



Name: Trupti Rajendra Patil
PRN no: 2020BTECG00051
Branch: computer Science
Subject: BEE
Date: 24-8-2021

EXPERIMENT - 06

Title: To study working, types, construction and parts of transformer.

Objective: To understand functioning of transformer

Theory: Transformer is an electrical device that transfers electrical energy from one circuit to other by electromagnetic induction.
Some important components of transformer.

- 1) Laminated core
- 2) Windings
- 3) insulating material
- 4) Breather
- 5) Tap changer
- 6) conservator
- 7) cooling tubes
- 8) Transformer oil
- 9) Buchholz relay
- 10) Explosion vent

The above parts can be further explained as:

1) Laminated core:

It is used to support the coinding in the transformer. It provides low reluctance path



flow of magnetic flux. It is made up of laminated core (soft iron) to reduce eddy current loss and Hysteresis loss. Diameter of transformer core is directly proportional to copper loss and inversely proportional to iron loss.

2] Windings:

These are classified in two different ways:

- a) Based on input and output supply
 - i) primary ii) secondary
- b) Based on voltage range.
 - i) High voltage ii) low voltage.

3] Insulating material:

Insulating material like papers and cardboards are used to isolate primary and secondary windings from each other as well as the transformer core. These windings are made up of copper due to high conductivity and ductility.

4] Breather:

Expansion and contraction of oil cause change in pressure of conservator. This change in pressure of conservator is balanced by flow of atmospheric air into and out of the conservator. This contains of silica gel to provide moisture free air.

5] Tap changer:

To balance voltage variations within transformer, tap changers are used. There are two types of tap changers-on load and off load. In on load tap changers, tapping can be changed without isolating transformer from supply while in off load, transformer needs to be disconnected from supply.



6] conservator:

It conserves transformer oil. It is an airtight metallic cylindrical drum which is fitted above transformer.

7] cooling Tubes:

It is used to cool the transformer oil. The circulation of the oil within transformer may be natural and forced. In the case of natural circulation, when the oil temperature rises, the hot oil naturally moves to the top and cold oil moves down, while in case of forced circulation an external pump is used.

8] Transformer oil:

It performs two functions : i) insulation ii) cooling for core and coil assembly. Core and windings of transformer must be completely immersed in oil. Normally by carbon minerals oils are used for transformer oils.

9] Buchholz Relay:

It is connective device container housed over the connecting pipes from main tank to conservator tank. It is used to sense fault inside the transformer.

10) Explosion vent:

The boiling hot oil from the transformer is expelled during internal faults through the explosion vent to avoid explosion of transformer. This is generally placed above level of conservatory tank.



Construction:

Basically, transformer consist of two inductive windings and laminated steel core. coils are insulated from each other as well as steel core. A transformer also contains of a suitable container for the assembled core and windings such as tank, a suitable medium for insulating core and windings from its container such as transformer oil, suitable bushings for insulating ad bringing out terminals of the windings from container, temperature guage to measure temperature of hot oil and oil guage to indicate oil level inside tank.

Working Principle:

The basic phenomena behind working of transformer is mutual induction between two windings.

Types of Transformer:

1) Types on basis of construction:

- core type transformer: Windings are wounded on the core.
- shell type transformer: The coils are former wound and mounted in layers with insulation betⁿ them.

2) On the basis of purpose:

- step up transformer: voltage increase
- step down transformer: voltage decrease.

3) On the basis of types of supply:

- single phase
- Three phase.



4) On the basis of their use :

- a) Power transformer : Transmission network, high rating
- b) Distribution transformer: Distribution network, lower rating than power transformer
- c) Instrument transformer: used in relay and industries.

5] on the basis of cooling employed.

a) oil immersed transformer:

These transformers are further classified as

- i) oil immersed natural cooled
- ii) oil immersed force air cooled
- iii) oil immersed water cooled
- iv) oil immersed force oil cooled.

b) Dry type transformers: These are types of these transformers as

- i) air blast type
- ii) air cooled type.

Conclusion:

The principle, working, construction and types of transformer has been studied.



