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POWER SAVING SYSTEM FOR LATHE

[1]Neelakanthareddy. Y.B [2]Harish Mudegannavar , [3]Siddesh N Bevinahalli
[1,2,3]Mechanical Engineering Department, RTE Society's Rural Engineering college, Hulkoti.
*Email: neelakanthareddy41@gmail.com

ABSTRACT

In this modern world, the power saving system is help to us many purposes. Here we are using an electronic A.C motor speed regulator. This regulator is used to maintain the set speed of the motor constant.

The speed variation due to over load, line voltage fluctuations, over voltage, surge problems etc. Can be controlled and the speed is maintained constant by using Cycloconverter. This unit can be used 1/2H.P. A.C. motorspeed variation occurs due to overloading, line voltage fluctuations in the input supply, over-voltage, changes in the frequency, surge issues etc., which can be solved using Cycloconverter Speed

This paper is going to discuss an efficient technique to control the speed of a single phase induction motor in three steps by using cycloconverter technique by thyristors. The induction motor is most widely used machine in both industrial and domestic sector, the difficulty of varying its speed by a cost effective device is one of its main disadvantages.

As the AC supply frequency cannot be changed, so this paper presents a thyristor controlled cycloconverter which enables the control of speed in steps for an induction motor. The microcontroller used here is from 8051 family, a pair of slide switches is used to select the desired speed range (f, f/2 and f/3) of operation of the induction motor.

INTRODUCTION

Now days minimization of overall cost is required during the lathe operations . Hence in this system in Lathe we are using an electronic A.C. motor speed controller. In most of the machines using of A.C. motor's constant speed is best suited for several applications. Speed variation occurs due to overloading, line voltage fluctuations in the input supply, over-

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voltage, changes in the frequency, surge issues etc., which can be solved using Cycloconverter Speed variation occurs due to overloading, line voltage fluctuations in the input supply, over-voltage, changes in the frequency, surge issues etc., which can be solved using Cycloconverter. Hence to overcome the above issues electronics control units are suggested. These issues could cause poor speed regulation of the motor and also lesser potency. To avoid these issues electronic unit is used to take care of consistency of speed of the motor. The speed control of the A.C motor can be constructed ensuring the automatic speed regulation irrespective of load conditions, we can set the required constant speed with help of cycloconverter. In this mechanical project, there will be an AC motor attached to a frame which will work as a spindle.

OBJECTIVES

1. Objective is to maintain the set speed of the motor constant
2. To overcome speed variation due to over load, overvoltage
3. Assuring the automatic speed regulation irrespective of load condition.

BASIC PRINCIPLE BEHIND CYCLOCONVERTERS:

Although there are three different types of Cycloconverters, the working of them are very similar except for the number of power electronic switches present in the circuit. For instance a single phase to Single Phase CCV will have only 6 power electronic switches (SCR's) while an Three Phase CCV might have upto 32 switches.

The bare minimum for a Cycloconverter is shown below. It will have a Switching circuit on either side of the Load, one circuit will function during the positive half cycle of the AC power source and the other circuit will function during the negative half cycle. Normally the switching circuit will be demonstrated using SCR as power electronic device, but in modern CCV you can find the SCR's being replaced by IGBT's and sometimes even MOSFETS.

The switching circuits will also need a control circuit, which instructs the Power electronic device when to conduct and when to turn off. This control circuit will normally be a Microcontroller and might also have a feedback from the output to form a closed loop system. The user can control the value of output frequency by adjusting the parameters in the control circuit. The diodes in the above diagram are used to represent the direction of flow of current. The positive switching circuit always sources current into the load and the negative switching circuit always sinks current from the load.

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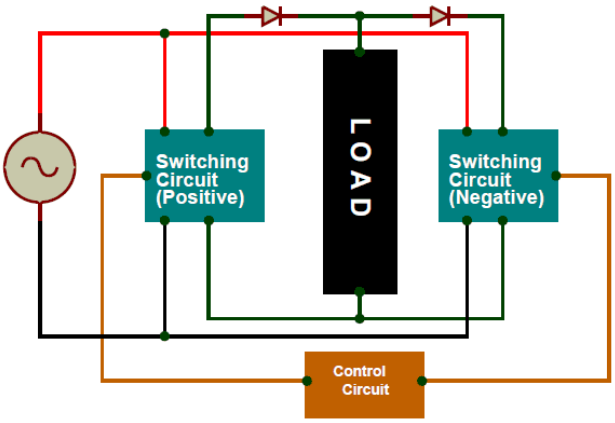
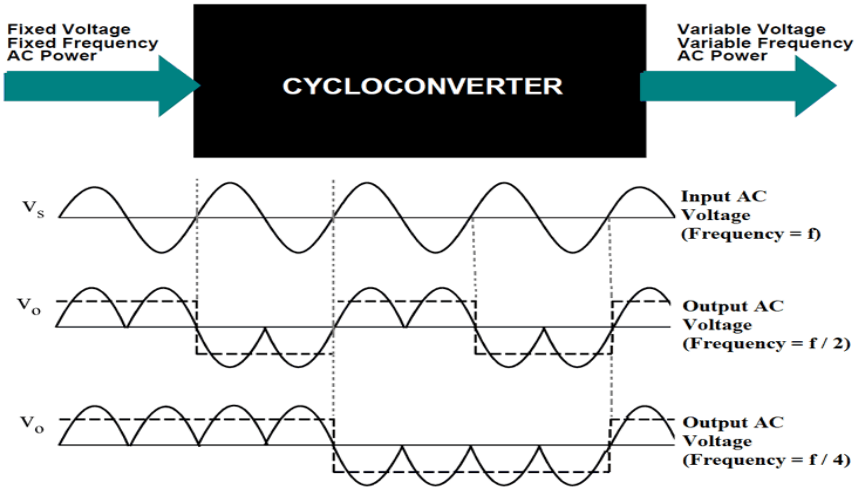
CIRCUIT DIAGRAM



WAVEFORM OF CYCLOCONVERTER



CONCLUSION

Induction motor is known as a constant-speed machine. And this project is successfully proposing one of the efficient, easy and cheaper technique to control the speed of induction motor. Thus, the speed of the induction motor can be achieved in three steps i.e. (F, F/2 andF/3).

In manufacturing and process industries, the variable frequency is required for driving

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various electrical machineries. The cycloconverter or variable frequency generator plays a significant role in driving those electrical machineries. The study mainly focuses on the design and construction of the single phase cycloconverter. The commercially designed cycloconverter circuit may use different design pattern than this one. The cycloconverter circuit can be extended further for three phase application.

Also this project presents successfully the new topology of cycloconverter drive for the AC motors in lathe. And prove it with the best literature review.

This project is going to discuss an efficient technique to control the speed of a ac induction motor in three steps by using cycloconverter technique by thyristors.

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