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AEROFLOW PERFORMANCE

GM LS3 WITH T56 TRANSMISSION

STANDALONE WIRING HARNESS

WARNING!

THIS PRODUCT REQUIRES DETAILED KNOWLEDGE OF AUTOMOTIVE SYSTEMS. WE RECOMMEND THAT THIS INSTALLATION BE CARRIED OUT BY A SUITABLY QUALIFIED AUTOMOTIVE ELECTRICIAN/TECHNICIAN.

INTRODUCTION

Congratulations on your purchase of Aeroflow Performance GM LS3 wiring harness. Aeroflow Performance products cannot and will not be responsible for any damage, or other conditions resulting from misapplication of the parts described herein. However, it is our intention to provide the best possible products for our customer, products that perform properly and satisfy your expectations. Should you have any questions? Please call technical support at +61 2 8825 1900 and have the product part number on hand when calling.

This Aeroflow Performance wiring harness is designed to be a complete plug and play harness for EFI GM LS3 series engines (2006 and newer) and LSX using a 58 tooth crank sensor. Both engines must have the factory installed Drive By Wire throttle body installed. This wiring harness will suit the T56 manual transmissions or non-electronic controlled automatic transmissions. The harness is constructed with GM Delphi connectors and terminals and high temperature wires. It includes all wiring that is required by the Engine Control Module (ECM) to run and control the fuel injection system and transmission.

NOTE : A few recommendations are important to take note of before and after installation of this wiring harness.

- Never disconnect the battery or the PCM connections while the ignition is turned on
- Always use a digital volt/ohm meter when testing of any electrical circuit is being carried out and do not back probe any connectors as this can lead to permanent damage of connectors and wires.

PRE-INSTALLATION

1. All LS3 / LSX engines will require the Vehicle Anti-Theft (VAT) systems to be removed/disabled*. The ECM input will prevent the engine from starting.
2. Factory stock LS3 / LSX engines utilize 4 oxygen sensors (O2) in OEM configuration. They will be mounted on each bank of the engine with one before the catalytic converter and one after. Both rear mounted O2 sensors (after the catalytic converter) **MUST NOT** be used in the installation of this wiring harness*. The GM part number for the front oxygen sensor is GM 12581966.
3. All LS3 / LSX engines utilize emission control devices such as the Evaporative and Charcoal Canister Purge. This wiring harness does not include any provisions for all of these emission control devices*.
4. The oil pressure sensor is not required for normal operation of the engine. If you wish to use an oil pressure gauge, you must purchase separately this oil pressure sensor GM12616646 (2008 & older) or GM12621234 (2009 & up). If using an aftermarket oil pressure gauge you must use the sender that comes with that aftermarket gauge.
5. A brake switch must be used for proper Drive By Wire throttle control and operation. The brake switch should be closed (electrically connected) when the brakes are being applied and open (not electrically connected) when the brakes are not applied. Purple wire should see 12v+ when brakes are applied. **NOTE :** Failure to wire the brake switch correctly could result in inoperable throttle conditions.
6. It is a must to use a Vehicle Speed Sensor (VSS) when using a T56 or a non-electronic automatic transmission such as TH350, TH400, Powerglide etc. Failure to use this VSS can result in unexpected stalling during hard braking or throttle body operation can be limited.
7. Factory or aftermarket coil harnesses are not included in this wiring harness and must be purchased separately (AF49-1504)

* It is recommended to have the ECM reprogrammed to disable these features so as to avoid any Diagnostic Trouble Codes (DTC) being stored, at a minimum VATS will need to be disabled for engine to run.

ROUTING HARNESS

Routing your harness depends upon the particular make and model of the vehicle. Each application is different especially with custom retro fit or conversion vehicles.

- This harness is designed to have the ECM mounted in the passenger front compartment area such glove box, under the dash or the kick panel. Decide where and how the ECM & fuse box will be mounted. These two must be mounted no further apart than the wiring will allow.
- Route the harness away from any sharp edges and components that open and close such as doors and hood.
- When routing the harness ensure to provide extra mounting support to protect from any hazards.
- When routing the harness ensure enough slack is placed where movement could possibly occur
- Route harness away from any extreme heat sources such as exhaust systems. If required build a heat shield or heat sleeve the wiring for protection.

This wiring harness is equipped with a ground wiring section that is designed to bolt to the rear portion of the left side cylinder head and adjacent to the fuse block supplied with the harness. As with all automotive wiring the grounding is critical for proper operation. Ensure a clean and secure spot is used for all grounding.

- A ground cable (no smaller than 4 gauge) must be used from the negative battery terminal to the chassis frame (not included in this harness)
- A ground cable (no smaller than 4 gauge) must be used from the engine block to the chassis frame (Do not use the engine mounts as this connection is not effective)
- A ground strap must be used from the engine block to the vehicle body.

INSTALLATION OF HARNESS

Before attempting this installation guideline below. Disconnect the battery cables from the battery and ensure they will not touch at any point.

This harness is designed to have the ECM mounted in the passenger compartment area. This harness has been split into two main sections, Engine Compartment Section & Under Dash Section. The Engine Compartment Section is on one side of the firewall rubber grommet and the other side is considered the Under Dash Section.

- Engine Compartment Section : includes wiring for the fuel injector, ignition coils, starter motor, engine sensors and VSS.
- Under Dash Section : includes ignition feed wire, Data Link Connector (DLC) , under dash wires, Accelerator Pedal Position Sensor, ECM connectors and fuse/relay box.

Below is a general guideline to connecting the wiring harness. Each setup may be different for your application. If you are unsure please contact a professional.

ENGINE COMPARTMENT SECTION

1. Mark the position where the wiring harness will come through the firewall. Using a 2" hole saw, drill the hole in the firewall for the rubber grommet. Make sure to deburr the hole with a deburring tool or file for a smooth finish.
2. From inside the cabin, feed the Engine Section of the wiring harness through the 2" hole. Push the grommet into the hole until it is seated.
3. Route the entire Engine Compartment section to the top of the engine. The Engine Compartment section of the wiring harness is designed to be split into two banks, a left hand bank for the left side of the engine and a right hand bank for the right side of the engine. This should be very similar to how the factory wiring harness was routed. Each of these banks are not labelled but they are individually loomed with conduit. The left-hand bank should contain the connectors for the CAM, MAF and ECT sensors.
4. Route the left-hand bank of the wiring harness behind the intake manifold and then between the left side valve cover and fuel rail.
5. Route the right-hand bank of the wiring harness between right side valve cover and fuel rail.
6. Route the Vehicle Speed Sensor (VSS) connector over the transmission case to the rear of the transmission. **NOTE** : When routing the VSS wiring ensure it is at least 300mm (12") away from any ignition wiring such as spark plug leads.
7. Route the battery positive ring terminals (2 large ring terminals with red heat shrink) , Knock Sensor and Crank Angle sensor connector behind the left hand cylinder head. When routing under the exhaust manifold to the correct location an extra heat sleeve may be required.
8. Locate the black wires in the left hand bank of the wiring harness. It will be two small ring terminals with black heat shield over the wires. Route these to the back of the cylinder head and bolt them down to ground the engine.
9. Using the table below connect the wiring and connectors ensure you match up the number of the connector with the correct component. Ensure the wiring colours match up so you know you have the right connector.

Connector	Connected To	Wire Colours	Check List
1	#1 Fuel Injector	Pink , Black	
2	#2 Fuel Injector	Pink , Dark Green	
3	#3 Fuel Injector	Pink , Tan	
4	#4 Fuel Injector	Pink , Light Blue	
5	#5 Fuel Injector	Pink , White	
6	#6 Fuel Injector	Pink , Yellow	
7	#7 Fuel Injector	Pink , Red	
8	#8 Fuel Injector	Pink , Dark Blue	
9	Left Bank Ignition Coil Plug	Black, Red , Dark Green , Brown , Light Blue , Purple , Pink	
10	Right Bank Ignition Coil Plug	Black , Orange , Dark Green , Brown , Light Blue , Purple , Pink	
11	Left Bank Oxygen Sesnor	Tan , Purple , Pink , Grey	
12	MAF Sensor	Yellow , Black , Pink , Purple , Tan	
13	Alternator	Tan , Grey , Red (optional)	
14	ECT Sensor	Tan , Yellow	
15	Cam Sensor	Orange , Pink , Brown , Purple (VVT only) , Tan (VVT only)	
13	IAT Sensor	Purple , Tan	
15	MAF Sensor	Yellow , Black , Pink	
16	Left Bank Knock Sensor	Dark Blue , Light Grey	
17	Throttle Body	Brown , Yellow , Tan , Dark Green , Light Blue , Purple	
18	MAP Sensor	Orange , Light Green , Grey	
19	Right Bank Knock Sensor	Light Blue , Grey	
20	Right Bank Oxygen Sensor	Tan , Purple , Pink , Light Green	
21	Crank Angle Sensor	Dark Blue , Yellow , Light Green	
22	Starter Motor	Large Ring Terminals (Black)	
23	VSS Sensor	Yellow , Purple	
24	Ground	Small Ring Terminal (Black)	
25	Oil Pressure	Tan , Grey , Black	
26	Reverse Lockout	Light Green , Pink	

For more information or technical enquires

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UNDER DASH SECTION

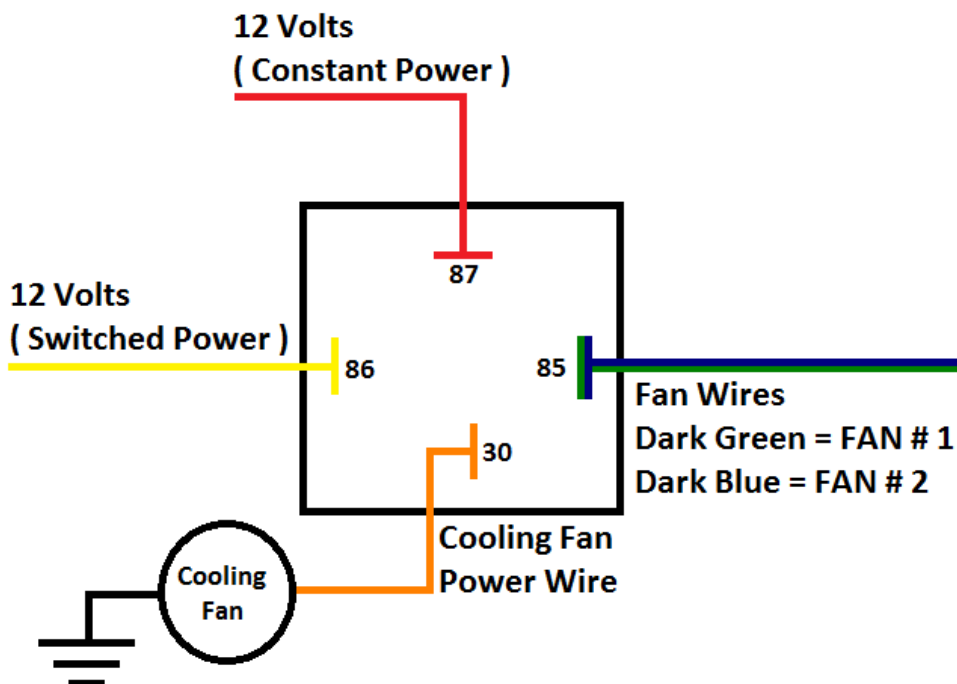
The wires in this section of the harness consists of the Data Link Connector (DLC) which is an OBDII, Ignition feed , Malfunction Indicator Light (MIL), Speedometer, Tachometer, Accelerator Pedal Position Sensor, ECM Connectors, Primary Cooling fan, Secondary cooling fan, Park/Neutral Signal & Brake Signal wires.

NOTE : Do not make any connections while the PCM is plugged into the harness

1. Route the under dash wires bundled together to the driver’s side of the dash.
2. Using the table below connect all wires as shown in the table. Ensure to use correct electrical connectors and procedures.

UNDERDASH WIRES (GROUPED TOGETHER)			
WIRE COLOUR	CONNECT FROM	CONNECT TO	CHECKLIST
Brown	MIL Light Ground	Throught automotive light to 12 volts	
Black	Speedometer	Speedometer module	
White	Tachometer	Electronic tachometer	
Dark Green	Fan 1 Ground	Ground side of Fan 1 relay (Sold Separately)	
Dark Blue	Fan 2 Ground	Ground side of Fan 2 relay (Sold Separately)	
Orange	Clutch Position (If Required)	To Ground (While Clutch is depressed)	
Purple	Brake Signal / TCC Ground	To 12 volts (When brakes are applied)	
UNDER DASH SECTION WIRES			
N / A	Fuel Pump (Line)	To 12 Volts Battery Power	
N / A	Fuel Pump (Load)	To Fuel Pump	
Red	Ignition Feed (Relay Centre)	12 Volts Fused Switched Power (Key On & Cranking)	
Multiple	ECM Connectors	ECM	
Multiple	Accelerator Pedal Position Sensor (APP)	Accelerator Pedal	

3. In the stock configuration when wired up FAN # 1 will come ON at 107 °C (226 F) and go OFF at 105 °C (221 F). FAN # 2 will come ON at 112 °C (235 F) and go OFF at 110 °C (230 F). A diagram is provided below for a guideline for the cooling fans wired up to an automotive relay (Sold Separately). Each fan should have it’s own separate relay.



4. A fuel pump relay is provided in the relay centre. The signal side of the relay is pre wired into this harness. The feed and out sides of this relay are not wired or supplied with this harness. Two blade terminals are supplied separately to complete the circuit. Ensure that the correct sized wire is used and fused wiring is installed when wiring in your fuel pump depending on our application (refer to your fuel pump manufacturer for details). Measure the length of wires from your fuel pump to the relay and strip the wires and crimp the supplied blade terminals onto the wires. Insert the crimped terminals into the relay holder to complete this circuit. **NOTE :** Ensure to correctly Ground and Fuse your fuel pump circuit or engine damage may occur.
5. Connect the two ECM connectors from the wiring harness to the vehicles ECM. The Connectors are coloured coded to prevent incorrect installation. **NOTE :** care must be taken not to bend any pins in the ECM.
6. All wires not being used should be individually tape and secured to prevent any electrical shorting.
7. Permanently mount the vehicles ECM, Accelerator Pedal and Fuse/Relay centre in the appropriate location.
8. After all connections have been made throughout the entire harness and they have been double checked to ensure no loose wires or connections. Place the ignition in the off position and reconnect the battery terminals.
9. Before starting the engine it is recommended to check the following.
 - Harness is completely connected (including o2 sensors, Check Engine Light and Brake Switch)
 - Exhaust is installed
 - Air intake duct and MAF are installed correctly
 - Battery is installed in vehicle and is at 12 volts
 - Ground are secured

TROUBLE SHOOTING GUIDELINES

If you are having trouble with your engine running poorly or not running at all. First perform the basic trouble shooting advised in your particular engine / service manual. Check for faulty connections, blown fuses, disabling of VATS in the ECM, spark, timing, fuel pressure and check for any trouble codes that the ECM may have stored.

Please see below a guideline on checking the trouble codes stored in the ECM (refer to factory service manual if unsure or for further instructions)

1. In order to retrieve the trouble codes in the ECM. A scanner must be connected the Data Link Connector (DLC) connector in the wiring harness. Follow the instructions provided with the scanner to read all the codes stored in the ECM.
2. After you have checked and noted down all codes remove the connector from DLC connector. **NOTE :** A code indicates a problem in a specific circuit and may not be the particular part that is defective.
3. Before taking more extensive correction actions for any trouble codes, make sure all connections on the trouble circuit are clean and tight (including the ECM). Inspect the wiring in the circuit for any broken, shorted or exposed / damaged wires. Ensure all ground wires are clean and secure.
4. If a trouble is detected and the problem has been fixed, clear the codes by first making sure the ignition is off and then disconnecting the NEGATIVE battery cable for at least 3 minutes.

IF NO START

1. Ensure the red ignition wire from the back of the fuse / relay centre has 12 volts with the key in the ON position and the CRANKING position. If not present trace back to the wiring issue at the source with a multimeter.
2. Check the 2 Large Ring Terminals by the Crank Angle Sensor are connected to a constant 12 volt power.
3. Check fuel pressure is present at the correct value. (refer to factory service manual)
4. Check all fuel injectors are firing when CRANKING. (refer to factory service manual)

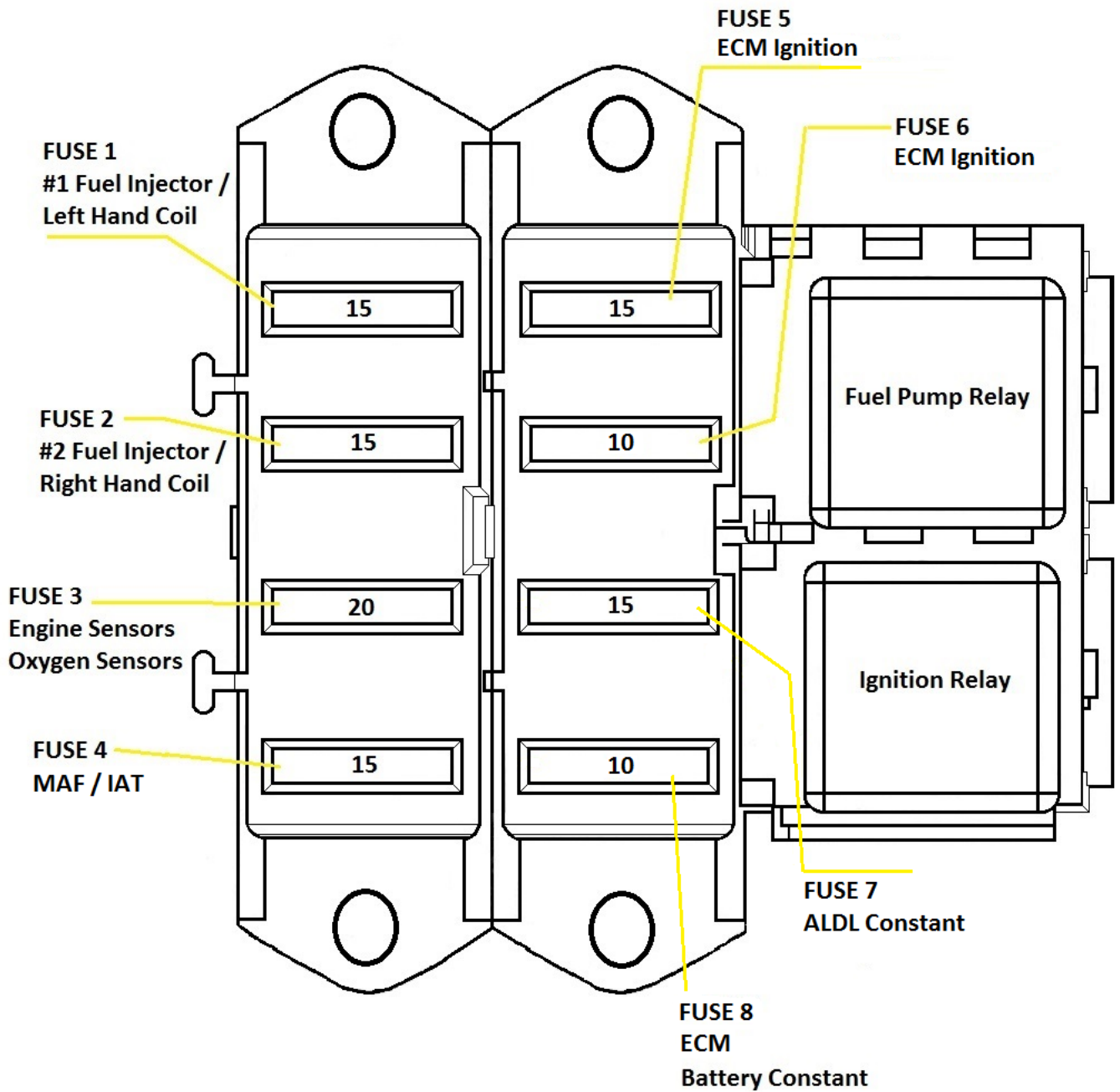
THROTTLE PEDAL DIES

1. Brake switch wire (PURPLE WIRE) is not connected correctly. Brake signal needs 12 volts when the brakes are applied and ground though the taillights when the brakes are not applied.
2. Incorrect tune in the ECM for the throttle body, MAF and MAP sensors that are being used (if aftermarket a re program of the ECM may be required)
3. Incorrect accelerator pedal used or the pedal is wired incorrectly.
4. Trouble codes logged in ECM.

IF COOLING FANS STAY RUNNING

1. Check Engine light is connected properly.
2. Relay/s are wired incorrectly.
3. Trouble codes exist in the PCM and must be cleared and fixed.

FUSE / RELAY CENTER FRONT VIEW

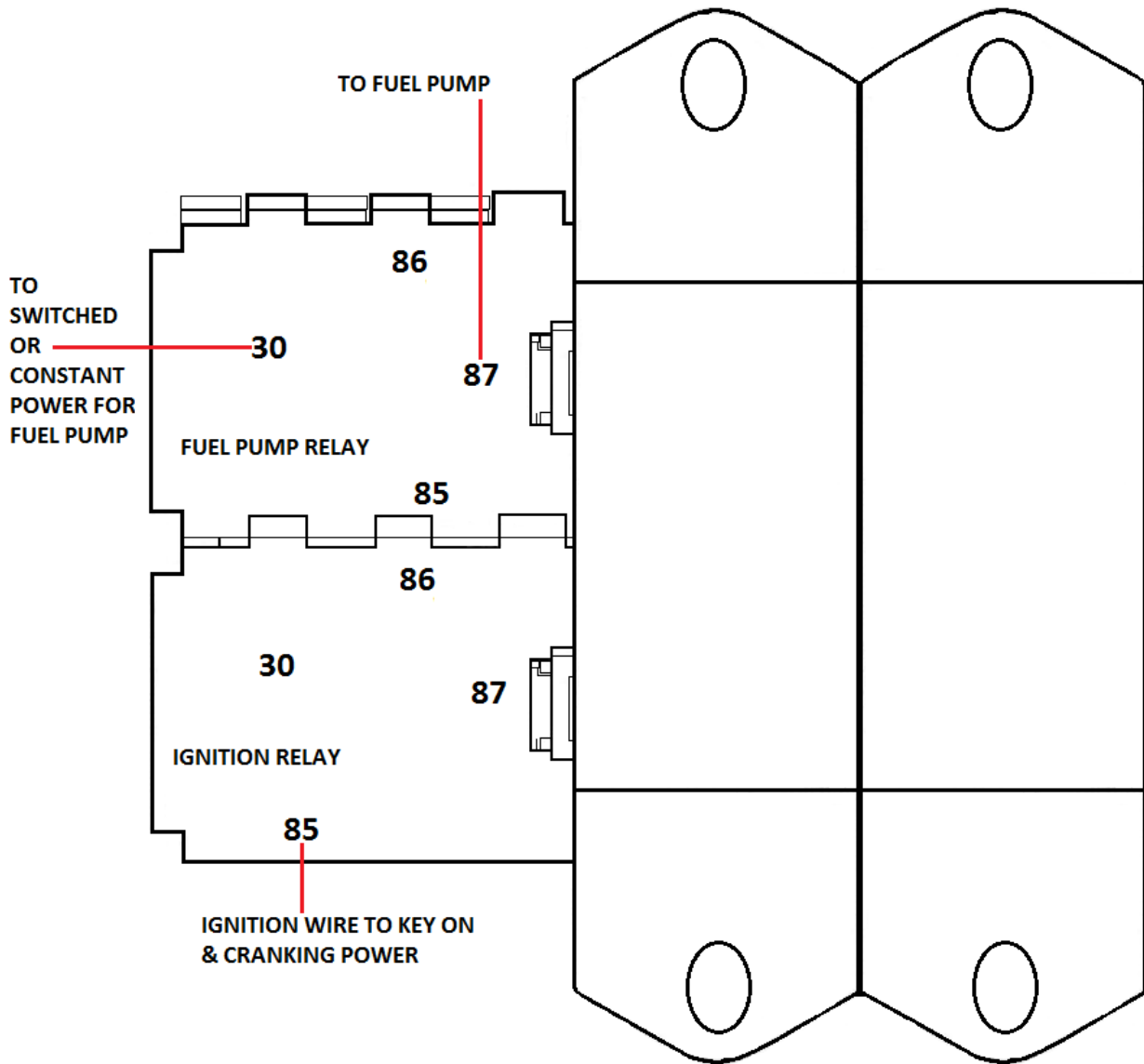


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FUSE / RELAY CENTER REAR VIEW



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