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Coreless Welding Transformer

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Abstract

The study of welding transformer with detailed sequence of operation is necessary. Parameters of welding type transformer compared to those of an ordinary step down transformer of equivalent ratings are distinct. Also these papers present a new method for manufacturing of arc welding type transformer. This method uses an auxiliary circuit and series coupled inductor and hence the number of tappings of simulation and experiment result are presented to show valuable operating of proposed method arcing starting.

Keywords: *Secondary winding, Primary winding, Coil*

INTRODUCTION

This forms the joint no pressure is required in case of arc welding the temperature is of the order of 3600 degree celsius at which mechanical pressure is not required for joining two metals the arc voltage varies between 45-60 V and current from 150 Amperes in sheet metal work. The arc should have negative resistance characteristics meaning that resistance decreases as current increases or as arc current increases and arc forms flexible conductor and produce magnetic field two effects of this magnetic field.

In this type of welding transformer the core is not used hence it is core less transformer and hence due to absence of core the constant losses are very less. It is compact in size therefore very less eddy current losses and hence hysteresis losses are also very less. For cooling purpose the small motor fan is used.

On primary side of winding four tappings are created in order to increase the welding power according to the application these are as follows:

Table 1 : *Details of primary Winding*

Tapping No.	Voltages on Secondary	Primary currents	Current on secondary
1.	51.04V	275	125.77A
2.	48.08V	290	136.88A
3.	45.58V	300	147.79A
4.	43.88V	315	150.98A

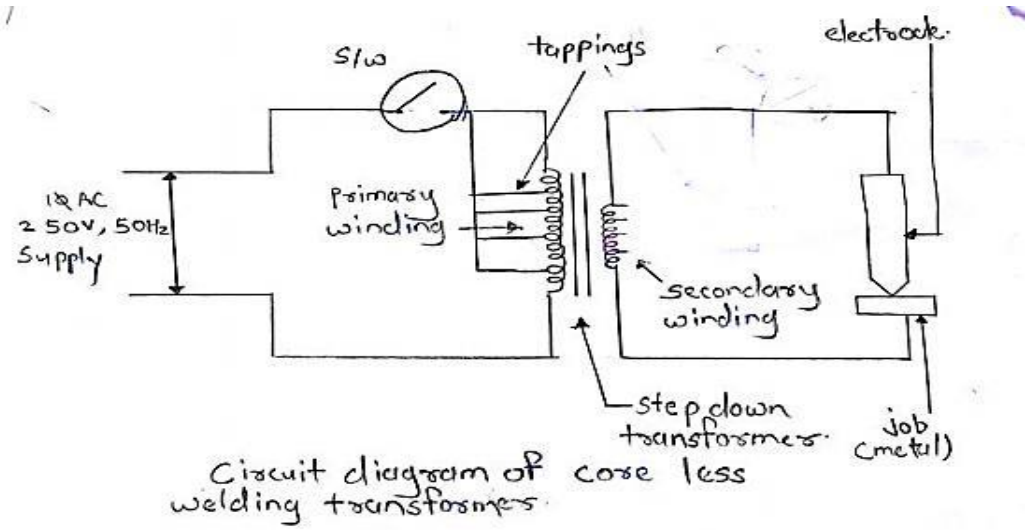

Figure 1: *Circuit Diagram.*

Circuit Diagram Operation

The above figure or circuit diagram shows the constructional diagram of welding transformer. Primary has four tappings and secondary has an electrode and a switch is provided to the this welding transformer. When the voltage is given to the primary winding then flux is created in the primary winding then this flux is cut by the secondary winding directly. According to the faradays law of electromagnetic induction the voltage is induced in secondary winding hence high current (It is above 100A) flows through secondary winding. The welding transformer is a step down transformer. It is single phase welding transformer. The primary winding voltage is 230V primary winding current is 0.9A. When the supply is given to primary winding the flux is created in air gap and the flux links with secondary winding and first of all one electrode is connected to the job (metal job) and second electrode of secondary is connected to the job. Tappings are provided to increase the arcing speed on the secondary side. It is depending upon types of application to be used.

CONSTRUCTION

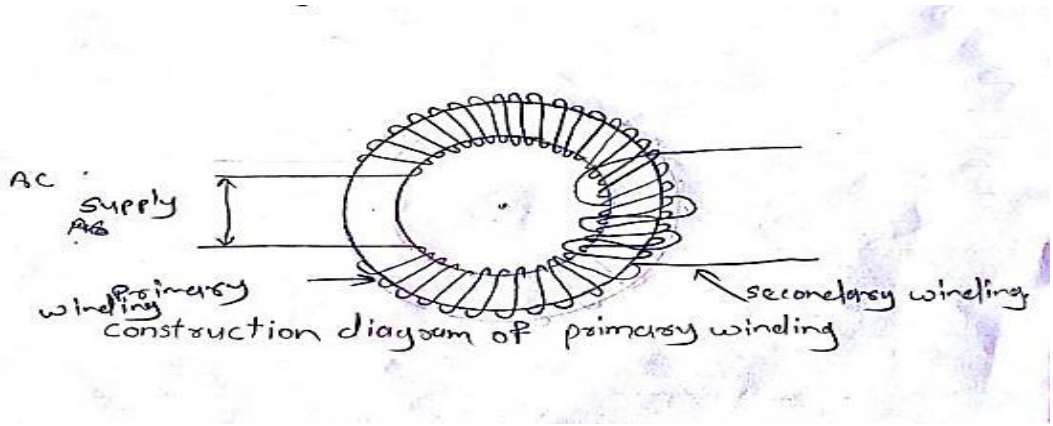

Figure 2: *Primary Winding.*

Primary winding of welding transformer consist of total 315 turns and the material used for primary winding is copper that has 5mm^2 cross-sectional area. Due to absence of core the flux are circulate in the air gap of the transformer. A uniformly flux production is possible. Hence heating of primary winding increases and hence to limit short circuit the high quality insulation is used, for e.g. cotton tape, insulating paper and also sometimes varnish is preferred.

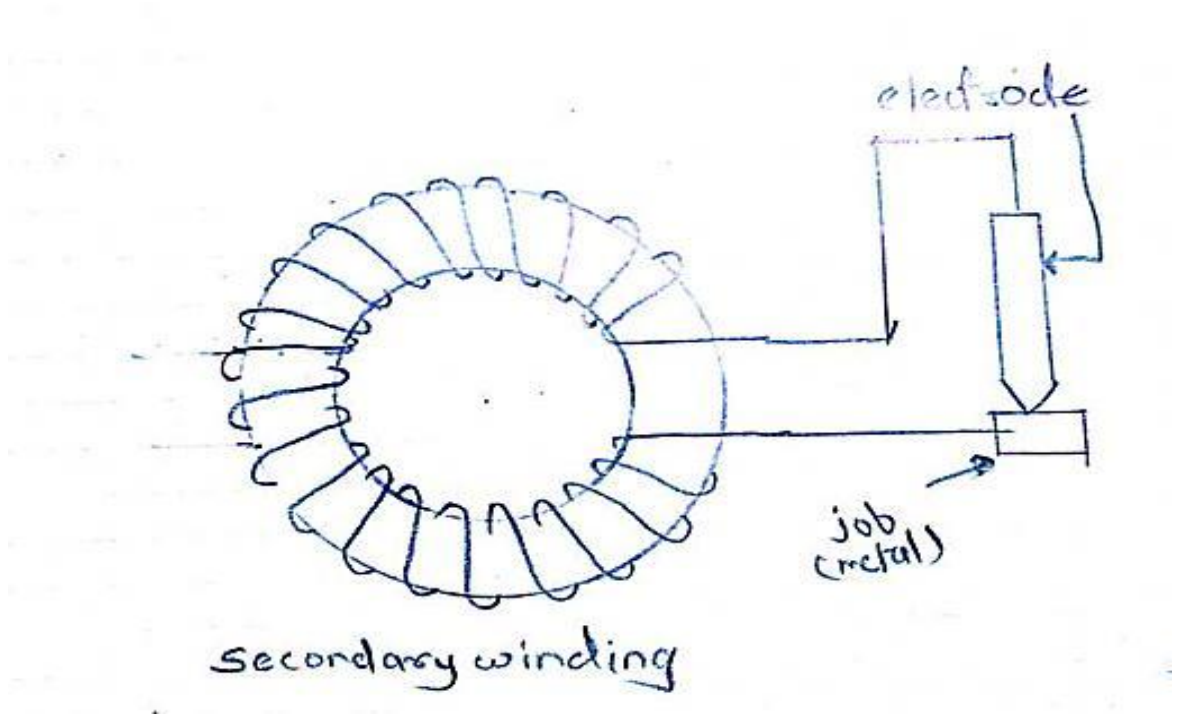

Figure 3: *Secondary Winding.*

Secondary winding is having less number of turns as compared to primary winding. The secondary winding turns are 47. And the cross-sectional area is large. It is about 2.5 cm^2. The resistance on secondary side is less due to large area of cross-section of conductor. Due to these high current flows through secondary winding. Hence it should be provided with high rating insulation, for e.g. cotton tape, varnish.

Advantages

1. The welding transformer is core less.
2. Reduces cost of core of transformer.
3. It is compact in size.
4. Running cost of welding transformer is less.
5. Initial cost is less.
6. It requires single phase supply.
7. Hysteresis and eddy current losses are very less.

RESULTS

Hardware implementation of the welding transformer based power consumption.

CONCLUSION

In these way we learnt about most popular welding types used in industry. This provides reliable welding. General welding equipment is not very costly. Portable welding requirements are available. A large number of metal and alloy both similar and dissimilar can be joined by welding. Welding permits considerable freedom in design.

REFERENCE

1. Available: HTTP://reinforcement/Archives/doc/manual142.PDF
2. Baldwin T.L. & Hogans T. Reactive-Power compensation for voltage control at resistivity welders. *IEEE Trans. On industry application*. Doi: 101109/TIA.2005.858301.
3. Klopcic B., Dolinar D. & Stumberger G. Advanced controlled of a resistance spot welding system. *IEEE Trans. On power electronics*. Doi:101109/TPEL.2007.911851
4. www.wikipedia.com

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