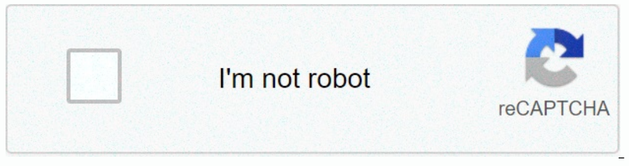

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Snap circuits instruction manual

You've probably heard these terms before. You knew they had something to do with electricity, but maybe you weren't sure quite how. Just as your heart creates pressure to transmit blood, a battery or generator creates pressure or force to push electrons around a circuit. The voltage is force and is measured in volts (V). A typical flashlight battery produces 1.5V, and the standard domestic electrical voltage is 110V or 220V of electric current, or the flow of electrons, measured in ampere (a). The product of electric force (in volts) and current (in ampere) is electrical power, measured in watt (W). Generating a battery 1.5V and generating a current flow of 1A through a flashlight bulb delivers 1.5V x 1A = 1.5W electrical power. Blood flowing through your body doesn't get free rides. The walls of blood vessels obstruct the flow, and the smaller the blood vessels, the greater the resistance to the flow. Some pressure produced by your heart is just to move the blood through the blood vessels. As the electrons move by the stars, they collide in the atoms. This hampers the flow of electrons. Provides resistance to the flow of wire current. The amount of resistance depends on the material, diameter and length of the wire. With the decrease in the diameter of the wire, the resistance increases. Resistance is in units of OHM (Ω). Ohm's law deals with voltage, current and resistance: resistance (Ω) = voltage (V)/current (I) law of OHM is made up of R = V/I electric circuit wires and other components - such as light bulbs, transistors, computer chips and motors can be written. The wires, called conductors, are made up of metals called conductors that have a low resistance to the current, connecting components. Copper and aluminum are the most common conductors. Gold, because of its resistance to corrosion, is often used to attach wires to small electronic chips. In an incandescent bulb, the current flows through a thin tungsten wire or a metal filament that provides high resistance to current flow. Friction, or loss of kinetic energy, produces heat when electrons collide in atoms. If the temperature of the filament is high enough, it starts to shine and begin to give light. That is indescribable. Typical filament temperatures for light bulbs are around 4,600 degrees F (2,550 °C). Unfortunately, 90 to 95 percent of the energy supplied for a light bulb is lost as light rather than heat, so incandescent bulbs are very inefficient. In fluorescent light, electrons pass through a tube filled with mercury vapor and neon or argon gas. As electrons collide in mercury atoms, they cause electrons in atoms to absorb some of their energy. As these electrons return to their normal position, they radiate bundles of light energy called photons. Fluorescent lights are four to five times more efficient Bulbs. On the next page, we will look at closed circuits, open circuits, short circuits, chain circuits and parallel circuits. There is a complete way to flow the current into a closed circuit. There is not an open circuit, which means that it is not functional. If this is your first risk to the circuit, you might think that when a circuit is open, it's like an open door or gate that can flow through the current. And when it's closed, it's like a closed door that can't flow through the present. In fact, it's just the opposite, so it might be used to this concept for a while. A short circuit is a low resistance path, usually inadvertently formed, which bypasses part of the circuit. This can happen when two bare wires touch each other in a circuit. Part of the circuit bypassed by short circuit stops working, and a large amount of current may start to occur. This can cause a lot of heat in the wires and fire. As a security measure, the fuse and circuit breaker automatically open the circuit when excessive current is over. In a chain circuit, the same stream flows through all components. The total voltage in the circuit is the sum of the voltage in each component, and the total resistance is the sum of the resistance of each component. V = V1+V2+V3 and R=R1+R2+R3 in this circuit. An example of a chain circuit is a string of Christmas lights. If any one of the bulbs is missing or burned out, no stream will flow and none of the lights go on. Parallel circuits are like small blood vessels that branch from the artery and then join a vein to return blood to the heart. Now think of the two wires, each representing an artery and a vein, with some small wires connected between them. The same voltage in these small wires will apply to them, but different amounts of current flowing through them depending on the resistance of individual wires. An example of parallel circuits is the system of wiring of the house. The same power source supplies all lights and equipment with the same voltage. If one of the lights burns out, the current can still flow through the rest of the lights and equipment. But if there is a short circuit, the voltage becomes almost zero and the whole system goes down. Circuits are usually very complex combinations of series and parallel circuits. The first circuits were very simple DC circuits. We will look at the history of the circuit and the difference between DC and AC on the next page. MIT researchers just completed a computer to do yet another task that most humans are unable to do: it learned how to play a game by reading the instruction manual. The MIT Computer Science and Artificial Intelligence Lab is a computer that now all plays civilization on its own — and it wins nearly 80% of the time. Those are better figures than most of us could brad about, The real win here is the fact that the instruction manuals do not explain how to win the game, just how to play it. The results may be game-oriented, but the actual purpose for the experiment was to get a computer to do more than process terms as data - and actually process them as language. In this case, the computer read instructions on how to play a rather complex game, so not only proceeded to play that game, but to play it very well. If you take the same process and apply gaming to something else real-world, like replacing it with pharmaceutical or automotive technology, you can have a computer that is capable of doing more than just a reference tool. A lot more. Take IBM's Watson. Sure, it's an amazing advance in computing technology, but it's based on the idea that if you load monstrous bulk data into a computer, that it could put it to use in a way that can be a human. The results are pretty decent, but they are very specific to what kind of data the machine has been given — and right now that data is likely to be things like sales catalogs and insurance policies. Loading a multitude of medical journals into a Watson-style machine could make for something very useful in diagnosis, but it's not going to make a doctor. Teaching a computer would actually be to read medical books, like a student at Med School, something completely different. It might be a bit far away for the moment, though. A more short-term goal would probably be language, which is consistent with the original goal for experimentation. Now that a computer has learned how to read an instruction manual, it doesn't seem too far a leap to read it through foreign language books, and actually learn a language. What we would have at that point is a computer that could translate phrases based on their intended meaning, rather than just processing word definitions and grammar rules. Eliminating the worldwide language barrier would be a hell of a lot better than winning a game of civilization, after all. Read everyone at MIT News has an Ikea horror story. My wife's work desk, for example, took her and my mother-in-law to gather for an entire day, moving forward only to fits and starts with constant timeout for Kos. (I had help, but I was easily absent for reasons I can't remember.) Even Ikea itself seems to have accepted this reputation. Alan Dickner, Ikea's deputy packaging manager, says a newspaper in Sweden described Ikea [furniture assembly] as something between civil engineering and a submarine captaincy, and I think that's a good description. Still, Ikea is an unmistakable way to turn anger into respect: assembling almost any other brand of furniture. After an hour spent comparing stacks of obscure components against an assembly diagram that looked like a misfiled mimeograph from Area 51, I somehow A homegoods and tables- as well as a growing curiosity about how Ikea designs its packaging and instructions, which now seemed positively Eamesian in comparison. For Winston Churchill's famous sarcasm adaptation, Ikea can be the worst form of ready-to-assemble product design we have — all others apart. According to Alan Dickner, whatever your most frustrating Ikea experience is, it could have been worse— and most likely for the packaging engineer who tested even more complex versions of the product before arriving at the customized design that you unboxed on your living room floor. We had a furniture piece, a kind of wardrobe, which was basically 400 fittings and screws to hold it together, Dickner says. Of course, this extreme knock-down - the industry term for the dissolution of products to make them easier and cheaper to ship products to customers- is a big reason why Ikea wardrobe is so affordable. But when it takes someone five hours to make it, you can ask yourself: Have you gone too far with flat packing? Dickner says. It is always about finding a balance between the ease of assembly and the optimization of packaging. (That wardrobe, for the record, was redesigned for knocking down in fewer components.) Ikea's flat packaging engineers include any new Ikea offering to accompany product designers at the initial briefing. But after a half-century of knocking down bookshelves and armoires, Ikea doesn't need to repeat the wheel very often. For 80% of ready-to-assemble products, Ikea packaging engineers rely on what dickner proven solutions say: generalized templates that engineers nip and leak to match the specifications of a new item. These proven solutions aren't just algorithmically optimized (though they are) – they also include ground knowledge about living conditions in all the countries where Ikea furniture is sold. It would be quite stupid to design a package that is flat and efficient but won't fit into a small elevator or staircase, Dickner said. It sounds ridiculous, but in the United Kingdom, that returning a product was one of the most frequent reasons for the customer. He adds that global package designs are tested in Japan and South Korea because of those customers who live in the smallest place. Turning a three-dimensional sofa into a pseudo 2-D flat pack jigsaw puzzle is a no-mean design feat. But if the Assembly directives make no sense, then all that work is controversial. According to jan Friedlund, designer who worked on these instruction manuals, there are two guiding principles behind each page: clarity and continuity. The first word is quite clear, but Ikea takes it seriously to start by putting a product together with instruction designers (or communicators, according to Fredlund). Assembly offers an opportunity to explore if there's a risk that the customer will place a certain part in the wrong direction which may not seem like an obvious mistake at the moment, but a problem several steps later, Fredlund says. Continuity, meanwhile, separates Ikea's instructions—even painful ones from other brands. Like LEGO, frame-by-frame images are based on creation images, digital snapshots, 3-D models and videos of test assemblies. Designers take pains to submit each constant picture from a single, unchanged point-view (mimicking the customer), so that confusing rotations or changes in perspective are reduced and the customer can remain more easily oriented as he moves back and forth between the booklet and parts. If the end result sometimes feels like a civil engineering project (as Dickner admits with some pride), it's because the high level of accuracy and redundancy actually reduces even the most complex or tedious Ikea assemblies. They may not be pleasant, but they are at least rational and comprehensible—even sympathetic— by design. Think of that big-nosed Ikea guy who's been shown calling the company when he gets stuck. He is not ridiculed or condescending. If anything, he represents some designer at Ikea who has already gone through exactly what you're going through on the floor of your living room now: half-quizzically piled up from the instruction manual - parts and glancing to the back, hoping for the best, but believe it will all happen. At the very least, makes sense. To take a feel.