Generation IV 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 E38 ECM (Some special applications or requests may use an E67. However, the instructions remain the same.) and if applicable either the T42 or T43 TCM with calibrations for the appropriate engine and transmission combination. The service numbers 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 ECM/TCM 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 4L60e, 4L80e, T56, 6L80e/90e, and non-electric transmissions, for LS3 based 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 T42 TCM. It is REQUIRED to operate the transmission. This is usually mounted right next to the ECM in most factory applications. IF you do not have one, BP Automotive can provide one.

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 ECM/TCM and/or Fuse Block in the cabin of the vehicle. Most swaps do mount the ECM/TCM in the cabin, and this is why BP Automotive includes a grommet with all new harnesses.

1. Wire Cutters and/or Strippers.
5. Drill with a 2 1/8 Hole Saw for the Supplied Grommet.
6. Appropriate bit for Fuse Block and ECM/TCM 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 ECM/TCM 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 crimping tools meant for harness production. *Delphi repair tools are 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 ECM/TCM mounting. It is imperative not to mount the ECM/TCM in any matter that would leave it grounded. The ECM/TCM needs to be mounted so that it is isolated from shock or shorting.

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. This helps with fitment and cleans up the look of the harness as it lays on 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.
4L60/65/70/80e, 4L80e, and 6L80/90e

- Malfunction Indicator
- Tachometer (Optional)
- Speedometer (Optional)
- Brake Switch (There will be TWO wires)

Non-Electric Automatic

- Malfunction Indicator
- Tachometer (Optional)
- Speedometer (Optional)

T56 or Manual Transmission

- Malfunction Indicator
- Tachometer
- Speedometer
<table>
<thead>
<tr>
<th>Wire Color</th>
<th>Purpose</th>
<th>Wiring</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>Tachometer (Optional)</td>
<td>Tach Signal From ECM/TCM. Stock signal from ECM/TCM is a 8 CYL Signal. You may need to try a few different settings depending on the settings in your ECM/TCM. <strong>You may also need to do the Resistor Mod. See Page 10.</strong></td>
</tr>
<tr>
<td>Dark Green/WHT</td>
<td>Speedometer (Optional)</td>
<td>This is the vehicle speed signal from the ECM/TCM. 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.</td>
</tr>
<tr>
<td>Light Blue</td>
<td>TCC+ Brake Switch (Required)</td>
<td>This wire should have 12v on it when brakes are pressed. This is how the ECM/TCM knows to unlock the converter when the brakes are pressed. <strong>This is required for Electronic Automatic Applications.</strong></td>
</tr>
<tr>
<td>Purple</td>
<td>TAP Shift (Optional)</td>
<td>TAP Shift. See Page 7.</td>
</tr>
<tr>
<td>Brown/WHT</td>
<td>Malfunction Indicator (Required)</td>
<td>This is the wire the ECM/TCM uses to control the check engine light. The ECM/TCM provides a <strong>GROUND</strong> to this wire when diagnostic trouble codes are present.</td>
</tr>
<tr>
<td>Dark Green</td>
<td>Fan 1 Relay Control (Optional)</td>
<td>The ECM/TCM will <strong>GROUND</strong> this wire when the temperature or pressure set point is reached for Low Speed/ Fan 1. If BP Automotive tuned your ECM/TCM this fan is set to 196°. <strong>Please refer to the diagram on page 8 for easy relay and wiring instructions for this connection.</strong></td>
</tr>
<tr>
<td>Dark Blue</td>
<td>Fan 2 Relay Control (Optional)</td>
<td>The ECM/TCM will <strong>GROUND</strong> this wire when the temperature or pressure set point is reached for High Speed/Fan 2. If BP Automotive tuned your ECM/TCM this fan is set to 207°. <strong>Please refer to the diagram on page 8 for easy relay and wiring instructions for this connection.</strong></td>
</tr>
<tr>
<td>Pink/BLK</td>
<td>Switched Ignition (Required)</td>
<td>This wire needs to be wired to the ignition switch or another existing wire in your vehicle that has 12vdc in <strong>RUN AND CRANK</strong></td>
</tr>
<tr>
<td>Gray</td>
<td>Fuel Pump (Required)</td>
<td><strong>This is the 12v switched power supply that will turn on your fuel pump when the ECM/TCM 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.</strong></td>
</tr>
</tbody>
</table>
This diagram is the ONLY support BP Automotive offers for TAP Shift functions. Using native GM TAP Shift functions in a standalone environment with only an ECM/TCM requires the use of the Corvette wiring and calibration for the TCM in the 6L80e/90e T43 TCM.

All other native GM TAP systems use a Body Control Module (BCM) which is NOT used in a standalone environment.

If you are using an aftermarket TAP Shift system, this wire will not be used and the TAP shift functions will be separate of our harness. Please contact the manufacturer of your system for installation questions.

BP Automotive includes this wire in our harness strictly as a COURTESY only. This is to prevent customers who know how to wire this in from having to run a separate wire.
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.

BP Automotive Harness Dash Wiring
Fan 1 Relay Control - Dark Green
Fan 2 Relay Control - Dark Blue

Fused Battery Power

Fused Ignition or Battery Power

TERMINAL 87a
WILL NOT BE USED

58x Gen IV VVT  58x Gen IV
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**                                   |
| Engine Control Module (ECM)                   | E38 – Service Number Varies Year to Year          |
| Transmission Control Module (TCM)            | Service Number Varies by Year and Transmission.   |
| Crankshaft Position Sensor (CKP)              | 12585546 or AC Delco 213-3520                     |
| Camshaft Position Sensor (CPS)                | 12568983 or AC Delco 213-3826                     |
| Manifold Absolute Pressure (MAP) (Varies by Year and Engine) | 12614973 or AC Delco 213-796                     |
|                                               | 12591290 or AC Delco 213-4681                     |
| Knock Sensor                                 | 12570125 or AC Delco 213-1576                     |
| Coolant Temperature Sensor (CTS)              | 15326388 or AC Delco 213-953                      |
| Mass Air Flow Sensor (MAF)                    | Varies by Application. Recommended-12576410. (May require re-pin of connector if this was not specified.) |
| Oxygen Sensor (O2)                           | 12581966 or AC Delco 213-1694                     |
| Accelerator Pedal                            | Varies by Application. Recommended-25835421. (May require re-pin of connector and a re-tune if this was not specified.) |
| Non VVT GM Cam Bracket with Harness          | 12627501 (Pictured on Previous Page)              |
TACH TROUBLESHOOTING

- The stock settings for the TACH output on a Gen IV ECM/TCM is **Completely Dependent on How it is Tuned.**
- Ensure your TACH is set to the proper setting for the output that was tuned into your ECM/TCM.
- IF you are using the Stock TACH in the vehicle being swapped, ensure that the ECM/TCM 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 ECM/TCM.
NO START

- MAKE SURE THE PINK/Blk 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 ECM/TCM. 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 ECM/TCM 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.

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