

# Temperature Controlled Dc Fan Using Thermistor

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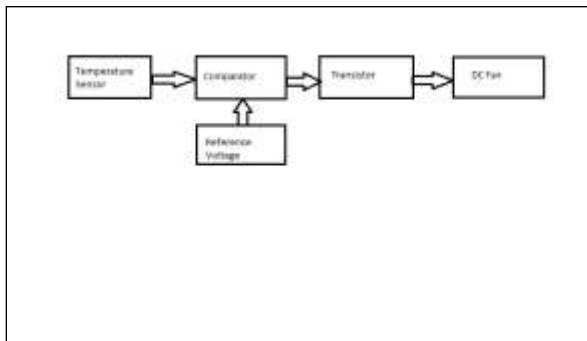
**Abstract:** over the last decade, advance in digital electronics have made smaller, cheaper and faster. throughout this revolution as well ,mobile computing environment such as PDA has been created and undoubtedly other advance in technology like smart home also play an important role towards better life in the future. This project is about how we can control the fan based on temperature sensor regardless of traditional thermistor. It is also part of smart home application where the fan will gradually increase the speed if the temperature in the environment is increasing. Besides that, the component that made up the temperature sensor is known as thermistor. A sensor is a type of transducer. In a broader sense, a transducer is sometimes defined as any device that converts energy from one from another. There are two type of thermistor depends up on the sign of k. Firstly is positive temperature coefficient [PTC]. PTC thermistor works by the increasing the resistance with increasing temperature. Secondly is negative temperature coefficient [NTC]. NTC thermistor works by decreasing the resistance with increasing temperature. This project focuses on NTC type of thermistor. Experiment can followed to evaluate whether this circuit can save energy through the use of temperature sensor and thus promote efficiency. Finally after some experiments has been done. The result of the experimentation and finding can be concluded.

**Keywords:** Temperature sensor [NTC thermistor], comparator, dc fan, motors, reference voltage.

## I. INTRODUCTION

Temperature controlled DC fan based on the working principle of thermistor. Thermistor is kind of temperature dependent resistor and its resistance varies depending on the temperature in its vicinity .There are two type of thermistor –NTC and PTC. Negative temperature coefficient [NTC] thermistor .decreasing its resistance when the increasing temperature .While positive temperature coefficient [PTC] increases its resistance when the temperature increases .Temperature controlled dc fan using NTC type thermistor.

## 2. BLOCK DIAGRAM



**Fig 1. Blockdiagram of temperature controlled dc fan using thermistor**

## 2.1 Block Diagram Description

### 2.1.1 Temperature sensor

In temperature controlled dc fan we have used a NTC type thermistor. It is called NTC because its resistance increases when its temperature decreases and vice versa.

### 2.1.2 Comparator

Op amp IC741 is used as a voltage comparator which compares the voltage between its two inputs i.e., inverting and non inverting terminal

### 2.1.3 Dc Fan

The temperature controlled dc fan is based on the working principle of thermistor. The 12V is used in this circuit.

### 2.1.4 PNP Transistor

The PNP transistor is the exact opposite to the NPN transistor device we looked at in the previous tutorial. Basically, in this type of transistor construction the two diodes are reversed with respect to the NPN type giving a Positive-Negative-Positive type of configuration, with the arrow which also defines the emitter terminal this time pointing inwards in the transistor symbol.

### 2.1.5 Reference voltage

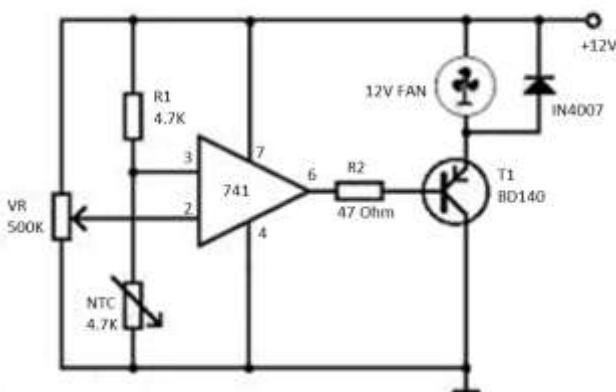
Analog device offers the widest selection of high performance voltage reference in the industry. Our products range from high accuracy, low noise for high industrial application to general purpose, low power for handheld, battery-powered application. ADI is the ultimate source for design engineers looking for the perfect voltage reference that is cost effective, reliable, and dependable.

## 3. Working

The basic working principle of temperature controlled dc fan is based on the working principle of thermistor. Thermistor is component which changes. There are two type of thermistor available which are NTC i.e., negative temperature co-efficient and other is PTC which is positive temperature coefficient.

In temperature controlled dc fan we have used a NTC type thermistor. It is called NTC because its resistance increases when its temperature decreases and vice versa. Similarly in PTC its resistance increases when temperature increases and vice versa

## 4. Circuit Diagram



## 5. Advantages & disadvantages

### Advantages

- It's very economical and easy to handle by the user.
- Speed varies automatically, so that it controls the speed without using it manually. It is help full to disabled people.
- It is very easy to install in officers, houses etc.
- Save energy by slowing down its speed in low temperature

### Disadvantages

Thermistor is very sensitive device. If thermistor is damage effect whole circuit

## 8. Results

Initially, circuit was selected and components where purchased and the circuit was verified in bread board. Then we designed the PCB and the circuit was soldered onto the PCB.

The speed of the fan is varied by changing temperature.

## 9. Conclusions

Gas leakage security system comprises of sensitive sensor, GSM module and RF links which are cost effective and consumes less power with low maintenance. The sensitivity of the sensor is high and it gives very fast response, accurate detection and provides necessary security to the user

The system can be further enhanced by using PIC microcontroller in place Atmel microcontroller which supports real time application and real time clock to display the date and time of the gas leakage. The system can also be modified using a temperature sensor that detects sudden rise in temperature due to other causes which can be hazardous. The temperature sensor can also use to detect the temperature near the high pressure gas pipes, display it and also alert when high temperature is reached.

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