a Multimeter - First Steps. Making a Battery Clip Pluggable. Making a Stripboard Circuit. Soldering Wire to a Loudspeaker. Too Tight Breadboard Problem. Track My Order. Frequently Asked Questions. International Shipping Info. Send Email. Mon-Fri, 9am to 12pm and 1pm to 5pm U. Mountain Time:. Schematics are our map to designing, building, and troubleshooting circuits. Understanding how to read and follow schematics is an important skill for any electronics engineer. This tutorial should turn you into a fully literate schematic reader! We'll go over all of the fundamental schematic symbols:. Then we'll talk about how those symbols are connected on schematics to create a model of a circuit. We'll also go over a few tips and tricks to watch out for. Schematic comprehension is a pretty basic electronics skill, but there are a few things you should know before you read this tutorial. Check out these tutorials, if they sound like gaps in your growing brain:. Are you ready for a barrage of circuit components? Here are some of the standardized, basic schematic symbols for various components. The most fundamental of circuit components and symbols! Resistors on a schematic are usually represented by a few zig-zag lines, with two terminals extending outward. Schematics using international symbols may instead use a featureless rectangle, instead of the squiggles. Variable resistors and potentiometers each augment the standard resistor symbol with an arrow. The variable resistor remains a two-terminal device, so the arrow is just laid diagonally across the middle. A potentiometer is a three-terminal device, so the arrow becomes the third terminal the wiper. There are two commonly used capacitor symbols. One symbol represents a polarized usually electrolytic or tantalum capacitor, and the other is for non-polarized caps. In each case there are two terminals, running perpendicularly into plates. The symbol with one curved plate indicates that the capacitor is polarized. The curved plate usually represents the cathode of the capacitor, which should be at a lower voltage than the positive, anode pin. A plus sign should also be added to the positive pin of the polarized capacitor symbol. Inductors are usually represented by either a series of curved bumps, or loopy coils. International symbols may just define an inductor as a filled-in rectangle. Switches exist in many different forms. Switches with multiple poles, usually have multiple, alike switches with a dotted line intersecting the middle actuator. Just as there are many options out there for powering your project , there are a wide variety of power source circuit symbols to help specify the power source. Most of the time when working with electronics, you'll be using constant voltage sources. We can use either of these two symbols to define whether the source is supplying direct current DC or alternating current AC :. Batteries , whether they're those cylindrical, alkaline AA's or rechargeable lithium-polymers , usually look like a pair of disproportionate, parallel lines:. More pairs of lines usually indicates more series cells in the battery. Also, the longer line is usually used to represent the positive terminal, while the shorter line connects to the negative terminal. Sometimes – on really busy schematics especially – you can assign special symbols to node voltages. You can connect devices to these one-terminal symbols, and it'll be tied directly to 5V, 3. Positive voltage nodes are usually indicated by an arrow pointing up, while ground nodes usually involve one to three flat lines or sometimes a down-pointing arrow or triangle. Basic diodes are usually represented with a triangle pressed up against a line. Diodes are also polarized , so each of the two terminals require distinguishing

identifiers. The positive, anode is the terminal running into the flat edge of the triangle. The negative, cathode extends out of the line in the symbol think of it as a - sign. There are a all sorts of different types of diodes , each of which has a special riff on the standard diode symbol. Light-emitting diodes LEDs augment the diode symbol with a couple lines pointing away. Photodiodes , which generate energy from light basically, tiny solar cells , flip the arrows around and point them toward the diode. Other special types of diodes, like Schottky's or zeners, have their own symbols, with slight variations on the bar part of the symbol. So for each of these types of transistor, there are at least two ways to draw it. The collector C and emitter E pins are both in-line with each other, but the emitter should always have an arrow on it. A mnemonic for remembering which is which is "NPN: n ot p ointing i n. And again, there are two different versions of the symbol, depending on whether you've got an n-channel or p-channel MOSFET. Remember: "n is in" kind of the opposite of the NPN mnemonic. They may have more than two inputs, but the shapes should remain the same well, maybe a bit bigger , and there should still only be one output. Integrated circuits accomplish such unique tasks, and are so numerous, that they don't really get a unique circuit symbol. Usually, an integrated circuit is represented by a rectangle, with pins extending out of the sides. Each pin should be labeled with both a number, and a function. As you can see, these components greatly vary in size and pin-counts. Because ICs have such a generic circuit symbol, the names, values and labels become very important. Each IC should have a value precisely identifying the name of the chip. Some of the more common integrated circuits do get a unique circuit symbol. Often, there will be two op amps built into one IC package requiring only one pin for power and one for ground, which is why the one on the right only has three pins. Simple voltage regulators are usually three-terminal components with input, output and ground or adjust pins. Crystals or resonators are usually a critical part of microcontroller circuits. They help provide a clock signal. Crystal symbols usually have two terminals, while resonators, which add two capacitors to the crystal, usually have three terminals. Whether it's for providing power, or sending out information, connectors are a requirement on most circuits. These symbols vary depending on what the connector looks like, here's a sampling:. We'll lump these together, since they mostly all make use of coils in some way. Transformers not the more-than-meets-the-eye kind usually involve two coils, butted up against each other, with a couple lines separating them:. Speakers and buzzers usually take a form similar to their real-life counterparts:. And motors generally involve an encircled "M", sometimes with a bit more embellishment around the terminals:. Fuses and PTCs – devices which are generally used to limit large inrushes of current – each have their own unique symbol:. The PTC symbol is actually the generic symbol for a thermistor , a temperature-dependent resistor notice the international resistor symbol in there? In general, symbols should share a fair amount in common with the real-life components they model. In addition to the symbol, each component on a schematic should have a unique name and value, which further helps to identify it. One of the biggest keys to being schematic-literate is being able to recognize which components are which. The component symbols tell half the story, but each symbol should be paired with both a name and value to complete it. Values help define exactly what a component is. For schematic components like resistors, capacitors, and inductors the value tells us how many ohms, farads, or henries they have. For other components, like integrated circuits, the value may just be the name of the chip. Crystals might list their oscillating frequency as their value. Basically, the value of a schematic component calls out its most important characteristic. Component names are usually a combination of one or two letters and a number. The letter part of the name identifies the type of component – R 's for resistors, C 's for capacitors, U 's for integrated circuits, etc. Each component name on a schematic should be unique; if you have multiple resistors in a circuit, for example, they should be named R 1 , R 2 , R 3 , etc. Component names help us reference specific points in schematics. The prefixes of names are pretty well standardized. For some components, like resistors, the prefix is just the first letter of the component. Other name prefixes are not so literal; inductors, for example, are L 's because current has already taken I [but it starts with a C Here's a quick table of common components and their name prefixes:. Although theses are the "standardized" names for component symbols, they're not universally followed. Use your best judgment in diagnosing which part is which. The symbol should usually convey enough information. Understanding which components are which on a schematic is more than half the battle towards comprehending it. Now all that remains is identifying how all of the symbols are connected together. Schematic nets tell you how components are wired together in a circuit. Nets are represented as lines between component terminals. Sometimes but not always they're a unique color, like the green lines in this schematic:. Wires can connect two terminals together, or they can connect dozens. When a wire splits into two directions, it creates a junction. We represent junctions on schematics with nodes , little dots placed at the intersection of the wires.

Nodes give us a way to say that "wires crossing this junction are connected". The absences of a node at a junction means two separate wires are just passing by, not forming any sort of connection. When designing schematics, it's usually good practice to avoid these non-connected overlaps wherever possible, but sometimes it's unavoidable. Sometimes, to make schematics more legible, we'll give a net a name and label it, rather than routing a wire all over the schematic. Nets with the same name are assumed to be connected, even though there isn't a visible wire connecting them. Names can either be written directly on top of the net, or they can be "tags", hanging off the wire. Names and labels help keep schematics from getting too chaotic imagine if all those nets were actually connected with wires. Nets are usually given a name that specifically states the purpose of signals on that wire. Truly expansive schematics should be split into functional blocks. There might be a section for power input and voltage regulation, or a microcontroller section, or a section devoted to connectors. Try recognizing which sections are which, and following the flow of circuit from input to output. Really good schematic designers might even lay the circuit out like a book, inputs on the left side, outputs on the right. If the drawer of a schematic is really nice like the engineer who designed this schematic for the RedBoard , they may separate sections of a schematic into logical, labeled blocks. Voltage nodes are single-terminal schematic components, which we can connect component terminals to in order to assign them to a specific voltage level. These are a special application of net names, meaning all terminals connected to a like-named voltage node are connected together. Like-named voltage nodes -- like GND, 5V, and 3. The ground voltage node is especially useful, because so many components need a connection to ground. If there's something on a schematic that just doesn't make sense, try finding a datasheet for the most important component. Usually the component doing the most work on a circuit is an integrated circuit, like a microcontroller or sensor. These are usually the largest component, oft-located at the center of the schematic. See our Engineering Essentials page for a full list of cornerstone topics surrounding electrical engineering. Take me there! That's all there is to schematic reading! Knowing component symbols, following nets, and identifying common labels. Understanding how a schematic works opens up the whole world of electronics to you! Check out some of these tutorial, to practice your new-found schematic knowledge:. Need Help? Mountain Time: Shopping Cart 0 Items. Product Menu. Today's Deals Forum Desktop Site. All Categories. Development Single Board Comp. Contributors: jimblom. Overview Schematics are our map to designing, building, and troubleshooting circuits. Schematic Symbols Part 1 Are you ready for a barrage of circuit components? Resistors The most fundamental of circuit components and symbols! Schematic Symbols Part 2 Diodes Basic diodes are usually represented with a triangle pressed up against a line. Name Designators and Values One of the biggest keys to being schematic-literate is being able to recognize which components are which. Names and Values Values help define exactly what a component is. Reading Schematics Understanding which components are which on a schematic is more than half the battle towards comprehending it. Nets, Nodes and Labels Schematic nets tell you how components are wired together in a circuit. Interested in learning more foundational topics? Resources and Going Further That's all there is to schematic reading! Check out some of these tutorial, to practice your new-found schematic knowledge: Voltage Dividers - This is one of the most basic, fundamental circuits. Learn how to turn a big voltage into a smaller one, with just two resistors! How to Use a Breadboard - Now that you know how to read schematics, why not make one! Breadboards are a great way to make temporary, functional, prototype circuits. Working with Wire - Or, skip the breadboard and jump straight into wiring stuff up. Knowing how to cut, strip, and connect wire is an important electronics skill. Series and Parallel Circuits - Building circuits in series or parallel requires a good understanding of schematics. Sewing with Conductive Thread - If you don't want to work with wire, how about building an e-textiles circuit with conductive thread? That's the beauty of schematics, the same schematic circuit can be built in a number of different ways with a number of different mediums. Comments 3 View Paginated Print. Your Account Log In Register. So, how to read car wiring diagrams? A car wiring diagram is a map. To read it, identify the circuit in question and starting at its power source, follow it to ground. Use the legend to understand what each symbol on the circuit means. A wiring circuit is so called because the wiring must make a complete circle, any break in this circle, causes a fault. Power leaves the positive side of the car battery through the power cables and is always actively looking for the shortest possible return path to the negative side of the car battery. Power is battery voltage and in any circuit the path to the load from battery positive may be described as the power side of the circuit. As you know, voltage loves to travel through any metal, and not just the metal within wires. The return path after the load is known as the ground side of a circuit. The function of a relay is to control a high amp circuit like a starter motor or head lights using a low amp switch circuit. Running high amps through a small switch would

cause the switch to burn out and fail, possibly starting a fire. Relays are common in circuits and also housed within control units. A relay is a electromagnetic switch, it has two separate circuits, a Control circuit and a Load circuit. This causes the coil of the relay to become magnetic, which pulls the movable armature within the relay, closed. When closed open in the above diagram , it allows power travel from the battery to the light. Through the 30 and 87 pins. When the switch is turned off, battery disconnected the coil is no longer magnetic and the spring loaded movable armature returns to open default position. Cheap volt meters are OK for finding power and grounds, but modern vehicles will require accurate resistance readings to correctly diagnose a faulty circuit or component. An incorrect meter reading can cause a ton of trouble. The starter circuit relay in the pic above operates in an identical fashion. By turning the ignition switch to start, voltage flows through pin 86 and grounds at This magnetizes the coil which in turn causes the armature pin 30 to 87 to close completing the load side circuit, and the engine cranks. Modern cars as you know are packed with control modules. Pre-computer classic cars have a simple wiring circuit â€" for example, pressing a switch sends power through a wire, to a window motor and the window moves. Modern cars handle it a little differently â€" pressing a switch, sends a signal through a wire to a control unit computer , which in turn sends power to the window motor. The control unit or controller will only send power to the window motor if certain pre-programmed conditions are met. Of course the window may not move for other reasons, the control unit may be faulty, or software needs to be updated or re-flashed, motor faulty etc. So why did they go and make things more complicated and expensive to fix? Well, control units do offer significant advantages, some of which include:. All control units are connected to each other via a twin twisted pair of wires, the communication system is know as CAN controller area network. It will typically show a set of symbols and a brief description. Tip : Some diagrams are easier to understand than others, but having the wrong wiring diagram can catch out even the pros. To avoid frustration, be sure that your wiring diagram is correct for your vehicle. Wiring diagrams were traditionally printed in book form, diagrams are big as you know, to fit them all on one page would make them unreadable. The solution â€" a number at the end of each circuit indicated the page on which the rest of the circuit diagram was continued. Other solutions include showing just one systems wiring circuit to a page, for example, just showing the wiring diagram for the headlights. This works pretty well and was carried over to the digital age. Digital wiring diagrams are a lot more efficient and easier to use, so if possible, always opt for digital schematics. The diagram below is a basic car light circuit, at first sight it might look complicated, but as you understand the flow, it will become clear. Remember, battery power voltage at the top of the page is trying to get to the ground supply at the bottom of the diagram. Starting at the top of the included diagram, you can see power flows in two paths, 1 down to the light relay left and 2 to the central electronic unit CEM which is a control unit. The CEM module offers a ground at X when ignition is on. This as you know magnetizes the integrated relay coil and causes the armature to close. The closed armature in turn offers a path for power to flow onwards to the switch. Hitting the light switch now, allows voltage flow through the light switch relay coil and grounds through the CEM integrated ground path. The light relay coil is as you know, now magnetized and so it pulls the armature of the relay clos

2002 f150 sub box
a o smith ac motor wiring diagram
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 ed allowing power flow from path 1 all the way through to ground at the bottom of the diagram, powering the lights as it does so. The circuit is now complete. How to check fuel pump fuse. To see the wiring diagrams and special tools I use check out the Auto electrical repair tools page. A diagram is a detailed map of a system and a schematic is a more simplified representation. John Cunningham is an Automotive Technician and writer on Rustyautos. I've been a mechanic for over twenty years, I use my knowledge and experience to write articles that help fellow gear-heads with all aspects of classic car ownership, from tires to roof aerials and everything in between. Working on a Duramax is not for the faint hearted, but you already know that. Most days I love them, but some daysâ€¦ A misfiring engine is the most common engine complaint and the coil is always the number one suspect. But finding the coil can sometimes cause some head scratching. Ignition coils are commonly Continue Reading.