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Generation III Standalone Engine Harness



Installation Guide

At BP Automotive we take pride in hand building harnesses for the best quality possible. Each harness is hand made with the utmost attention to detail that your swap deserves. **Please read these instructions in their entirety before contacting us. Many of the questions we receive are questions already answered in these instructions! Keep an eye out for all BOLD and/or BOLD and UNDERLINE text with yellow highlighting. All text highlighted in this manner is a common question or common installation error.**

We warranty all items that are used for their normal intended use, to be free of all defects. Thank you for your purchase and confidence in our product! We also offer many other conversion and swap parts, so feel free to contact us if you need any other parts!

The Basics

This engine management harness is intended to be used with the 99-06 PCM with a calibration for the appropriate engine/transmission. The service number will vary from application to application. It is also intended to be used with the GM Oxygen Sensors listed on your Oxygen Sensor Connector Labels. We have also listed the part number in the table located on page 9 of this installation manual.

The PCM MUST be flashed to have the VATS and other non-needed items removed from the calibration for your swap. If you have not had this done, we can provide this service to you. Just contact us using our contact information on the front page.

This guide covers the 4I60e, 4I80e, T56, and non-electric transmissions, for Drive by Cable and Drive by Wire Applications, just follow the dash wiring guide for your appropriate application.

If you have a 4L60e or a 4L80e you will need a double pole brake switch so that the PCM can properly control Torque Converter Lockup Functions. If you do not have one, we carry them in stock for your convenience. Part # TCC-001.

Let's Get Started

As with any wiring project, there are some tools that you will need. The tools listed below will be dictated by whether you decide to mount the PCM and/or Fuse Block in the cabin of the vehicle. Most swaps do mount the PCM in the cabin, and this is why BP Automotive includes a grommet with all new harnesses.

1. Wire Cutters and/or Strippers.
2. Hand File to File Rough Edges.
3. Soldering Iron or Torch.
4. Heat Shrink and Solder.
- 5. Drill with a 2 1/8 Hole Saw for the Supplied Grommet.**
6. Appropriate bit for Fuse Block and PCM Bracket Mounting Screws or Bolts.

Now that you have your tools gathered up it is time to get started on the harness installation. If you have decided that you have enough room in the cabin of your swap vehicle to mount the PCM and Fuse Block inside, you will want to determine where you want to drill your hole in the firewall for the harness pass through. Once you have made your mind up and you get your hole drilled, you will want to use the hand file on the edges to clean up any burrs. Once that is done you will want to feed the engine harness into the engine compartment from inside the cabin of the vehicle.

Once you have the harness through the hole and have the trunk of the harness situated you will want to snap the grommet into the hole. It is VERY thick and will stay in place. Your firewall is now sealed, and your harness is protected!

The connectors are all labeled for easy installation onto the engine. Once you have that finished, we can now concentrate on the few connections that you will have to make in order to get the swap running properly. It will take only 2 wires to get the engine running, but there are some more wires that must be wired in to get it all working properly.

Wiring and Wiring Techniques

It is vital to have a good, reliable connection at any place a splice is needed. In a factory harness this is achieved with dies and a proper crimping press. A solder less crimp does not have any airspace in the copper and meets certain crimp height and crimp width specifications. Here at BP Automotive we achieve this using very expensive hand crimping tools meant for harness production. Delphi repair tooling is commonly mistaken to achieve a solder less crimp. Any connection made with any tool other than a production crimp tool must be soldered after being crimped per Delphi Repair Manual J-38125-620B.

It can be difficult trying to solder without an extra set of hands. We recommend picking up some appropriately sized NON-INSULATED butt connectors. Use a high leverage crimp tool available at many auto parts stores to crimp the wires together. Don't forget the heat shrink before you crimp the connection. Once you crimp the wires together use your soldering iron or torch to solder each side of the butt connector to the wire. Then seal it up with your adhesive lined heat shrink.

Grounding and Mounting

There are some VERY important things that are often overlooked. Grounds, grounds, grounds. It is vital to have at least a 4 AWG grounding strap from the engine to the frame and from the negative battery terminal to the frame. Lastly, you will want to connect a grounding strap from the engine to the body. It is a must to have proper grounds to ensure reliable operation of your fuel injection system. Do not forget the ground to the back of the driver side cylinder head on the engine harness. Do not ground it anywhere but the cylinder head.

Another detail that is often overlooked is proper PCM mounting. **It is imperative not to mount the PCM in any matter that would leave it grounded.** The PCM needs to be mounted so that it is isolated from shock or shorting. The easiest way to do this is with a GM flat plastic mounting bracket. We keep these in stock for your convenience. **Part # BKT-001.**

Bear in mind that all our fuse blocks have labeled covers on them, so do not mount them in a manner that would prevent cover removal. **To mount the fuse block simply remove the base via the latches at the 4 corners on the bottom of the fuse block and then mount the base and snap the fuse and relay assembly back into the base.**

The harness is made to be routed from the back of the intake forward. The main "Trunk" of the harness exits the rear passenger side of the engine. **If you have a Vortec Truck engine and are using the stock intake, you will need to detach the Knock Sensor harness from the side of the intake and tuck it behind the engine.** This helps with fitment and cleans up the look of the intake.

What Goes Where

This section covers the purpose and proper connection of the leads that you will have wire into your vehicle. There are three different checklists, one for each different transmission type covered by this guide. **Please refer to the checklist that covers your application and ignore the checklists that do not apply to your application. For each connection on the checklist refer to the spreadsheet with all the wire/connection descriptions to determine the use and proper connection of the wire.** Just follow the guide correctly, for each wire on your appropriate checklist and you will be set. They are listed in the spreadsheet.

On 4L60e and 4L80e transmission applications the PRNDL Gear Select Module on the driver side of the transmission will NO LONGER BE USED. This can be removed. It is not needed for standalone operation. This does NOT help your transmission shift, it is just for digital PRNDL readout and other factory vehicle functions not relevant to shifting the transmission.

Lastly, the ring terminal that exits the harness next to the Crank Position is NOT a ground. This is the BATTERY POWER source for the harness. It has a fusible link installed to protect this circuit, the harness, and your vehicle. If this fusible link is ever damaged it should NEVER be replaced with any size other than a 14ga fusible link.

4L60e and 4L80e

Malfunction Indicator

Tachometer **(Optional)**

Speedometer **(Optional)**

TCC+

Non-Electric Automatic

Malfunction Indicator

Tachometer **(Optional)**

Speedometer **(Optional)**

T56 or Manual Transmission

Malfunction Indicator

Tachometer

Speedometer

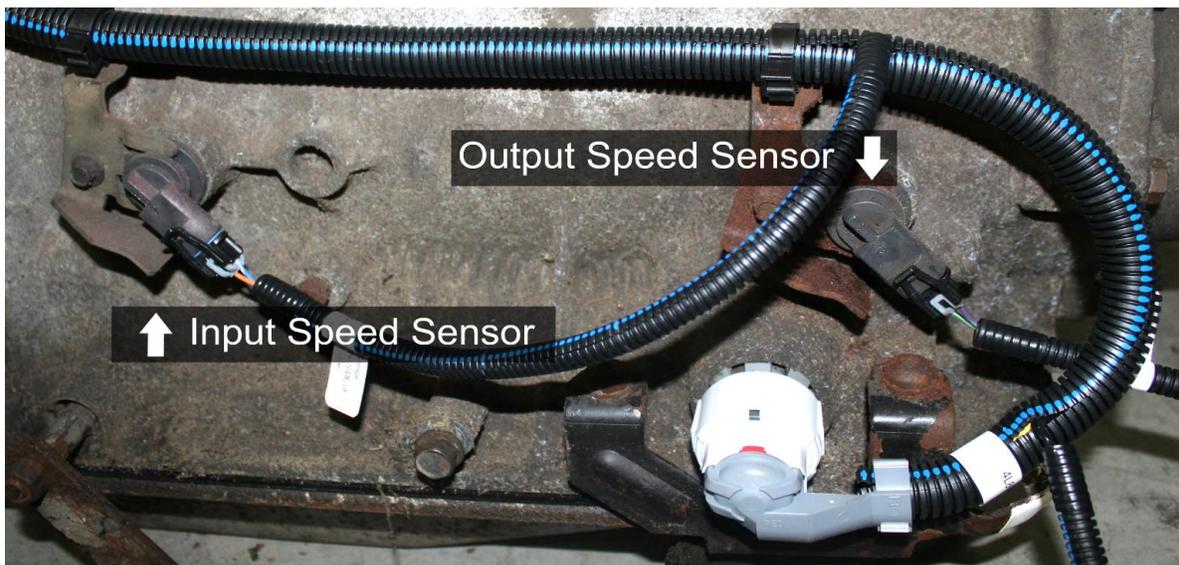
Loose Connection Wiring Guide

Wire Color	Purpose	Wiring
White	Tachometer (Optional)	Tach Signal From PCM. Stock signal from PCM Is a 4 CYL Signal. You may need to try a few different settings depending on the settings in your PCM
Dark Green/WHT	Speedometer (Optional)	This is the vehicle speed signal from the PCM. This is a 4000 Pulse per mile signal that can be changed via Programming. Some aftermarket speedometers can use this signal, some cannot. Some aftermarket gauges have a module that controls their gauges. This will connect to the module in that instance.
Purple	TCC+ Brake Switch (Required)	This wire should have a constant 12v on it. When brakes are pressed the circuit should open and lose voltage. This is how the PCM knows to unlock the converter when the brakes are pressed. This is required for Electronic Automatic Applications. It is also required for Cruise Control to Function on most Drive by Wire Manual Applications.
Brown/WHT	Malfunction Indicator (Required)	This is the wire the PCM uses to control the check engine light. The PCM provides a GROUND to this wire when diagnostic trouble codes are present.
Dark Green	Fan 1 Relay Control (Optional)	The PCM will GROUND this wire when the temperature or pressure set point is reached for Low Speed/ Fan 1. If BP Automotive tuned your PCM this fan is set to 195*. <i>Please refer to the diagram on page 8 for easy relay and wiring instructions for this connection.</i>
Dark Blue	Fan 2 Relay Control (Optional)	The PCM will GROUND this wire when the temperature or pressure set point is reached for High Speed/Fan 2. If BP Automotive tuned your PCM this fan is set to 205*. <i>Please refer to the diagram on page 8 for easy relay and wiring instructions for this connection.</i>
Pink/BLK	Switched Ignition (Required)	<i>This wire needs to be wired to the ignition switch or another existing wire in your vehicle that has 12vdc in RUN AND CRANK</i>
Gray	Fuel Pump (Required)	<i>This is the 12v switched power supply that will turn on your fuel pump when the PCM activates the supplied fuel pump relay in our fuse block. This wire will be connected directly to your fuel pump hot wire. You will ground the other lead of the pump to the chassis or battery.</i>

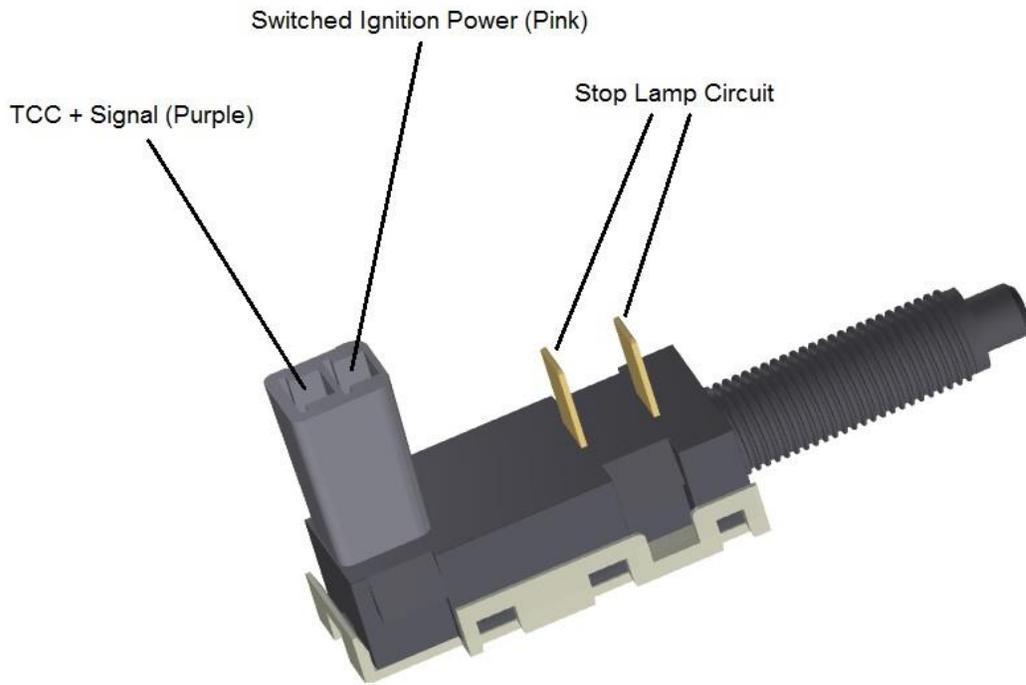
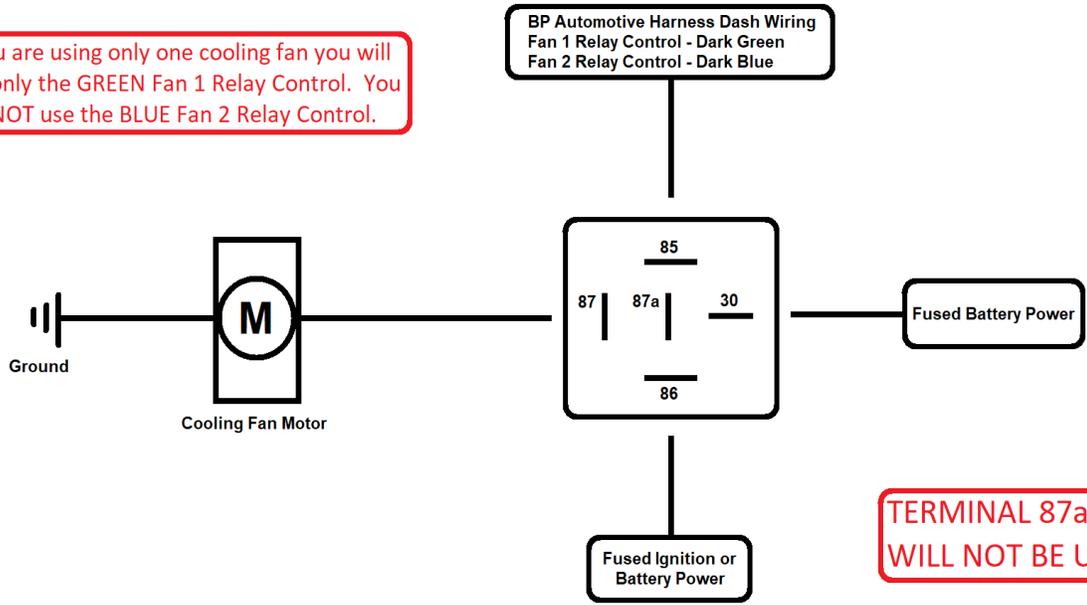
Drive by Cable Cruise Control Wiring Guide		
White	Cruise Engaged Signal	When using a GM cruise control module, this wire will be hooked to the cruise control module.
Dark Green	Cruise Control Inhibit	When using a GM cruise control module, this wire will be hooked to the cruise control module.

Drive by Wire Cruise Control Wiring Guide		
Wire Color	Purpose	Wiring
Gray	Cruise On Signal	Simple switched 12v signal wire that turns cruise control off and on.
Dark Blue	Cruise Set/Coast Signal	Momentary switch that sends 12v signal. One quick press sets current speed. If switch is held vehicle will coast and then maintain current speed when switch is released. After cruise is set a momentary press will decrease set speed by 1MPH.
Light Blue	Stop Lamp Supply Voltage	This wire should be hooked to the same wire that feeds your brake lights, this will disengage cruise control when you press the brake pedal. 12V signal on this wire disengages cruise control.
Gray w/ Black	Cruise Re-sume/Accel Signal	Momentary switch that sends 12v signal. One quick press resumes previously set speed. If switch is held vehicle will accelerate until released, and then maintain that speed. Momentary press after set will INCREASE set speed 1 MPH each time pressed.

4L80e Routing



If you are using only one cooling fan you will use only the GREEN Fan 1 Relay Control. You will NOT use the BLUE Fan 2 Relay Control.



Important Diagram Follow Up

For wiring in cooling fan relays, if the relays you have were NOT provided by BP Automotive please DO NOT call us with questions related to the installation of these relays, contact the relay manufacturer with any questions. Due to the vast options of relays and kits on the market we cannot possibly help with parts we did not manufacture or provide.

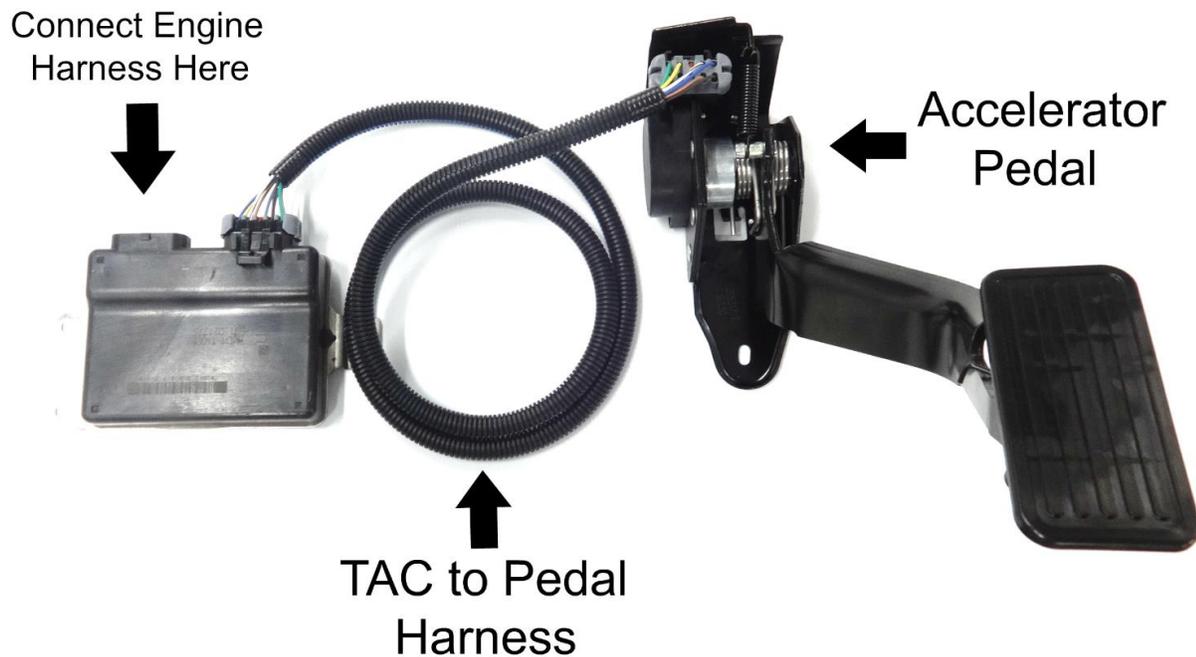
IF BP Automotive did provide your cooling fan relays or kit please refer to the diagrams on the previous page and the instructions provided with the relays or kit BEFORE contacting BP Automotive. Our instructions are very thorough and all information with installation is in our instruction manual.

Common Abbreviations and Compatible/Replacement Parts

Part and Abbreviation	Part Number
Powertrain Control Module (PCM)	Service Number 09354896 or 12200411
Crankshaft Position Sensor (CKP)	12560228 or AC Delco 213-354
Camshaft Position Sensor (CPS)	12561211 or AC Delco 213-363
Manifold Absolute Pressure (MAP)	16212640 or AC Delco 12614970
Knock Sensor	10456603 or AC Delco 213-3521
Idle Air Control Valve (IAC)	17113391 or AC Delco 217-1806
Throttle Position Sensor (TPS)	17123852 or AC Delco 213-912
Coolant Temperature Sensor (CTS)	15326388 or AC Delco 213-953
Mass Air Flow Sensor (MAF) (5 Wire MAF & IAT)	25179711 or AC Delco 213-364
Mass Air Flow Sensor (MAF) (3 Wire)	25168491 or AC Delco 213-4657
Intake Air Temperature (IAT) (N/A w/ 5 Wire MAF)	12160244 or AC Delco 213-243
Oxygen Sensor (O2) (Drive by Cable)	19178961 or AC Delco AFS 138
Oxygen Sensor (O2) (Drive by Wire)	12587785 or AC Delco 213-1702
<u>Oil Pressure Sensor (OPS)</u> <u>THIS IS NOT USED UNLESS YOU HAVE SPECIAL RE-REQUESTED IT. THIS PORT ON THE ENGINE WILL BE USED FOR YOUR GAUGE SENDER FOR YOUR ORIGINAL GAUGE OR THE SENDER FOR YOUR AFTERMARKET GAUGE.</u>	12616646 or AC Delco D1846A

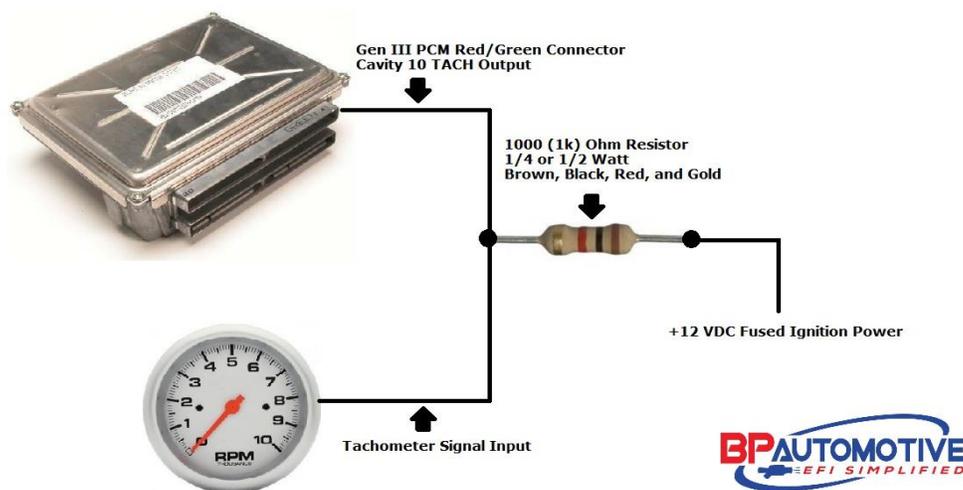
Drive by Wire (DBW) Compatible/Replacement Parts

Part and Abbreviation	Part Number
Corvette/CTSV Throttle Actuator Control Module (TAC)	12578953
2001-02 Vortec Throttle Actuator Control Module (TAC)	12578953
2003-06 Vortec Throttle Actuator Control Module (TAC)	12573059
Corvette/CTSV Accelerator Pedal (APP)	12565643
2001-02 Vortec Accelerator Pedal (APP)	12565643
2003-05 Vortec Accelerator Pedal (APP) (9 Pin)	15264643
2006-07 Vortec Accelerator Pedal (APP) (6 Pin)	15107594
Corvette/CTSV/2001-02 Vortec TAC to Pedal Harness	TAC-001
2003-05 Vortec TAC to Pedal Harness	TAC-002
2006-2007 Vortec TAC to Pedal Harness	TAC-003



TACH TROUBLESHOOTING

- The stock settings for the TACH output on a Gen III PCM Is a **4 Cylinder pulse output!**
- Ensure your TACH is set to the proper setting for the output that was tuned into your PCM.
- IF you are using the Stock TACH in the vehicle being swapped, ensure that the PCM has been tuned for the proper output.
- IF your TACH is still reading incorrectly or not at all follow the diagram below for instructions on what to do to get it to work properly.



TROUBLE SHOOTING INSTRUCTIONS

If you are trying to start your swap and are having some issues with getting it started or getting it to run properly, there are a few things that you will want to check for BEFORE you contact us for help. Below are a few guides to help with common issues!

- Check your fuel pressure! It should be steady at 58 PSI
- Check for any Blown Fuses
- Check for Loose Connections on the Power and Ground Circuits!
- Make Sure you have GOOD Grounds from Frame, Battery, and Block.
- Make Sure the harness Grounds are Bolted to the back of the HEAD.
- **MAKE SURE THE PINK/Black Stripe SWITCHED IGNITION CIRCUIT HAS +12VDC IN RUN AND START!**
- Ensure the VATS has been disabled in your PCM.

NO START

- **MAKE SURE THE PINK/Black Stripe SWITCHED IGNITION CIRCUIT HAS +12VDC IN RUN AND START! This is the Most Common Issue We are Called About!**
- Check for Spark, if you do not have spark look and see if your tach moves at all when you are cranking. If the Crank Sensor is working properly you should see some movement on the TACH. Call Us if the TACH does not move.
- Check for Fuel. A very common issue with these engines is the injectors becoming gummed up from sitting with old fuel in them. Go to your local parts store and rent or buy an injector noid light kit. If your injector Connectors light up the lights while cranking the injectors are being commanded to pulse, and your injectors are clogged if you have an absence of fuel on your spark plugs.

COOLING FANS RUN CONSTANTLY

- Make sure that the Malfunction Indicator has been connected properly, controlling the GROUND side of your bulb.
- If the Light is Illuminated, then Codes are present. Scan the vehicle using a scanner.

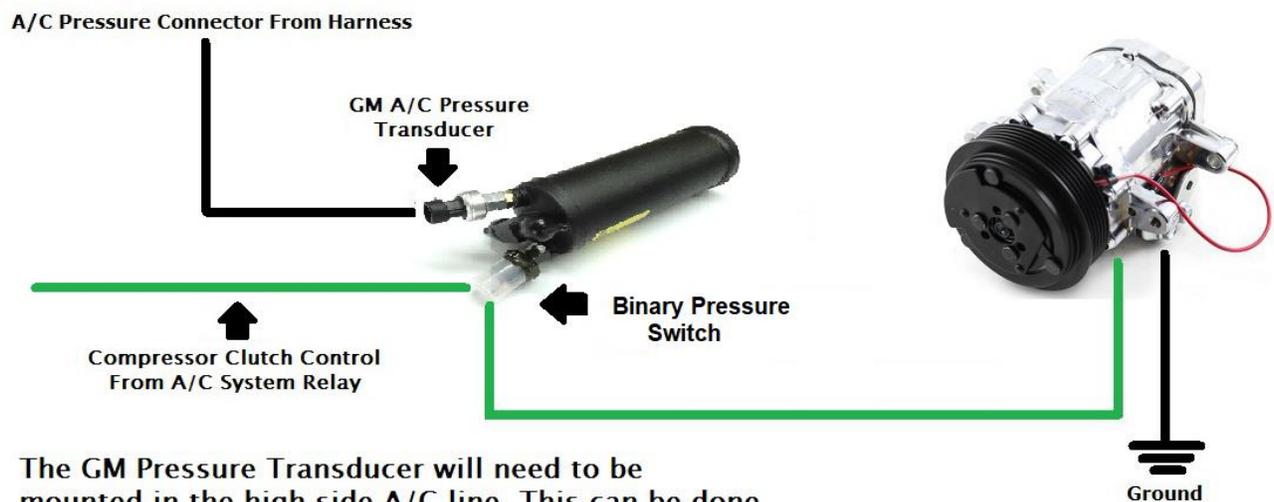
MALFUNCTION INDICATOR (Check Engine) LIGHT ON

- There is a code present in the PCM. Scan via the DLC provided with the harness with a hand-held scanner. Turn your key to the ON position and connect the scanner to the DLC port. Follow the on-screen prompts on the scanner.
- **A code does not mean that the according sensor is bad. The code indicates a problem with that circuit, do NOT replace the part until you have determined that it is the cause of the code. This is VERY important to remember.**

Cooling Fan Operation with Air Conditioning

Proper operation of cooling fans with A/C on a LS Swap requires the use of a GM Pressure Transducer that utilizes a metric fitting that is difficult to integrate. We have a universal Receiver Drier and many other parts that will bolt right into a Vintage Air system to make the A/C Installation a snap! We do also have weld in fittings for complete custom A/C systems as well.

The integration of the GM Pressure transducer will allow the PCM to see the pressure of the A/C system so that it can stage the cooling fans accordingly, bump the idle, and calculate load. This is how all LS and LT Equipped Vehicles operate in factory form and is the best way to accomplish factory style operation and reliability. Please refer to the diagrams on the next page for reference on how to integrate your air conditioning.



The GM Pressure Transducer will need to be mounted in the high side A/C line. This can be done with the pictured receiver drier, our tee in fitting, or our weld in fitting. This transducer is **REQUIRED** for the PCM to control fans while the A/C is running. Forcing the fans on with a relay will drastically decrease fan life as the fans will be on even at cruising speeds.

