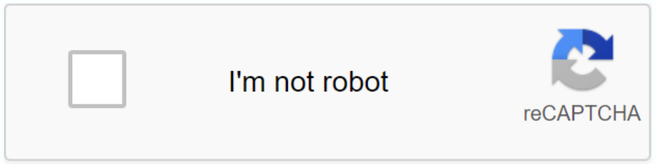

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Car subwoofer wire gauge guide

Doug Newcomb, Mike Mettler Part Car Audio for Dummies Cheat Sheet When plugging your car's audio system, using the right gauge wire for the amplifier is crucial. To avoid problems and get the best sound, determine the rating of the fuses of your amplifiers and their distance from the battery and look at the following table to find out the correct power indicator. For example, if your amplifier is drawing 60 amps of current and the distance to the car battery from the amplifiers is 12 feet, locate where the ampere rating along the top interseques with the approximate distance in the middle area of the graph, and then determine the correct gauge wire on the left. (In this example, there would be 8 gauges.) For the amplifier to function properly, it needs its power supply and grounding line to be large enough to meet its demand for electricity. What wire gauge (thickness) to use to power the wiring depends on how much current your system will try to consume, and on how long the wiring will run. Understanding the needs of your system can help you know when to choose a 4-gauge wire instead of an 8-gauge wire. Do a little math and then check out our wire size table below. Of course, if you are looking for a new amplifier, we present the recommended set for connecting the amplifier with each amplifier. Formulas for calculating the current draw To determine the approximate current stroke (in amps) of the amplifier, you must first calculate the total system performance. Multiply the number of channels by rms watts per channel. If you have multiple amplifiers, add up the rms total performance data to get the total. Generally speaking, there are two types of amplifiers - Class D and Class AB - so there are two formulas for calculating the current draw. (You can read the detailed explanation below the chart.) You use a formula that applies to the amplifier. If you don't know what your class is, use ab class calculations for the safest result. Class D amplifier: total RMS power divided by 0.75 Amp Efficiency divided by 13.8 Vt equals current power in amperes class amplifier: total RMS power divided by 0.50 Amp Efficiency divided by 13.8 Volts equals current draw in amperes The resulting value is approximate to the maximum current thrust of your system, depending on what kind of amplifier you have. Compare this number with the numbers in the Amperes column in the table below. Now find out the length of the cable you will need - this is the distance from the battery to the mounting location of the amplifier. Get these two numbers in the chart and determine which cable gauge you need. Please note that the smaller the gauge number, the larger the wire. 1/0 (one-aught) is a common name for a wire with a gauge of 0; 2/0 (two-aught) for wire with 00 gauges. Wire size calculator Note: This chart is for copper wire only. Copper aluminum (CCA) wire handle the amount of current that copper wire of the same size can handle. More detailed explanation Here's an explanation of the formulas we use, in case you want more details. Calculating the overall power of the amplifier is simple, but other parts can be confusing. Current calculation: Joule law current (Amperes) equals power (Watts) divided voltage (Volts) But no amplifier is 100% effective The above formula, itself, does not take into account the ineffectiveness of its own energy production. That has to count. Current (amperes) equal to power (watts) divided amp efficiency (X%) divided by voltage (Volts) Factoring in this inefficiency for each amplifier class, we come to the two above formulas: Formula for Class D amplifiers A typical Class D amplifier is about 75% efficient, which means that about three-quarters of the energy it generates turns into sound output, while one quarter of the energy is lost as heat. So if the amplifier pulls out 400 watts, it actually draws about 533 watts of power from its source, and the wiring of the amplifier must be large enough to handle this draw. Class D amplifier Current Draw equals its RMS output power divided by 75% Efficiency divided by 13.8 Volts The formula for Class AB amplifiers A typical Class AB amplifier is about 50% efficient, which means that about half of the power it generates is converted into audio output, while the other half of the power is lost as heat. So if the amplifier pulls out 400 watts, it actually draws about 800 watts of power from its source, and the wiring of the amplifier must be large enough to handle this draw. Class AB Amplifier Current Draw equals its RMS output power divided by 50% Efficiency divided by 13.8 Volts Automotive voltage is neither 12 volts nor 14.4 volts A 13.8? Yes, the vehicles have a 12-volt electrical system, but we're assuming the vehicle is in use – meaning its alternator will hit the system voltage at about 13.8 volts. It is a better representation of the electric power supply of the vehicle in the real world. Dividing 12 results in a larger number that could refer to a larger wire gauge, but is often in the same color range in the chart. Manufacturers use 14.4 volts when they spec their equipment, exaggerating their performance ratings. Resistance increases with wire length The reason different cable lengths carry different ratings is that the electrical resistance inherent in all wires accumulates when the cable lengthens until it forces the voltage to drop below the usable level. At this point, the size of the power cord resets the voltage to the intended level. The size of the wire is important for the current finally, according to our technicians, the primary performance limitation in most amplifier installations is in simultaneous delivery – either weak ground or insufficient water meter. Installing too small the water meter results in low performance, potentially shorter service life of connected components (amplifier and speakers) and potential safety risk. On the other hand, installing too large a wire gauge really has no drawbacks, and there is the potential for better performance. Obviously, there is no need to buy a 2-gauge wiring when a 10-gauge will do. Such uselessness would be a waste of money. But if the chart could tilt anyway between the two sizes, having a larger wire size would be a smart choice. What size speaker wire do I need? Speaker wiring matters too. The signal and power coming from the amplifier shall not be obstructed on the way to the loudspeakers and submarines. When you replace or run new speaker lines, we recommend using: 18-, 16-, or 14-gauge wires for 16-, 14-, or 12-gauge wires for subwoops As with power wire, the longer the run and the more current you're pushing through it, the larger the size you should use. For example, if there is an amplifier in the trunk and you are sending 100 watts to the front speakers, a 14-metered speaker cable is a good way. But if the amplifier is only 50 watts, a 16-gauge would be fine. Let us help you get what you need Now that you have some idea of how many wiring amplifiers you need, trade our choice of amplifier wiring and accessories. We have ample wiring kits, distribution blocks and everything you need. And if you have any questions about compiling a shopping list, please contact our advisor by phone, email or chat - the information is at the top of this page. If you want to learn more about installing an amplifier, read our amplifier installation guide Wondering what size wire speaker you need? You're not alone – there's a lot of confusion when it comes to hooking speakers & getting the right type and gauge wire. In this guide, I'll show you the right gauge and the type of speaker wire you'll need. I'll also cover a lot more, too: What speaker wire gauge meansHow to check which speaker wire is positive or negativeHow to connect speaker wire to clamps or splice itCopper clad aluminum (CCA) vs. pure copper wireTo read more! Infographic - Speaker wire fast factsWou get the answer: What size speaker wire do I need? Speaker wire size quick guideFor most cases using home or car speakers (not subwoones) 18 gauge (18AWG) is fine. The 18AWG wire is good for about 50W for 4 ohm (auto) speakers and 100W for 8 ohm (home stereo) speakers. For higher power systems or longer lengths, 16 gauge is a great choice. For longer lengths (50-100ft) / (15-30.5 m) you will need to go up 2 gauges (14 ga.) to avoid losing energy. Very long wire lengths lose a little energy over long distances due to resistance. Using a larger wire can help reduce or avoid it. (See my detailed chart later for more information) First of all, it is important to know that you should not spend on a larger speaker wire than you need. It's wasting your hard earned money to get a wire that's bigger (and costs more) than what you need. It will not improve the sound or anything like that, despite what the sellers can say. The size of the speaker wire you need is based on 3 things you can easily check: Stereo or amplifier performance (usually listed as RMS watts) Rating Ohm (impedance) speakersLength neededNichok if you want a simplified answer here is a graph that meets the needs of most people. Simplified wire size of the chartWire SizeRecommended For18 Ga.Car speaker and home speakers up to 25 ft with average power levels (50W RMS and under) 16 Ga.Longer speaker runs for auto & home stereo speakers; Moderate performance subwoobors (under 225W)14 Ga.Long (100ft+) speaker running or higher performance applications such as high power 2 or 4 ohm subwoone. In most cases for daily listening at medium or low power (50W RMS or below), 18 gauge (18AWG) wire is what you need. It's a good compromise between price and handling as it is usually well priced and easy to find. Choosing a speaker wire for long distancesA table above works well for most cases. But what if you need to say 50 feet or even 100 feet long? In this case, you will want to double the size by selecting a wire meter of 2 sizes up. The wire meter (the amount of copper in them) doubles by moving to not the next gauge, but instead one after that. Example: A 18AWG wire loses about 4 watts at maximum power if it's 50 feet long. To avoid this, we select a guide gauge of 2:18 -> 16 -> gauge 14. Speaker Wire Power & size chart If you would like to save money using a smaller wire gauge here is a handy chart I made based on the maximum performance that you can use with wire for different lengths. With it, you can choose the right wire based on the type of speaker, how much power you will use and one of several close lengths you will need. Wire GaugeLength/Power for 8 Ohm SpeakersLength/Power for 4 Ohm SpeakersLength/Power for 2 Ohm Speakers 20AWG 3ft: 263W, 16ft: 49W, 25ft, 32W 50ft: 16W 3ft: 131W, 16ft: 25W, 25ft: 16W, 50ft: 8W 3ft: 66W, 16ft: 12W, 25ft: 8W, 50ft: 4W 18AWG 3ft: 418W, 16ft: 78W, 25ft: 50W, 50ft: 25W 3ft: 209W, 16ft: 39W, 25ft: 25W, 50ft: 13W 3ft: 104W, 16ft: 20W, 25ft: 13W, 50ft: 6W 16AWG 3ft: 664W, 16ft: 125W, 25ft: 80W, 50ft: 40W 3ft: 332W, 16ft: 62W, 25ft: 40W, 50ft: 20W 3ft: 166W, 16ft: 31W, 25ft: 20W, 50ft: 10W 14AWG 3ft: 1056W, 16ft: 198W, 25ft: 127W, 50ft: 63W 3ft: 528W, 16ft: 99W, 25ft: 63W, 50ft: 32W 3ft: 264W, 16ft: 50W, 25ft: 32W, 50ft: 16W 12AWG 3ft: 1679W, 16ft : 315W, 25ft: 202W, 50ft: 101W 3ft: 840W, 16ft: 157W, 25ft: 101W, 50ft: 50W 3ft: 420W, 16ft: 79W, 25ft: 50W, 50ft: 25W For example, 2 Ohm Subwoofer with up to 250W of power from the ampere, but need only 3ft length can use 14AWG wire. (Instead of a larger, more expensive wire) What gauge gauge speaker wire? The speaker wire does not have only one size (gauge). Most speaker wire follows the American Wire Gauge (AWG) standard, which uses a graph of different gauges. Assigns the number of each standard size and evaluation of the electrical conductor. Similarly, each size is sized for a certain amount of electricity capacity. The speaker wire is supplied in a wide range of standard sizes based on the American Wire Gauge (AWG) standard. The American Wire Gauge Standard, also less commonly known as the Brown & Sharpe Wire Meter, is a standardized wire gauge system used since 1857 for round electrically conductive wire diameters. AWG wire charts use a numbering system where the smaller number is a larger wire with more copper wires. Similarly, a larger number is used for smaller conductors with fewer conductors. I realize it seems a little weird, but once you start using it, you'll get used to it pretty quickly. Why wire gauge mattersThe AWG is very important because it means you can be sure what size speaker wire you are getting just like any other power wire you would buy. The speaker wire is treated the same (because it's the same, basically!) as a regular power supply to connect the wire, which also follows the AWG standard. Most speaker wire sold today consists of 2 wires connected as a pair with one marked as positive wire (I'll cover it later here). Gauges available usually range from about 20 or 22 gauges to 10 gauges, with 18 gauge being the most popular. Stranded vs. Hard WireD Wire (left) is a terrible choice for speakers & audio systems. It's very hard to bend & curve, it can break when exposed to constant vibrations, and it's also harder to make a connection with. Braided wire (right) is vastly easier to solve. Braided wire consists of a large number of small copper wire strands, which is very flexible and also easier to strip, crimp connectors and work with manually. All speaker wire fixed is braided wire - which means it is made up of a bundle of 16-60 or more small copper racks. It is very flexible and also easy to deal with for wire stripping & adding connectors or twisting manually. However, the fixed wire has only one wire. Since it is commonly used for home and industrial power lines, you may be tempted to use the remaining solid wire for speakers. Hard wire is a terrible choice for almost all audio systems and especially auto audio installation. But why? Use a stranded, not a solid wire for speakersA mpm wire is fine for homes or buildings, because it never moved after installation. However, it is very hard to bend into place and is also exposed to damage over time when exposed to constant vibrations, as in a car or truck. Over time, the wire can develop weak spots that break! I strongly recommend that you did not bother with a hard wire as it is not worth the risk or trouble. Many types of hard wire (such as for home sockets) have It's super hard to undress, too. How much wire do you need? It's always best measured to make sure – but since many people use speaker wire for almost the same things there are some common lengths that work. In the diagram above, you can see some normal lengths for the wire speaker, which should be in the ballpark. Buying & using speaker wire is definitely one of those cases where old advice is better to have too much than not enough to pay! You don't want to run out of wires because you don't plan well. To find out how much speaker wire you need, my suggestions is to use one of the following:Meter measures long length of force to runMake sure to try to take curves & bends into account, but don't be afraid to get it exactly right. Measure the distance, and then add a few feet (2 or so is good) to take into account small differences. Tape measure works well, so with a string or rope you can place along the path where the wire will go. Mark the length and measure it. I like to add at least 1 foot length for each part of the wire for home stereo use and 2 feet each for car radio equipment to play it safe. Figuring out how much wire to buyInterest to buy a speaker wire, one thing to know is that it adds up quickly! Here are two examples that show what I mean: Example wire length speaker #1Home stereo example: Front speaker length measured: 2 x 6ftReas speakers measured: 16 & 22 ftTotal wire needed: 6 + 6 + 16 + 22 = 50 ft (15.2m) Example of speaker length #2Car stereo example: Running from dashboard to front door speakers and rear speakers. The length of the front speaker measures: 2 x 8ftRear speakers measured: 16 & 20 ftTotal wire needed: 8+8+16+20=52ft (15.9m) Speaker wire is usually sold in rolls such as 25ft, 50ft, and 100ft, although some retailers offer it on foot as well. Sometimes pre-cutting lengths are also available. These are usually around 6, 12, or 18 ft. However, more often than not you save money by buying a good quality roll. Just make sure you don't buy a poor quality wire or overpriced wire (more on that later). Just remember this rule: never take risks with the length of the speaker wire - do not guess. Buy at least a little more than your estimate. Which speaker wire is positive? Which is negative? How do I check if the speaker wire is positive or negative? The most common types of positive wire markers are given here as examples. 99% of the time, figuring out which wire is positive is really easy once you know what to look for. The good news is that once you know what to look for, 99% of the time it's very easy to figure out which speaker wire is positive and which is negative. Here is a list of the most common positive indicators of the speaker: The printed line or row line is on the positive wire Wire insulation is red or different color than negative wire (most red is used)One wire has a copper color and one has a silver surfacePositive wire can have small + symbols and / or wire gauge information printed on itPrint or pressed strip is made in positive wire insulationZ 5 kinds, fingerprints can sometimes be a little harder to notice, so sometimes you need to look very closely under good lighting. Also positive wires that use + printing can be a bit hard to read sometimes too. Which is positive: copper or silver? These are less common, but speaker & power wires that have copper and silver color, you can choose one of the two to be positive. However, copper wire, as a rule, is considered positive. Silver wire is actually copper wire, which in most cases was lightly coated (canned). Once you know which is the positive wire then the second is the negative wire. Music uses AC signals and does not pass in one direction only. We use one wire as a positive when connecting speakers to be consistent when connecting them. This is to prevent some speakers from being wired out of phase, meaning only the speakers play with the opposite motion as others, resulting in poor sound. For best results, it is important to connect the speakers in the same way. How to cut and strip speaker wireUzekuly the most common wire stripping & cutting tools. A wire stripper can cut & strip most of the wire, while the crimping tool can strip and also crimp connectors for the wire. Wire cutting pliers are very useful for cutting small to large wires. Automatic wire strippers make stripping wire super easy. There are a number of affordable tools for cutting or stripping the speaker wire. All the tools in the picture above can cut and strip the wire. If you use crimping connectors, the best crimping tool is. For the simplest possible removal of wire insulation, automatic wire strippers, available from about $15, are gorgeous and make the job super easy to do. Expect to spend about $7-10 on the basic hand tool you need. How to connect & extend speaker wireSpeach speaker wire is not too heavy and there are several ways to go about it. However, I do not recommend just twisting the wire together. It's unreliable, and it's going to fall apart over time. You can also potentially damage the stereo or amplifier if the wire becomes exposed and creates a short circuit. Instead, here are 2 ways you can connect the speaker wire with professional results: Soldering and isolatingPositionsMing crimping crimping connectorsSoldering is a little harder to do, but the advantage is that it is the most reliable way to connect wires. You will need a soldering cup (at least 15W, although I recommend 25W or higher), solder, electrical tape and wire removal tool. The crimping tool (left) is often affordable and easy to find. Some crimping connectors. Blue crimping or butt connectors (right) work well connecting the ends of the speaker wire. Crimping connectors are reliable and easier to use. It's as simple as stripping the speaker wire, twisting the wire tightly, then inserting it into the connector and then crimping firmly at each end. The crimping tool can be found for less than $10 if you shop carefully. Copper aluminum vs copper speaker wireCopper clad aluminum (CCA) wire has in the last few years, becoming more common as the price of copper wiring has risen. It's one of those little things you might not know when buying that companies don't tell you. Unlike pure copper wire, copper aluminum uses an aluminum wire core with thin copper plating. From the outside, it looks the same for plating. Aluminum offers a lower weight and lower cost than copper, so it's at first glance may seem like a great way to replace the more expensive copper line. However, the problem is that aluminum is not as good an electric conductor as copper. Aluminum has only 61% copper conductivity (in other words, it has 39% more resistance), which means it will take larger aluminum wires to get the same wire quality. Daily use & what to knowIn most cases, such as average listening & typical performance levels, this is not really a problem in everyday use. However, if you drive speakers at a higher level of performance, or want the absolute best for your money, you'll need to be sure to look for a package that determines the wire is 100% pure copper. When buying cca speaker wire, get the same quality as true copper wire to move up to one gauge in size. For example, replace 18 copper wire use 16 gauge CCA wire. More readingWondering how to wire to your home or car speakers and need examples? Check out my speaker wiring diagram article here for more information. To help you install the car amplifier & speaker, you will find some great information in my guide showing how to wire a 4 channel amplifier to the front and rear speakers here. Do you have comments or questions? I'd like to hear from you, &;; your questions can help me make this guide better! Feel free to leave a comment or question below. Below.

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