INDUCTION MOTOR SPPED CONTROLED BY INVERTER

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ABSTRACT

To control the speed of motor by using frequency inverter which is compact in size , it is simpale on construction and easy to maintained speed, inverter can connected to drive for more reliable .

Keyword: - *keyboard, working of PCB, inverter , resistance valve*

1. Introduction

In many industries facing the energy cost , rush operation , safety work on three phase motor so this concept is created , by using frequency inverter easy to control of speed for this inverter, some advantages we get from it like soft starting , speed variation , increase reliability, life of machine , less maintenance high power factor . A frequency inverter is a precision electronic device specifically designed and used to control the speed of AC induction motors without affecting the electricity consumption, torque, impedance, magnetic flux, etc. of the motor. It is integrated to an operator interface for receiving the required speed control commands . Why can't frequency inverters be replaced by other straightforward means? The following article will provide the exact purpose of using frequency inverters to control AC motor speed.

1.1 Working of frequency inverter

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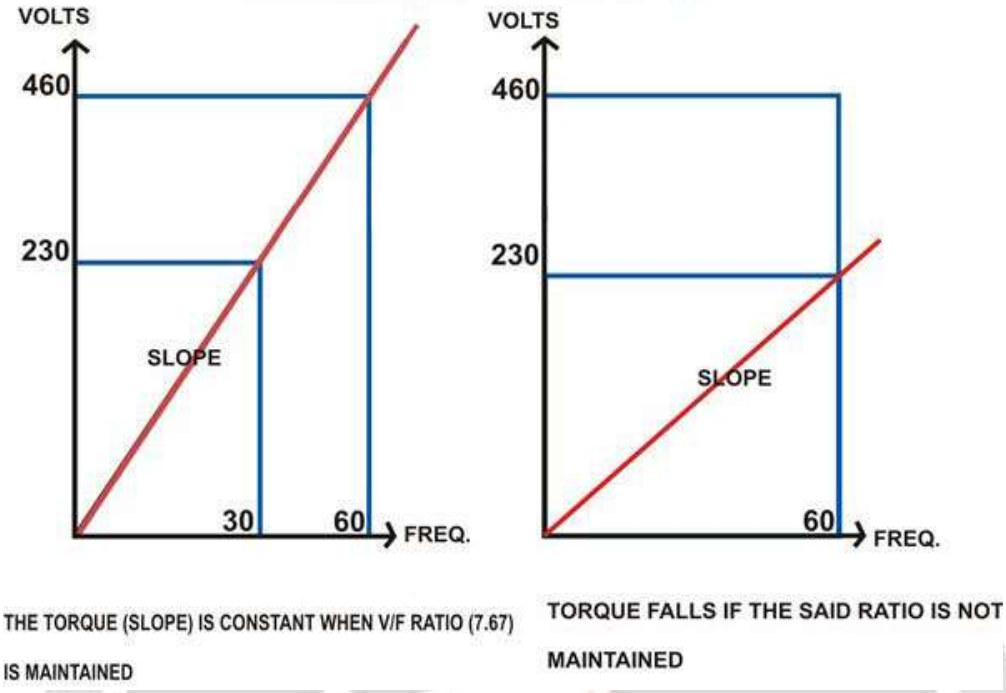
1.2 How Its work

The purpose of a frequency inverter is specifically intended to control the speed of an AC motor by strictly checking the above parameters. Here, the speed of the motor is varied by changing the magnitude of the supplied voltage as well the frequency at a constant ratio and thus the motor is able to maintain a constant torque even at lower speeds.

The basic characteristic of AC motors makes it imperative that the supplied voltage and the frequency to it are always at a particular constant ratio. Referring to the adjoining graph, let's consider the example of an AC motor operating at 460V/60 Hz frequency for optimum performance. Now, if the applied voltage is reduced to 230 volts, keeping the slope coincident to the original, we clearly see that the frequency required is 30 Hz. The second graph

simply shows how the slope or the torque of the motor falls in case the frequency is not changed and is kept at 60 Hz. Dividing 460 by 60 or 230 by 30 we easily find the required safe operating ratio for the AC motors which comes to about 7.67 volts per hertz.



THE TORQUE (SLOPE) IS CONSTANT WHEN V/F RATIO (7.67) IS MAINTAINED

TORQUE FALLS IF THE SAID RATIO IS NOT MAINTAINED

As the above theory should have helped you understand a frequency inverter, the next page will explain the operating principle of a frequency inverter.

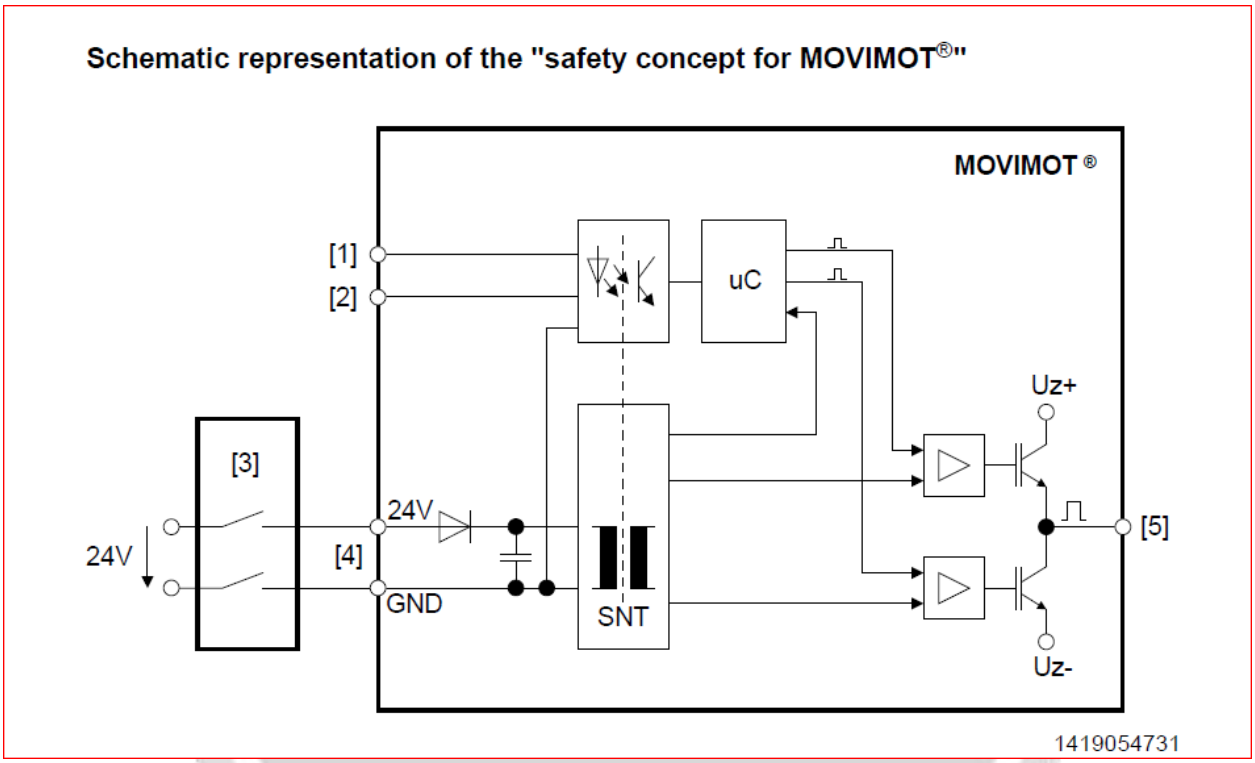
The electronic circuit in a frequency inverter unit is discretely divided into three main stages, viz. an input converter (bridge rectifier stage), a DC Bus line, and an output inverter (using micro controllers and IGBTs).

Let's look at how each stage works.

- Input Converter: This stage consists of high power diodes arranged in a regular bridge configuration. The AC mains supplied here is rectified and converted into DC. But this DC is not free from the residual AC components and harmonics. It requires further filtering.
- DC Bus: Here the rectified DC is stripped and filtered from the left-over harmonics and AC residues using inductors and capacitors. This stage helps in making the output to the motors totally ripple free and ideal for AC supply motors.
- Inverter: As its name indicates, this stage converts the DC from the DC bus back to AC, but in a very special way that forms the heart or rather the brain of the circuit. It consists of bulky microcontroller ICs designed and programmed especially to change the output frequency along with the voltage proportionately and also create a 3-phase output from a single phase input. This stage particularly makes frequency inverters very unique and most ideal for controlling AC motor speeds.
- Output: The command from the above stage are sent to the output IGBTs (Insulated Gate Bipolar Transistors) which switch the voltage received from DC bus into narrow chopped steps. To do this the ICs employ PWM technology and convert the DC into quasi-sinusoidal waves. The longer the switching time of these waves, the higher is the voltage at the output to the motor and its vice versa. This procedure is actually responsible for two important functions – to change the output voltage without any waste of electricity and, very crucially, to change its frequency simultaneously at a particular given rate to keep the torque and the magnetic flux constant.

A resistive load can be simply controlled by changing the applied voltage. But controlling inductive loads like an AC motor definitely isn't that simple and can be done only by the frequency inverters. Here we comprehensively discuss the purpose of a frequency inverter and how a frequency inverter works.

The below representation for safety concept of INVERTER (MOVIMOT)



2 CONCLUSION

• The conclusion is that we can use this inverter of motor for safety working and safely start , it has easy to controlled no special requirements for drive ; example distance of drive and motor is long then inverter is used for controlling ,we can change the speed by changing frequency . Easy operation and startup, Manually adjustable setpPoints (2 speeds and 1 ramp)

3. REFERENCES

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