

DIY O2 Sensor MIL Eliminator

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NOTE (07/17/2007): The circuit presented here is identical (give or take some component values) to every commercial MIL eliminator I have examined--at least a dozen. However, you may find that it does not work with newer (2001-1/2+) cars because of advances made in both engine control software and processing power.

Specifically, many newer ECUs (PCMs or whatever) no longer monitor the rear O2 sensors for only reduced voltage and phase difference (see the oscilloscope traces below), but also for switching frequency ratios between the two (front and rear) sensors. The simple passive RC network used in MIL eliminators cannot simulate the required switching frequency ratios and may not work properly with newer cars. In this event you will need to use a custom ECU program ("tune") to switch off the rear sensor(s) (catalyst monitoring function) to block the MIL.

[Click here for a '99 to '04 Mustang V8 specific wiring diagram...](#)

Commercially available generic MIL Eliminators¹ range from reasonably priced (\$12 each) to absurdly priced (\$40 each), however they all have one thing in common--inside there's only two passive electronic components worth a couple bucks or so at Radio Shack, specifically:

[RS p/n 272-1434](#) -- 1.0uF 20% dipped tantalum capacitor (\$1.59 each as of this writing)

[RS p/n 271-1356](#) -- 1.0 M Ohm 1/4 Watt 5% carbon film resistor (\$0.99 for 5 as of this writing)

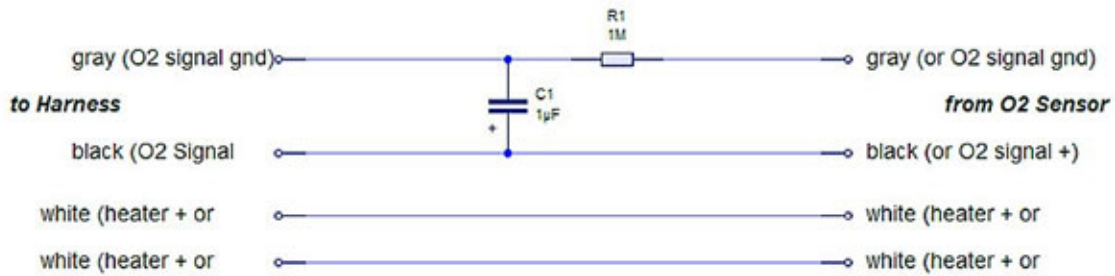
-or-

[RS p/n 271-1134](#) -- 1.0 M Ohm 1/2 Watt 5% carbon film resistor (\$0.99 for 5 as of this writing)

The diagram shown below is all there is. The circuit is a very simple single-pole RC filter with a corner frequency of 0.16 Hz or so, which when placed in series with the rear sensor's output attenuates the signal by a variable amount depending on the frequency of the sensor signal. This is normally 1.0 to 5.0 Hz, making the filter's output 15dB to 30dB (or 6 to 30 times) less than the input signal (which without catalytic converters is the same as the output of the front sensors).

The filter therefore feeds the PCM a line of crap--specifically that the rear O2 sensor's signal is less than the front sensor's signal, **and** that it is changing differently over time (due phase shift introduced by the filter) than the front signal--combined this manipulated signal makes the PCM a happy camper and it keeps the MIL off...

Platinum/Zirconium O2 Sensor MIL Eliminator
 Jul-2002 by C.Knight

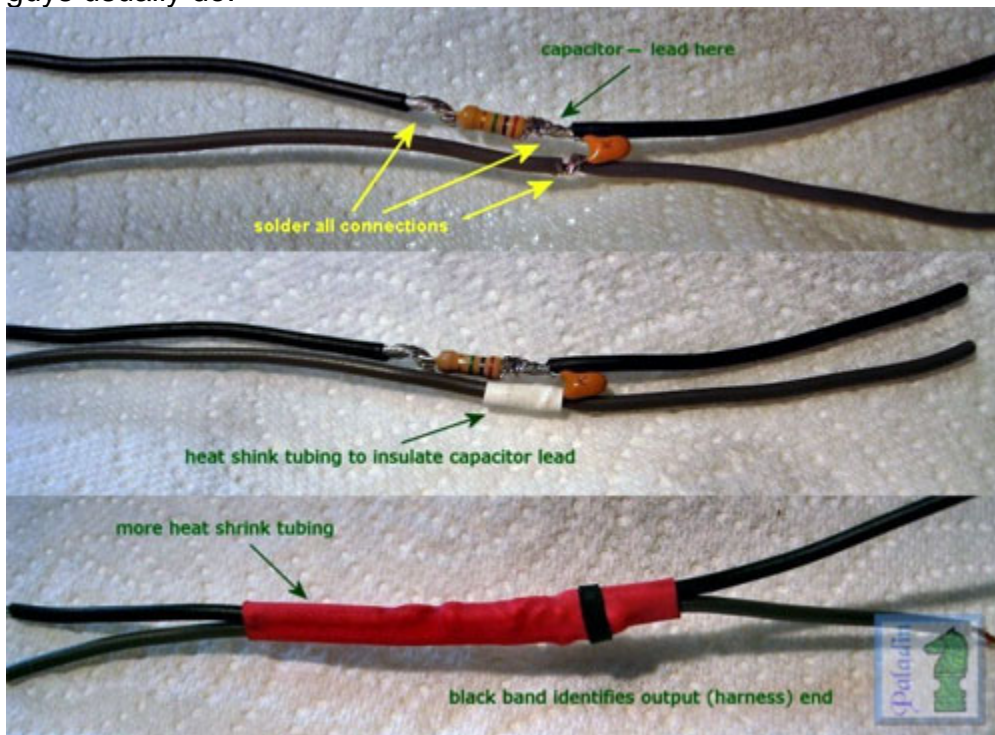


C1 - 1.0uF 35V tantalum, RS# 272-1434 (\$1.59 ea.)
 R1 - 1.0M Ohm 1/4W 5% resistor, RS# 271-1356 (\$0.99 for

Note: Wire colors are standard for most aftermarket sensors, OEM sensors may have different colors however the functions (O2 +, O2 gnd, and heater) will exist--check your vehicle's wiring diagrams.



Here's a series of photos showing how I make 'em up, all connections are just twisted and soldered. You should squirt a glob of RTV sealant on the whole thing and then wrap it up in tape, or use heat shrink tubing like the commercial guys usually do.



And finally, for those who might give a rat's backend, here's a comparison of the input and output of this circuit when driven by a 0.600 V sine wave at 1.0Hz and 5.0Hz. As you can see the attenuation values are very close to the theoretical values presented above (the capacitor is a +/- 20% component, the resistor +/- 5%). The reduced input voltage measurement at 1.0Hz is due to the loading effect of the filter as the input frequency approaches the turnover frequency (I should have used a 50 Ohm source).

Clearly seen are both the amplitude and phase changes as the input frequency changes, this is what tricks the ECU.

(Instrumentation: Wavetek 1288 function generator; Lecroy 9450A digital oscilloscope)

