International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 03 | Mar 2019 www.irjet.net p-ISSN: 2395-0072

CURRENT LIMITING TRANSFORMER

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Abstract - *The core gaps are used in magnetic shunt paths of current limiting transformer to limit secondary current under short circuit conditions. In short circuit condition the infinity of current flows in secondary side of transformer and the secondary winding of transformer gets burn or load such as motor connected to secondary winding will damage. Current limiting transformer is capable for limiting short circuit current in short circuit condition the current on secondary side is increase and flux on secondary side also increases, this increased flux on secondary winding gets bypassed by using the iron core .this iron core is placed in between the two limbs of transformer*

Key Words: Types of Transformers1, Applications2

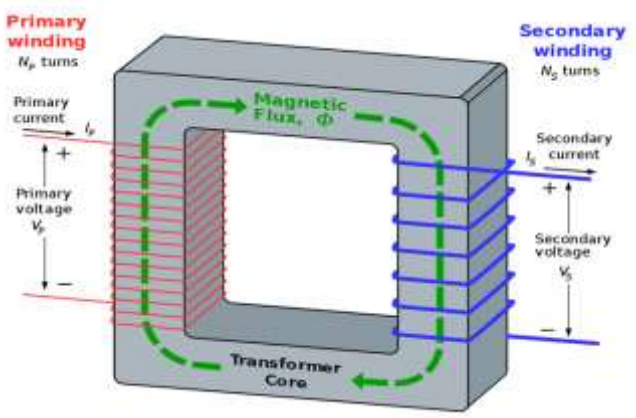
1. INTRODUCTION

As current control is plays important role in different industrial sector for driving drives, a current limiting transformer have distributed primary and secondary winding. Primary coil P1, P2, P3 are placed in half part of core and S1, S2, S3 are placed at opposite end of core. One another important change in conventional design is change in leakage inductance properties. Leakage inductance has the useful effect of limiting the current flows in a transformer without dissipating power.

As leakage inductance depends on the geometry of the core and the windings. Change in leakage inductance is done by adding extra path to flow of flux in between core limbs. If we design transformer with 100% of leakage inductance the transformer will not burn event after short circuit the secondary winding.

2. CONSTRUCTION OF TRANSFORMER

Transformer works on the principle of faradays law of electromagnetic induction “whenever a current carrying conductor is placed in magnetic field it cuts the magnetic flux and EMF is induced in conductor”



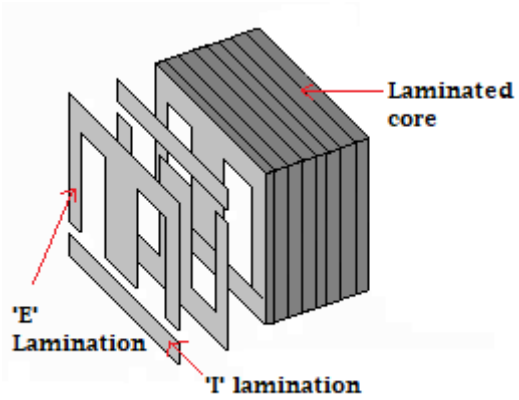
3. PARTS OF TRANSFORMER

3.1 Winding

Enamelled Copper Wire or Enamelled Aluminum Wire is used in the construction of transformers, inductors, motors, headphones, loudspeakers, hard drive head positional, potentiometers, and electromagnets, and many more applications. Enameled wire is covered with thin insulation. Enameled copper wire typically uses one to three layers of polymer film insulation, to provide a tough, continuous insulating layer.

3.2 Core

Cold Rolled Grain Oriented Electrical Steel (CRGO) and Non Cold Rolled Non Grain Oriented Electrical Steel CRNGO. Grain oriented Electrical Steel CRGO is undoubtedly the most important soft magnetic material in use today. Whether in small transformer, distribution transformer or in large transformer & generator, grain oriented electrical steel CRGO is a must for the production of energy saving electrical machines. Grain oriented Electrical Steels are iron-silicon alloys that provide low core loss and high permeability needed for more efficient and economical electrical transformers



3.3 Bobbin

Winding is wound on Bobbin and these bobbin consist of Bakelite and fiber material. When we Design a Transformer then we use Bakelite material because it can withstand with high voltage and high heat. Bakelite or polyoxybenzylmethylenglycolanhydride is an early plastic. It is a thermosetting phenol formaldehyde resin, formed from an elimination reaction of phenol with formaldehyde. It was developed by Belgian-born chemist Leo Baekeland in New York in1907. Bakelite has a number of important properties. It can be molded very quickly therefore identical units can be mass produced.

Moldings are smooth, retain their shape and are resistant to heat, scratches, and destructive solvents. It is also resistant to electricity, and prized for its low conductivity. It is not flexible.

4. CONCEPT OF CURRENT LIMITING TRANSFORMER

The expansion of the electric power system and the connection of dispersed generators to electric network lead to increase the fault current. Although many kinds of fault current limiter have been proposed and are under development ,most of them work only for the current limitation and high cost well as more space required for their installation are difficult problems. Further more a certain amount of connection causes voltage fluctuation over a prescribed voltage quantity criteria in the distribution system .one of the solution is to establish a step voltage regulater (SVR) in the half way of distribution line ,however this need an extra expense and it cannot limit current properly this problem prevent development of electric network and extensive introduction of the dispersed generators .we have proposed the transformer whose leakage reactance can be controlled by an moving iron-core block .this equipment with capacitor in parallel –connection has three functions of voltage transformation ,fault current limitation and voltage regulation therefore it can be substituted for a transformer in a distribution substation or a consumers power receiving substation SVR and so on , with an additional fault current limiting function it is also expected that it works for power flow control and fault current limitation in a loop network .a small trial transformer is manufactured and functions are proved experimentally and its characteristics and some points that should be improved clarified.

5. CONCLUSION

The current limiting transformer is used to limit the current on secondary side under the fault condition from the current limiting transformer we conclude that to limit the current we need to add the extra core in between the windings. Also we limit the short circuit below the rated current.

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