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Would a transformer be a resistive load? No. It is mainly an inductive load with some parasitic resistance and capacitance thrown in. Inside every little problem, is a big problem trying to get out. I feel, it depends on the load on the transformer, though the transformer itself contributes due to copper and iron losses. If the major load on the secondary of the transformer is resistive, the self inductance of the transformer alone would amount to only say 3 or 4 % and the rest depends on the actual load, the transformer characteristics obviously depend on the Quality of the manufacture. This is a duplicated thread. Eric " Good enough is Perfect ", good enough means it meets the Clients specification. I Please do NOT PM me with technical questions, use the Forums A transformer is nearly purely inductive when unloaded and nearly purely resistive when fully loaded with a resistive load. When fully loaded with a purely resistive load the leakage inductance is resistive for the small amount of inductive I do not answer private messages asking for help because no one else can benefit from advice I may give or correct me if I'm wrong. Please ask on the open forum if you have a question and I'll be happy to help, if I know the answer. Desired, manufacturers' fully assembled, wired and operational, tested in our workshops, before site works are minimal. The ESS are compact and consist of power factor correction equipment.... Would a transformer be a resistive load? No. It is mainly an inductive load with some parasitic resistance and capacitance thrown in. Inside every little problem, is a big problem trying to get out. I feel, it depends on the load on the transformer, though the transformer itself contributes due to copper and iron losses. If the major load on the secondary of the transformer is resistive, the self inductance of transformer alone would amount to only say 3 or 4 % and the rest depends on the actual load, the transformer characteristics obviously depend on the Quality of the manufacture. This is a duplicated thread. Eric " Good enough is Perfect ", good enough means it meets the Clients specification. I Please do NOT PM me with technical questions, use the Forums A transformer is nearly purely inductive when unloaded and nearly purely resistive when fully loaded with a resistive load. When fully loaded with a purely resistive load the leakage inductance is responsible for the small about of inductive. I do not answer private messages asking for help because no one else can benefit from advice I may give or correct me if I'm wrong. Please ask on the open forum if you have a question and I'll be happy to help, if I know the answer. Here is the 4th part of Nasir's tutorial on transformers. The 3d one was Losses in a transformer. If you want to write for the blog just like Nasir, don't hesitate and send us a mail. What is loading? A load is a part of the circuit which consumes electrical energy or power and converts it into some other form like heat of some external mechanical work or electrical energy. Similarly, when an external circuit is attached to the secondary coil of the transformer, so that it draws the appropriate amount of the electric energy power distributed across the secondary coil, then the transformer is said to be loaded. Current only flows through the circuit if it is closed, i.e., only when the secondary coil has a closed circuit connected to it, called the load, only when the current can flow through it. The load on a transformer can be of several types. Resistive Load Capacitive Load Inductive Load Or a Combination of above types.No Load Behavior of a Transformer When the secondary coil of the transformer is not connected to any external circuit or both its two leads are open, then the transformer is said to be in a no-load condition. In this case, when the current is supplied to the primary coil of the transformer through an external alternating source, then this current is used for magnetizing the core of the transformer, but in actual is not exactly equal to the magnetization current. This is due to the fact that the current which is supplied to the primary coil at no-load condition has two components. One is the magnetizing component which is merely utilized for the production of the alternating magnetic flux in the core, while the other one is the energy supplying component which is used for the compensation of the core losses of the transformer. These two components can be vector ally represented as follows: Where; Iw is the energy supplying component and Iμ is the magnetizing component of the primary no-load current I0. When the secondary coil is open, the back emf produced by the current of the primary coil does not let this current flow to the secondary winding and hence the circuit does not complete and we get no output power. Behavior of Transformer on loading When a load is connected across the secondary windings of the transformer, then the circuit completes, and through Faraday's law of electromagnetic induction, a current also flows through the secondary coil. This current produces a magnetic field of its own, and depends upon the type of load and the voltage induced in the secondary coil, which in return depends upon the number of turns in the secondary coil, as it is shown through the relation below: And finally we can write all the above expressions into one equation, which is: Where; n is called the Transformation Ratio. The magneto motive force produced due to this current produces a flux in the secondary coil which opposes the flux of the primary coil, as a result of which a decrease in the net flux is observed. This weakening of the main flux makes the voltage fall down a bit, and to compensate this flux weakening, an extra current flows through the primary coil and then the effect is such that it neutralizes the magnetic force of the secondary coil, so that the total magneto motive force remains changed. This on load representation of the transformer is shown below: That's all for today, in the coming post we will check the difference between the Series and Parallel Transformer. We can join transformers both in series and parallel configuration to increase different parameters. So in the coming we will check what the differences between the two combinations are. Nasir, Share – copy and redistribute the material in any medium or format for any purpose, even commercially. Adapt – remix, transform, and build upon the material for any purpose, even commercially. The licensor cannot revoke these freedoms as long as you follow the license terms. Attribution – You must give appropriate credit , provide a link to the license, and indicate if changes were made . You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use. ShareAlike – If you remix, transform, or build upon the material, you must distribute your contributions under the same license as the original. No additional restrictions – You may not apply legal terms or technological measures that legally restrict others from doing anything the license permits. You do not have to comply with the license for elements of the material in the public domain or where your use is permitted by an applicable exception or limitation . No warranties are given. The license may not give you all of the permissions necessary for your intended use. For example, other rights such as publicity, privacy, or moral rights may limit how you use the material. Status Not open for further replies. Hey guys, I want to calculate the current on the primary side of a 3 phase transformer. I have a 100kV load, the pri voltage is 25kV, the secondary voltage is 120/208V and assume a PF of 0.8. I'm just learning this stuff so any help is greatly appreciated. Thanks primary power = secondary power @100%efficiency, ideal coupling also i think primary is the LOW voltage side, or the input side IF your new with electronics and HV , and doing a teslacoil i'd suggest reading all those safety tips out there in the net but over E1. This causes the secondary winding current I2 in order to restore the primary flux Φ that E1 = V1. This additional current I2' produces additional flux Φ2' in the primary as shown below. The total flux Φ2' in such a case is the sum of the two fluxes Φ1 and Φ2' produced by the secondary current I2, but it is in the same direction as the main flux Φ2. This completely causes to neutralize the magnetic effect of the secondary current. This whole process starts at the instant when the transformer is loaded. Therefore, the net flux in the transformer when it is loaded is only due to primary (i.e., Φ) which is the same as that of the no-load condition shown in the below figure. Therefore, we can conclude that whatever will be the condition of the transformer (either no-load or on-load). The operation will be the same if the voltage drop across the windings is not assumed and the core losses will remain constant under all conditions. Hence, when the transformer is loaded, the primary has two components currents in it i.e., no-load I0 and load component of primary current I2'. The total primary current is the vector sum of I0 and I2' as given by, Phasor Diagram of Transformer on Load Condition : The phasor or vector diagrams for a transformer on resistive, inductive, and capacitive loads are drawn by taking flux Φ as the reference. Let,V1 = Primary supply voltage. E1 & E2 = Primary and secondary induced emf's.I0 = No-load primary input current.I2 = Primary current.I2 = Secondary current.I2 = Balancing current or load component of the primary current. For Resistive (non-inductive) Load : When the transformer secondary is connected to a resistive load, the current will be in phase with the voltage. For Inductive Load : When the transformer secondary is connected to an inductive load, the current flowing will lag with respect to the voltage as shown below. For Capacitive Load : Similarly, when the transformer secondary is connected to a capacitive load, the current flowing will lead to the respective voltage as shown below. In a transformer when it is loaded as compared to current I2', I0 is very small, and if we neglect it. Then primary current I1 is equal to I2' (I1 = I2'). We get, you 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: 500 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 is also present for a power transformer. The above type of an outdoor type power transformer can be familiar to you. Distribution transformers do the same job of delivering the power to consumers at required voltage levels. These types of transformers are step-down transformers – meaning that their function is to reduce the applied voltage to lower levels, to fulfill the requirements of consumers or load centers. Even though industrial standards limit the rating of distribution transformers to 500kVA, even higher ratings are also being manufactured. Constructional features of these transformers are similar to that of power transformers but sometimes lack Buchholz relay, oil conservator, and cooling arrangements. Distribution transformers are available in single-phase as well as three-phase versions.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 and ring-type 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 another 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 used for current carrying conductors.A dry-type transformer is one that does not contain a liquid medium surrounding its windings. The insulating gas or dry compound. When compared to oil-immersed ones, dry-type transformers are lighter and non-flammable. Windings are coated with resin or varnish to protect them from adverse environmental conditions. They are suitable for both indoor and outdoor applications, but they are recommended only for environmental conditions. Some of them are equipped with forced cooling arrangements. Constructional features of these transformers are similar to that of power transformers but sometimes lack Buchholz relay, oil conservator, and cooling arrangements. 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 creates a phase shift between the primary and secondary sides. This phase shift affects the flow of current through the circuit. It is also known as a quadrature booster. A quadrature booster consists of two separate transformers. One of them is connected in series to the main circuit and the other is connected across the phases. The output of the shunt transformer is then applied to the input side of the series transformer. The magnitude of the voltage and phase shift can be controlled by varying the taps on the secondary of 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 VA rating, autotransformers need lesser copper conductors for windings. Also, 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. How can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today's most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors' Picks.Browse Editors' FavoritesHow can financial brands set themselves apart through visual storytelling? Our experts explain how.Learn MoreThe Motorsport Images Collections captures events from 1895 to today's most recent coverage.Discover The CollectionCurated, compelling, and worth your time. Explore our latest gallery of Editors' Picks.Browse Editors' FavoritesI am just a beginner when it comes to high frequency high voltage ac so this question may or may not sound stupid. I have a ccl inverter that takes 12 volts dc and turns it into 900 volts ac at around 25khz, when I plugged a neon indicator bulb into one of 2 outputs it glowed like normal, but I accidentally disconnected one of the leads going to the bulb, and to my amazement, it was still glowing, albeit a lot dimmer. How can this light work with only one end attached to a power source? Thanks in advance -Ray. Because of the relatively high frequency, (25kHz), there is sufficient capacitance in the neon lamp and the unconnected wire for a small current to flow through the neon lamp and excite the gas. JimB Experience is directly proportional to the value of the equipment ruined. Happily retired and playing with my big boys toys every day. Try adding a length of wire to the not connected neon lamp's leg. (turn off the power first) Or you could just set a tool on the leg. (turn off the power first) don't get killed! it's the stray capacitance of the open electrode with the air around it that provides a path for what amounts to leakage current... when I was young, and working my first summer job in a TV shop, we would use a neon bulb (not wired to anything at all) to verify that the Horizontal Output tube and the flyback transformer were working and continuing to operate. The bulb was connected to the anode of the HOTT and the other lead to the secondary winding.An EMF E2 is induced in the secondary winding that develops a voltage V2 across its terminals.When a load is connected between the secondary winding terminals, a current will flow in the secondary winding and load circuit which is denoted by I2.The secondary winding current also induces a counter emf voltage (V1) and lags the magnetic flux by 90°.The reactive component Iμ lags the supply voltage V1 by 90°.The active component Iw is in-phase with the supply voltage (V1).The no-load current I0 lags the supply voltage V1 by an angle φ0 which is the no-load power factor angle of the transformer.From this phasor diagram, we can derive the important relations of different electrical parameters of the transformer. They are, (1). The magnitude of no-load current: I0 =Iw sin(φ) + Iμ cos(φ) (2). The magnetizing component of no-load current: Iμ = I0 sin (φ) (3). 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