I'm not a bot

Morning all, I have recently had a bedroom plastered top to bottom and the plaster decided to take down the light a tape the wires together (for what ever reason). Now I don't know which wire is which how can I determine what wire is live and neutral? I know the earth wire and my loop wires are all red (same as all other light in the house) But the remaining wires are all black so can't identify them by site, is there a way I can find out what is what? Thanks Kris Do you plan on using this plasterer again? If not (and assuming you haven't paid) then get on the phone & ask him when he's coming back (or sending an electrician) to sort the light out. For the future, next time you get a room plastered ask the plasterer what they want doing about sockets, switches, light fittings etc- some are happy with plates off the wall but still connected (I usually tape freezer bags round sockets and switches, saves me the chore of picking bits of plaster off them afterwards), some prefer them removed & cables tucked out of the way. Taped the cables together- lucky they weren't live. How many bits of T & E are there- 2 or 3? Do you own a multimeter and do you know which settings to use to determine voltage or resistance? I have a multimeter but not 100% sure on how to determine voltage and resistance. Never had to before In that case, playing guess and go on here is going to pose a significant risk of injury. Call an electrician. (For someone with the necessary knowledge and test equipment, this will be at worse a 30 minute job provided that idiot plasterer hasn't nicked the cables with his float and used the tape to hide the damage). Hi, if you can workout how to use your meter on continuity, it will be straight forward. Regards, DS I see very little point in having a tool but having no idea of how to use it! Nows the time to dig out the instructions. Concentrate on the continuity (resistance) function. Let us know when you are up to speed, then you'll be ready for the next step. PS Check out the AC voltage function to. You'll need that to make sure the supply is safely isolated before you do the continuity bit Never needed to use one before and it came as part of a set so that's why I didn't know how to use it. Didn't need it anyway I figured out what they had done by finding which cable was from the socket and previous light and the one going to the next. Quite simple all fixed working perfectly and correct voltage running through them all. If you need to find a tradesperson to get your job done, please try our local search below, or if you are doing it yourself you can find suppliers local to you. Select the supplier or trade you require, enter your location to begin your search. Please select a service and enter a location to continue... Please Choose... Plumber / Gas Engineer Electrician Builder Decorator Builders' Merchant Plumbers' Merchant Tile Supplier Flooring Supplier Are you a trade or supplier? You can create your listing free at DIYnot Local The Gauge Guide bullets will help you determine the overall size (including insulation) of an unmarked cable. Actual diameters may vary depending on the age, make and insulation thickness of your cable. If you are still not sure, the most accurate way to measure your cable is to determine the area in mm^2 of the copper conductors. As an example, let's assume we want to know the area for 6 B&S cable: Count the total number of strands. (168) Measure the diameter of one of the strands. (0.32) In this case we have 168 strands @ 0.32mm each. Knowing this we now do the following calculations: Square (multiply by itself) the diameter of each strand (0.32 × 0.32 = 0.1024) Multiply this result x (Pi) 3.142 (0.1024 x 3.142 = 0.3217408) Divide this result by 4 (0.321536/4 = 0.0804352) Multiply this result by the number of strands (0.0804352 x 168 = 13.5131136) Therefore the approximate area for 6 B&S cable is 13.50mm^2 Cable Size & Diameters Cable Size Nom Area mm^2 Nom O.D.mm Amp Rating Part # Prefix Gauge Guide 8 B&S 7.71 5.5 74 C8 6 B&S 13.5 7.2 103 C6 4 B&S 20.26 8.3 135 C4 3 B&S 26.45 10.2 168 C3 2 B&S 32.07 11.3 188 C2 1 B&S 39.55 12.1 210 C1 0 B&S 49.00 12.7 246 C0 00 B&S 64.15 14.5 292 C00 000 B&S 83.19 16.4 335 C000 0000 B&S 99.27 17.5 399 C0000 Twin 8 B&S 7.71 7.1 x 12.5 59 C2TS-8 Twin 6 B&S 13.5 8.8 x 16 82 C2TS-6 Twin 4 B&S 20.26 10.3 x 18.6 108 C2TS-4 Twin 2 B&S 32.07 13.4 x 24.6 150 C2TS-2 Vehicle Applications 8 B&S (7.71mm^2): Auxiliary power application up to 74amp 6 B&S (13.50mm^2): Some standard alternators Battery cables for small engines Auxiliary power application up to 103amp 4 B&S (20.26mm^2): Battery cables for standard engines Auxiliary power application up to 135amp 3 B&S (26.45mm^2): Battery cables for standard engines Auxiliary power application up to 168amp 2 B&S (32.07mm^2): High powered accessory leads (winches, inverters) Battery cables for 4 & 6 cylinder engines Jumper Cables for standard engines Auxiliary power application up to 188amp 1 B&S (39.55mm^2): High powered accessory leads (winches, inverters) Battery cables for larger 6 cylinder & small V8 engines Auxiliary power applications up to 210amp 0 B&S (49.00mm^2): High powered accessory leads (winches, inverters) Smaller trucks & diesel engines Battery cables for high performance 6 cylinder & standard V8 engines Jumper Cables for larger engines Auxiliary power applications up to 246amp 00 B&S (64.15mm^2): High powered accessory leads (winches, inverters) Battery cables for high compression & large V8 engines Jumper Cables for very large engines Auxiliary power applications up to 292amp 000 B&S (83.19mm^2): High powered accessory leads (winches, inverters) Large trucks, diesel & marine engines Battery cables for very large high performance engines Auxiliary power applications up to 335amp 0000 B&S (99.27mm^2): High powered accessory leads (winches, inverters) Large trucks, diesel & marine engines Battery cables for very large high performance engines Auxiliary power applications up to 399amp Extended Lengths It is recommended for applications over 5m in length that you increase the cable gauge by at least one size. Learn cable sizing in sq mm with formulas, examples, and analysis to optimize your electrical installations for safety and efficiency. Cable sizing is essential to prevent overheating, voltage drops, and energy losses in electrical circuits. Proper sizing ensures that the cable can safely carry the current without exceeding its thermal limits. Incorrect cable sizing can lead to equipment failures, electrical fires, and other hazards. It is not merely a regulatory compliance issue; it's crucial for ensuring the long-term reliability of electrical systems. Current Rating: The maximum current the cable will carry, which can vary depending on the load and usage pattern. Length of Cable Run: The distance between the power source and the load affects the voltage drop and resistance in the cable. Voltage Drop: A critical factor, the voltage drop should be minimized to maintain performance and efficiency. The acceptable level is usually between 3% to 5% of the total voltage. Ambient Temperature: High temperatures can reduce the cable's current-carrying capacity. Adjustments may be necessary based on the installation environment. Installation Method: Whether the cable is installed in air, conduit, or buried underground can affect heat dissipation and therefore the cable's performance. Type of Load: Understanding the nature of the load (resistive, inductive, or capacitive) is essential as it influences the current drawn by the load. Safety Standards and Regulations: Compliance with local electrical codes ensures that installations are safe and reliable. The primary formula used for calculating the cable size in square millimeters (sq mm) is derived from Ohm's Law and the power formula: $A = (I \times L \times 2) / (K \times \Delta V)$ Where: A: Cross-sectional area of the cable in sq mm. I: Current in amperes (A). L: One-way length of the cable run in meters (m). K: Conductivity constant of the material (Copper = 56, Aluminum = 35, in sq mm/A/m). ΔV: Acceptable voltage drop in volts (V). Step-by-Step Calculation To illustrate the calculation, let's consider an example: Example Scenario We need to determine the cable size for a copper cable that will carry a current of 30 A over a distance of 50 m, with a maximum allowable voltage drop of 3 V. Step 1: Identify Parameters I: 30 A L: 50 m K: 56 sq mm/A/m (for Copper) ΔV: 3 V Step 2: Apply the Formula Plugging the values into the formula: $A = (30 \times 50 \times 2) / (56 \times 3)$ Step 3: Perform the Calculation Calculating the numerator: Calculating the denominator: Now, dividing the numerator by the denominator: A = 3000 / 168 ≈ 17.86 sq mm Step 4: Selecting the Cable Size The calculated cable size is approximately 17.86 sq mm. Therefore, you would select the next standard cable size, which is typically 25 sq mm, to ensure safety and compliance with regulations. Common Mistakes in Cable Sizing When sizing cables, it's easy to make mistakes that can compromise safety and performance: Neglecting Voltage Drop: Failing to account for voltage drop can lead to inefficient operation of electrical devices. Ignoring Ambient Temperature: Not adjusting for higher temperatures can lead to cable overheating and failure. Overestimating Load Current: Using the highest possible current without considering the actual load can lead to oversized cables and increased costs. Using Incorrect Conductivity Values: Different materials (copper vs. aluminum) have different conductivity values, and using the wrong one can skew calculations. Not Consulting Local Codes: Electrical codes can vary, and ignoring them can lead to non-compliance and safety hazards. In addition to calculations, several practical considerations should be taken into account: Future Expansion: Consider the potential for future load increases and choose a cable size that allows for expansion. Installation Environment: Factors such as moisture, chemicals, and physical protection need to be considered for cable longevity. Maintenance Access: Ensure that cables are installed in a manner that allows for easy access for inspections and maintenance. Cost vs. Performance: Balance between selecting a cable that meets performance requirements without excessive costs. Real-World Applications of Cable Sizing Proper cable sizing is vital in various scenarios, including: Residential Wiring: Ensuring that household circuits can safely handle appliances and equipment. Commercial Installations: Large buildings with significant electrical loads require meticulous cable sizing to prevent overloads. Industrial Settings: Factories and plants must consider multiple machines and equipment when calculating cable sizes to ensure safety and efficiency. Renewable Energy Systems: In solar PV installations, proper cable sizing is crucial to optimize energy transfer and minimize losses. Conclusion Calculating the appropriate cable size in square millimeters is a fundamental skill for electrical engineers and technicians. By understanding the factors that influence cable sizing, applying the correct formulas, and considering practical aspects, you can ensure safe, efficient, and compliant electrical installations. Always remember that proper cable sizing is not just about meeting regulatory requirements; it's about ensuring the safety and reliability of electrical systems. FAQ The best way is to perform calculations based on the current load, cable length, acceptable voltage drop, and other environmental factors. 2. Why is voltage drop important in cable sizing? Voltage drop affects the performance of electrical devices. Excessive voltage drop can lead to inefficient operation, overheating, and potential damage. 3. Can I use a smaller cable size to save costs? No, using a smaller cable size can lead to overheating, voltage drops, and safety hazards. Always size cables appropriately for the load they will carry. 4. How often should I check my cable sizes? It's advisable to check cable sizes whenever you make significant changes to your electrical systems or when installing new equipment. 5. Are there software tools available for cable sizing? Yes, various software tools and applications can assist with cable sizing calculations, making the process more efficient and reducing human error. Prasun Barua is an Engineer (Electrical & Electronic) and Member of the European Energy Centre (EEC). His first published book Green Planet is all about green technologies and science. His other ... Please can someone clearly state how to identify 6mm2 twin and earth cable? I know I need 6mm2 but don't know if my kitchen is wired with it. If it isn't of course it is Part P to install a dedicated cooker radial circuit as most of the threads on this forum state, if it is 6mm2 then the job is done. Does the 6mm2 relate to the area of ONE of the copper cables viewed end-on and excluding the insulation? That seems awfully thick. What would the diameter of one of the copper cables be? I think it would be useful for people if the diameters of the commonly used cables were posted onto the site along with the mm2 for identification purposes. Thanks very very much Tim Try here. Might be of some help. I think it would be useful for people if the diameters of the commonly used cables were posted onto the site along with the mm2 for identification purposes. it has been for years, its in the wiki or the sticky Amended link for you to try. See item 26 in the sticky. (although this is only a guide, and measurements will vary depending on manufacturer, and age of the cable) 6.0mm^2 relates to the cross sectional area of one of the conductors. If you have a micrometer, you can measure the diameter of one of the strands, and then with some mathematics you can calculate the actual CSA of the conductor. a very easy way is to buy some 6mm T&E cable clips (these days they are embossed "6mm") preferably just a few in a handy pack (or find an electrical person who will give you one) pull the pin out or it will stick in you Try it for size against a sample piece of cable on the Electrical shelf (it is a tight, clip-on fit) so you know how it feels. Then go home and see if it fits your cable in the same way. It is very handy to keep a few sample cable clips so you can tell the difference between sizes that you can't differentiate by eye. 4mm is rarely used but sometimes found on older cooker circuits. 10mm is bigger. 2.5mm is easy to recognise by eye IMO. 1.5mm and 1mm are fairly similar. this is much much easier and cheaper than using a micrometer or vernier gauge wow! thanks very much for your quick replies. Item 26 in the wiki was a useful substitute in the absence of information about the diameters of the actual conductors. It's clear that I don't have 6mm2 as per Item 26 the outside nominal diameter of the cable sheath fits best with 10.3 mm x 6mm = 2.5mm2. A rough workout of the area confirms this: Conductor diameter measured with a ruler is a bit less than 2mm diameter (lets say 1.8) area = pii(3.14) x 1.8^2 / 4 = 2.54mm2 To work out diameter of conducter for a given area you; square root (4 x area /pii) (3.14) and for 6mm2 cable you get a conductor diameter of 2.76 ~ 2.8mm. So diameter of 6mm2 cable will be about 2.8 mmin diameter - less than I expected and only 1mm wider than I have at the moment. What a difference a mm makes! Probably about £200 for a new circuit. Thanks all, Tim How many strands does your "2.5mm^2" conductor have? What colour are they? one copper strand. the sheath is grey (marked BASEC), the live is sleeved in red, the neutral is sleeved in black and the earth is of course bare except when within boxes. Why do you ask? What will I expect to pay for fitting of a (6mm2 or 10mm2 as the electrician sees fit) circuit stretching about 8m and provision of a 40amp MCB into a spare on my CU with a two pole switch (without 3-pin additional plug socket) at the cooker end? There is access to the underfloor joists as the basement ceilings are all down leaving the cable-runs exposed so routing should be pretty easy. Tim I'd be opting for 10mm2 cable for a new cooker circuit, cable that was too small got you into this mess in the first place! As for price, its very hard to say, but use a spark you've dealt with before, or comes reccomended and they'll give you an idea where you stand and how much you'll be looking at cost wise. I don't charge for simple quotes like the job you require. There may be other issues with your electical installation in general (main bonding for example) that requires attention before another circuit can be installed/modified. got a sparky that I've used before lined up to do the job in 6 - 10 mm2 his decision. I'm sure he'll check the mains bonding though visually it looks ok. Quite happy with the price it's not too much for peace of mind. The whole question arose because I asked someone how you determined cable thickness and they misadvised me that the mm2 quoted in cable thicknesses was measured across the width of the sheath so it gave me false hope that I was adequately cabled. Thank you for all your help - I'm sure I'll be back The only sure way is to accurately measure the dia of the conductor core or cores and apply Pi D squared over 4 (or Pi R squared) because the sizes quoted are cross sectional area of the conductor not diameter. I have a list of sizes I`ll see if I can find it. Measurement via a micrometer would be most accurate, followed by vernier caliper then steel rule. Once you get used to the sizes then "Rack of the eye" should suffice Found it Cable Diameters CSA Dia mm Dia inches No of Strands 1.0 1.128 0.0444 1 1.5 1.382 0.0544 1 2.5 1.784 0.0702 1 4.0 0.853 0.0336 7 6.0 1.045 0.0411 7 10.0 1.349 0.0531 7 16.0 1.706 0.0672 7 25.0 2.132 0.0839 7 Sorry pasting does nowt for the spacing here what about 2.5 multi strand. i am compiling a list together. do any of you have the csa sizes for multi strand cables below 4mm Stranded can mean new (metric) or old (imperial). Taking old imperial, eg, 14th regs, 1966+. Current ratings Clipped-Direct Rarely used - 1 strand, 0.044-inch dia, 0.0015in^2 / 0.98mm^2 CSA = 12A Thin lighting off 2-way switching to each hall wall bulb - 3 strand, 0.029-inch dia, 0.0020in^2 / 1.28mm^2 CSA = 15A More common old lighting - 3 strand, 0.036-inch dia, 0.0030in^2 / 1.97mm^2 CSA = 19A Into power circuits - 7 strand, 0.029-inch dia, 0.0045in^2 / 2.98mm^2 CSA = 23A - 7 strand, 0.036-inch dia, 0.0070in^2 / 4.60mm^2 CSA = 31A - 7 strand, 0.044-inch dia, 0.0100in^2 / 6.87mm^2 CSA = 37A - 7 strand, 0.052-inch dia, 0.0145in^2 / 9.59mm^2 CSA = 46A - 7 strand, 0.064-inch dia, 0.0225in^2 / 14.53mm^2 CSA = 61A The largest conductor size in PVC-sheath/PE-insulation to BS1557 was 0.06in^2 CSA. Higher ratings for Butyl/Silicone. Earliest PVC/PE Twin-&-Earth was 1948, rare. - Grey, Black or ???? PVC sheath - CPC may be bare - more typical with grey sheath if CPC present - CPC may be green sleeved - more typical with black sheath if CPC present (like French twin & earth) NOTE even if you do have CPC in an old lighting install, it may not be connected to anything - it may be floating or even live. If you ever use LSOH cable, particularly Prysmian which seems stiffer than others, stranded in 2.5mm is easier to work with. Current ratings increased with time from 13th-14th-etc regs. 13th regs clipped-direct were 5/10/15/20/28/36/43/53A for above. If you need to find a tradesperson to get your job done, please try our local search below, or if you are doing it yourself you can find suppliers local to you. Select the supplier or trade you require, enter your location to begin your search. Please select a service and enter a location to continue... Please Choose... Plumber / Gas Engineer Electrician Builder Decorator Builders' Merchant Plumbers' Merchant Tile Supplier Flooring Supplier Are you a trade or supplier? You can create your listing free at DIYnot Local Hi folks I'm in the process of upgrading my shower to a 10.5kW version, and from what I can gather on here I need at minimum a 10mm2 cable connecting it to the consumer unit. However I'm baffled as to where this measurement is taken. The present cable is in some places white and others grey and is kind of rectangular and about 6mm on it's thinner side and about 12mm on it's wider side. Does that mean it's 6mm cable? How do you measure it and work out it's size? Thanks for any help! Brilliant thanks londonboy! If it's white in some places, and grey in others that implies there's a joint somewhere - you need to identify where it changes as any connections may have a lower capacity than the cable itself, so might be the limiting factor. Ideally with a high power appliance like a shower, the only joint should be at the isolator (often a pull cord one) - it's not against the regs to have other joints, but it adds more potential for things to fail, and they need to be rated appropriately... Remember there is a lot of variables, longer runs, insulation, grouping etc can all result in you needing a bigger cable. Also you need RCD protection. I'd recommend getting an electrician round to double check everything (before you fit the shower and tile the wall). There is an isolator switch for the shower in the airing cupboard in the kitchen (ie. not in the bathroom and not a pull cord). It's one of those standard white box white switches with a glowing red light. I'm not sure if that meets "regs". I think you're right though I'd need to get an electrician in to replace the wire. Also I have an old style fuse box (not sure if I have RCD's whatever they are) so not sure if that's suitable. Ta for all your advices! You should assume it's a 6mm sq (edit: and therefore needs replaced with a bigger suitably sized cable) as for the old shower I wouldn't expect anyone to supply and fit a considerably more expensive and little harder to work with 10mm sq when a 6mm sq was suffice. The regs are the IET wring Regulations, currently the 17th edition British Standard 7671, effectively legally binding. Any circuits supplying equipment in a room with a fixed bath or shower (ie a bathroom) must be protected by an RCD. Your property, life and limb is at risk if you do not use the correct size of conductor so I would also advise you get an electrician to check it out. The regs are the IET wring Regulations, currently the 17th edition British Standard 7671, effectively legally binding. Well, you are wrong there. BS7671 is not statutory (ie it is not legally binding) Building Regulations Part P is, however. And you will need to comply with all of that. It refers to BS7671. Please refer to the WIKI and read up on the legalities of what you are thinking of doing. IMO (as you don't know what an RCD is) you should get a registered electrician in to: assess your installation to see if it can stand the extra load look at the existing wiring to see if it is big enough for the extra load tell you about the important safety measures that you MUST take when mixing electricity with water. You can get someone by looking at www.competentperson.co.uk That's why I said effectively, because the Buildings Regs make it effectively a legal requirement to follow the regs. If you need to find a tradesperson to get your job done, please try our local search below, or if you are doing it yourself you can find suppliers local to you. Select the supplier or trade you require, enter your location to begin your search. Please select a service and enter a location to continue... Please Choose... Plumber / Gas Engineer Electrician Builder Decorator Builders' Merchant Plumbers' Merchant Tile Supplier Flooring Supplier Are you a trade or supplier? You can create your listing free at DIYnot Local I'm currently installing a new kitchen and replacing my cooker with a separate hob and double oven. The hob has a total wattage of 6600 watts and the double oven has a total of 4400 watts I plan to run a separate cable for each appliance from an isolator switch placed next to the consumer unit. The cables will run from the isolator switch under the floor for around 6 metres then through a conduit for the last meter to a cooker switch on the wall. What size of cable should I use, 6mm or 10mm Thanks in advance, Chris What about the cable running from the CU to the Cooker isolator are running separates for this or just one? Because of the way the current cooker cable runs in to the consumer unit I can't replace it without removing the consumer unit and the board it is attached to and that requires lifting a false floor Also the kitchen is being re located to a separate area of the house so the old cooker cable will simply be disconnected at the consumer unit and new cable run from a separate isolator switch. Just as an after thought, I should possibly mention that I plan to use a 50 amp isolator switch and run a cable to each appliance from the isolator switch as combined the power required by both the hob and the oven is 11 KW. Even though the highest rated appliance is 6.6KW? couldnt you over rate the cable to the hob isolator switch in the kitchen? then spur off of that to your oven isolator? instead of running 2 separate cables. wouldnt that save running an extra cable? then both cooking appliances are on the same dedicated circuit. Both appliances will be on the one circuit from a 50amp isolator switch but the hob and the oven will have their own separate switches. Also the Hob and oven will be around 2.5 metres away from one and other. The reason I would like to use 6mm is two fold. Firstly I have recently aquired 25 metres of 6mm T&E saving me a few pennies, hey I'm from scotland and a penny saved ... Secondly and most importantly, I don't want any joins in the wires between the isolator switch and the wall switch for the appliance it's self. Hope the above makes sense. So can I do this safely using 6mm T&E or do I need to use 10mm? If I understand your set up correctly by applying a diversity calculation to the output and assuming the cooker control swithes have no integral socket outlets. A 45Amp MCB will be need, 6.oomm2 T&E can carry 47Amps safely, providing no derating factor apply such as grouping of cables and the cables does not pass through thermal insulation and the fuse type being used is not a BS 3036. Hope this helps, but the use of 10mm2 will allow for further upgrades in power at a later date. If you need to find a tradesperson to get your job done, please try our local search below, or if you are doing it yourself you can find suppliers local to you. Select the supplier or trade you require, enter your location to begin your search. Please select a service and enter a location to continue... Please Choose... Plumber / Gas Engineer Electrician Builder Decorator Builders' Merchant Plumbers' Merchant Tile Supplier Flooring Supplier Are you a trade or supplier? You can create your listing free at DIYnot Local When it comes to electrical wiring, the size of the cable you choose is an important factor. Not only does it need to be able to carry enough power to do the job, but it also needs to comply with local regulations in the UK. If you are wiring a new installation or replacing old wiring, it's important to understand how to measure and select the right size of cable.Electrical cables come in a variety of sizes, and the size you choose will depend on the type of wiring you're using and the amount of power you need to move. It's important to make sure that the cable you select is the right size for the job. Knowing how to measure and calculate the correct size of the cable is an important part of any wiring project.In the UK, cables are measured in British Standard (BS) units. The most common unit of measurement for cables is millimetres squared (mm2), which is equivalent to the cross-sectional area of the cable. To calculate the size of the cable you need, you first need to work out the amps of current you need the cable to carry. Once you have this figure, you can use a cable size calculator to help you determine the mm2 of cable required. When calculating cable sizes, it's important to factor in the amount of voltage drop (voltage at the end of the run) you will experience. Voltage drop is the amount of voltage that is lost over a certain distance due to resistance in the cable. The greater the distance the cable has to travel, the higher the voltage drop. To ensure that your wiring system works efficiently, you should aim to keep the voltage drop at or below 3%.As well as calculating the size of the cable you need, you must also consider the type of cable you require. Different types of cable can be used for different applications; for example, some are designed for overhead lines, whilst others are suitable for underground installations. It's important to select the right type of cable for the job in hand to ensure that it is safe and meets all relevant standards. Once you have the size and type of cable you need, you can purchase the cable from an electrical wholesaler or manufacturer. Be sure to check that the cable you purchase is certified by the National Measurement and Regulation Office (NMRO) or British Standards Institution (BSI). This certification confirms that the cable meets all the necessary specifications and safety requirements.Measuring and selecting the right size of cable is an important part of any electrical wiring project. By following the steps outlined above, you can ensure that you select the right size and type of cable for your application. Remember, never underestimate the importance of safety when dealing with electricity – always consult a qualified electrician if you are unsure. Electrical cables are usually used to transmit electricity to different places from one angle to the other. Therefore, to identify these electrical cable sizes, it is essential to understand that incompatible sizes of electrical cables can convey incompatible amounts of current. Also, the electrical cable is determined and measured in American Wire Gauge (AWG) and the International Electro-technical Commission (IEC) electrical wire standards. As a result, the larger or higher the AWG number becomes, the smaller or lower cable size is indicated. While for IEC, electrical cable standards enable easy operation of computers, workstations, printers, laptops, etc. While identifying the right electrical cable size for lighting depending on their types, it's not advisable to run too much current by way of too small of a cable because it can cause lasting impairment to the wiring. It's also possible that it could start an electrical fire. As luck would have it, there are a distinguished number of ways to identify the size of an electrical cable. These electrical cable and wire size methods only require essential appliances that are efficacious for indirect connections to all cables. The following are the simplex methods or ways of identifying the electrical cable sizes: Firstly, please look at the cable insulators and their insulation. Afterward, explore for text or written digits on the insulation. This is done to check whether the last numbers in each string of text represent the AWG of the wires or not. Once you have confirmed that and find they are not, you continue to the next step, incising the wires with your wire cutter. But, it is good to note that the cut should stand up to the run of the wire. Make sure you measure the diameter of the cross-section in inches, of which the diameter is known to be the distance from one side of the cross-section to the opposite side in a straight line. Divide the diameters of the wires by 45. Determine the load of your suitable and fitting electrical cable size. Check the colors; supposedly, they should be black, red, white (neutral), and green in most cases. Examine and differentiate between cable sizes and understand their purposes depending on where one will use them. 2. What Electrical Cable Size Use? Generally, one of the most commonly used electrical cable sizes is 12 and 14 gauges, consecutively, in residential, industrial, and different workplaces. Also, lots and lots of research has found that the larger appliances of electronics, such as electric stoves, electric heaters, water, dryers, and central air units, will often use 6, 8, or even ten gauges electrical wires. But, the right size of electrical cable wire to use varies among different types of cable sizes. To understand or even select the right size of electrical cable, here are some types of electrical cable sizes that are useful and the ones that rely on our products: Solar cable: These cables connect the components of a circuit and serve as a conduit where electricity travels. You have to mainly mount solar cable panels on the rooftop to avoid obstruction. The panels help the energy trespass to the current electrical cable size. There are three types of solar cable, which enable and differentiate the classification of solar cables. Whereby the classification is done based on the numbers of wire gauges. Generally, these types are DC solar cables, DC main cables, and AC connection cables, either in modules or strings. Electrical cable size itself: These electrical cable sizes have a significant role in transporting the energy power or electricity from one point to another. These cables are above local services; they are international ones. Fire-resistant cable: This type of cable continues to operate in the presence of fire. They are good at testing the electrical cable size in earning different classifications. Typically, they work hand in hand with flame. Besides that, fire-resistant are designed to maintain and retain the circuit and integrity of electrical cable size. Also, it continues to work for a specified period under defined conditions. Armored cable is defined as a cable with a metal protective covering, making the best electrical cable size to use. Usually, these armored cables have hard-wearing power cables, which transfer and supply leading electricity. Control cable: The control cable are famously known as multi-conductor cables, basically used in automation and instrumenting applications. They are in a UL relationship, where they are being measured purposefully to regulate the transmission of automated processes. Typically, the control cables have a massive concern of flexibility when they are designed. This is because it is imperative to know if the control cable will require flexibility or you will continuously flex it. Also, control cable comes in 3 applications that do not limit against assembly lines, power distribution, and robotic. All the above types of best electrical wires and cables have different sizes. That is where you will learn about the best sizes to use in each type of electrical cable. Additionally, the classification of electrical cables is also determined by numbers. Of which each number has a function. Other types include the low, medium, and high voltage cables, which are also helpful. 3. How Do You Measure the Electrical Cable Size? The measurement of electrical cable size can be, at times, confusing and challenging. That is why you should always be attentive while sizing it because it's vital to select the proper wire or cable size when measuring a wire for electrical installations. The wrong wire size for more oversized loads of current may create chaos and confuse coalitions, leading to the electrical equipment's failure, hazardous fire, and serious injuries. From that, it is good to make it clear that, from the scientific angle, all conductors, wires, and cables (apart from the superconducting ones) have some amount of resistance. This resistance is usually straightly symmetrical to the length and the opposite symmetrical to the diameter of the conductor. This is because a voltage drop occurs in that conductor whenever current flows through a conductor. Usually, voltage drops may be abandoned for small lengths of conductors. Still, in the case of lower caliber and long-length conductors, we have to consider the considerable voltage drops for proper electrical wiring cable installation and subsequent load superintendence. Besides that, when it comes to electrical wiring, cables, woofers, and speakers, among other electrical machines used for designing treasures, are all under the particular species subjects based on gauge. As a result, the proper electrical wire gauge for woofers and speakers is determined by their length and height and whether or not they are installed correctly in a wall. Other than that, for you to have a secure and safe run of wire in perfection, you need to check its current with an electrical wiring gauge first and see if it's of help and easy to handle. And remember, "wires for treasure makers are subject to physical stress factors." In that case, to find the correct gauge for a particular project, use the prescribed tool. There are five concrete and valuable steps that can guide you through conducting your measurement efficiently. They are as follows: The first thing to always do is eliminate the non-conveyor from electrical wiring and machine wires before sizing its diameter. With the help of a cutter rapier, wedge around the boundary of the insulation and let it lapse at its end. Measure both the non-metallic wiring and wire gauge using the sizing tools that specify measurements for these metals. Use the gauge beside the aperture to position the wire congenially without space. Gauge tools for nonferrous wires bear a different gauge scale than those for ferrous wires. Measure wires containing iron using the Standard Wire Gauge (SWG). Trap the short wires into the round caves. 4. What Is The Electrical Cable Size Chart Amp? By assuming we all understand what a chart is, we, therefore, need to understand the term "amp." An amp is an amperage, and it is referred to as the strength or energy of a current of electricity, which is determined and measured in amperes. Also, the chart amp is the maximum current that a conductor can carry continuously under the conditions of utilization without exceeding its temperature rating. Note that you must use the correct size of electrical wire for the circuit's current (load) requirement to prevent the wire from overheating. Aside from that, ensure that the number and types of electrical gears are connected to a circuit to make it easier to examine the ampacity requirement of the conductor. Usually, a general-function house cable size circuit is designed for 20 amps. While a lighting circuit's electrical cable may be designed for only 15 amps, One of the known, easiest, and simplest methods for calculating chart amps is to take the wattages and divide them by the voltages. For instance, let's take the watts of, say, a lighting fixture you are assigned to do or working for, as 100 and its volts as 20. With this, you'll be required to divide 100 by 20, and you will get 5. Mathematically, this is how it should appear: 20/100 = 5. With that done, just like any other job that requires tools, the electrical cable sizes also have tools that enable easy calculation of chart amps using tools like a multimeter. This tool is defined as a tiny hand-held gear that can measure resistance, voltage, and amperage. It is always wise to remember that when planning or tasked with using this kind of tool, it's vital for you to know what rating the specific model you are using has. A good example is when multimeters will be or are expected to be rated to handle a certain amount of current. If you use a multimeter rated for five amps, but you run 100 amps through it, then the multimeter's fuse will be damaged. Understanding and sizing the amp is imperative, especially when working on a lighting installation or electrical project. You will want to make sure the electrical wires used are not taking on more current than they can handle and are rated for. In the example above, the electrical wiring cable size in the mechanism can only handle an electrical current of up to five amps. They are not supposed to carry more than that, based on the volts and watts being used. Before you carry out your work, always make sure you test all the wires in a light socket for an amp to know how much current it can handle before installing lights of specific wattage. 5. What Is The Length Of An Electrical Cable In mm? Mostly, when dealing with electrical cable size in mm2, you are likely to find what we call twin core and earth cabling used in every single place in different working places and homes in multiple varieties of sizes. Usually, 2.5 mm and 1-1.5 mm are the most commonly used micrometers for socket staff and lights. In addition to that, there is another electrical cabling known as twin-core, which is used for internal and external electrical power cables. And as the name advocates, the twin is a formation of the other two navels, linked with the outer jacket and earth in between. With the inclusion of harmonized colors involved, the twin core cabling is also famously known to be made of a golden sheath for the live score and a blue arming for the neutral core. The earth core will be clear to see in green and yellow sheathing (but will become green when you install it). You then must cover it with an insulation sleeve adequately. Besides that, another core that assists fully in electrical cable wiring is called flex. This one typically joins your appliances and lights for fixed and robust wiring, and it serves the same purpose as the twin core. However, this cabling is obtainable in a range of sizes. Below is an example of a table showing the different sizes one might need for different appliance ratings: APPLIANCE RATING FLEX SIZES 700W 0.5mm2 1.4Kw 0.75mm2 2.3Kw 1mm2 3Kw 1.25/1.5mm2 Last Updated on June 27, 2022 by Richard The following step-by-step guide will show you how to calculate the correct size of cable and wire, or any other conductor, for electrical wiring installations with solved examples in both British or English and SI Systems, i.e., Imperial and Metric Systems, respectively. Keep in mind that selecting the proper wire size is crucial when sizing a wire for electrical installations. An inappropriate size of wire for larger loads with high current may lead to chaos, resulting in the failure of electrical equipment, hazardous fires, and serious injuries. This step-by-step guide explains how to calculate the correct wire and cable size for electrical wiring installations. We will use examples in both the British/English and SI systems (Imperial and Metric systems, respectively). The solved examples for wire sizing are based on wire ampacities and current-carrying capacities according to NEC, IEC 60364, 60228, 60898-1, 60947-2 (International Standards), IET Wiring Regulations, BS 7671 (British Standards), and IEEE regulations. Related Post: How to Size Service-Entrance Conductors and Cables? Why is Correct Wire Size Important? Selecting the correct wire size is crucial when planning and sizing conductors for electrical installations. Using an improper wire size for high-current loads can lead to equipment failure, hazardous fires, and serious injuries. using correct wire size is crucial in electrical wiring installations for several key reasons: Safety Undersized wires can overheat due to excessive current flow, which may lead to electrical fires or equipment damage. Choosing the correct wire size ensures that the wire can handle the expected load without overheating or failing. Current-Carrying Capacity Each wire gauge has a specific current-carrying capacity, known as ampacity. Using the proper wire size ensures that the wire can handle the required current without generating excessive heat or voltage drop, ensuring the efficient operation of electrical equipment. Voltage Drop Incorrect wire sizing can lead to excessive voltage drop, where electrical power is lost as heat along the wire. This can reduce the efficiency of appliances and lighting, cause motors to underperform, and increase energy consumption. Proper wire sizing minimizes voltage drop and ensures that the correct voltage reaches the end of the circuit. Compliance with Standards Electrical codes and standards, such as the NEC, IEC, and BS 7671, specify minimum wire sizes for different applications. Following these regulations ensures that installations are legal, safe, and meet industry standards. Longevity of the Installation Correctly sized wires have a longer lifespan because they are less likely to suffer from excessive heat, wear, or mechanical stress. This reduces maintenance costs and the need for early replacements. Cost Efficiency While undersized wires pose safety risks, oversizing wires can lead to unnecessary costs. Proper wire sizing strikes a balance between safety, performance, and cost. Related Post: How to Size Feeder Conductors with Overcurrent Protection Factors Affecting the Wire Size Current Carrying Capacity: The amount of current the wire needs to carry (known as ampacity) influences its size, ensuring it can handle the load without overheating. Load Current and Breaker Size: The known value of load current in amperes and the rating of circuit breaker. Voltage Drop: For longer distances, consideration of voltage drop becomes crucial to maintain the efficiency and proper functioning of the electrical system. Ambient Temperature: The environmental temperature affects the wire's ability to dissipate heat, impacting its current-carrying capacity. Insulation Type: Different insulating materials have varying thermal and electrical properties, influencing the overall performance and size requirements. Installation Method: The manner in which the wire is installed, whether in conduit, cable trays, or exposed, can affect its ability to dissipate heat and, consequently, its size. Conductor Material: Copper and aluminum have different conductivity and temperature characteristics, influencing their suitability for specific applications and, consequently, their sizing. Code Guidelines: Adherence to electrical codes and standards is crucial, as they provide specifications and regulations for wire sizing to ensure safety and compliance. Type of Load: The nature of the electrical load, whether resistive, inductive, or capacitive, can impact the wire size needed for optimal performance. Cable Bundling: When multiple conductors are bundled together, there is a need to derate the ampacity of each conductor, affecting the overall wire size requirements. Frequency of Operation: For applications involving alternating current (AC), the frequency of operation can influence the skin effect, affecting the effective resistance and thus impacting wire sizing. Types of Cables: It also depends on types of wires and cables for copper and aluminum such as NM-B (Non-Metallic Sheathed Cable) also known as Romex, MC Metal-clad Cables, THHN/THWN, UF-B (Underground Feeder), USE (Underground Service Entrance), SE (Service Entrance): Related Post: How to Size a Branch Circuit Conductors with Protection? All conductors have resistance, which is directly proportional to their length and inversely proportional to their diameter: $R \propto l/a$ ... [Ohm's laws of resistance $R = \rho (L \div a)$] As current flows through a conductor, a voltage drop occurs. While it can be neglected for short distances, longer or thinner wires require voltage drop considerations to ensure proper system function. According to NEC 210.19(A), the maximum recommended voltage drop on a branch circuit is 3% and from the beginning of a feeder to the farthest outlet on a branch circuit should not exceed 5% (215.2(A). For long-distance runs over 50 feet(15.25 meters), consider upgrading to a larger gauge wire to compensate for voltage drop. According to NEC 310-16, for every 100 feet (30.50 meters) of wire length, add 20% ampac