# Nowling version of EFIE

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Text is original Nowling, typos and all, except comments (in blue) which are Eagle-Research.

This is an EFIE I designed a while back. Basically, it appears to me that the oxygen sensor is a variable resistor and forms a voltage divider with a resistor in the vehicle computer.

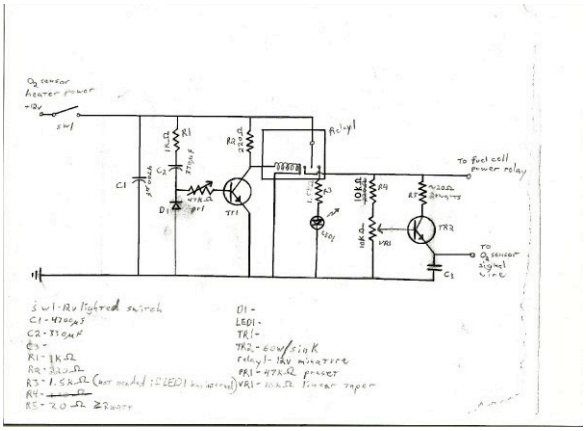
So, by putting a variable resistor(transistor) is parallel with the oxygen sensor I can add a small deflection to the signal going to the computer. I built it and installed it in my truck and it appears to work just fine.

I use the power to the oxygen sensor (heater) because it is only hot while the vehicle is running, but another power source would work. I had calculated it's function mathmatically before I ever built it and it worked exactly as designed.

The reason I designed it was that I had built other EFIEs that I got from the internet and didn't like the way they functioned and didn't like the fact they required harder to find components.

When the device is powered up the LED will light and there is a delay before the circuitry kicks in, adjusted by the preset resistor. When the device becomes active the LED turns off. The potentiometer adjusts the deflection to the signal. The circuit also controls the relay that powers the fuel cell (on-board electrolyzer).

I was interested in what you thought about it and if you had any recomendations for the design. Thanks. I really wanted to make the design available to others on the net because it was simple and cheap, but noone I've sent the design to would post it.




well, the main advantages of my EFIE are it's cheap and simple to build and simple to opperate/calibrate. i'm not sure the O2 sensor heater power is the best place to draw the power from, but as i said, i used it because it is only hot while the vehicle is running.

the fuse that runs to the O2 sensor was more than enough amps to power my device on my truck. you can simulate the function of my circuit by placing a resistor parallel to the oxygen sensor(i don't remember the resistance). it can be calculated mathmatically. you want .1 to 1 volt at 1 amp from a 14 volt source. what ever the voltage division is to achieve these results. the formula was a bit complicated, i have it written down somewhere.

If you find it, I can put it with your schematic

ok, i did some math and this is what i got. as i stated before the O2 sensor forms a voltage divider with a resistor in the computer. now, i am working with the results i recieved from my truck but i'm sure that it is probably fairly standard.

the computers resistor appears to be about .5 ohms. the O2 sensor appears to vary from 6.5 ohms to 69.5 ohms. these two resistors will give a varying volage from .1 volts to 1 volt given a 14 volt source. the formula i used was Vout=Vin(R2/R1+R2) with R1 being the O2 sensor and R2 being the computer resistance. By placing a variable resistance parallel to R1(O2 sensor) I can modify the resistance resulting in a change of the output voltage. Rt=(R1XR2)/(R1+R2) with R1 being the O2 sensor and R2 the variable resistance.

I could also place a variable resistance in series with the O2 sensor to alter the signal in the other direction, but this is not nesecary for our purposes. after looking at my old schematic, i am not sure that it really does need any alteration except that R5 needs to be as high wattage as possible probably 5 watt minimum but maybe as high as 10 watt.

The heat sink on transistor 2 is very necessary due to the current flowing through the circuit. I would really like to have the circuit critiqued by a knowledgable engineer, but the one in my truck has never failed, so i guess thats a good sign.

i guess i should have told you that i came about these numbers by measuring the voltage and the current at the O2 signal wire. The current gives me total circuit resistance(14 ohms) and the voltage gives me the division ratio.(results=1 amp at .5 volts)

This is my new video demonstrating my EFIE.

http://www.youtube.com/watch?v=w7hDCbCiA9E