

A decorative vertical bar in a vibrant magenta color runs along the left edge of the page. The background features three overlapping circles: a large light blue circle on the left, a large magenta circle on the right, and a smaller light beige circle at the bottom left. The text is arranged within and around these circles.

# TEMPERATURE CONTROLLED DC FAN

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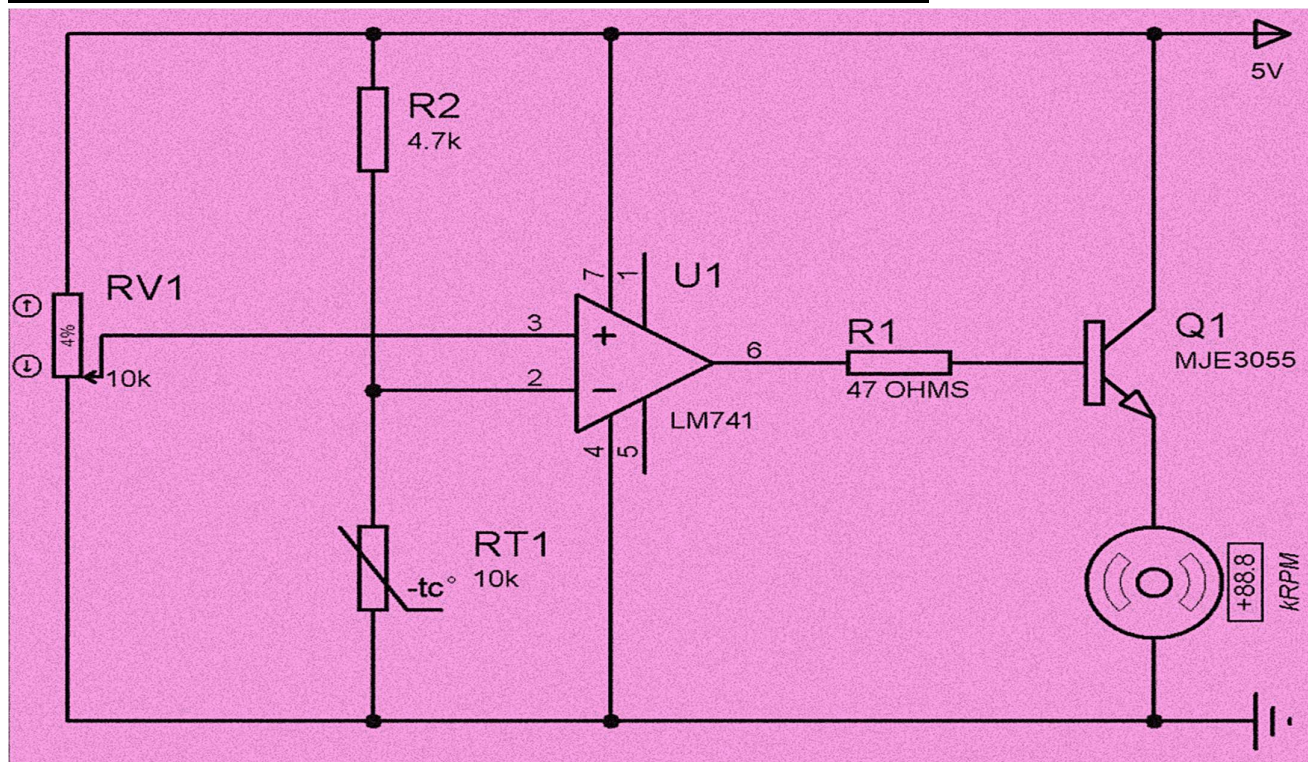
# INTRODUCTION

We have made this project to perform real life applications of simple electronic components like Op Amp, Thermistor, etc. Our project is made up of simple electronic components like OP AMP LM741, Transistor MJE3055, etc. The following is list and brief description of each of the components used.

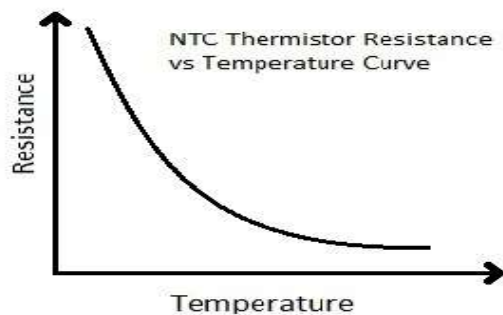
## COMPONENTS

Component	Use in Circuit	Applications
Op Amp IC LM741	An operational amplifier is a DC-coupled high gain electronic voltage amplifier. It's a small chip having 8 pins.	1. Voltage Follower 2. Voltage Amplifier 3. Arithmetic Circuits
NPN Transistor MJE3055	The NPN transistor consists of two n-type semiconductor materials and they are separated by a thin layer of p-type semiconductor.	1. Switching Circuits 2. Amplifying Circuits 3. Temperature Sensors
NTC Thermistor - 10k	A thermistor is a thermally sensitive ceramic semiconductor which exhibits a change in resistance as the temperature changes.	1. Heat Sensing Circuits 2. Thermal Trigger Applications 3. Temperature Controlling Circuits
Potentiometer – 10k	Potentiometer is an electric instrument that used to measure the EMF of a given cell	1. Voltage Regulating 2. TV, Radio frequency regulation 3. Audio Control
Resistors - 47 Ohm, 4.7k	Motor that transforms electrical energy to mechanical by DC current	-
DC Fan (Motor)	-	Everywhere where we need air flow.
Power supply-5v	-	-
Breadboard	-	-

## 1. CIRCUIT DIAGRAM FOR TEMPERATURE CONTROLLED DC FAN:



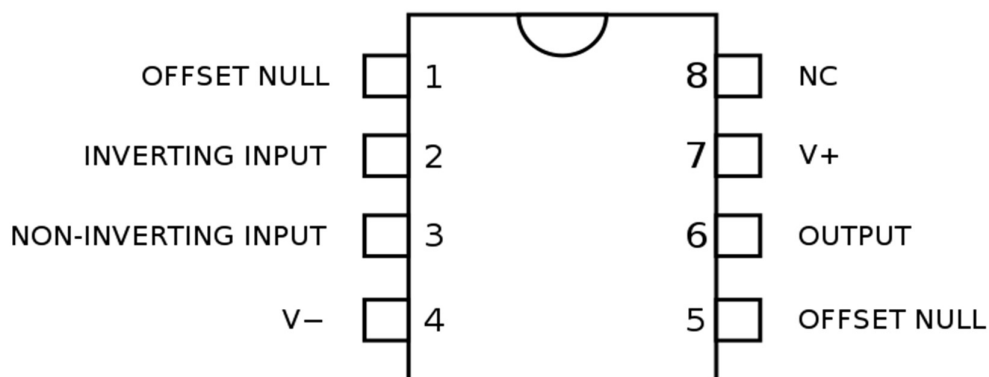
## 2. CHARACTERISTICS OF THERMISTOR:



We can see that resistance of Thermistor is very high when the temperature is low. But as the temperature increases, Thermistor's resistance reduces as a smooth curve.

We use this same property to Turn ON / OFF the DC Fan. When the temperature reaches a threshold value, resistance reduces; starting current flow to fan.

## 3. PIN DIAGRAM OF Op Amp IC LM741:



## WORKING OF TEMPERATURE CONTROLLED DC FAN:

1. It works on the principle of thermistor.
2. In this circuit, PIN 3 (non-inverting terminal of op amp 741) is connected with the potentiometer and PIN 2 (inverting terminal) is connected in between of R2 and RT1 (thermistor) which is making a voltage divider circuit.
3. Initially, in the normal condition the output of the op amp is LOW as the voltage at non-inverting input is lesser than inverting input which makes the NPN transistor remains in off condition.
4. The transistor remains in OFF condition because there is no voltage applied to its base and we need some voltage at its base to make the NPN transistor conduct. Here we have used NPN transistor MJE3055 but any high current transistor can work here like BD140.
5. Non when the temperature is increased, the resistance of Thermistor decreases and the voltage at non-inverting terminal of op-amp becomes higher than the inverting terminal, so the op amp output PIN 6 will become HIGH and transistor will be ON (because when the output of op amp is HIGH the voltage will flow through the collector to emitter).
6. Now this conduction of NPN transistor allows the Fan to start.
7. As the thermistor return to the normal condition the fan will automatically turn OFF.

## APPLICATION OF PROJECT:



CPU/GPU FAN



FACTORIES  
EXHAUSTS



TEMPERATURE  
SENSITIVE AREAS

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