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How long does it take to charge a car battery with a 10 amp charger Frequent use of your car for long trips and daily round trip highlights the importance of keeping the battery fully charged and in top condition. This is especially important during the winter months when most car utilities such as heaters, highlights, windshield wipers, etc. are constantly in use. The battery will not be able to constantly crank the motor motor if an excessive current is drained from it and is not replaced. In recent years, technology has improved considerably, with improved energy density and faster charging periods. One of the main difficulties with car batteries has traditionally been their frequent use combined with slow battery charging. However, as battery technology advances, these issues are being resolved. Modern batteries can now be considered an important source of backup power. Let's take a look at the factors that influence battery charge speeds. Battery status When thinking about battery status there are a number of variables to consider. Charging Status (SOC%) An expression that describes the current capacity of the battery in percentage form, SOC can be determined by the current integration that detects the change in battery capacity over a specific period of time. Download Depth (DOD%) The percentage value of the battery capacity that has been discharged over a long duration. 80% of the DOD refers to the deep discharge stage. Terminal voltage (V) The voltage difference at the battery terminals with the charge applied. Typically, the terminal voltage changes with the SOC and discharge current. Internal resistance The resistance present within the battery that generally differs from the charge and discharge that depends directly on the SOC. The higher the resistance, the lower the efficiency. Importance of charging status A significant factor affecting charging is the maximum charging speed that a car battery can maintain over a specific period of time. Therefore, it becomes important to determine the charging status of the battery. Determining the SOC will allow you to predict the average duration of the load. The charging status describes the status of the battery, that is, the charging capacity. Therefore, when the battery is fully charged, SOC will be 100%. Note: Information such as charging status and other important metrics can usually be found on the battery or in your instruction manual. If this information is not available, you can determine the charge status through the charge process. a process in which you can connect the charging unit directly to the battery. Upon receiving a sudden current charge, the charging unit will discharge the battery and measure the SOC. Detecting the batteries of the battery charge car are usually lead-acid batteries that are made up of cells. Each cell contains approximately 2 Volts, therefore, a Volt car battery consists of 6 individual cells. A fully charged 12 volt battery provides 12.9 Volts, while a fully discharged battery will emit 11.4 Volts. Therefore, the difference between a fully charged battery and a discharged battery is only 0.25 Volts. Let's find a formula to calculate the residual charge on the battery. Residual battery charge The following formula applies to 12 volt batteries: Percentage charge (Measured battery voltage- 11.4 Volts)/1.5 Volts x 100. To work with this formula, the battery must be in a sleep state, which means that the battery must not supply power at any charge. According to experts, the battery must be idle for at least 24 hours in order to record an accurate measurement. The above formula is an accurate method of calculation, as long as the charging current is always less than 1% of the battery capacity in amps-hours. Battery charge duration The time it takes to fully charge the battery depends on the current battery status of your car and, most importantly, the charger and its amp-hours (amps). The lower the battery charge, the longer the charge duration. If the battery is badly discharged, it will take several hours to fully charge the battery. Step 1: Before starting the charging process, you must determine the battery backup capacity. The general rule for calculating the number of amp-hours in a battery is to multiply the backup capacity by 0.6. Example: If your car's battery has 100 minutes of backup capacity, multiply those 100 minutes by 0.6 and that would give approximately 60 amp-hours at a 20-hour rate. Step 2: Check the open circuit voltage of your battery with the help of a voltmeter. This is the voltage without load or connected circuits. Do not charge the battery before testing the open circuit voltage. If the voltmeter reads a voltage of 12.2 Volts, then it has 50% charge. Example: If the battery has 50% charge, there are approximately 30 amps of hours left in the battery. Therefore, it becomes necessary to add more hours of amps to balance the internal resistance within the battery and provide a full charge to the battery (30 amps x 0.2 x 36 amp-hours) Step 3: Charge your car's battery with a 10 amp charger in order to add that precise amount of amp hours to the battery. To determine the charging duration, simply divide the battery amp-hour by 10 (with a 10 amp charger). Charging duration, amp-hours remaining in the battery / 10 amps of charger Example: If your battery is left with 50 amp hours, then the approximate duration of the It will be the amp-hours that are divided by 10 hours of charging; that is, it will take 5 hours to fully charge the battery of your car (50 amp hours / 10 to 5 hours). 10 amp chargers are ideal for 12-volt car batteries because they automatically control amperage and during the charging cycle. After charging the battery, allow it to cool to room temperature and use a voltmeter to determine that the voltage is in balance. How does it take to charge a car's battery with a 10 amp charger? Click here to learn about the best home battery chargers. Facebook Pinterest Reddit LinkedIn Email If you're wondering how long it takes to charge your car's battery, you're likely to have a bad day! Know how long you could be without a vehicle and make plans that could make your day a little better. A small car battery can be charged in 24 hours at 2 amps, or 5 hours at 10 amps. Medium-sized batteries can be charged in 31 hours at 2 amps, or 6 hours at 10 amps. Larger vehicle batteries can be charged in 50 hours at 2 amps or 10 hours at 10 amps. That's the simplified answer to give you an estimate of the stadium. In this article, I'll be covering how I calculated the numbers on my graphics, what kind of charger is best for charging your car's battery, charging your car's battery with the car alternator, and time to charge a car battery when using commonly available chargers. If you are in a hurry, however, you can simply click on the amp rating of your charger below to get a brief answer or you can cross-reference your charger with the battery in the tables below of charging times. Charging Time Ranges for Car Batteries Rated at: CCA 200-315 / RC 40-60 Charger AmpsTime in Hours at 50% DischargedTime in Hours at 100% Discharged (Dead Battery) 1.5 Amps15-19.2530-38.5 2 Amps11.25-14.4422.5-28.88 4 Amps5.63-7.2211.26-14.44 5 Amps4.5-5.789-11.56 6 Amps3.75-4.817.5-9.62 8 Amps2.81-3.615.62-7.22 10 Amps2.25-2.894.5-5.78 15 Amps1.5-1.933-3.86 20 Amps1.13-1.442.26-2.88 25 Amps0.9-1.161.8-2.32 30 Amps0.75-0.961.5-1.92 40 Amps0.56-0.721.12-1.44 50 Amps0.45-0.580.9-1.16 Green = Safe Charger Amp Rating, Yellow = Use Caution, Red = Risk of overcharging / battery damage. Charging Time Ranges for Car Batteries Rated at: CCA 315-550 / RC 60-85 Charger AmpsTime in Hours at 50% DischargedTime in Hours at 100% Discharged (Dead Battery) 1.5 Amps19.25-24.538.5-49 2 Amps14.44-18.3828.88-36.76 4 Amps7.22-9.1914.44-18.38 5 Amps5.78-7.3511.56-14.7 6 Amps4.81-6.139.62-12.26 8 Amps3.61-4.597.21-9.18 10 Amps2.89-3.685.78-7.36 15 Amps1.93-2.453.86-4.9 20 Amps1.44-1.842.88-3.68 25 Amps1.16-1.472.32-2.94 30 Amps0.96-1.231.92-2.46 40 Amps0.72-0.921.44-1.84 50 Amps0.58-0.741.16-1.48 Green = Safe Charger Amp Rating, Yellow = Use Caution, Red = Risk of overcharging / battery damage. Charging time ranges for car batteries classified in: CCA 550-1000 / RC 85-190 AmpsTime Charger in Hours to Downloaded (Single Amplifier Output)Time in hours at 100% discharged (single amplifier output) 1.5 A24.5-46.2549-92.05 2 A18.38-34.6936.76-69.38 48 A9.19-17.3418.38-34.68 5 A7.35-13.8814.7-27.76 A7.35-13.8814.7-27.76 8 A4.59-8.679.18-17.34 10 A3.68-6.947.36-13.88 15 A2.45-4.634.9-9.26 20 A1.84-3.473.68-6.94 25 A1.47-2.782.94-5.56 30 A1.23-2.312.46-4.62 40 A0.92-1.2731.84-3.46 50 A0.74-1.331.48-2.78 Green - Safe Charger Amplifier Classification, Yellow - Caution of Use, Red - Risk of battery overload/damage. How I estimated the charging times for each charger and battery When I did the calculations, I borrowed the initial configuration of the Schumacher table which is a battery charger manufacturer. I essentially extrapolated your chart that you use for your 1.5 amp charger to get a baseline for all other values. The cards have ranges depending on the CCA (cold start amp) or RC (reserve capacity) of your car's battery. Your car's battery rating will be on the label on top of the battery. After locating where your car's battery rating fits, you'll see an estimate of charging time depending on whether you're completely dead (100% discharged) or half dead (50% discharged). In the graph shown here (which assumes that you are only recharging a 50% battery – not dead), you will notice that the first two categories are in Amp Hours (AH) but that car batteries are classified into cold crank amplifiers (CCA) or spare capacity (RC). Charging times based on 50% discharge. In order to estimate how long a charger will take to charge, we need to take the car's batteries to an AH-equivalent rating because, for example, a 4 amp charger will generally replenish 4AH within one battery per hour (not including inefficiencies). In order to see how Schumacher (a battery charger manufacturer) treats the different kinds of car batteries with respect to AH, I did some math. Let's take the 32AH battery. It says it takes 13.5 hours to bring a 32AH battery back to full charge from 50%. 32AH/2 to 16AH that needs to be replaced. 16AH / 13.5 hours at 1.19 amps per average hour from the 1.5 amp charger. The 12-hour 50% battery needs 6 amps of recharge. Therefore, 6AH / 5 hours at 1.2 amps per average hour from the charger of 1.5 amps. The 6AH battery needs a 3AH recharged, so 3AH / 2.5 hours at 1.2 amps per average hour from the 1.5 amp charger. We're sorry about the outage, but if you're interested in how long it takes to charge a car's battery, you may also be interested in how fast a car's battery will run out if it's connected or disconnected from a car. I have that article with graphics here and it will open in a new tab, if you are interested. I'll let you go back to what you were reading! The reason why Up to 1.2 amps per hour instead of 1.5 is the increasing internal resistance of the car's battery as it approaches full charge. With the examples given, they all lead to this formula: XAH / charging time listed 1.2 If we apply the same logic to CCA/RC batteries, we can see that it takes 19.25 hours to charge a 315CCA or 60RC battery of To get the AH, I do it: X / 19.25 to 1.2 x &gt; X at 1.2 \* 19.25 &gt; X at 23.1AH to &gt; 23.1 \* 2 to 46.2AH. A 315CCA or 60RC battery is an equivalent of 46.2AH. I continued to do all these math for all values and got to 36AH at 46.2AH, 46.2AH to 58.8AH, and 58.8AH to 111AH for car/truck battery ranges. Approximate amp hour (AH) car battery rating based on CCA/RC Charge Times sticker numbers: 200-315 CCA, or 40-60 RCSticker numbers: 315-550 CCA, or 60-85 RCSticker Numbers: 550-1,000 CCA, or 80-190 RC 36 - 46.2 AH46.2 - 58.8 AH58.8 - 111 Check the label on top of your car's battery and find where it matches on the chart. The approximate times of the amplifier's time range are calculated below. Once this is done, you simply take any of the values, calculate the percentage of AH that needs to be recharged, divide it by 0.8, and then divide it by the number of amplifiers in the charger. You should really test the open circuit voltage of your battery with a voltmeter before you start charging to anticipate the time, especially if you don't have a modern smart charger! Disconnect the battery for accurate reading with the voltmeter and to reduce the risk of damaging your car electronics when charging in case the battery has an internal short circuit. Here is a graph indicating the charging status depending on the voltage. Percentage of battery charge remaining by voltage 100%12.65+ 90%12.5 80%12.4 70%12.35 60%12.25 50% 12.1 40%11.9 30%11.75 20%11.6 10%11.3 0%10.5 Car batteries should not be discharged at a high rate. Anything at 50% or less will shorten the life of your battery. Charge immediately if the battery is so low. Limitations with results Of course, these are all estimates that try to take into account inefficiencies, but battery science is extremely complex and full of theories, laws and estimates. The limitations to these results could be from any of the following: internal resistance, heat, battery age, the specific gravity of each cell, the level of sulfation in the plates, the true output of the charger, and more. The purpose of this chart was to extrapolate what Schumacher (a real manufacturer of battery chargers) provided. It's not perfect, but it's definitely a solid estimate of the stadium of loading times. My 12v smart charger will not detect my car's battery This is a problem you could encounter if you really let your car's battery drain completely. This type of battery is nothing more than too heavy a paper weight. It is usually an easy problem to fix if you can get a jump from another car. The reason the one that your smart charger will not start the charging process is due to its built-in security function. Most smart chargers will not pass power through their cables until a minimum voltage of a battery is detected first. This is so that the charger doesn't try to pass a charge if it hooks cables to the wrong terminals or so on. How do I get my 12v smart charger to detect my car's battery? The 12-volt smart charger needs a measurable voltage in the battery to start charging. Securely connect the bridge cables of a working car with a good battery to the fully discharged battery for a few minutes and speed up the engine a little to increase amperage. Securely disconnect the cables from the bridge and connect the charger. If this doesn't work, you can repeat the process a couple of times for longer when connecting to the donor vehicle. I brought some batteries this way that were undetectable by smart chargers. Is a top amplifier charger okay for my car's battery? I would very discourage the use of a charger of more than 10 amps when charging a car battery. In fact, I'd stay in the range of 2 to 8 amps. I think 5 amps is the sweet spot when it comes to vehicle batteries. If you have a truck, you could get away with it with a 10 or 15 amp charger, but a lower one would still be healthier for your battery. Batteries will tend to overheat, overload and boil electrolyte off when they are receiving an amperage greater than 25% of their total amp-hours rating. Most car batteries are in the equivalence range of 40 to 60 amp hour. Truck batteries and other larger vehicles can be lifted in the 80 amp equivalence range. If you have a 50AH battery and you hook a 30 amp charger to it, you are risking overheating, deforming the plates, and losing the electrolyte solution through evaporation due to electrolysis. It also increases the production of hydrogen (explosive) gas and hydrogen sulfide (H2S, harmful). A slower charge gives battery boards more time with less stress to convert your charger's electrical energy into chemical energy. It may take an hour or two longer, but it's worth it for a healthy battery. If you are looking for a solid charger and/or maintainer, I recommend this 5 amp charger from Amazon. It's soft on your car's battery, you can charge it overnight, and you can leave it connected indefinitely for long-term storage! Mine has lasted more than 6 years while running 365 days a year, without malfunction, and I can be sure that it is never overloading my battery and only providing you with the amount of current you can accept. Will a trickle charger overload my car's battery? Yes, a drip charger that is not a smart charger that runs in float mode will eventually ruin your battery if left connected over time. Trickle Chargers pumping a small current into the battery even if the battery cannot accept it. This slowly evaporates the electrolyte through electrolysis (overload). If you have an older drip charger, be sure to remove the cables shortly after the battery has reached full charge. If you have a modern smart charger that has a or the way to maintain, you can leave them connected indefinitely, as they only give current when the battery is naturally self-discharged. The perfect charging option to leave connected to a battery indefinitely without the worry of overloading! Do car batteries charge while it's in use? Yes, they do, but it's not an ideal way to charge a battery discharged of 50% or more. Driving your car idling for the purpose of charging the battery only creates excess heat under the hood as your alternator and voltage regulator work harder without the cooling effects of air circulation as when driving. The best thing to do if you have a battery discharged is to connect it to a suitable smart charger. Let's face it, however, most of us have tried to recharge a battery at rest after a jump. If you are going to do so, try to leave the car running for at least 20-30 minutes and turn off all unnecessary accessories (AC, radio, lights, etc.). How long does it take to charge the battery of a Dead car? Dead (fully discharged) would require a small car battery about 25 hours, a larger car or a small 32-hour SUV battery, or a larger SUV and truck about 48 hours to fully charge with a 2 amp charger. The same batteries can be charged in approximately 12 hours, 16 hours and 24 hours with a 4 amp charge, respectively. If the battery is completely discharged, you may need to skip another vehicle's battery for a few minutes first to give it a temporary voltage spike so that a smart charger can recognize the battery. Without doing so, a smart charger will not recognize a battery and the current will not flow. How long do you need to drive a car to recharge a dead battery? After jumping a dead battery, drive at least 30 minutes to allow the alternator to re-raise the battery to an acceptable level so that it start over on its own. If you have access to a smart charger, it is best to hook your car's battery to it as soon as possible to bring the battery to a healthy state. How long does it take to charge a car's battery with a trickle charger? A 1.5 amp drip charger can charge a 50% discharged small car battery (200-315 CCA or RC 40-60) in approximately 15 to 19 hours, a medium-sized battery (315-550 CCA or RC 60-85) in 19 to 25 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 24 to 46 hours. Double these times if the battery is completely discharged. How long to charge a car battery at 2 amps? A 2 amp drip charger can charge a 50% discharged small car battery (200-315 CCA or RC 40-60) in 11 to 14 hours, a medium-sized battery (315-550 CCA or RC 60-85) in 14 to 18 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 18 to 35 hours. Double these times if the battery is completely discharged. How long to charge a car battery in 4 amps A 4 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in about 6 to 7 7 a medium-sized battery (315-550 CCA or RC 60-85) in 7 to 9 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 9 to 17 hours. Double these times if the battery is completely discharged. How long to charge a car battery at 6 amps A 6 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in about 4 to 5 hours, a medium-sized battery (315-550 CCA or RC 60-85) in 5 to 6 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 6 to 12 hours. Double these times if the battery is completely discharged. How long to charge a car battery at 8 amps An 8 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in about 3 to 4 hours, a medium-sized battery (315-550 CCA or RC 60-85) in 4 to 5 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 5 to 9 hours. Double these times if the battery is completely discharged. How long to charge a car battery at 10 amps A 10 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in about 2 to 3 hours, a medium-sized battery (315-550 CCA or RC 60-85) in 3 to 4 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 4 to 7 hours. Double these times if the battery is completely discharged. How long to charge a car battery at 15 amps A 15 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in about 2 hours, a medium-sized battery (315-550 CCA or RC 60-85) in 2.25 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 2.5 hours. Twice as many times if discharged 100%. 15 amp chargers should be used with caution. 15 amp chargers are starting to push the car's battery beyond its ability to absorb the entire current of the charging process. This leads to overheating, electrolyte boiling or worse. It is recommended to use a 3-stage smart charger with a maximum output of 15 amps if you are following this path so that the charger detects when it needs to reduce amperage. 15 amp hour chargers would be acceptable for larger deep cycle batteries, but they are a bit strong for starter batteries like your vehicle's. How long to charge a car battery at 20 amps A 20 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in 1.5 hours, a medium-sized battery (315-550 CCA or RC 60-85) in 2 hours, or a large car battery (550-1,000 CCA or RC 85-190) in 2 hours. Twice as many times if discharged 100%. It is not recommended to use this large charge. The 20 amps are pushing the car battery beyond its ability to absorb the entire current of the charging process. This leads to overheating, electrolyte boiling or worse. Use only a 20 amp smart charger on the starter batteries at the top end of the scale and use it only with great caution. How long to charge a car's battery at 30 amps A 30 amp charger can charge a small car battery discharged at 50% (200-315 or RC 40-60) in about 1 hour, a medium-sized battery (315-550 CCA or RC 60-85) in 1 hour, or a large car battery (550-1,000 CCA or RC 85-190) in 2 hours. Twice as many times if discharged 100%. It is not recommended to use this large charge. 30 amp chargers give off amperage at more than 50% of the estimated amp-hours of a typical starter battery and could be dangerous and shorten battery life. Use a 30 amp charger at your own risk. How long to charge a car battery at 40 amps A 40 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in about 45 minutes, a medium-sized battery (315-550 CCA or RC 60-85) in 1 hour, or a large battery (550-1,000 CCA or RC 85-190) in 1.5 hours. Twice as many times if discharged 100%. Do not use this large charger for car batteries. 40 amp chargers give off an amperage of nearly 100% of the estimated amp-hours of a typical starter battery and can be dangerous and shorten battery life. You can expect a risk of overload, hydrogen gas and hydrogen sulfide at high levels. Structural damage to the battery is a great possibility. How long to charge a car's battery at 50 amps A 50 amp charger can charge a small car battery 50% discharged (200-315 CCA or RC 40-60) in 45 minutes, a medium-sized battery (315-550 CCA or RC 60-85) in 45 minutes, or a large battery (550-1,000 CCA or RC 85-190) in 1 hour. Twice as many times if discharged 100%. Do not use this large charger for car batteries. 40 amp chargers give off an amperage at 100+% of the estimated amp-hours of a typical starter battery and could be dangerous and shorten battery life. You can expect the risk of overload, hydrogen over-gas and hydrogen sulfide at high levels. Structural damage to the battery is a great possibility. Facebook Pinterest Reddit LinkedIn Email

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