

Sensor Controlled Motor

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The plan for this project is to make an electrical circuit that monitor a motors and gives forms of feedback. In this circuit, a shaft encoder motor will be hooked to an Arduino. The motor will be hooked up using an H bridge and to the Arduino. Then there will be a series of sensors to help keep the motor from overworking. The first will be a thermal sensor. The thermal sensor will measure heat on the motor and if the motor gets to a certain threshold, it will shut it off. The other way the motor will be monitored is the Revolutions Per Minute. This will be measured in two different ways. The first way will be with a shaft encoder on the motor. The shaft encoder outputs pulses as the motor spins at a pace of sixty-four pulses per revolution. The pulses outputted are simply high or low. The Arduino will be programmed, in a way that every time there is a high pulse, it will measure the time from the time before. Therefore, the relationship between the pulse duration and RPM will be negative correlation. Each pulse duration can be measured and if at any time the pulse durations is too low, meaning the RPM is too high, the motor will shut off. This type of RPM measurement will be instantaneous and if at any time the pulse is too low the motor will shut off. The other form of RPM measurement is with the use of a hall sensor. This will be programmed to monitor the RPM over a period of time and not instantaneously like the shaft encoder. Two magnets will be attached to the motor, with opposite poles facing away from the motor. As the motor spins, the magnets go by the hall sensor. The hall sensor will output a voltage pulse when a north magnet passes by and is shut off when the south pole magnet passes by. Therefore, the hall sensor outputs a pulse that can be counted over a period of time and then a threshold RPM will be set in case the motor is spinning too fast for a long duration. Overall, this electrical circuits project will contain sensors and negative feedback to control the motor. This can be applied to any electrical motor and the general knowledge of being able to understand and make this circuit will ultimately be beneficial.