

EE221

Experiment #7: Sensor Motor Control Circuit

Problem: In laboratory experiment #5 you configured a sensor indicator circuit. Today's lab will use that same temperature sensing circuit to operate a motor (turn it on or turn it off). Review your work from lab #5 prior to working on this lab experiment.

The output from the LM339 comparator will be used to control a Bipolar Junction Transistor (BJT) as shown below in Figure 1. What is a BJT? How does it function as a switch? Spend a few minutes researching these questions (on the internet) and *document* your findings in your laboratory notebook.

Design a circuit that will turn on the motor when the temperature sensor (thermistor) is touched. Use a voltage source of +10V for the motor (V1 in Figure 1). Demonstrate the working circuit to your instructor. (INSTRUCTOR NOTEBOOK SIGN OFF)

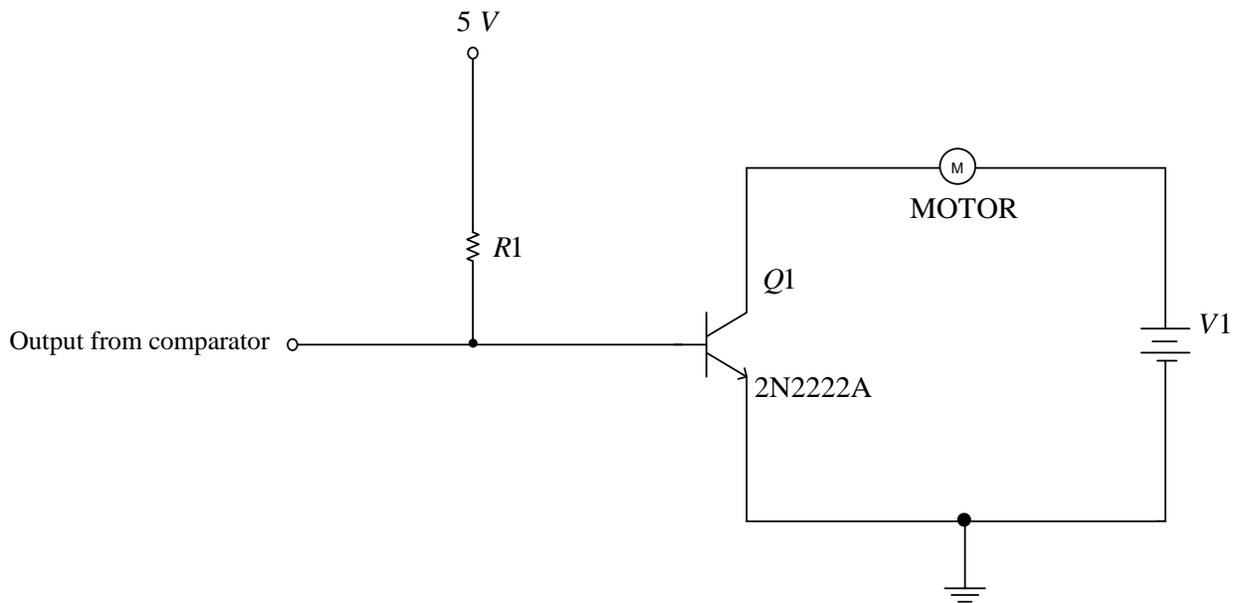


Figure 1 – Motor Control Circuit

Hints: Model the motor as a resistor, and size this value of resistance by using Ohm's Law after experimentally measuring the current through the motor with 10V applied. Next, using the equivalent circuit shown in Figure 3.40 in your text (page 109) assume that β (the coefficient of the dependent current source) has a value of 75 choose the resistor R1 so that the collector current (I_C) will be the value you experimentally measured above (assume $V_{BE}=0.7V$).