

EXCELCIER



Malfunction Indicator Light Eliminator Installation Manual

Version 1.0

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**EXMI-01
Rev. A**

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About Excelcier



"Fun and creativity that is unique and makes people look twice"

"Excelcier" started many years ago as a misspelled nickname for myself on bulletin board systems. I was very young and fell in love with the ship from Star Trek™, the "EXCELSIOR" and I guessed at its spelling incorrectly, however, my misspelled version stuck with me. As the years progressed, it became my handle on most internet related locations. When I bought my Cougar, it seemed natural to extend that into my newly found world and my car then affectionately became officially named "Excelcier" from that point forward.

I try hard to create as many original and unique ideas on my car as possible so that I do not have "just another clone car". I wanted a car that was challenging to work on due to lack of common parts and one that was in low volume so I could be more creative and surprise people.

This lead to designing unique custom lighting circuits that began grabbing people's attention. That desire has now lead into the development of some of these circuits into units available to become shared with others. Keep an eye open as many more products will begin to emerge in the near future!

Table of Contents

I. DISCLAIMERS AND WARRANTY 5

II. SYSTEM COMPONENTS 6

III. TECHNICAL ASSISTANCE..... 7

IV. BEFORE YOU BEGIN 7

V. BACKGROUND INFORMATION 8

1.0 INSTALLATION INSTRUCTIONS 11

2.0 TROUBLESHOOTING AND FREQUENTLY ASKED QUESTIONS..... 13

i. DISCLAIMERS AND WARRANTY

Warranty Information:

Excelcier / Ron Zlotnik warrants to the original customer, in the originally installed vehicle a limited warranty of one year against defects in the product and manufacturing only. We do not warrant against damage incurred to your vehicle in any way by the usage or installation of this product. We do not warrant against damage incurred to the MIL Eliminator unit by incorrectly interfacing it to your vehicle or in any other application not covered by this installation manual.

Within 12 months of purchase, Excelcier / Ron Zlotnik will repair or replace, our option, any defective system at no charge, however the owner is responsible for shipping charges. After 12 months from date of purchase, Excelcier / Ron Zlotnik will, at our option, repair or replace a unit for a \$10 fee including shipping and handling.

Installation, labor, removal and reinstallation are not the responsibility Excelcier / Ron Zlotnik.

The warranty period begins from the date of receipt of purchase to Excelcier / Ron Zlotnik.

Incidental, consequential and/or indirect damages are expressly disclaimed. No person or entity is authorized to alter, amend or increase this limited warranty. All parts and accessories are covered under the expressed warranty with the exception of the fuse and relays as these are deemed normal wear and serviceable components and do have limited life spans.

The Dealer and/or consumer will be responsible for freight or shipping charges to Excelcier / Ron Zlotnik on all merchandise returned for repair or replacement. Excelcier / Ron Zlotnik will be responsible for any freight or shipping charges on product returned or exchanged back to the Dealer and/or consumer.

Disclaimers:

Excelcier / Ron Zlotnik hold no responsibility if you damage your installation tools or your vehicle in any way. By purchasing and installing this product, it is assumed that you have the capabilities to install this by cutting into your vehicles wiring and are aware of the risk to your vehicle as you will void any manufacturer's original or extended warranties by making this modification.

Excelcier / Ron Zlotnik hold no responsibility for units damaged due to water / environmental intrusions. It is the responsibility of the buyer to ensure that this unit is shielded from the elements properly.

A consumer's remedy is limited to repair or replacement of the unit and in no event shall exceed the purchase price. Incidental, consequential and/or indirect damages are expressly disclaimed. No person or entity is authorized to alter, amend or increase this limited warranty.

ii. System Components

This unit consists of the following components;

1. MIL Eliminator unit
2. A piece of heat shrink to cover the entire unit and wires after installation

iii. Technical Assistance

Should you require technical assistance or have technical questions about this product, please visit the web site at <http://excelcier.com> or contact Ron Zlotnik at rzlotnik@gmail.com

iv. Before you Begin

Required Tools and materials that this product does not supply

1. Wire cutters and wire strippers
2. Heat shrink gun or other heat source
3. Very small flat head screwdriver
4. Tie Straps / Wire sheathing - optional

DISCONNECT YOUR POSITIVE BATTERY TERMINAL BEFORE BEGINNING ANY MODIFICATIONS TO YOUR VEHICLE.

DO NOT disconnect the battery if the vehicle has an anti-theft-coded radio or is equipped with an airbag. Doing so may cause a warning light to be displayed. Under this condition, take extra precautions during installation to avoid a battery short.

DO NOT apply and fluids directly or indirectly onto any components of this module. Doing so may damage the unit and void any warranty:

v. Background Information

(Information in this section created by **Eaton Design**)

About the O2 Sensor

The O2 sensor can be considered a small battery that has an operating range of 0 to 1 volt when fully warmed up to 600°F. Its voltage depends on the amount of oxygen in the exhaust stream.

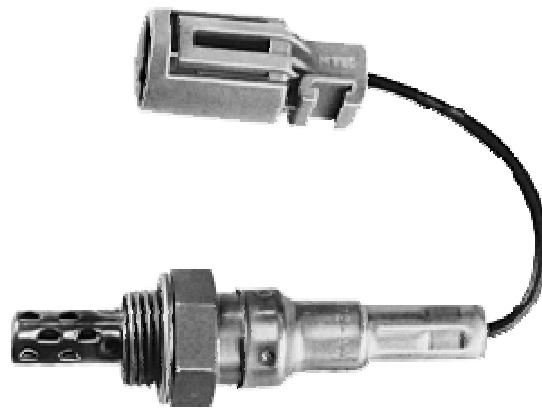
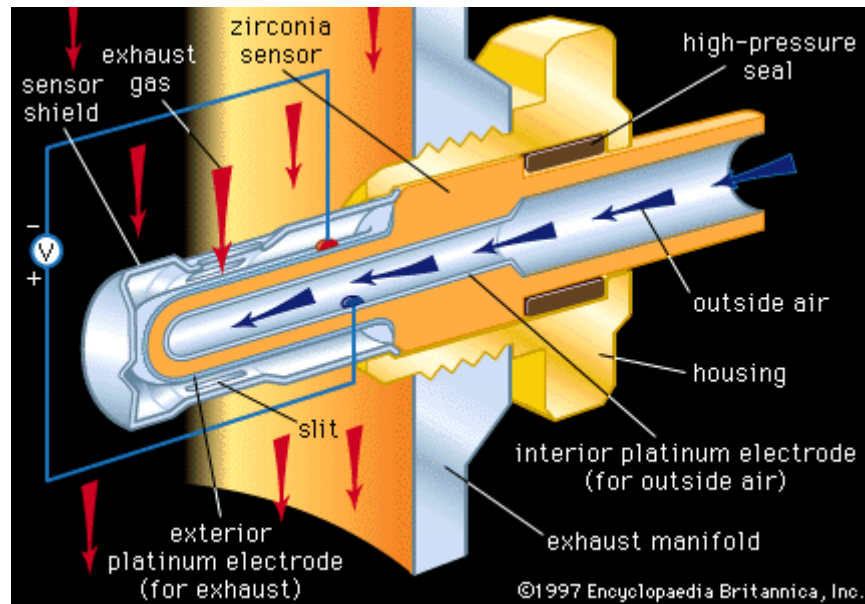


Fig. 1 O2 Sensor



All O2 sensors are vented to the atmosphere which contains Approximately 21% oxygen. The exhaust of a gasoline Powered engine typically contains up to 2% oxygen. The Sensor's output voltage depends on the oxygen content of the exhaust stream. That is, if the exhaust has 2% oxygen, it is lean. This produces a low voltage, below .3 volt (300 millivolts). If the exhaust has near 0% oxygen, it is rich. This produces a high voltage, above .6 volt (600 millivolts). These voltages are sent to the computer and it reacts by adjusting the air/fuel ratio. This is commonly known as the O2 feedback system and when this system is operating it is said to be in "closed loop". When it is not operating, meaning the computer is not reading and responding to the oxygen sensor, it is said to be in "open loop".

Keep in mind that the computer uses all the sensors to control timing, fuel mixture, and emission systems. The O2 sensor as an input is used by the computer to keep the mixture as balanced as possible. When the air/fuel ratio is "balanced" it is at 14.7 parts of air to 1 part of fuel by weight. That means that for every pound of gasoline the engine burns, it will need 14.7 pounds of air. Keep in mind that oxygen occupies only 21% of the total air volume needed by the engine. The term "stoichiometric" is the term referring to the point at which the catalytic converter can be at its maximum efficiency when converting the three major pollutants (CO, HC, NOX) into harmless emissions (CO2, H2O, N, H).

The computer can only use the sensor's output information under certain conditions. First, the sensor must be hot to produce a normal signal. (600°F). This is why most sensors today have built-in heaters to counteract the cooling effects of prolonged idling and to achieve closed loop mode sooner during warm-up. Heating the sensor also keeps it cleaner and extends its life considerably. The heater usually gets voltage from a constant "key-on" source like the fuel pump relay or a fuse. This is what the second and third wires are for on today's sensors. By the way, the late model Chrysler products are now using 4 wire O2 sensors. The four Wires are; O2 sensor output, O2 sensor ground, 12 volt heater feed, and heater ground. On 3 wire sensors, the O2 sensor grounds through its case and doesn't require a separate ground wire

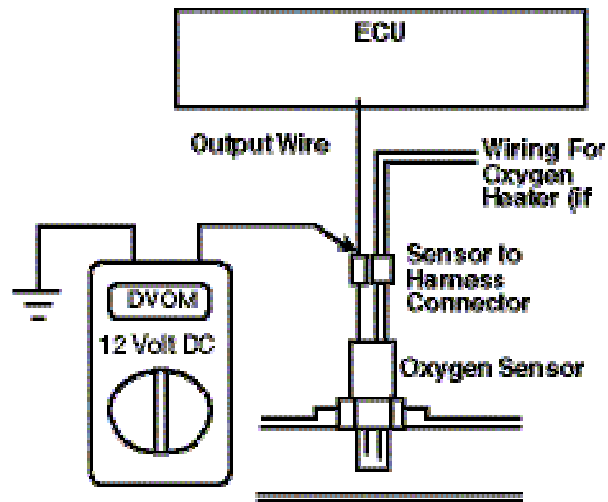
Secondly, the computer is programmed not to go into closed loop operation until the coolant temperature sensor tells the computer the engine is warmed up. If the system tries to go into closed loop too early in the warm-up period, the leaning effect of the system would cause drivability problems and pollutants.

Thirdly, the computer is also programmed to ignore the O2 sensor at near wide open throttle conditions. Maximum power requires maximum enrichment.

Also, some manufacturers have a built-in time delay. For example, on some GM models, closed loop is delayed for 1 to 2 minutes every time the car starts. This allows engine stabilization to take place before the engine goes into closed loop.

We can then conclude from the open loop conditions above that O2 sensor feedback is used when the engine is warmed up, at Idle, and at part throttle (cruise) conditions.

In order to read the O2 sensor, most computers send out a certain voltage to the output terminal of the sensor. This is typically around 450 millivolts. Since we know that the sensor sends low voltage (under 300mv) when a lean condition is present and a high voltage (over 600mv) when a rich condition is present, the computer can count the number of times the sensor crosses the 450mv mark. Cross-counts are the number of times an O2 sensor crosses 450mv. A scanner can "look" at this for you.



Even though you can't see the number of cross-counts without a scanner, you can use a digital voltmeter to watch the open/closed loop system operate. Just connect your meter as illustrated above, while the O2 sensor is still connected, and start-up the car.

Caution: Do not ground the output wire of the sensor. This can damage the sensor and your readings will be erroneous.

When the car starts (cold), you should see approximately .450 Volt (450mv) on the O2 output wire. This reading often varies slightly. The system is now in open loop.

After a few minutes (less if the engine is warm or the O2 Sensor is heated), this reading should begin to fluctuate. You will see changing numbers ranging from near 0 volt to near 1 Volt. If these readings occur, everything is ok. The O2 sensor's output should vary relatively quickly. A lazy sensor, would show up here and the readings will vary slowly. If the readings don't start to vary (stay in open loop), you now are aware of it and can begin to look for the reason.

1.0 Installation Instructions

There are four o2 sensors on the car, two before the cats and two after. The two o2 sensors after the cats are the ones that are used to read emissions, and they are the ones that we need to change to make the MIL light go off. The four wires are the following:

- White Wire - 12V Heater +
- White Wire - Heater Ground
- Grey Wire - Output Signal
- Black Wire - 450 millivolts reference signal sent from the computer

We know that after the cats the mixture should be lean (because the cats function is to burn up any excess fuel that the engine did not) so all we have to do is make the Output Signal sense a low voltage (under 300mv) reading and oscillate the reading to make it look like a working o2 sensor.

Vehicle Installation

- 1) After removing the two correct O2 sensors from the vehicle (refer to Fig. 1) cut the Black and Grey wires near the middle of the harness allowing for wire slack on both sides.
- 2) Trim the wire lengths so that the MIL Eliminator circuit will fit nicely into the circuit as shown in Fig. 2
- 3) Cut and strip the four wires.
- 4) Slide the large piece of heat shrink over one side of the cut wires (black and gray together)
- 5) Notice each blue connector on the MIL Eliminator has a label of either I B or O B. Match each letter on the connectors to the corresponding letter in Fig. 2
- 6) Insert the correct wire into the correct spot by turning each small screw counterclockwise to loosen them, insert the wire, turn each screw clockwise until tight.
- 7) Gently pull on each connection to ensure they are snug in each connector.
- 8) Once all the connections are secure, slide the large piece of heat shrink over the entire circuit centering it to include overlapping the wires exiting the circuit.
- 9) Apply heat to shrink the tubing to best protect it.
- 10) It is recommended to further protect the entire bundle by taping the ends and / or adding waterproof tubing / shielding over the bundle when finished.
- 11) A finished product should look similar to Fig. 3.
- 12) Re-install the O2 sensors in their appropriate location in the vehicle.
- 13) Reconnect the battery. Start vehicle.

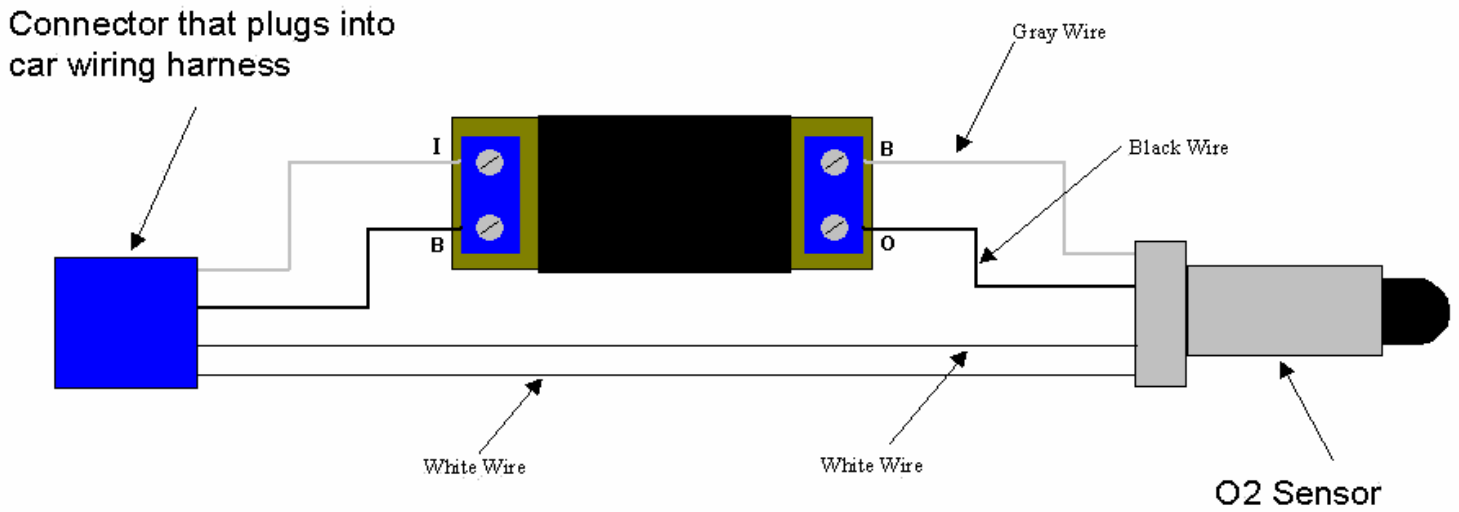


Fig. 2 Connected MIL Eliminator



Fig. 3 Completed modified O2 sensors ready for re-installation into the vehicle

2.0 Troubleshooting and Frequently Asked Questions

I just finished installing it and turned it on and my Check Engine Light is still on

- You may need to disconnect the battery again for 5 minutes to reset the ECU
- One of your connections may be loose. Revisit them and tighten the loose connection.

I've been using these without a problem for a long time now and suddenly the CEL came on

- Run Autotap or other OBDII scan to determine if you are having an O2 sensor fault code. If you are not, the CEL is on for an unrelated reason. Seek assistance from a qualified mechanic.
- If the DTC code is related to the O2 sensor, either the O2 sensor itself is worn out and needs replacing or it is possible that water / environmental elements have penetrated the MIL Eliminator circuit.
- If a mechanic verifies that the O2 sensor is still functioning properly, it is suggested that you allow the circuit to dry out overnight and see if the problem goes away the day after. If the problem persists, the MIL Eliminator circuit may be permanently damaged and may need to be replaced.