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# Conversion of Single Phase Ac Supply to Three Phase AC Supply by using MOSFET

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**ABSTRACT:** This paper presents a simple converter topology for driving a load with a single-phase AC supply. Using only six MOSFET converter supplies balanced output voltages at rated frequency, the proposed control approaches are supported by test results. The convertor takes single phase supply and converts it into three phase supply with the help of Optocoupler. The single phase supply is first converted into dc supply by using rectifier again dc supply of rectifier is given to inverter where MOSFET are used and converts the dc supply again into three phase ac supply. In the proposed scheme, Arduino Uno/Mega ADK microcontroller interfaced with Scilab is used to produce PWM signals. The PWM signals generated is given to IR2101( Gate driver IC) which drives the Optocoupler. Three phase machines can be run on this by converting single phase to three phase AC supply wherever three phase AC supply is absent. Three phase induction motor can be used as load for testing of the hardware. For example, electric vehicles. The experimental result showed that PWM pulses produced remained approximately constant and the hardware have satisfactorily converted the single phase power to three phase power supply.

**KEYWORDS:** Mosfet, topology,optocoupler, mega adk microcontroller, pwm singles,Three phase power.

## I. INTRODUCTION

Sinusoidal PWM has been a very popular technique used in AC motor control. This is a method that employs a triangular carrier wave modulated by a sine wave and the points of intersection determine the switching points of the power devices in the inverter. Though this method is unable to make full use of the inverter's supply voltage and the asymmetrical nature of the PWM switching characteristics produces relatively high harmonic distortion in the supply it is still popular for its simplicity.

The theory of SPWM and the project shall be made using a programmed microcontroller of 8051 family duly interfaced to 3 phase inverter with 6 numbers MOSFET or IGBTs from DC derived from a single phase or 3 phase, 50 Hz supply. The load shall be a star connected three phase 50 Hz, 440volt, 0.5 to 1 HP motor. Alternatively a star lamp load can be used to view the waveform only. The power supply consists of a step down transformer 230/12V, which steps down the voltage to 12V AC. This is converted to DC using a Bridge rectifier. The ripples are removed using a capacitive filter and it is then regulated to +5V using a voltage regulator 7805 which is required for the operation of the microcontroller and other components.

## II. RELATED WORK

The three phase supply plays a very important role in the large production in industries as it provides power at cheapest rate by single phase supply. Nearly 80% of the Industries required three phase supply.

Modern Electronic Systems are quite often powered from a three-phase power source. While utilizing power modules that operate directly from three-phase power might seem to provide optimal simplicity and flexibility, the added complexity required to realize three-phase power factor corrected circuitry usually negates any potential savings. This system uses single-phase and three-phase circuits from the component count, stress level and complexity standpoints. It demonstrates that when these items are taken into account, quite often the best choice is a combination of single-phase modules, configured to balance individual power line phases. In this project we also analysis the market demand & evaluate client requirement as well & also our project is useful for the commercial as well as residential sector. This test is performed to check whether the voltage at different terminals is according to the requirement or not.

We take a multi meter and put it in voltage mode. Remember that this test is performed without microcontroller. Firstly, we check the output of the transformer, whether we get the required 12 v AC voltage. Then we apply this voltage to the power supply circuit. Note that we do this test without microcontroller because if there is any excessive voltage, this may lead to damaging the controller. We check for the input to the voltage regulator i.e., are we getting an input of 12v and an output of 5v. This 5v output is given to the microcontrollers' 40<sup>th</sup> pin. An important application is the continuity test of a bundle of wires so as to find the two ends belonging to a particular one of these wires; there will be a negligible resistance between the "right" ends, and only between the "right" ends.

This test is performed just after the hardware soldering and configuration has been completed. This test aims at finding any electrical open paths in the circuit after the soldering. Many a times, the electrical continuity in the circuit is lost due to improper soldering, wrong and rough handling of the PCB, improper usage of the soldering iron, component failures and presence of bugs in the circuit diagram. We use a multi meter to perform this test. We keep the multi meter in buzzer mode and connect the ground terminal of the multi meter to the ground. We connect both the terminals across the path that needs to be checked. If there is continuation then you will hear the beep sound.

### III. METHODOLOGY

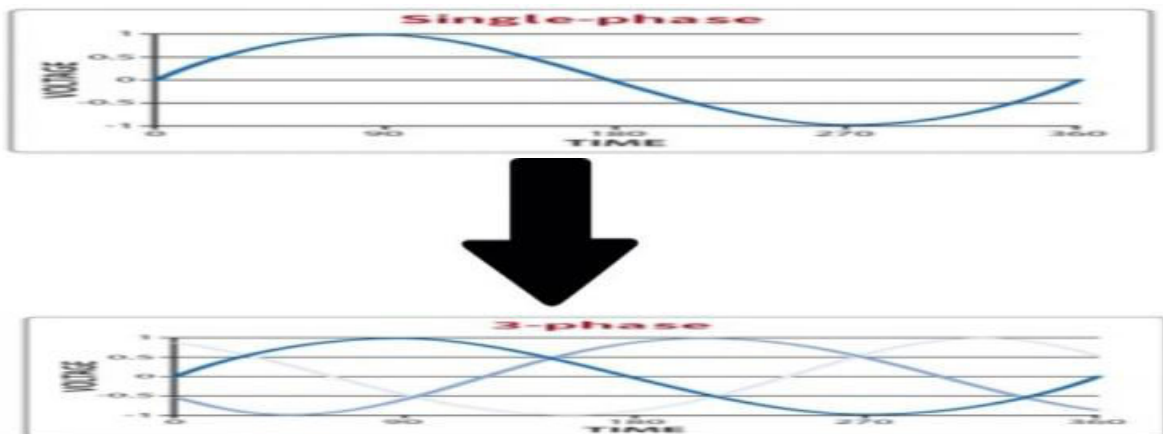
This test is performed to check whether the voltage at different terminals is according to the requirement or not. We take a multi meter and put it in voltage mode. Remember that this test is performed without microcontroller. Firstly, we check the output of the transformer, whether we get the required 12 v AC voltage.

Then we apply this voltage to the power supply circuit. Note that we do this test without microcontroller because if there is any excessive voltage, this may lead to damaging the controller. We check for the input to the voltage regulator i.e., are we getting an input of 12v and an output of 5v. This 5v output is given to the microcontrollers' 40<sup>th</sup> pin. Devices that can be used to perform continuity tests include multi meters which measure current and specialized continuity testers which are cheaper, more basic devices, generally with a simple light bulb that lights up when current flows.

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### IV. RESULT



no.1 waveform of result

Fig



#### V. CONCLUSION

Here we have generated three phase AC supply (440V) from single phase (230V) AC supply. Using this circuit we have successfully run a 3 phase motor of quarter HP.

We have also concluded that using this circuit we can minimize the problems cause due to shortage of 3 phase AC supply for a limited period of time.

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