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Manufacture of High Current Low Voltage Power Supply with Using the Mot (Microwave Oven Transformer)

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ABSTRACT

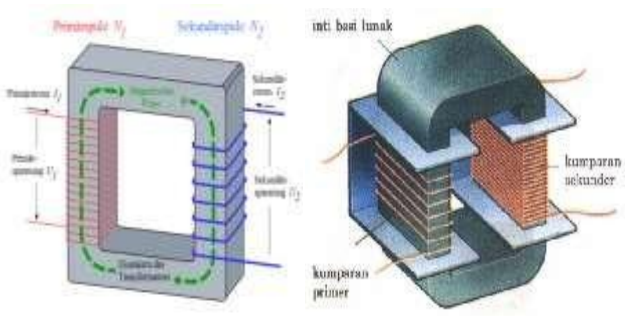
The manufacture of low voltage high current power supply using the MOT (Microwave Oven transformer) has been done. The purpose of this work is to convert low voltages into high currents by utilizing simple electrical equipment. This work use of varying voltages and different windings which are changed on the secondary winding section with a cable size of 240 mm 2, NYA cable type. The test is carried out with a series circuit, parallel circuit, and single circuit by utilizing a voltage of 30 V, 60 V, 90 V, 120 V and 5 different variations of winding. The results of this test provide knowledge of new methods that can be applied to iron smelting.

Keywords : Microwave Oven Transfomer, Microcontoller, Current sensor SCT 103, Liquid Crystal Display.

I. INTRODUCTION

Design of making this power supply is based on the need for high electric current The times that are very fast now need progress sufficient technology modern, for the sake of smoothing the life of the economy and wheels health. Therefore the need for electronic devices that are able to meet these needs, basically humans really need quite a lot of electricity in everyday life but because of the limited supply of electricity, we are required to make savings on a large scale, so the need for tools that can convert low voltages to be high current or more commonly known as power supply. For the use of this power supply there are still not many around us, because it requires special handling by parties who are skilled enough, so that the tool to convert low voltage into high current can only be used in certain tools. The large number of tools used to convert low voltages to high currents has not been supported by the availability of tools. The use of a power supply to convert low voltage to high current is not cheap enough, but in a day's wasted many used items in the form of an electric microwave can be used for the power supply.low threshold. DC high current engineering components consist of: IGBT diode (insulated-gate bipolar transistor), oscillator, driver and MOT. Under these conditions, a problem arises to generate high currents with the simplest possible circuit. One of the methods of generating high voltage currents is using a microwave oven transformer (MOT).

Transformer (Transformer) or abbreviated as Transformer used for DC Power supply is a Step-downTransformer which functions to reduce the voltage according to the needs of the electronic components contained in the adapter circuit (DC Power Supply). The transformer works based on the principle of electromagnetic induction which consists of 2 main parts in the form of a winding, namely the primary winding and the secondary winding. The primary winding is the input of the transformer while the output is the secondary winding. Even though the voltage has been lowered, the output from the transformer is still in the form of alternating current (AC current) which must be processed further.



In fact, the transformer is never ideal, heating energy always arises. Thus, the electrical energy entering the primary coil is always greater than the energy out of the secondary coil. As a result, primary power is greater than secondary power. Reduced power and electrical energy in a transformer is determined by the efficiency of the transformer. The ratio between secondary power

and primary power or the quotient between secondary energy and primary energy expressed in percent is called transformer efficiency. The efficiency of the transformer is expressed in η. The efficiency of the transformer can be formulated as follows.

$$\eta = \frac{Ws}{Wp} \times 100\,\% \qquad \eta = \frac{Ps}{Pp} \times 100\,\% \qquad \eta = \frac{Vs \times Is}{Vp \times Ip} \times 100\,\%$$

II. RESEARCH PROCEDURE

Microwave oven Transfomer or more commonly abbreviated as MOT, in MOT The transformer cores are only joined by two very thin welds. This tool converts low voltage into large currents, namely by changing the secondary winding, while the steps are as follows 1.MOT layer saw on the secondary winding, then remove the secondary winding, 2. Then use a hammer, chisel to remove the secondary coil, be careful not to hit the primary winding because the primary layer is still used, 3. Then scrape the core of the transformer with a chisel so that there is no glue and paper sticking, 4. Roll back the transformer core with a cable with a lot of turns that will be needed, Then glue the MOT wrapped around the cable, 5. Then connect the 220 V current to the PSA and driver, 6. Then give 220 V current to the IRF Mosfet so that commands current to flow, which is given a signal by PWM (Pulse width modulation), 7. The output voltage on the mosfet is connected to the MOT in order to convert the high voltage into large currents. 8. The output of the cable coil is connected to the load to find out how much current flows against the voltage according to the value required.

transformer does not have a cooler, so the user must follow the correct working procedure so that there is no disturbance and disaster. This test is carried out using a single MOT which is only connected directly to the MOT without an electric current, and using a NYA type cable with a diameter of 240 mm 2. This testing is aimed at comparing the values contained in the MOT using the Open circuit

Table 2.1 open single-range tests

Voltage Primary (V)	Current Primary (I)	Voltage Secondary (V)	Current secondary (V)	Coil
30	0,1	1	0	3
60	0,2	2	0	5
90	0,5	2,5	0	7
120	0,7	4	0	10
180	1,2	7	0	13
240	4,8	10	0	17

a. Measured single MOT Closed Circuit

Circuit testing this compare the value of the current carried out in a closed circuit where the voltage value has been determined. This test is done by changing the voltage and calculating the output current of the MOT, by means of short connecting the secondary winding so that the data is obtained.

Thus, the secondary coil of each transformer has been removed and changed to one that is thicker than the number of turns of the primary (Np), which means the result of the modified transformer has a different winding variation as shown in the table.

Voltage Primary (V)	Current Primary (I)	Voltage Secondary (V)	Current secondary (V)	Coil
30	86	344	3	30
60	173	1384	5	60
90	211	2532	7	90
120	293	4395	10	120
180	384	7296	13	180
30	86	344	3	30

b. MOT Testing with Parallel and Series

Measurements have been recorded of the input and output current to compare two different ways with series and parallel, see Schematic

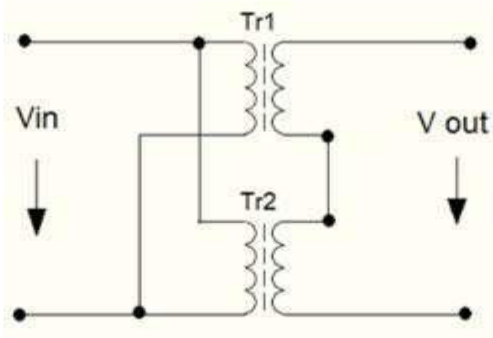


Figure 2.3 schematic Series circuit

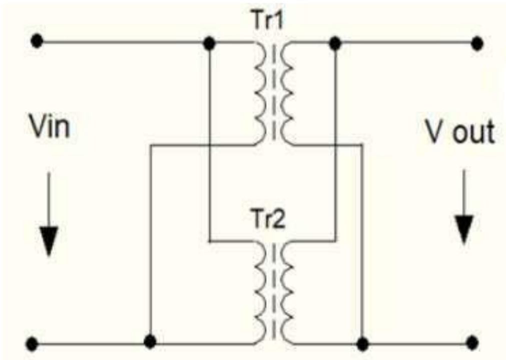


Figure 2.4 Schematic of a parallel circuit

Two transformers if arranged in parallel can produce 2 times the electric current. That is, for example, if the transformer is 3 A combined in parallel it will become 6 amperes, provided that it is better and safer to use the same brand and type. However, the amount of power required in the transformer will also increase considerably compared to using only a single transformer. However, in a circuit there will be even more suction power needed in series, but the resulting current is also smaller than the series, then it can be seen the comparison between the two combined transformers in the table below

Table. 2.3 measured parallel circuit

Voltage Primary (V)	Current Primary (I)	Current Secondary (V)	Power output (watt)	Coil
30	6	144	576	3
60	14	287	2296	5
90	19	357	4284	7

120	23	479	7185	10
180	29	619	11761	13

Table. 2.4 measured circuit series

Voltage Primary (V)	Current Primary (I)	Current Secondary (V)	Power output (watt)	Coil
30	9	112	448	3
60	18	221	1768	5
90	26	296	3552	7
120	36	420	6300	10
180	45	578	10982	13

III. RESULTS ANDDISCUSSION

Result Connecting Single MOT transformer

Connecting a single MOT and connecting to an open circuit power supply trying how the MOT will act after rewinding the secondary coil, at the voltage and number of turns for the primary and secondary windings, so it is found that Np otherwise ignores leakage or transformer efficiency. that the current generated from this modified transformer is almost 80 times of the input current, which means that the Transformer voltage equation does not apply when we shorten the circuit poles because there is leakage in the magnetic flux and there is some loss in transformer efficiency (not ideal). On the other hand, generating this amount of current gives us a good impression, namely that this transformer can be used as a iron smelter, welding tool, coil contack. For the comparison of the power generated by the circuit is very large, as shown in the graph below.

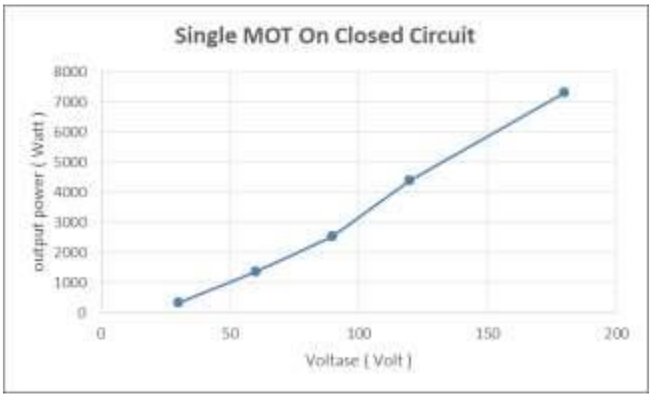


Figure 3.1 single series MOT.

Result CIRCUIT Series Connect Transformer MOT

Two transformers if arranged in series can produce twice the amount of current. As in the parallel arrangement of transformers, the two transformers used for this purpose should also be of the same brand and type to avoid problems. Connect MOT transformer While the current generated in two series connection lines is as the table shows (for 60V it is 221A) and (for 120V it is 420A), but we can see that single transformer (for 60V it is 211A) and (for 120V it is 384A) as which can be seen in the table, the power generated in a series circuit is very large compared to a single MOT circuit in other words that the power produced is up to 10982 watts while the power generated with a single circuit is 7296 watts, if seen from this data, the ratio of the power produced is ¼ times the power of a single circuit So, connecting the two transformers in a manner series could increase the suction current of the power source by 9 time compared with the use of a single transformer and higher than the parallel connection at 23% as can be seen in, which means the load on the transformer will be higher and this connection is undesirable. On the other hand, connecting two transformers in series results in approximately (5-9%) higher output current When single transformer. compared with performance.

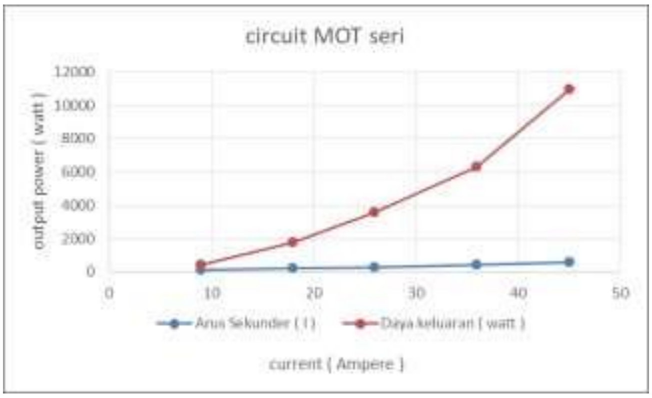


Figure 3.2 circuit MOT series

Result Parallel Rangakain Connect Transformer MOT

Two transformers, if arranged in parallel, can produce double the current. If each transformer produces (for example) 5A then after being arranged in parallel the two transformers will produce a current of 10A in a manner together. Two transformers that can be arranged like this must be two transformers that are completely identical, that is, the number and direction of the primary and secondary windings are the same as each other. Connect second The transformer in parallel increases the suction ampere load of the power source as can be seen in table (4.4.1) (for 60V is 14A) and (for 120V is 23A) compared to a single test transformer i.e. (for 60V it is 2A) and (for 120V that's 4A) as the table above shows. While the current generated in the two parallel connection lines shows (for 60V it is 287A) and (for 120V it is 479A), but a single transformer (for 60V it is 211A) and (for 120V it is 384A) as can be seen in the single MOT table. , using two transformer and connecting them in a parallel circuit can increase the suction current from the power source almost 7 times folding compared with use single transformer, which means the load on the transformer will be higher.

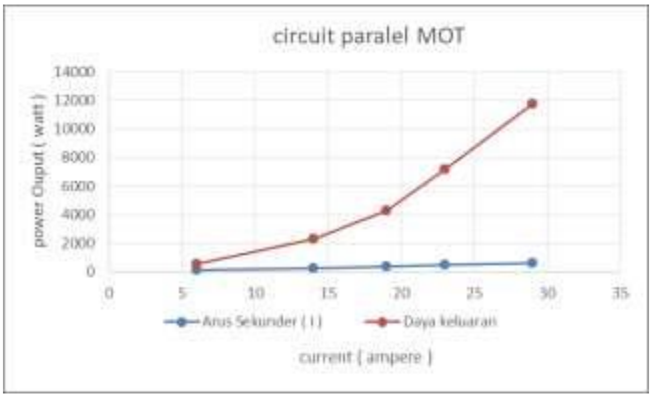


Figure 3.3 parallel MOT series

IV. CONCLUSION

1. Using two microwave oven transformers toproduce high currents from 11 to 19 times the input current used from a voltage source where in this study a series and parallel circuit were used with the current generated in a series circuit of 11 times the amount of current in and for a parallel circuit of 19 times the amount of incoming current.
2. Current changes that occur in a microwave oven transformer are very large, in a circuit connected in parallel, the voltage given is 30 v and a primary current of 6 A is capable of producing a secondary current of 144 A, while the maximum in research this using 180 v with a primer of 29 capable of producing 619 A.
3. In this study the value of the power generated by the power supply is very large, that is with use equation P = V x I, which power The result is an MOT that is arranged in parallel with the number of turns 10 times can be 11761 watts while the power generated if the MOT with the number of turns 10 times is arranged in a 10982 watt series, so it can be concluded that the MOT compiled in parallel is more effective than in series.

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