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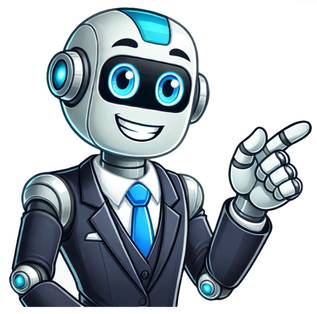

Our transformer size calculator can find the right transformer size (single or three-phase) for any load you require!Within this short text, you will learn:The working principle of transformers;How to size a single-phase transformer;How to calculate transformer size for a three-phase transformer; and More!Keep reading to learn about all the features of this transformer kVA calculator.Transformers are electrical devices that transform voltages. They can bring the voltage up or down depending on their purpose. Transformers work in the following way:Alternating current (AC) flows through a coil of wire, producing a changing magnetic field.A magnetic core leads this magnetic flux through another coil of wire which has a different number of turns than our first coil.Electromagnetic induction produces an electromotive force, a voltage difference, on the second coil.According to the number of turns, this transformer will create a step-up or step-down in voltage.We size transformers based on the load they should power and use kVA, kilo volt-ampere, to rate them (what is kVA?). A higher transformer's kVA means a higher current and voltage output.To find the appropriate size for our load, we need two things:IIII, the current of our load; andVV our load's voltage requirement.Then, all we need to do is plug these parameters into the respective transformer formula.For a single-phase transformer, we have:kVA=IV1000\text{kVA} = \frac{I\cdot V}{1000}kVA=1000IVand for a three-phase transformer:kVA=IV31000\text{kVA} = \frac{I\cdot V\cdot \sqrt{3}}{1000}kVA=1000IV3 This transformer sizing calculator operates with both equations: it works as a single-phase transformer kVA calculator and as a 3-phase transformer calculator! Simply select the transformer type at the top of this tool and type in your parameters.Using this tool is straightforward:Select the type of transformer (single or three-phase).Input your load's current requirement.Input your load's voltage requirement.Our calculator will automatically output the minimum kVA rating for the transformer.Done. Give it a try! Uriya Techniques (India) Pvt Ltd embodies a collective of seasoned professionals with expansive expertise spanning power transformer construction, design, development, production, quality assurance, and maintenance. Operating from a cutting-edge manufacturing facility, the company deploys state-of-the-art manufacturing and testing technologies, adhering stringently to ISO-9001:2008, 14001:2004, and 18001:2007 standards certified by Moody International and benchmarked against IS, IEC & ANSI norms. Uriya is renowned for its determination to offer best quality products to its esteemed clientele. Our competitive edge lies in its extensive marketing network, robust customer relationships and an unyielding commitment to exceptional service and excellence. Product introduction: A power transformer is an electric instrument which through electromagnetic induction, is used to transfer electric power between two or more electrical circuits. It is a static device, meaning it has no moving parts. Power transformers are commonly used in electrical power transmission and distribution systems to step up or step down the voltage level of alternating current (AC) electricity. It consists of two or more coils of insulated wire wound around a laminated iron core. The coil connected to the power source is called the primary winding, while the coil connected to the load is called the secondary winding. The primary and secondary windings are magnetically combined through the iron core but, electrically detached from each other. A power transformer is a pivotal device in the electrical transmission and distribution network. Constructed primarily from iron and copper, it serves the critical function of transforming voltage levels in the grid. This involves stepping up the voltage for transmission to minimize energy loss and stepping it down for safe distribution to industrial, commercial and residential units. Features: Features of a power transformer include robustness, durability and high efficiency. These power transformers are meticulously designed to withstand high voltages, ensuring reliable service even under challenging conditions. Their design includes intricate winding schemes and high-quality insulating materials for safety, while sophisticated cooling systems manage the heat generated during operation. Advantages: Power transformers come with a host of advantages, including their capacity for high voltage operation, excellent efficiency and low power loss, making them indispensable in the power grid. They also offer superior electrical isolation and signal modulation, leading to enhanced power quality. Why choose us: Our objective is to strive for a streamlined and efficient service to cater customers by leveraging quality, research, consultancy and monitoring services. Uriya Techniques (India) Pvt Ltd holds core values as integrity, commitment to customers, customer service and respect for individuals. These values represent the essence of a remarkable organization, and we strongly believe in incorporating them as fundamental principles in every decision we make. They not only guide our operations, planning and vision for the future, but also serve as a benchmark to evaluate them. We strive to create a supportive and positive learning environment where each member has the opportunity to develop a brighter future, fostering the growth and expansion of our company. With a flexible approach to repairs spanning a diverse array of transformer types and brands, Uriya has a proven track record of fulfilling a multitude of repair contracts, further strengthening its reputation in the market. Application in following industries : Chemical, Pharmaceuticals, Steel, Textile, Engineering, Plastic, Cement, Refineries, Mining, Captive Power Projects, Hydro Power Projects, Wind Mill Farms, Construction Houses, Pharma, Electrical, Electronics, Renewable Energy, Automobile We know that atransformer is always rated in kVA. Below are the two simple formulas which can be used to find and calculate the rating of Single Phase and Three Phase Transformers.In any case, both the voltage and currents should be form an individual side either primary or secondary respectively (e.g. Primary voltage primary current or secondary voltage secondary current). To properly size a transformer for a required home appliance, you should select the supply voltage and secondary load current in amperes.Sizing a Single Phase TransformerRating of Single Phase Transformer:P = V IWhere:V = Primary or Secondary VoltageI = Primary or Secondary CurrentP = Power of transformer in VA (Volt-Amps)Rating of a single phase transformer in kVAkVA = (V I) 1000Example:Suppose a 1-phase transformer has the values:P = 240V 62.5A P = 15000 VA ... = 15 kVASizing a Three Phase TransformerRating of Three Phase Transformer:P = 3 V IWhere:V = Primary or Secondary VoltageI = Primary or Secondary Current3 = 1.732P = Power of transformer in VA (Volt-Amps)Rating of a Three phase transformer in kVAkVA = (3 V I) 1000 Example:A 3-phase transformer having the primary voltage and current of 7200V and 4A respectively. Calculate the size of the three phase transformer.Solution:Primary Voltage: 7200VPrimary Current: 4ATransformer Rating = P = 3 V IPutting the values:P = 1.732 7200V 4AP = 49,881 VA 50 kVA Related Posts: Transformer Rating in kVA CalculatorThe following calculator will calculate the rating of the transformer in kVA, Primary or secondary voltage and current respectively. Just enter any two values and click on calculate to find the desired value. Now, look at the General nameplate rating of a 100kVA transformer.The nameplate clearly shows the rating of transformer is 100 kVA.The primary current on the high voltage (HV) side is 5.25 Amperes. Also secondary voltage or low voltages (LV) is 415 VoltsAnd secondary current (load current on low voltages (LV) side) is 139.1 Amperes.In simple words,Transformer rating in kVA = 100 kVAPrimary Voltages = 11000 = 11kVPrimary Current = 5.25 ASecondary Voltages = 415VSecondary Current = 139.1 Amperes.Now calculate for the rating of transformer according toP = V I (Primary voltage primary current)P = 11000V 5.25A = 57,750 VA = 57.75kVAOr P = V I (Secondary voltages Secondary Current) P = 415V 139.1A = 57,726 VA = 57.72KVAas you noticed, the rating of the transformer (on the nameplate) is 100 kVA but according to the calculation, the calculated value is 57kVA.Well, The difference comes due to ignorance of the fact that we used a single phase formula instead of three phase formula. It means it is a three phase transformer and we will use the associated formula for it.Lets clear it using the three phase transformer rating formula.P = 3 V IP = 3 V I (Primary voltage x primary current)P = 3 11000V 5.25A = 1.732 11000V 5.25A = 100,025 VA = 100kVA Or P = 3 V I (Secondary voltages Secondary Current)P= 3 415V 139.1A = 1.732 x 415V 139.1A= 99,985 VA 100kVAConsider the (next) following example.Voltage (Line to line) = 208 V.Current (Line Current) = 139 ANow rating of the three phase transformerP = 3 V IP = 3 208 139A = 1.732 x 208 139P = 50077 VA 50kVARelated Posts: Thats it. Now you know how to properly size a three phase and single phase transformer with suitable rating in VA or kVA for home appliances or any other load applications.The following table shows the dry transformer data of standard kVA rating, Voltage and Current rating for both single phase and three phase transformers.Single Phase TransformerThree Phase TransformerKVA RatingAmperesKVA RatingAmperes120V240V600V120V240V480V600V0.756.253.131.2538.337.2215.4918.334.171.6792521.710.88.661.512.56.252.51541.636.11814.4216.78.333.332055.348.124.119.232512.532569.460.130.124.1541.620.88.333083.372.236.128.97.562.531.312.537.510490.245.136.1083.341.716.7451251085414.33.31512562.525752081809.272.225208104411.71002782411209.237.5313136621.5112.5312271135108504172088 3.3150416361180144756253131252256255412712171100833417167300833722361289167139269627850013881203601481250 is the table in the image format if you need to download as a reference.Related Posts: The Engineering ToolBox provides a wide range of free tools, calculators, and information resources aimed at engineers and designers. It offers detailed technical data and calculations for various fields such as fluid mechanics, material properties, HVAC systems, electrical engineering, and more. The site includes resources for common engineering tasks, such as the values of 240V and 62.5A transformer Rating = P = 240V 62.5A = 15000 VA ... = 15 kVASizing a Three Phase TransformerRating of Three Phase Transformer:P = 3 V IWhere:V = Primary or Secondary VoltageI = Primary or Secondary Current3 = 1.732P = Power of transformer in VA (Volt-Amps)Rating of a Three phase transformer in kVAkVA = (3 V I) 1000 Example:A 3-phase transformer having the primary voltage and current of 7200V and 4A respectively. 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Find & calculate the power rating of a single phase or three phase transformer with the help of the two simple formulas that are shown below. In any condition, transformers size, the voltage as well as the currents should be derived from a single side, either the primary(or)the secondary side, respectively (for example, primary voltage (Volts)x primary current (Amps)or secondary voltage (Volts)x secondary current (Amps)). To determine the appropriate structural size of a transformer for a necessary domestic device, need to determine the supply voltage in volts& secondary load current measured in amperes. Calculating the Size of a Single PhaseTransformer Transformer with a single phase has the following ratings: P = V x I Where: V Primary (or) Secondary Voltage I Primary (or) Secondary Current P Power in VA The kilovolt-ampere rating of a transformer with a three phase kVA= (3 x V x I) / 1000 kVA= (1.732 x V x I) / 1000 Where: 3 1.732You might have come across various types of transformers in your daily life either knowingly or unknowingly. This article illustrates various transformer types. Before getting into classification, here is a brief introduction to the basic principle of the operation of transformers.Transformers are devices used to transfer power between two AC circuits. It works on Faraday's Law of electromagnetic induction. In all transformers except auto-transformers electric power is transferred from one circuit to another by a common magnetic field produced.When an alternating current is applied to the input side of the transformer, it produces a magnetic field. Due to the sinusoidal nature of the AC supply, the magnetic field produced shall be varying. When this varying magnetic field intersects the coil at the output side of the transformer an E.M.F is induced in it. Click to read more on the principle of operation of the electric transformer. Different types of transformers are explained in brief in this article.Transformers can be classified in several ways. In this article, we have classified them based on their application. The following are the distinct types of transformers.Apart from the types of transformers mentioned above, there are various other transformer types such as RF transformers, audio transformers, solid-state transformers, etc. which are not discussed in this section.Transformers that are used at the generating station to step up generated voltage are normally referred to as power transformers. These transformers are usually rated above 500kVA and are present between the generator and the distribution circuits. These transformers are also known as step-up transformers. Their construction varies with rating and installation locations. For outdoor use, they are usually oil-immersed whereas power transformers intended for indoor use are primarily dry type.Depending on the kVA rating power transformers are classified into small power transformers: 100 to 7500kVA, medium power transformers: 7500kVA to 100MVA, and Large power transformers: above 100MVA. Medium and large power transformers are equipped with added arrangements for cooling, tap changing arrangements, and Buchholz relay for internal fault protection. In addition to that, an oil conservator tank is also present for all power transformers. The above image of an outdoor type power transformer can be familiar to you.Distribution transformers do not operate at the generation voltage but operate on the voltage which is suitable for the consumer's use. Distribution transformers are also known as step-down transformers. These transformers are usually rated below 500kVA or even below 200kVA for single-phase transformers. Power ratings are also limited to maximize efficiency. Constructionally these transformers are similar to that of power transformers but some additional features are provided for ease of installation and cooling arrangements. Distribution transformers are single-phase or three-phase transformers. Instrument transformers are used to provide isolation between the high voltage or high current circuits and measuring as well as protection devices. Instrument transformers are classified into Potential transformers or Voltage transformers (PT) and current transformers (CT).Here are the differences between a potential transformer and a current transformer.The potential transformers or voltage transformers are used to step down the system voltage to lower levels so that the measuring instrument can be connected. They cannot be used for supplying raw power to the load. They are used with voltmeters, wattmeters, power factor meters, frequency meters, synchroscopes, circuit breaker tripping circuits, etc. The primary side of the transformer is connected to the high-voltage circuit and the instrument or other circuits are connected to the secondary winding. Any number of instruments can be connected to the secondary until the total impedance does not exceed the rated burden of the PT.With potential transformers, current transformers or CTs are used to isolate measuring and sensing devices to high-current circuits. The primary of a CT is connected in series in the circuit to be monitored and the protection circuits and measurement devices are connected to its secondary. The physical aspects and the connections may vary from one CT to other depending on its type.Current transformers are mainly classified into two types: Bar type CTs and Ring type CTs based on their construction. As stated above the bar-type CT carries full current through its primary whereas the ring-type CTs are installed over the current-carrying conductors.A dry-type transformer is a transformer that uses air as the primary coolant and insulation medium, rather than oil. Dry-type transformers are commonly used in indoor applications, such as in commercial buildings, where safety and fire hazards are a concern. Dry-type transformers are typically rated for lower voltages and smaller power ratings than oil-filled transformers, and they are often used in applications where the load is relatively constant and the ambient temperature is controlled. Dry-type transformers are rated up to 30MVA or 30000kVA. The installation space required by them is much lesser than that of oil-immersed transformers.All power and distribution transformers, except the dry ones, are oil-immersed transformers. As discussed earlier, the core and windings on these transformers are completely immersed in oil. The transformer oil provides better insulation and cools the core and winding.The isolation transformer is a type of transformer used to isolate a device or a circuit from the power supply. It provides galvanic isolation to the device. It has a turns ratio of 1:1 meaning that the primary and secondary of an isolation transformer contains an equal number of windings. It is capable of mitigating the DC component of a signal from one circuit to the other. This type of transformer can be found in DC power supplies and communication circuits.Constant voltage transformers or CVTs are primarily used as noise-reduction devices. It is a constant voltage output transformer, meaning large variations in input voltages results in very small variation in output voltage. These transformers are based on the saturation of ferromagnetic material and Ferro-resonance. CVTs are capable of reducing voltage sags and are widely used in dc power supplies, contactors, relays, solenoid valves, switched-mode power supplies, and PLC (Programmable logic controller) circuits. The output voltage regulation capability of a constant voltage transformer is determined by the inrush and steady operational currents of the connected load. CVTs works are low voltages (max 260V) and are available up to a rating of 1500VA.Phase-shifting transformers (PST) are used to improve the power transfer efficiency of AC networks. A PST consists of a phase shift between the input and output voltages. This phase shift is achieved by introducing a series voltage component with a controllable magnitude and angle. The series voltage component is usually provided by a shunt connected transformer.Maintaining the voltage level within the limit is necessary to maintain power quality. The step voltage regulator is one such device that keeps the magnitude of voltage within the limits. It consists of an autotransformer, a tap changer, and a control circuit for automatic tap changing. Step regulators can be used in single-phase, three-phase, or any one-phase of the wye or delta-connected three-phase system.An autotransformer is a transformer single winding. It consists of a single winding that acts as both primary winding and secondary winding. The energy transfer between the primary and secondary sides of an autotransformer happens mainly through conduction and a small amount of energy is transferred by induction. Their advantage over the two winding transformers is that for the same power rating and voltage ratio, it has lesser losses and higher efficiency than normal transformers.Autotransformers are widely used as AC motor starters and in laboratories to continuously varying voltage. They are available for single-phase and three-phase circuits. Three-phase transformers have three separate windings for each phase. Autotransformers are commercially known as variac and are available up to 2MVA.In a distribution transformer with delta-connected secondary or ungrounded WYE secondary connections, a grounding transformer is used to provide a ground path or neutral. This can help in reducing voltage transients when restriking ground faults occur. Zig-zag transformers can also be used for grounding.Read more about grounding transformers: Grounding transformer or Earthing transformerThese are small transformers found inside electronic circuit boards, especially in power supplies, amplifiers, televisions, radios, inverters, etc. They are made by winding wire over donut-shaped ferromagnetic cores.The types of transformers are not limited to those mentioned above. There are several other transformer types that are manufactured for a specific application.Device to couple energy between circuitsThis article is about the electrical device. For other uses, see Transformer (disambiguation).TransformerAn O-core transformer consisting of two coils of copper wire wrapped around a magnetic coreComponent typePassiveWorking principleElectromagnetic inductionInventorMichael Faraday[1]Invention year1831Electronic symbolIn electrical engineering, a transformer is a passive component that transfers electrical energy from one electrical circuit to another circuit, or multiple circuits. A varying current in any coil of the transformer produces a varying magnetic flux in the transformer's core, which induces a varying electromotive force (EMF) across any other coils wound around the same core. Electrical energy can be transferred between separate coils without a metallic (conductive) connection between the two circuits. Faraday's law of induction, discovered in 1831, describes the induced voltage effect in any coil due to a changing magnetic flux encircled by the coil.Transformers are used to change AC voltage levels, such transformers being termed step-up or step-down type to increase or decrease voltage level, respectively. Transformers can also be used to provide galvanic isolation between circuits as well as to couple stages of signal-processing circuits. Since the invention of the first constant-potential transformer in 1885, transformers have become essential for the transmission, distribution, and utilization of alternating current electric power.[2] A wide range of transformer designs is encountered in electronic and electric power applications. Transformers range in size from RF transformers less than a cubic centimeter in volume, to units weighing hundreds of tons used to interconnect the power grid.Ideal transformer equationsBy Faraday's law of induction: V P = N P d d t {\displaystyle V_{\text{P}}=N_{\text{P}}{\frac {\mathrm {d} \Phi }{\mathrm {d} t}}} Eq. 1[a][3] V S = N S d d t {\displaystyle V_{\text{S}}=N_{\text{S}}{\frac {\mathrm {d} \Phi }{\mathrm {d} t}}} Eq. 2where V {\displaystyle V} is the instantaneous voltage, N {\displaystyle N} is the number of turns in a winding, d/dt is the derivative of the magnetic flux through one turn of the winding over time (t), and subscripts P and S denotes primary and secondary.Combining the ratio of eq. 1 & eq. 2:Turns ratio = V P V S = N P N S = a {\displaystyle ={\frac {V_{\text{P}}}{V_{\text{S}}}}={\frac {N_{\text{P}}}{N_{\text{S}}}}=a} Eq. 3where for a step-up transformer a < 1 and for a step-down transformer a > 1.[4]By the law of conservation of energy, apparent, real and reactive power are each conserved in the input and output: S = I P V P = I S V S {\displaystyle S=I_{\text{P}}V_{\text{P}}=I_{\text{S}}V_{\text{S}}} Eq. 4where S {\displaystyle S} is apparent power and I {\displaystyle I} is current.Combining Eq. 3 & Eq. 4 with this endnote[b][5] gives the ideal transformer identity: V P V S = I S I P = N P N S = L P L S = a {\displaystyle {\frac {V_{\text{P}}}{V_{\text{S}}}}={\frac {I_{\text{S}}}{I_{\text{P}}}}={\frac {N_{\text{P}}}{N_{\text{S}}}}={\sqrt {\frac {L_{\text{P}}}{L_{\text{S}}}}}=a} Eq. 5where L P {\displaystyle L_{\text{P}}} is the primary winding self-inductance and L S {\displaystyle L_{\text{S}}} is the secondary winding self-inductance.By Ohm's law and ideal transformer identity: Z L = V S I S {\displaystyle Z_{\text{L}}={\frac {V_{\text{S}}}{I_{\text{S}}}}} Eq. 6 Z L = V P I P = a V S I S / a = a 2 V S I S = a 2 Z L {\displaystyle Z'_{\text{L}}={\frac {V_{\text{P}}}{I_{\text{P}}}}={\frac {aV_{\text{S}}}{I_{\text{S}}/a}}=a^{2}{\frac {V_{\text{S}}}{I_{\text{S}}}}=a^{2}Z_{\text{L}}} Eq. 7where Z L {\displaystyle Z_{\text{L}}} is the load impedance of the secondary circuit & Z L {\displaystyle Z'_{\text{L}}} is the apparent load or driving point impedance of the primary circuit, the superscript {\displaystyle '} denoting referred to the primary.An ideal transformer is linear, lossless and perfectly coupled. Perfect coupling implies infinitely high core magnetic permeability and winding inductance and zero net magnetomotive force (i.e. ipnpisns=0).[4][c]Ideal transformer connected with source VP on primary and load impedance ZL on secondary, where 0