

AC Fan Speed control using Triac

Abstract:

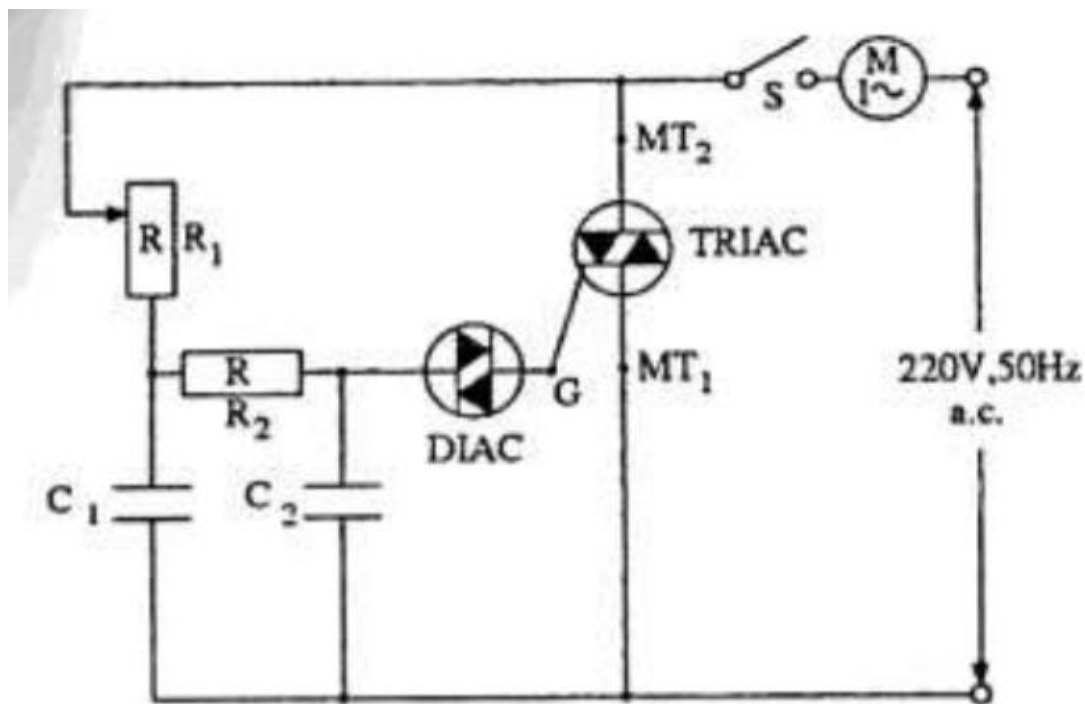
Today our country is facing power crisis and as a power conservation measure the electricity boards insist upon the consumers to save power using appropriate devices like power factor correctors, proportionate power derivative systems etc. The fan regulators can be classified under the proportionate power derivative system as it derives only the required power from the main supply. Thus power is not wasted unnecessarily but is rather conserved. A considerable amount of power can be saved by using the electronic fan regulators. The cost of electronic fan regulators is higher than that of the conventional fan regulators. However, if proper steps are taken to educate the consumers about its long term benefit i.e. energy conservation etc., the market of this product is likely to grow.

Introduction:

Electronic fan regulator is an electronic device consisting diacs, triacs, potentiometric resistance to provide stepless control of fan speed. These regulators can also be used as a speed regulator for many other small motors used in mixer, laboratory solution mixer etc. with appropriate current ratings. The triac is similar in operation to two thyristors connected in reverse parallel but using a common gate connection. This gives the triac the ability to be triggered into conduction while having a voltage of either polarity across it. In fact it acts

rather like a full wave thyristor, either positive or negative gate pulses may be used. Triacs are mainly used in power control to give full wave control. This enables the voltage to be controlled between zero and full power. With simple half wave thyristor circuit the controlled voltage may only be varied between zero and half power as the thyristor only conducts during one half cycle. The triac provides a wider range of control in AC circuits without the need for additional components, e.g. bridge rectifiers or a second thyristor, needed to achieve full wave control with thyristors. The triggering of the triac is also simpler than that required by thyristors in AC circuits, and can normally be achieved using a simple diac circuit. An isolation transformer is a transformer used to transfer electrical power from a source of alternating current (AC) power to some equipment or device while isolating the powered device from the power source, usually for safety reasons. Isolation transformers provide galvanic isolation and are used to protect against electric shock, to suppress electrical noise in sensitive devices, or to transfer power between two circuits which must not be connected. A transformer sold for isolation is often built with special insulation between primary and secondary, and is specified to withstand a high voltage between windings. Isolation transformers block transmission of the DC component in signals from one circuit to the other, but allow AC components in signals to pass.

Circuit Diagram:



Conclusion:

SCR in conjunction with a four diode bridge and timing network can also be used instead of triacs, although choice of particular arrangement depends on the availability of the reliable semiconductor devices and their price. Fan regulators with diac, triac and RC time constant network are more common in use. We conclude that with the increase in load voltage firing angle decreases and speed increases.