



CNG CONVERSION SYSTEM INSTALLATION MANUAL

2011 - 2013 FORD F-150 5.0L DEDICATED / BI-FUEL - UNDERHOOD



INTRODUCTION

Note: Before beginning installation, we encourage you to read the installation manual thoroughly and familiarize yourself with the install.

1. Do a quick inventory check using the provided packing slip and make sure your kit is complete. You can also refer to the parts list located in the back of the manual. If you discover shipping damage or a missing component, please contact M-TECH immediately.
2. Review our limited warranty with care.
3. Make sure safety is a priority by wearing eye protection, steel toe boots, keep your work area clean and always be aware of your surroundings.
4. No smoking near or around your work area during any portion of the install.
5. Never work on a hot engine.
6. Obey all traffic laws when testing the vehicle.
7. Always do a clean snip of all zip ties.
8. Clean up all debris caused by the installation.
9. Read and be familiar with the latest NFPA 52 codes and safety procedures for dealing with natural gas before you begin the install.
10. Make sure all proper paperwork is filled out before, during, and after the install. The paperwork packet will be provided to you by M-TECH.
11. Never attempt to modify the fuel system and always have the fuel system maintenance performed at an authorized dealership by qualified technicians.
12. Dedicated systems – Always leave at least ¼ tank of gasoline in the tank to avoid low fuel light on the vehicle dashboard display.

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| 1. (pages 4-5) | Wiring harness (Dedicated and Bi-Fuel) |
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!! WARNING !! Follow instructions as directed in the installation manual and do not attempt shortcuts. Follow proper safety procedures. Failure to do so can lead to bodily harm or fatality. Tampering with or improperly maintaining the high pressure fuel system can also result in bodily harm or fatality.

!! WARNING !! Batteries normally produce explosive gas. Therefore, do not allow flames, sparks or lighted substances to come near the battery. When charging or working near a battery, always shield your face and protect your eyes. Always provide ventilation. Failure to follow these instructions may result in personal injury.

!! CAUTION !! Be aware that this installation requires the use of High Pressure, Flammable, and Highly Explosive compressed natural gas. CNG is stored under at maximum of 3,600psi and at 70°F (21°C).

!! CAUTION !! Failure to complete the pre-installation checklist may result in severe engine damage after installation is complete.

!! CAUTION !! This installation is intended for unmodified vehicles. If the vehicle has been modified, consult M-TECH before the beginning install.

DISCLAIMER

M-TECH assumes no responsibility for damages occurring from accident, misuse, abuse, improper installation, improper operation, and lack of reasonable care or all previously stated reasons resulting in incompatibility with other manufacturer's products.

Chemicals and Lubricants

1. Silicone lubricant spray is required on all o-rings on fittings.
2. Epoxy primer or equivalent to rust proof any exposed metal.
3. Ford approved coolant liquid to top off the reservoir.

On Bi-Fuel systems gasoline shall not remain uncirculated for extended periods of time (over 60 days).

2011 - 2013 FORD F-150 COMPRESSED NATURAL GAS CONVERSION SYSTEM INSTALLATION INSTRUCTIONS

REQUIRED/RECOMMENDED TOOL LIST FOR M-TECH CNG CONVERSIONS

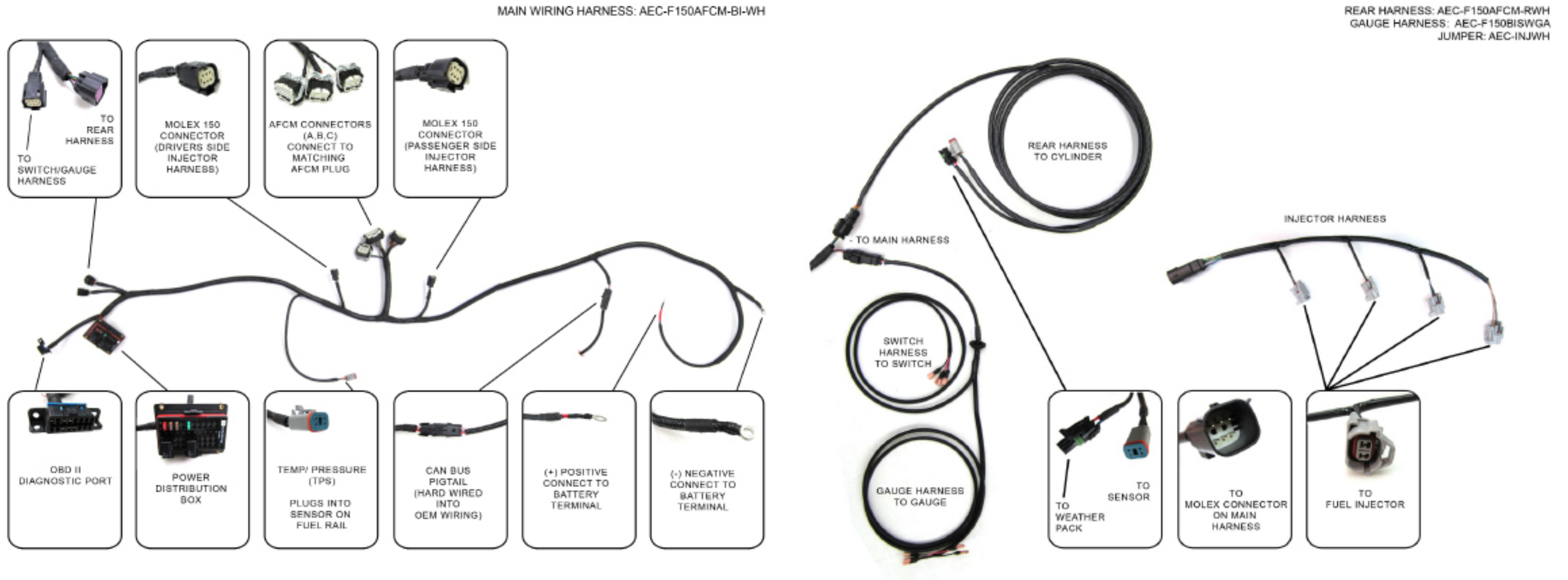
Recommended /Required Tools and Supplies (F-Series)

1. CNG MyCanic
2. Wire Strippers.
3. Soldering Kit w/ Heat Gun and Solder.
4. Black Electrical Tape.
5. Impact Drill.
6. Hand Drill.
7. Zip Tie Clippers.
8. Hose Clamp Tool/Pliers.
9. Hose Clamps (to restrict fluid flow).
10. Hose Cutters.
11. Socket: 5.5mm, 7mm- 13mm (Deep well and Short).
12. Ratchet: 3/8", 1/4" drive.
13. Screw Driver: Phillips head and flat head.
14. 6" Extension, 1/4" drive.
15. Wrench: 3/4", 7/8", 11/16", 1", 1/2", 19mm, 20mm, 21mm.
16. Manifold Plug Remover (M-TECH).
17. Terminal Removal Tool (aka Depinner).
18. Torque Wrench: Electric and Manual.
19. Chisel/file: Half Round and Flat.
20. Hole Saw bit: 2 1/8", 2 1/2".
21. Methane Detector – One can be recommended by M-TECH.
22. Knife/Blade.
23. Filter Socket (M-TECH).
24. Drill Bit: 3/8", 3/4" Drill Bit.
25. Self Tapping screw socket heads: 5/16", 3/8".
26. Tape Measure.
27. Soap Water.

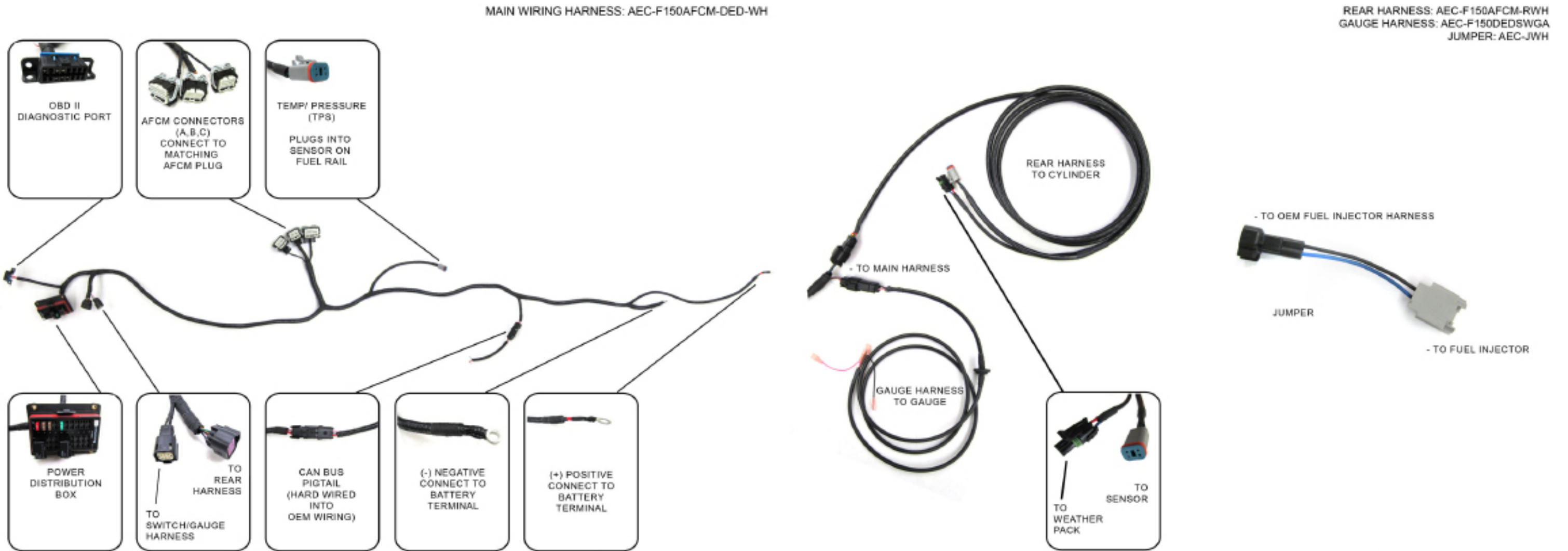
CHECK LIST:

1. Confirm packing slip to insure that you have received all components, assemblies and sub-assemblies.
2. Make sure non of the components and assemblies have been damaged in shipping.
3. Pre-inspect the vehicle following the QVM Q185 and NFPA 52 regulations (Contact M-TECH for the inspection check list).
4. Begin your conversion process.
 - Cylinder Installation
 - Regulator assembly installation
 - Fuel fill installation
 - High pressure line installation and routing
 - Low pressure and coolant line installation and routing
 - Underhood installation
 - Wiring (Including Switch and gauge) Installation
 - Decal placement
 - Fill and leak test
 - Begin your QC Process
5. Check Tire Pressure before test driving.
6. Check and fill coolant fluid before starting and test driving.
7. Be sure the rear harness is routed properly and is not loose under vehicle.
8. Be sure all provided parts are installed.
9. Final test drive.

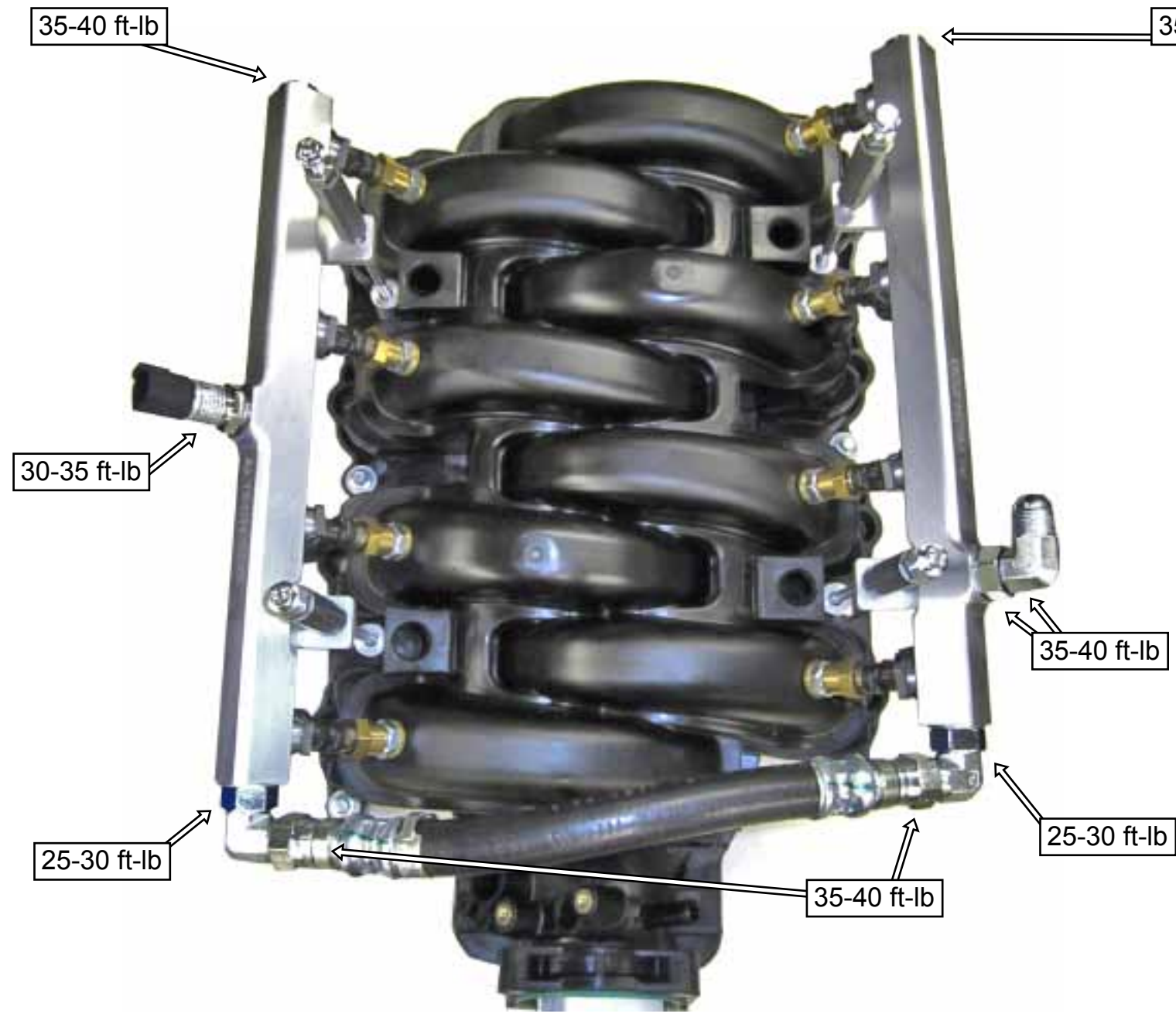
Wiring Harness - Bi-Fuel System



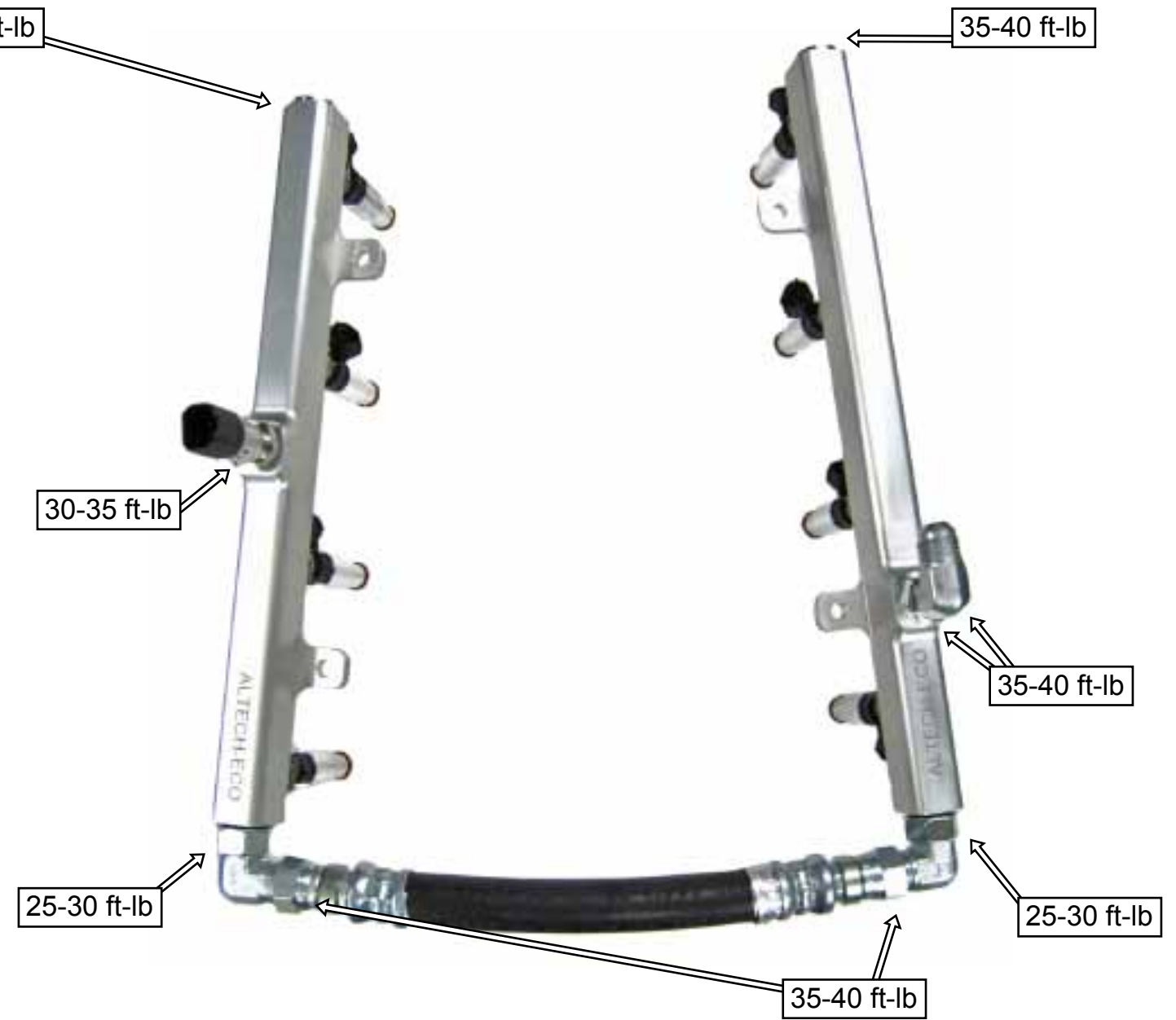
Wiring Harness - Dedicated System



Dedicated and Bi-fuel Fuel Rail



Bi-fuel

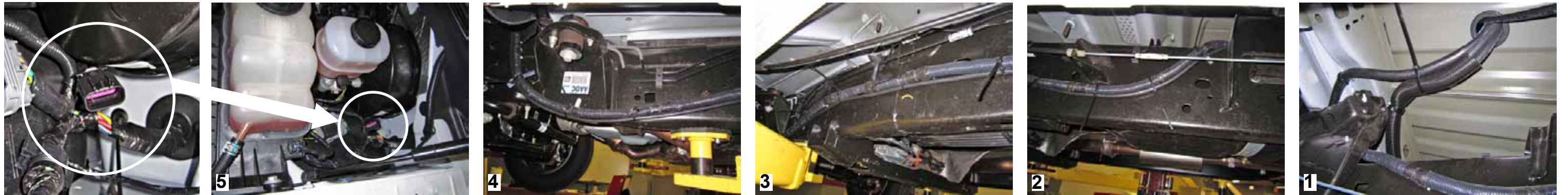


Dedicated

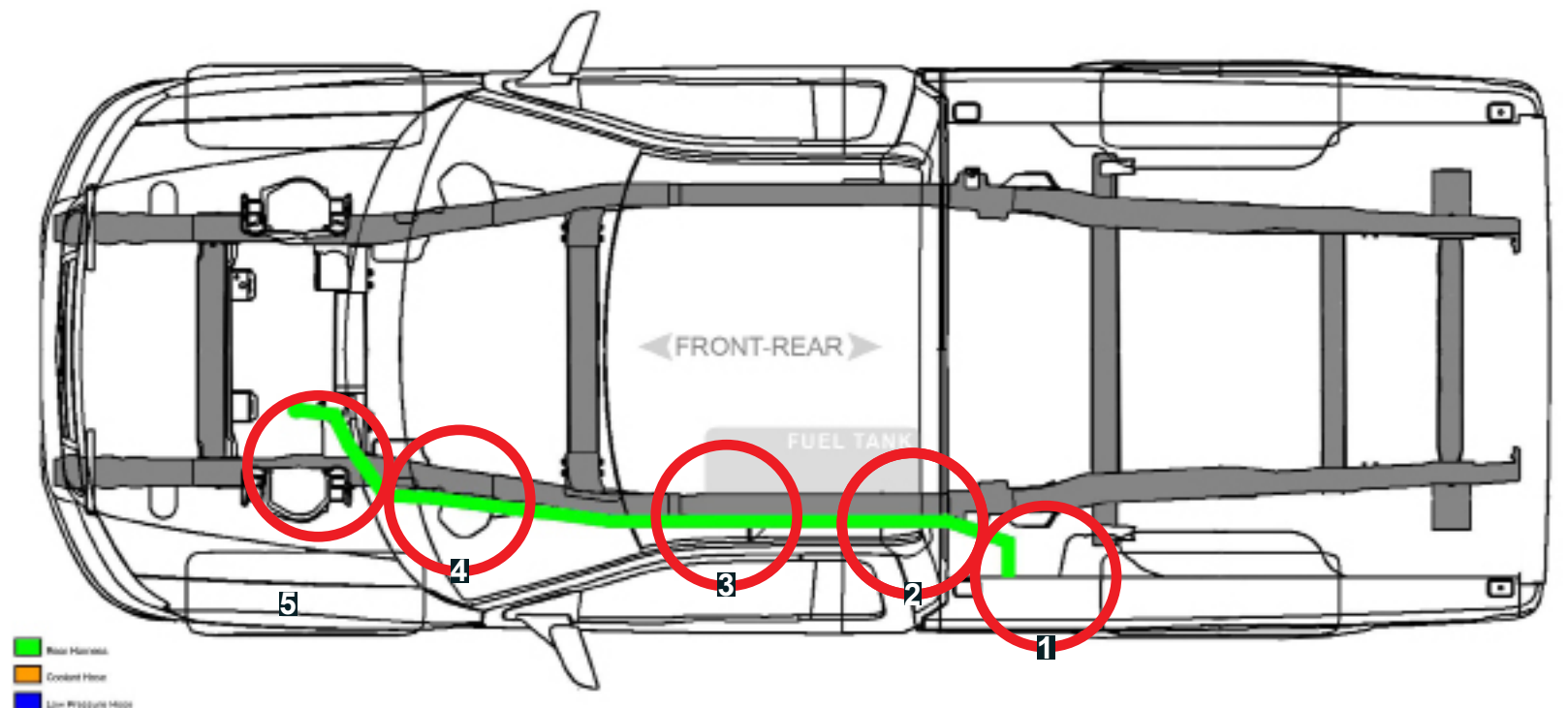
REAR WIRE HARNESS, COOLANT HOSES AND LOW PRESSURE HOSE ROUTING

Rear Harness Routing

1. Beginning at bed of truck, with a 7-1/2" zip tie, secure the Coolant hoses to the Rear Harness and Low Pressure hose beneath the truck bed.
2. Run the Rear Harness above the frame and around the bed mount to meet with the OEM harness.
- 3-4. Using 7-1/2" zip ties, secure Rear Harness to the OEM harness along the outside of the frame. Follow into engine bay as shown below.
5. Your should come up on the drivers side of the engine bay near the fender. Refer to the "Under Hood" section for the next step of the installation.



Note: Run and fit Rear Harness in the location shown below before securing. When running the Rear Harness, stay on the outside of the frame. Use 1" self-tapping screw with every P-clamp in this part of the installation.



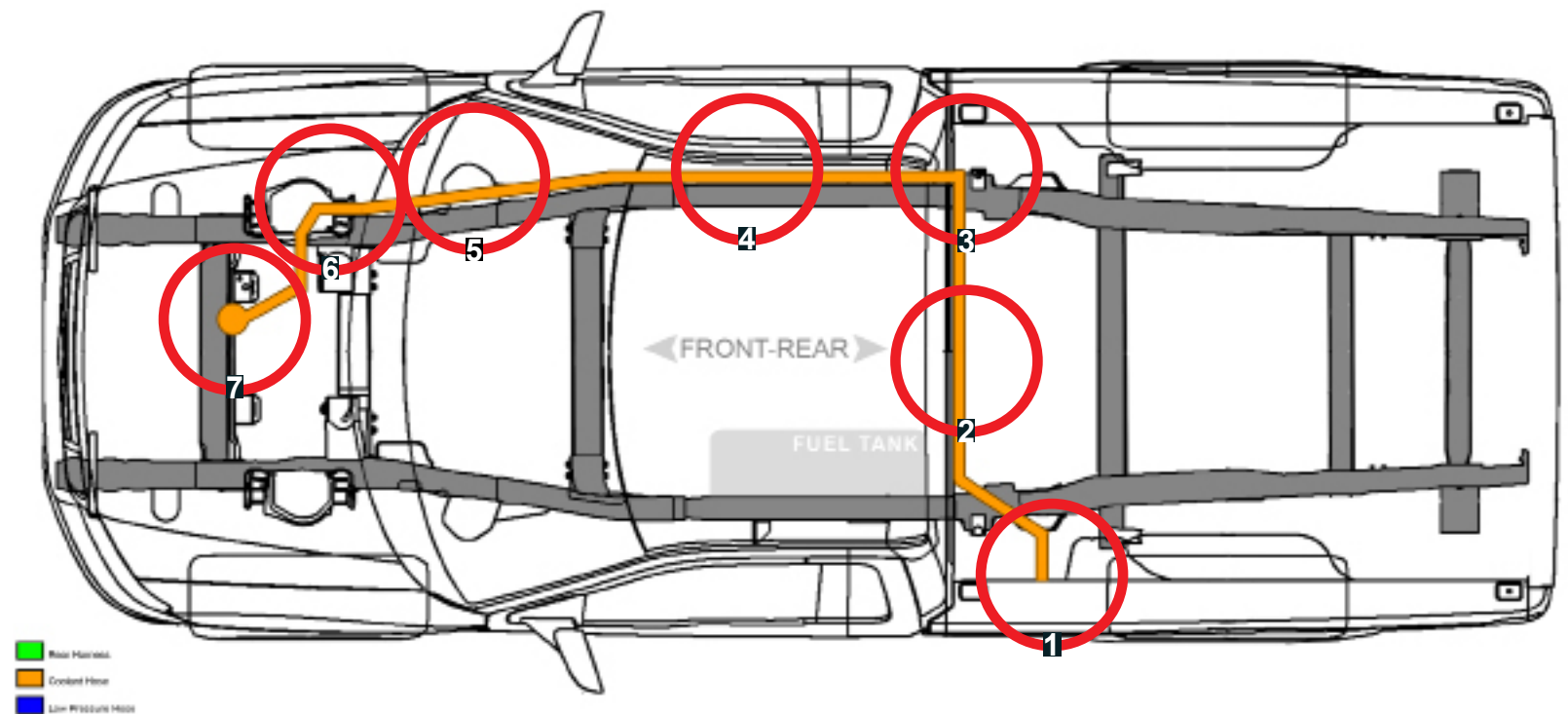
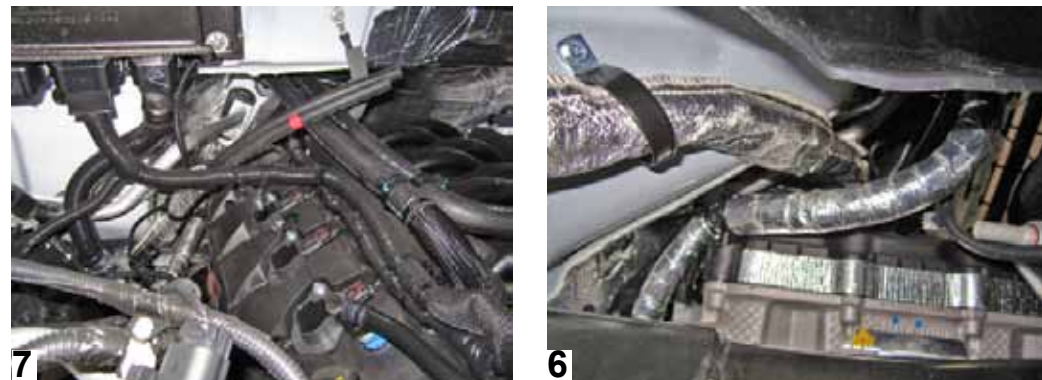
COOLANT HOSES, REAR WIRE HARNESS AND LOW PRESSURE HOSE ROUTING

Coolant Hoses Routing

1. Beginning at bed of truck, with a 7-1/2" zip tie, secure the Coolant hoses to the Rear Harness and Low Pressure hose beneath the truck bed. Using a 1-1/2" P-clamp, secure the loomed Coolant Hoses and Rear to the crossmember.
2. Run coolant hoses along the crossmember. Use a 1-1/2" P-clamp to secure.
3. Upon Reaching the other side secure hoses with a 1-1/2" P-clamp before turning the corner. Then secure on the cab crossmember using 1-1/2" P-clamp.
- 4-5. Continue running coolant hoses on the outside of the frame rail using two 1-1/2" P-clamp to secure in place.
6. When reaching the fire wall secure with a 1-1/2" P-clamp before running up into engine bay. (Be sure the Heat Shield Sleeve is installed before clamping.)
7. Your should come up on the passengers side of the engine. Refer to the "Under Hood" section for the next step of the installation.



Note: Run and fit Coolant hose in the location shown below before securing. When running the Coolant Hose, stay on the outside of the frame. Use 1" self-tapping screw with every P-clamp in this part of the installation.



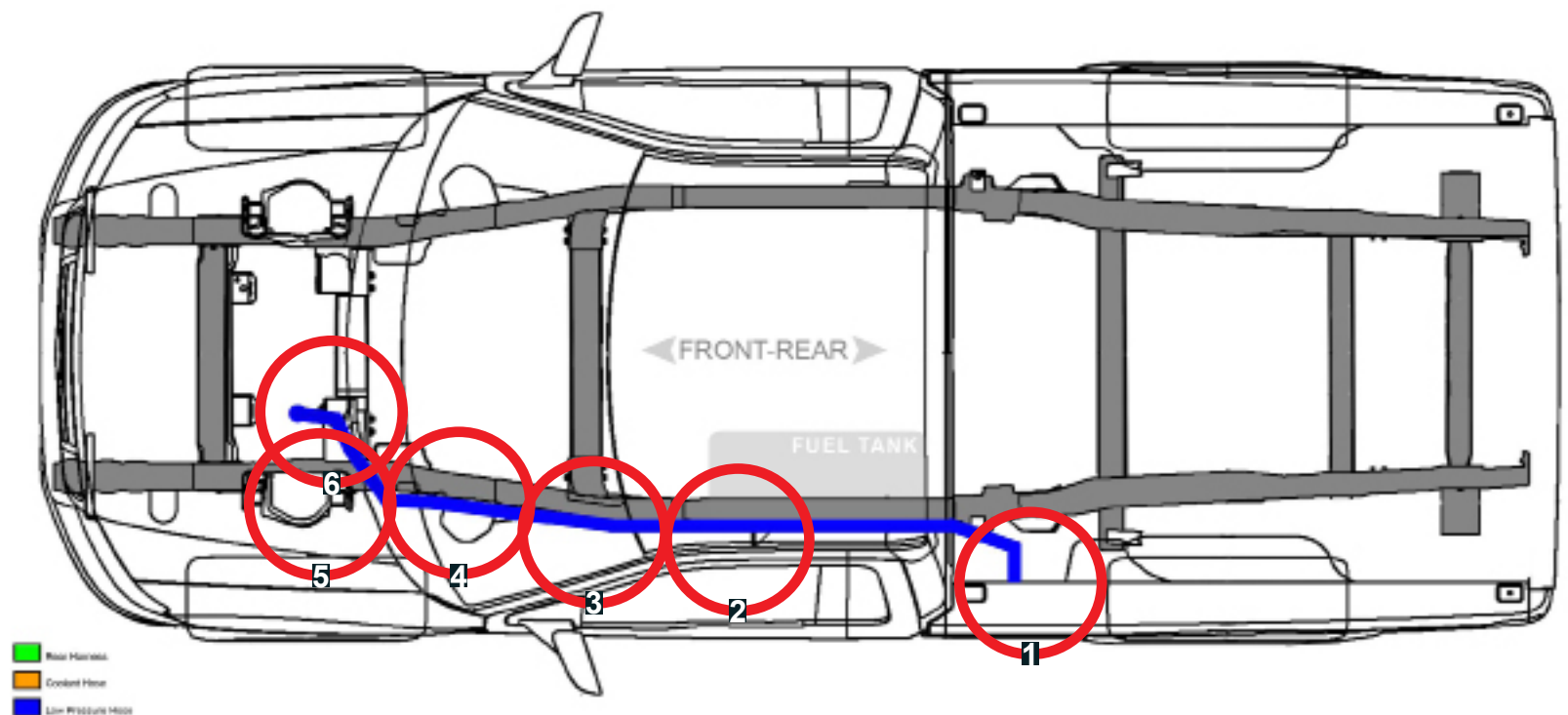
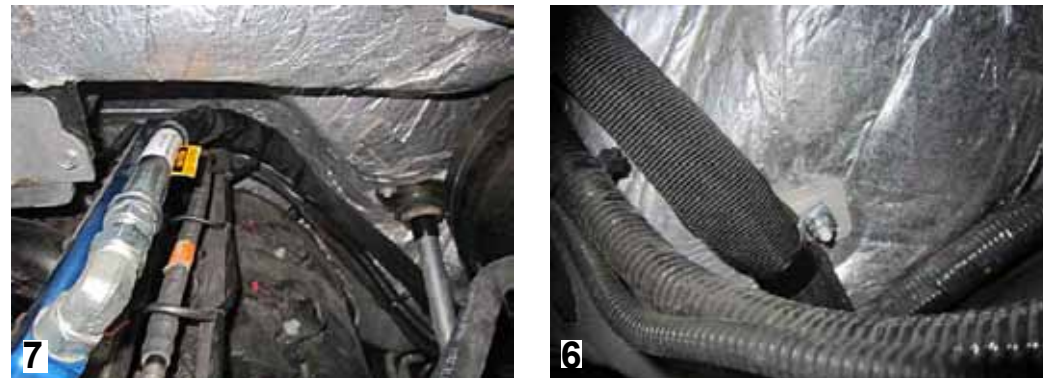
LOW PRESSURE HOSE, REAR WIRE HARNESS AND COOLANT HOSES ROUTING

Low Pressure Hose Routing

1. Beginning at bed of truck, Secure the Low Pressure using a 15/16" P-clamp and coolant lines using one self-tapping screw.
 2. Come along the fuel tank as shown below. Using 15/16" P-clamp secure to the sub-frame.
 3. Continue along the frame securing with 15/16" P-clamp to shown points.
 4. With 15/16" P-clamp, secure the low pressure hose to the body.
 5. Your should come up on the drivers side of the engine. Behind the wheel well along with the OEM harness and rear harness.
 6. Locate stud in engine bay and secure with provided nut. zip tie away from any moving parts.
- Refer to the "Under Hood" section for the next step of the installation.



Note: Run and fit low Pressure line in the location shown below before securing. Use 1" self-tapping screw with every P-clamp in this part of the installation.



INSTALLING COOLING LINES TO ENGINE

Cutting into OEM hoses.

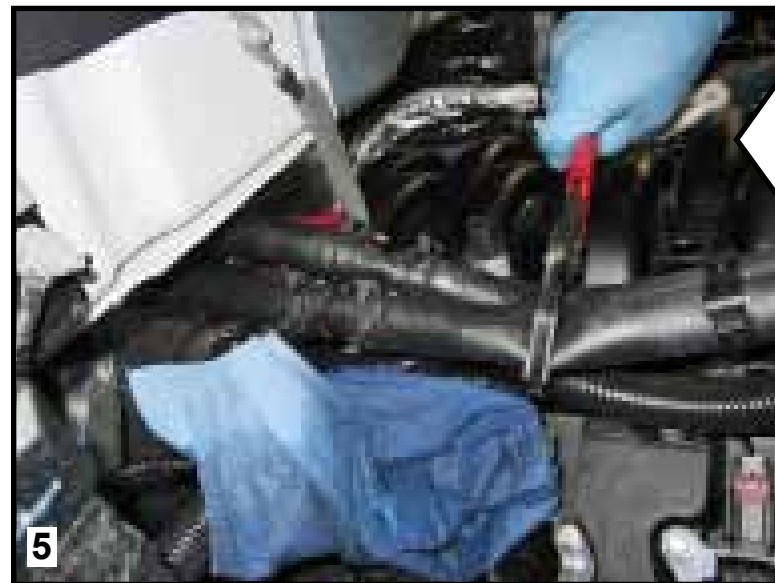
In this step you will be cutting the heater hoses to accommodate the Y-pipe fittings. During this there is coolant fluid in the heater hoses, be sure to prevent any spills on to the engine or ground.

Y-pipe Fitting (Part # AEC-CHY)

Heater hose clamps (Part # AEC-HC17MM)

Coolant line clamps (Part # AEC-HC8-AV)

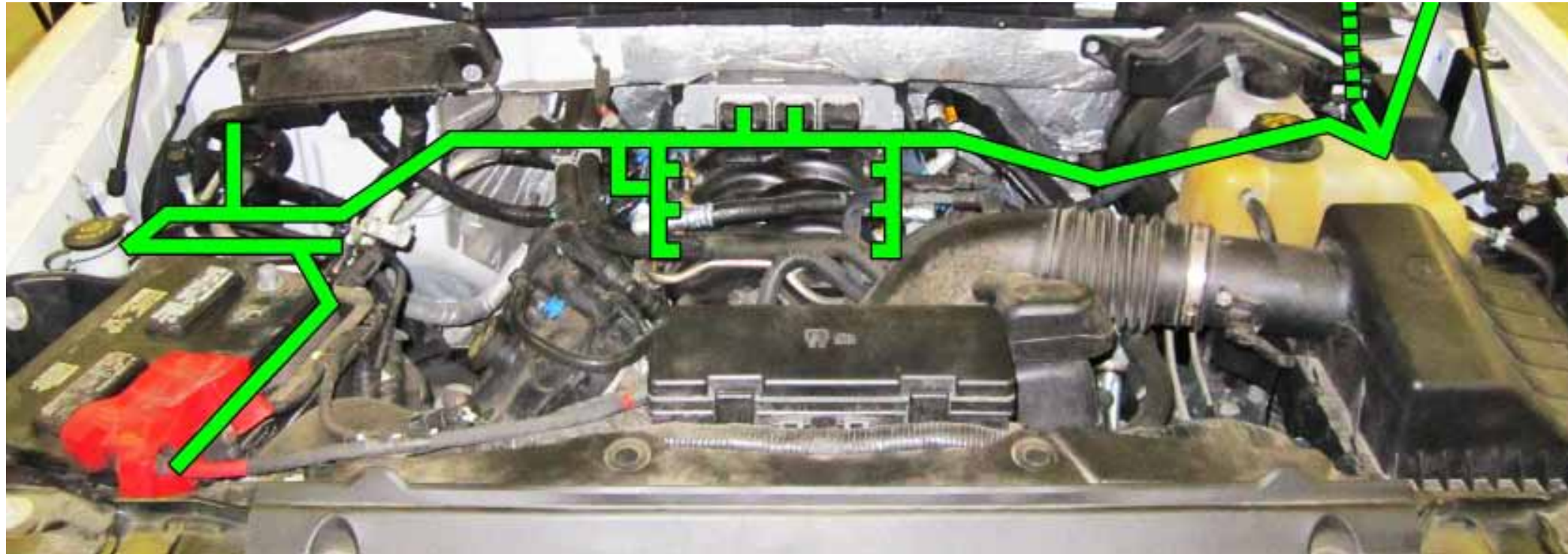
1. Starting with heater hose "A". Use a hose pincher tool to restrict the flow of coolant. Pinch far enough away from the firewall to have easy access to hose.
2. Take the marked CNG cooling hose and cut to a proper size if needed. Place a clamp and the U-Pipe fitting as shown.
3. Cut the OEM heater hose where the Y-pipe fitting will fit properly.
4. Place the heater hose clamps on both ends of the cut. Attach the Y-pipe fitting onto the OEM heater hose. Clamp and check for leaks. Repeat steps 1-4 for hose "B".
5. Once Both Y-pipe fittings have been installed check for leaks and clean up any spilled coolant. Also check fluid levels and top off.



INSTALLING COOLING LINES TO ENGINE

Main Wire Harness Routing

- Zip tie at least every one foot.
- Ensure that no part of the harness is loose or sagging.



INSTALLING THE MAIN WIRING HARNESS

Installing AFCM

Caution: Make sure to protect the vehicles fender from damage by using a fender cover or equivalent.

Installing the main wiring harness is essentially the same for all vehicle models. The main wiring harness is installed in the engine compartment and provides take-out connections for the components attached to the harness:

- Alternate fuel control module (AFCM) connectors (2)
- OBD-II connector
- Fuse and relay panel (hard wired into main harness)
- Positive and negative leads (connect to vehicle battery)
- Three lead harness to controller area network (CAN) bus (connect into Ford powertrain control module (PCM) harness)
- Temperature pressure sensor (TPS) connector
- Fuel injector wiring harnesses (bi-fuel system)
- 10-pin connector for rear electrical harness

Other components are the AFCM and the AFCM mounting bracket.

Tools:

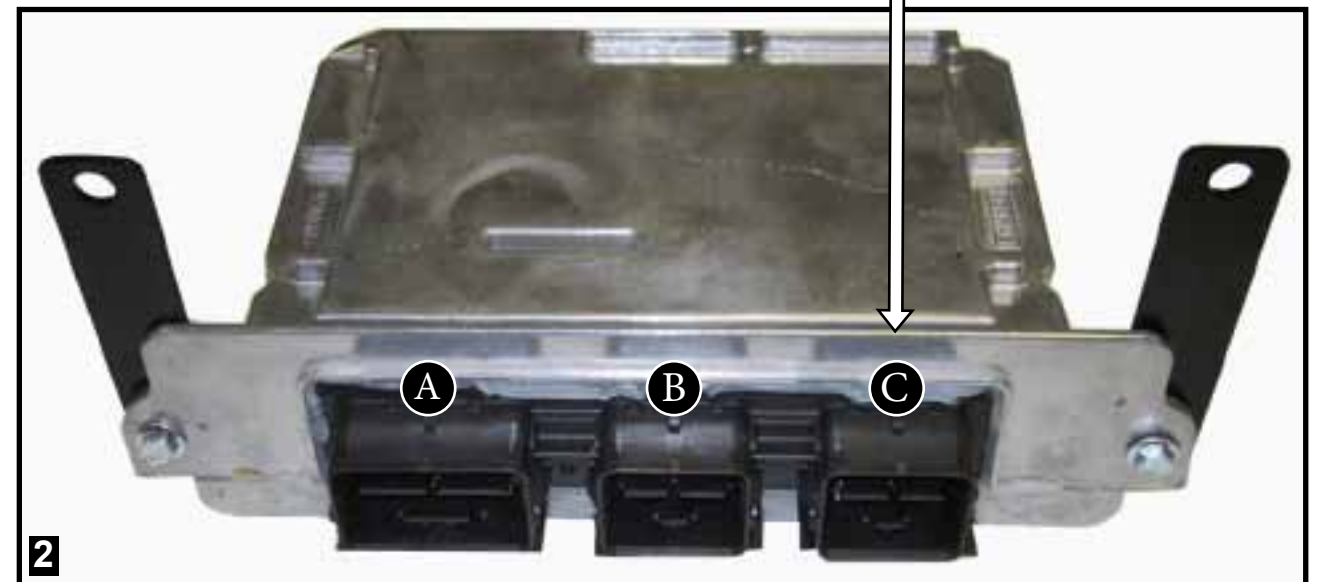
- Basic Hand Tools
- Drill
- Drill bit (3/8")
- Rivet nut setter
- Solder and heat gun

By this point the main harness should be routed. Start with obtaining the AFCM, AFCM mounting bracket/hardware and the bi-fuel injector wire harnesses (if required based on system installing).

1. While working on the vehicle be sure the battery is disconnected.
- 2-3. Assemble the hardware to the AFCM using the provided hardware.
4. CAN bus harness (AEC-CANBUS-INTERFACE)



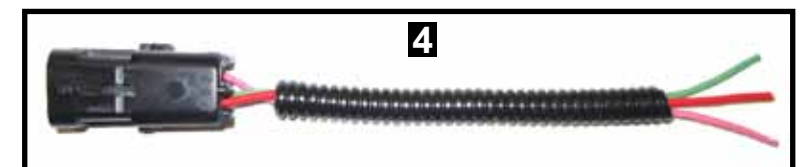
C plug blank
(Included with AFCM)



AFCM hardware



Assembled AFCM bracket.



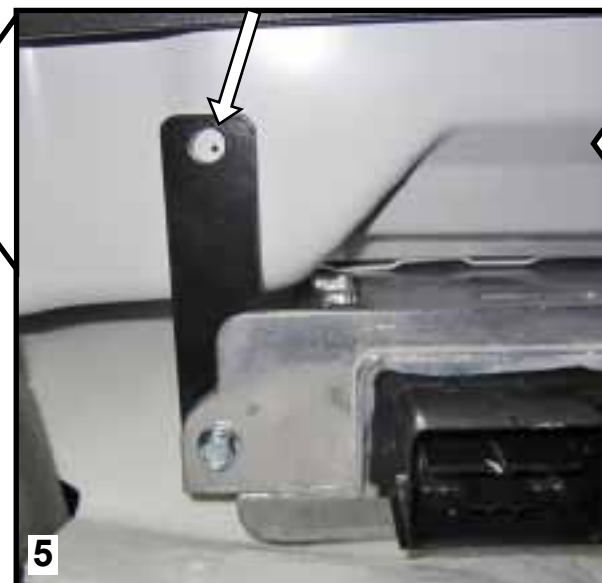
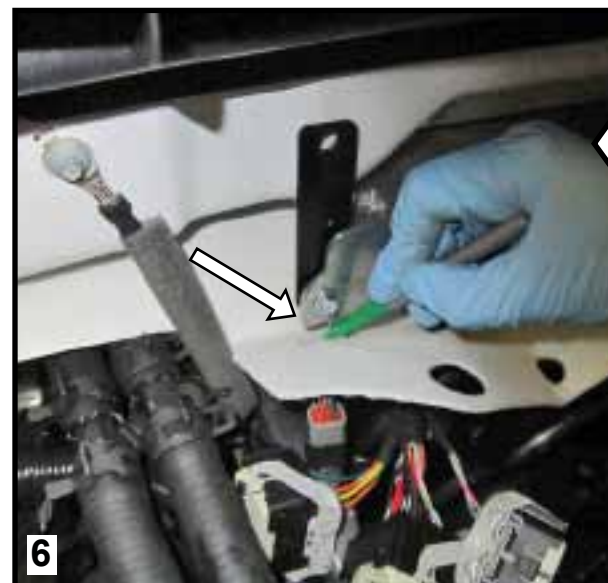
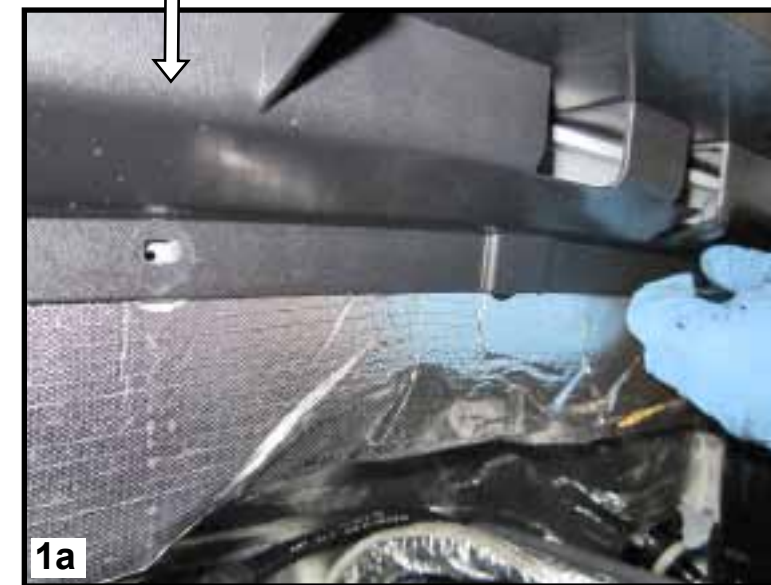
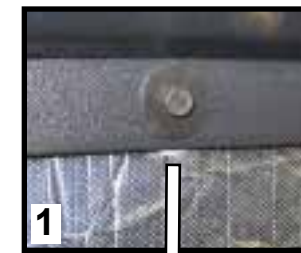
CAN bus harness

INSTALLING THE MAIN WIRING HARNESS

Installing AFCM continued

- 1-1a. Begin with removing four 8mm Bolts holding the wiper shroud.
2. Lift up the shroud to access the clips that hold fire shield. Remove clips to gain access behind the firewall.
3. Pull down firewall carefully as not to damage it.
4. Place the assembled AFCM in the space shown below. Make sure it fits snug.
5. Mark drill holes for AFCM bracket. Use a 3/8" drill to drill a hole for the Poly-Nut (47459)
6. Mark and carefully cut a 2" slot at the crease of the firewall for the bracket to come thru.

Continue on next page.

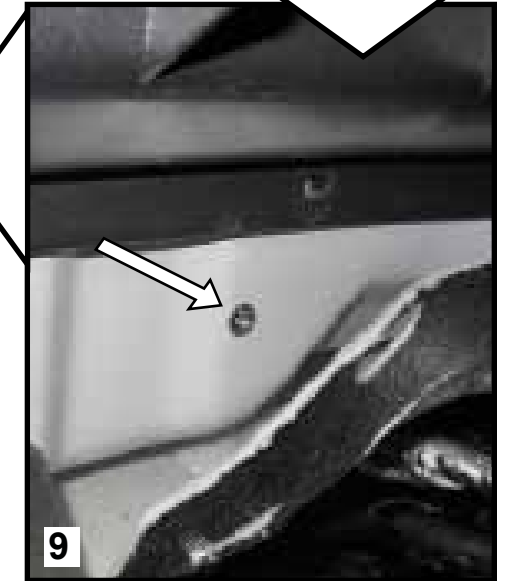


INSTALLING THE MAIN WIRING HARNESS

Installing AFCM continued

Take off the brackets on the AFCM for this part of the installation.

- 7-8. Set up a rivet nut setter. Place the poly-nut into the drilled 3/8" hole. Set the nut in the hole. Repeat on the other side.
9. The finished set nut should feel hold and not twist.
10. Hand tighten the bolt that holds the bracket. Push the bracket thru the firewall.
11. Now hand tighten the AFCM to the bracket. Make sure everything lines up. Then proceed to wrench tighten the bolts. *Be sure not to over tighten.*
12. Reassemble the firewall and shroud, then plug in the three AFCM connectors A,B,C (Blank) into the AFCM.
Be sure to latch them into place to secure.

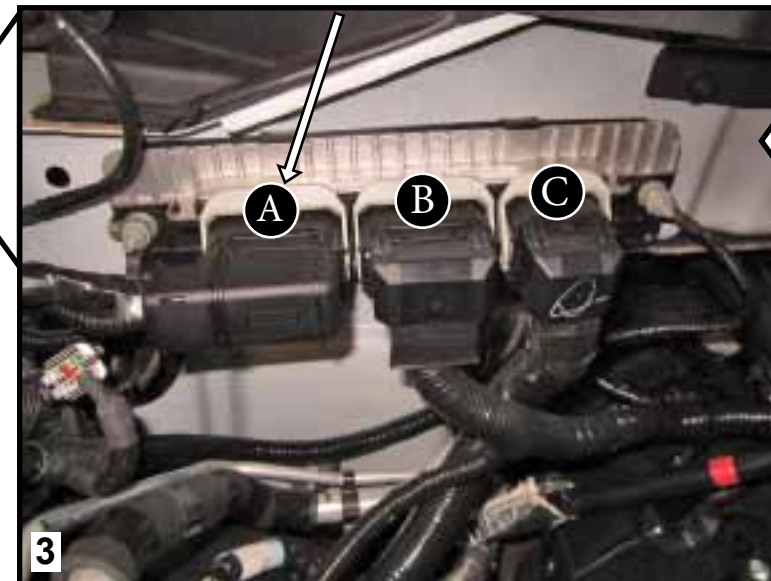


INSTALLING THE PIG TAIL

Installing CAN bus harness

- 1-2. Locate the FORD PCM on the passenger side of the engine compartment. Remove the dust shield which is held on by two flat clips. Remove the dust shield and set aside.
- 3-4. Find the largest connector on the FORD PCM plug "A" (Closest to the fender). Pull back the latch to unplug.
5. Remove the protective cover from the FORD PCM connector "A". peel back the electrical tap and the loom. This will insure easy access for stripping and soldering the wires.

Continued on next page.



INSTALLING THE PIG TAIL

Installing CAN bus harness continued

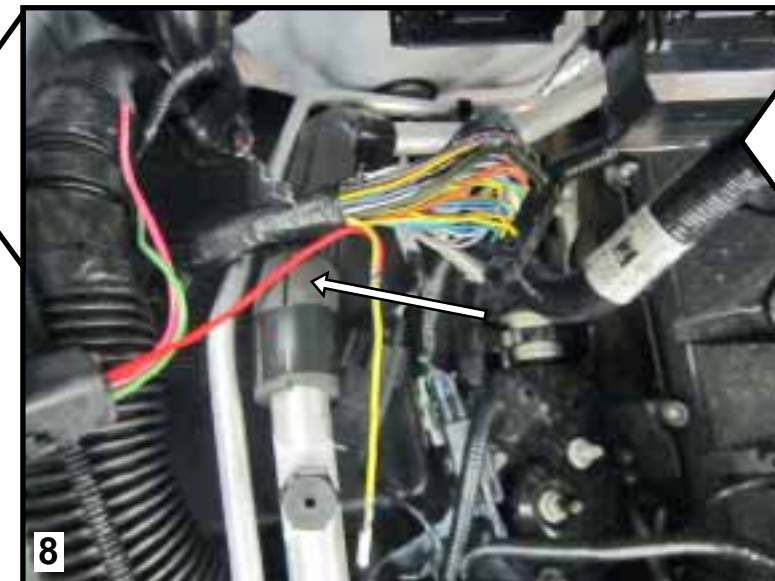
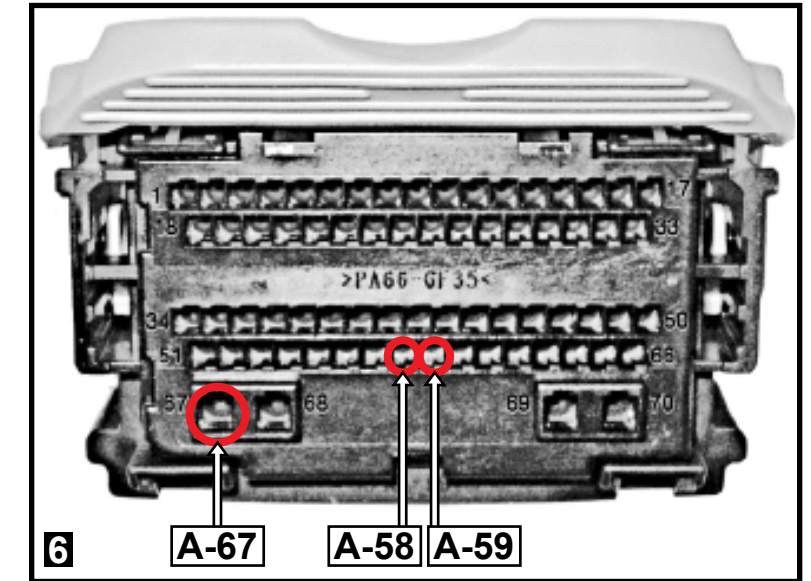
Note: It is recommended to de-pin the wire that you are working on for a cleaner installation. Also, de-pin the three wires one at a time to prevent cross-wiring or incorrect connections. Locate the "Rear harness and Pin out" sheet from your kit to continue.

6. Locate pin number A67, A59 and A58 on the connector.
7. De-pin the first wire and proceed to strip the wire about an inch leaving insulation on both sides.
8. Solder the CAN bus wire onto the Ford wire. Let cool then inspect for a good connection. slide the heat shrink onto the exposed wire and heat to finish.
9. Follow the steps 6-8 for the other two wires.
10. Once all three wires have been finished reassemble the FORD connector and plug it back into the FORD PCM. Reattach the dust shield and secure it. Finally plug the CAN bus harness into the CNG MAIN WIRING HARNESS.

Continue to the fuse box installation.



CAN bus harness



INSTALLING THE FUSE BOX

Installing Fuse box and bracket

Make sure the main harness is connected to the rear harness. Remove the cover from the fuse panel.

11. Remove the 10mm fender bolt. This will be the mounting point for the fuse box bracket (Part # AEC-AFCM5.0-PDBRK).
12. Attach the fuse box bracket and bring up the fuse panel. Hand tighten three 2.5mm hex bolts (175-H). Leave the front one closest to the fender free. The cover will be attached to the bracket there.
13. Attach the fuse box cover to the front right hex bolt. Do not over tighten.
14. Snap fuse box cover into place.



Fuse box bracket



INSTALLING THE BI-FUEL SELECTOR AND CNG FUEL GAUGE

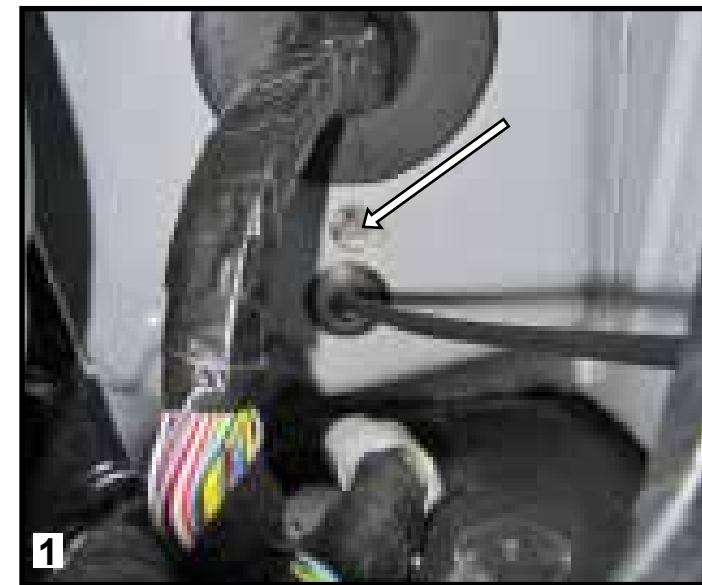
Installing Bi-Fuel Selector and Electrical Wire Harness

The bi-fuel selector and fuel gauge harness is (AEC-F150-BISWGA).
The fuel gauge harness for the dedicated system is (AEC-F150-DEDGA).

A rectangular hole must be cut into the dimmer switch panel to accommodate the selector. See example 1

CAUTION: During this step you will be drilling thru the firewall. Always check both sides of the drill location before proceeding as not to cause any damage.

1. From the engine compartment mark and predrill a pilot hole into the firewall. Then use a unibit to open the hole to 3/4" to allow the harness to be pulled thru.
2. From the inside cut out a hole in the insulation to match the hole in the firewall.
3. Push the wire thru the hole. Be sure to run the switch harness to the dimmer panel (on Bi-fuel only).
4. For switch panel cutting wiring refer to **INSTALLING Bi-Fuel Selector Switch**.
5. Start routing the gauge wire. Remove the bottom piece if the center cluster.
6. Route gauge harness to where the 12V plug was. For instructions on removal and assembly refer to **INSTALLING Gauge**.



INSTALLING THE BI-FUEL SELECTOR AND CNG FUEL GAUGE

Installing Bi-Fuel Selector Switch

The bi-fuel selector or switch is required on vehicles when the bi-fuel system is being installed. Dedicated CNG fuel systems do not require this selector. The bi-fuel selector switch is (AEC-AFCMBI-SWITCH).

A rectangular hole must be cut into the dimmer switch panel to accommodate the selector. See example 1

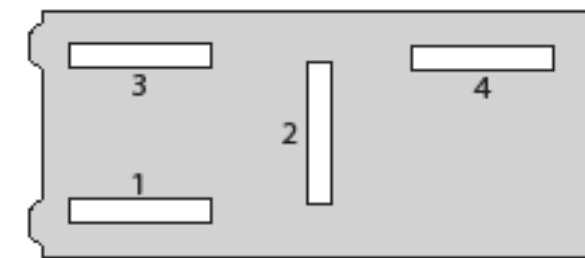
CAUTION: A precision cut **MUST** be made to protect the dimmer switch panel from damage and to ensure a precise fit of the selector switch.

1. Carefully remove the dimmer switch panel. Unplug and take to work station.
2. Use a dremel tool or another precision cut tool to make the cut shown in example 1.
3. Once the cut has been made clean off any excess shavings and make sure the CNG switch fits. Make any adjustments to the cut if needed.
4. Then make the following connections to CNG switch (Example 2):
 - Pink wire to terminal 4
 - Brown/green to terminal 2
 - Brown/orange to terminal 3
 - Black to terminal 1
5. Finished CNG switch should look like this on the dimmer panel. Before replacing the panel be sure that all OEM and CNG connections are plugged in.

Dimmer switch panel



CNG Switch back



Example 2

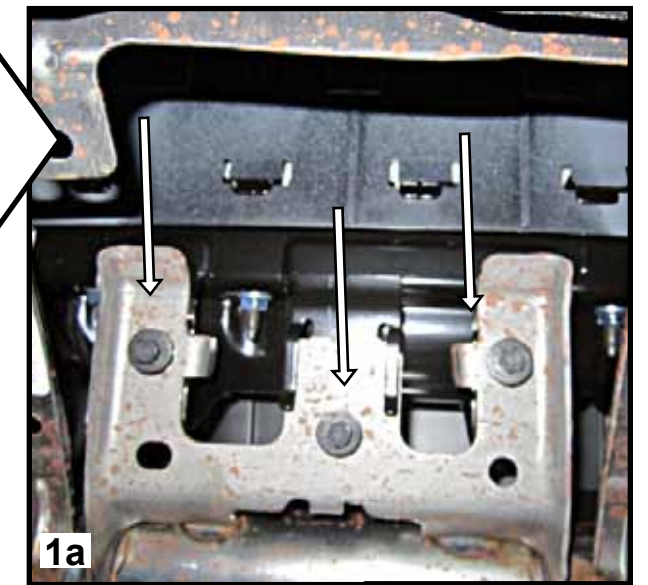


INSTALLING THE BI-FUEL SELECTOR AND CNG FUEL GAUGE

Installing Fuel Gauge

CAUTION: At this stage you will be working around the airbag. Be sure the car battery is disconnected and never unplug the airbag.

- 1-1a. Open glove box empty it then un-hook the sides to drop it all the way. look up to see three 8mm bolts. These bolts secure the airbag bracket. Remove airbag assembly just enough to access the bolt holding the trim piece.
2. Remove the 8mm bolt that holds trim in place.
3. Starting at the bottom of the right trim carefully pull out to unclip.
4. Once the bottom is unclipped, pull up on the center working your way up.
5. Remove trim from dash and unplug the 12V receptacle. For the next step remove the 12V assembly from trim. Continue on next page.



INSTALLING THE BI-FUEL SELECTOR AND CNG FUEL GAUGE

Installing Fuel Gauge

The fuel gauge is (AEC-AUTOMETERFUELGUAGE-CV).

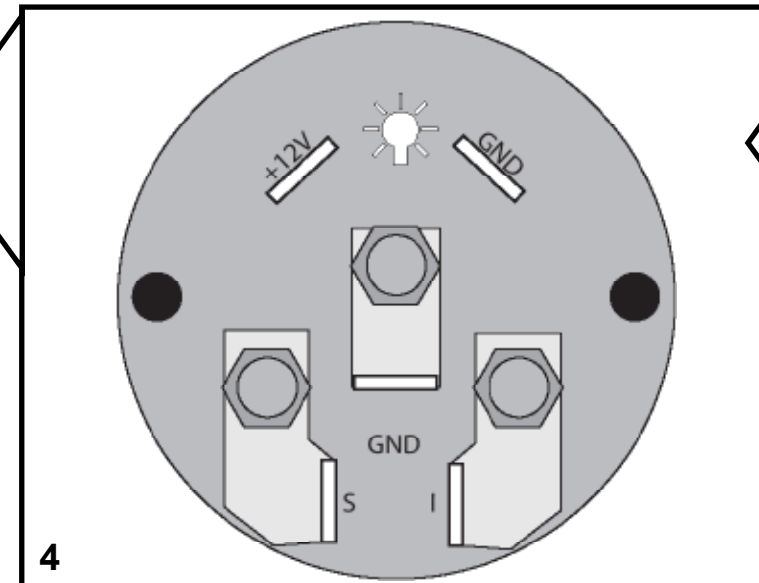
CAUTION: When drilling the trim be sure to keep it steady as not to damage the finish.

1. Use a 2 1/8" hole saw to cut the trim piece to accommodate the CNG fuel gauge. Be sure it is even all the way around before cutting. Clean off any excess for a smooth finish. The final hole should look like this.
2. Remove the Fuel gauge from packaging and find the rubber O-ring in your kit. Slide O-ring onto the back of the gauge and work it to the front. The O-ring acts like a washer and will ensure a clean fit.
3. See the instructions in fuel gauge box for assembly of the bracket.
4. Then make the following connections to CNG Fuel gauge:
 - Single Red wire to "+12V"
 - Single Black wire to "GND"
 - Double Pink wire to terminal "I"
 - Double Black wire to "GND"
 - Single Gray wire to "S"
5. Reassemble the trim back into place after making all appropriate connections. Very important to secure the airbag back into place using all bolts removed.

NOTE: The airbag assembly needs to slide correctly onto the airbag bracket.



At this point you are finished with the installation of the selector (Bi-fuel only) and CNG fuel gauge.

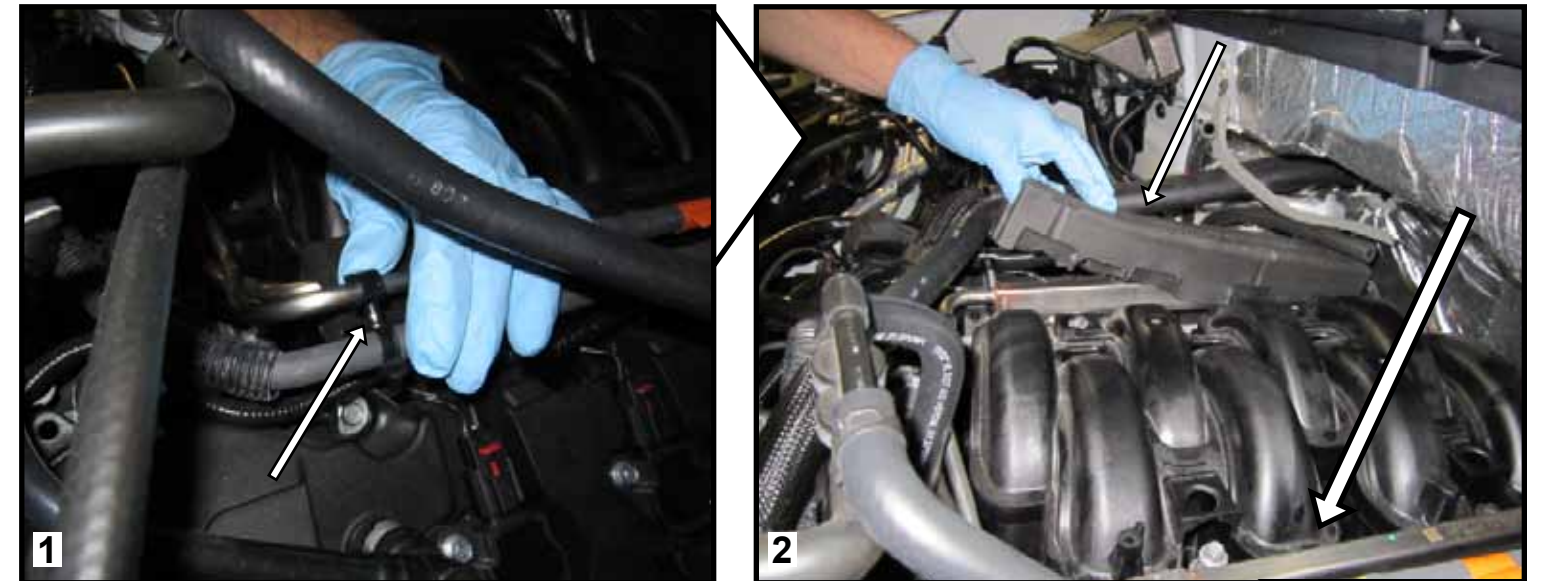


INSTALLING FUEL RAIL

Installing CNG Fuel Rails (Bi-Fuel)

To install a Bi-Fuel system you will need to remove the intake manifold assembly. And replace it with the one in your kit. You will be reusing the OEM fuel rail and sensor located on the intake manifold.

1. Locate the S-clip that holds fuel line. Un-clip.
2. Remove the foam shield from the OEM fuel rail on drivers side then repeat on the passenger side.
3. Unplug all OEM fuel injectors.
4. Remove four bolts that hold the OEM fuel rail on the intake manifold.
5. Undo the OEM fuel line. Caution the rail will still have fuel in it. Take precaution when removing.
6. Once the OEM fuel rail has been freed carefully pull up at one end and begin removing. Watch the fuel injectors and rail as not to damage it. Later you will be reusing the OEM rail.

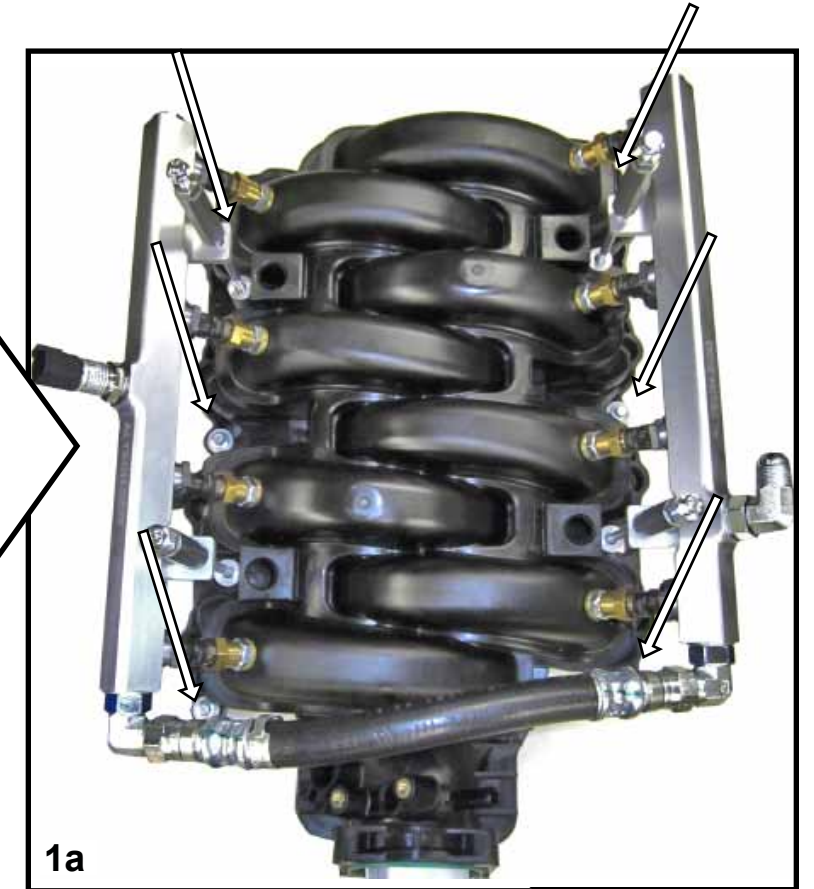


INSTALLING FUEL RAIL

Installing CNG Fuel Rails (Bi-Fuel) continued

At this point you will be removing the air intake hose, throttle body and finally the intake manifold.
Use caution when removing vacuum lines
You will not be reusing the intake manifold but using the one in your Bi-fuel kit.

- 1-1a. Start with removing six bolt that hold down the intake manifold. There are three on either side of the of the manifold. You will need to reuse them for the new manifold.
2. Remove all necessary clamps that hold the air hose to gain access to the throttle body.
3. After unplugging the throttle body remove screws holding it to the manifold. Remove and set aside.
4. Unplug any remaining vacuum lines, wires and hoses that are connected to the manifold.
5. Once the intake manifold is free carefully remove and set side. You will not be reusing it again.

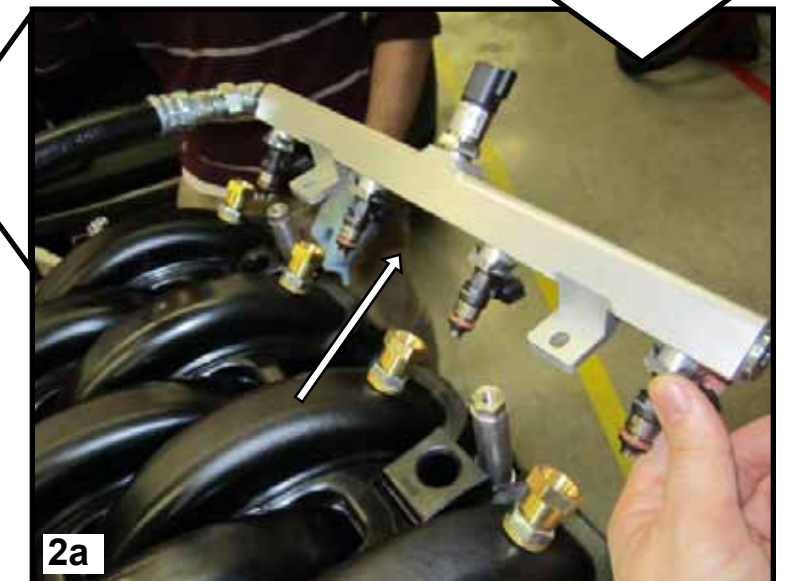
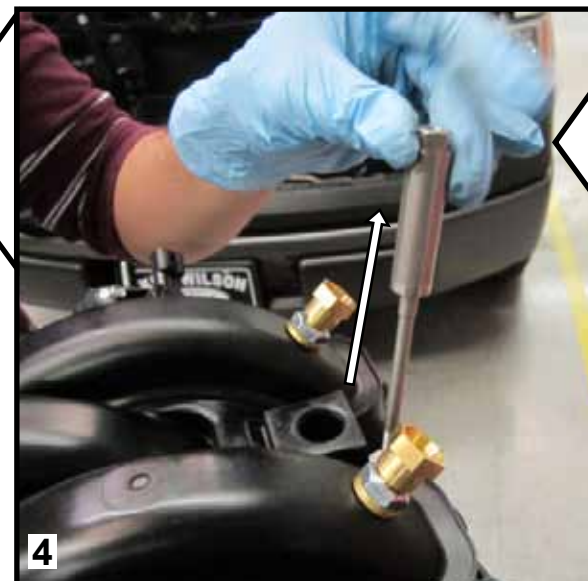
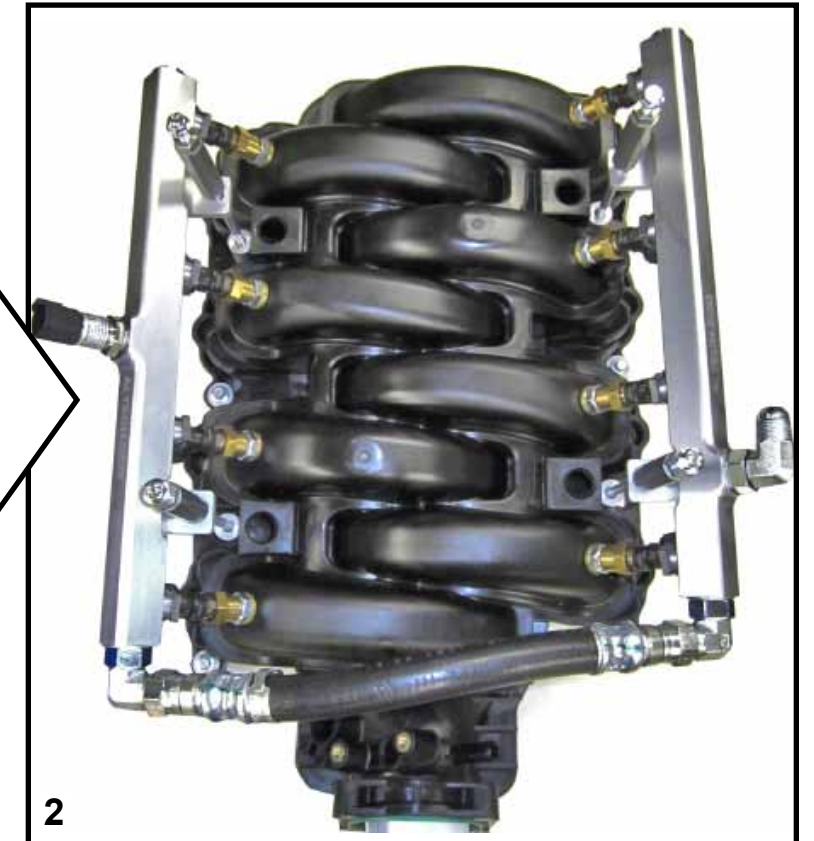
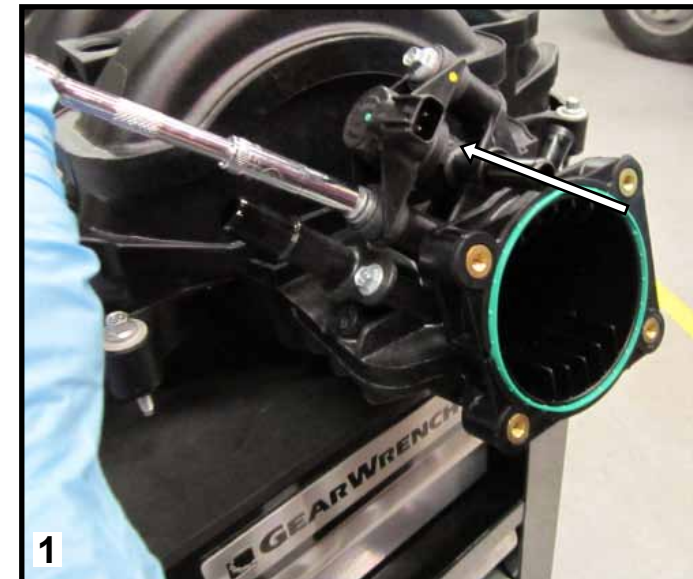


INSTALLING FUEL RAIL

Installing CNG Fuel Rails (Bi-Fuel) continued

At this point you will be prepping and installing the new Bi-fuel intake manifold. This new manifold comes ready to be installed and does not require any drilling or modifications. you will be reusing the sensor that was mounted on your old manifold.

1. On your old Manifold, carefully remove the sensor mounted on the opening of the intake.
2. You will receive a complete Intake manifold. Ready to be installed.
- 2a. Prep the new manifold by removing the CNG fuel rail and setting it aside.
3. Install the sensor that you removed from the old manifold onto the new one.
4. Remove the fuel rail bolt extension from the modified fuel rail. They will be in the way when installing the manifold. You will be installing them after you replace the OEM fuel rail.
5. Install the intake manifold assembly back into vehicle.

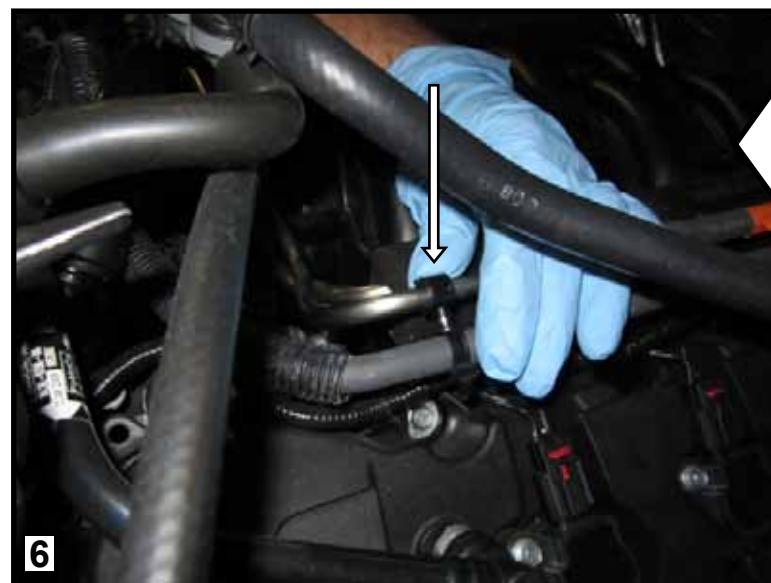
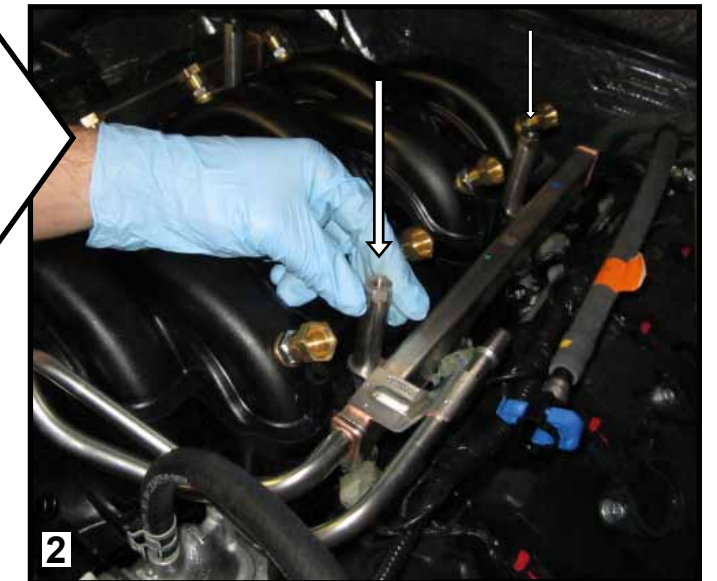


INSTALLING FUEL RAIL

Installing CNG Fuel Rails (Bi-Fuel) continued

When reassembling the new intake manifold be sure to reconnect the vacuum lines and plugs previously removes.

1. Replace the OEM fuel rail. Be sure that the O-rings are lubricated. Plug back in the injectors.
2. Install four fuel rail bolt extensions to secure the OEM fuel rail. Tighten to OEM specifications.
3. Be sure to lubricate all CNG injector O-rings before installing the CNG fuel rail. Install CNG fuel rail. Set one side at a time starting from front to back. Once set inspect to insure a correct fit. Plug in the CNG injector harness which comes out of the wire harness.
4. Secure the CNG fuel rail to the fuel rail bolt extensions. Tighten to (70in-lb)
Reconnect all of the vacuum lines and plugs removed in disassembly.
5. Connect the low pressure line to your CNG fuel rail. Tighten to specifications on spec sheet. And also connect the OEM fuel line. Check for leaks.
6. Secure fuel rail back to the S-clip.
Reinstall the air intake components and any other removed parts.



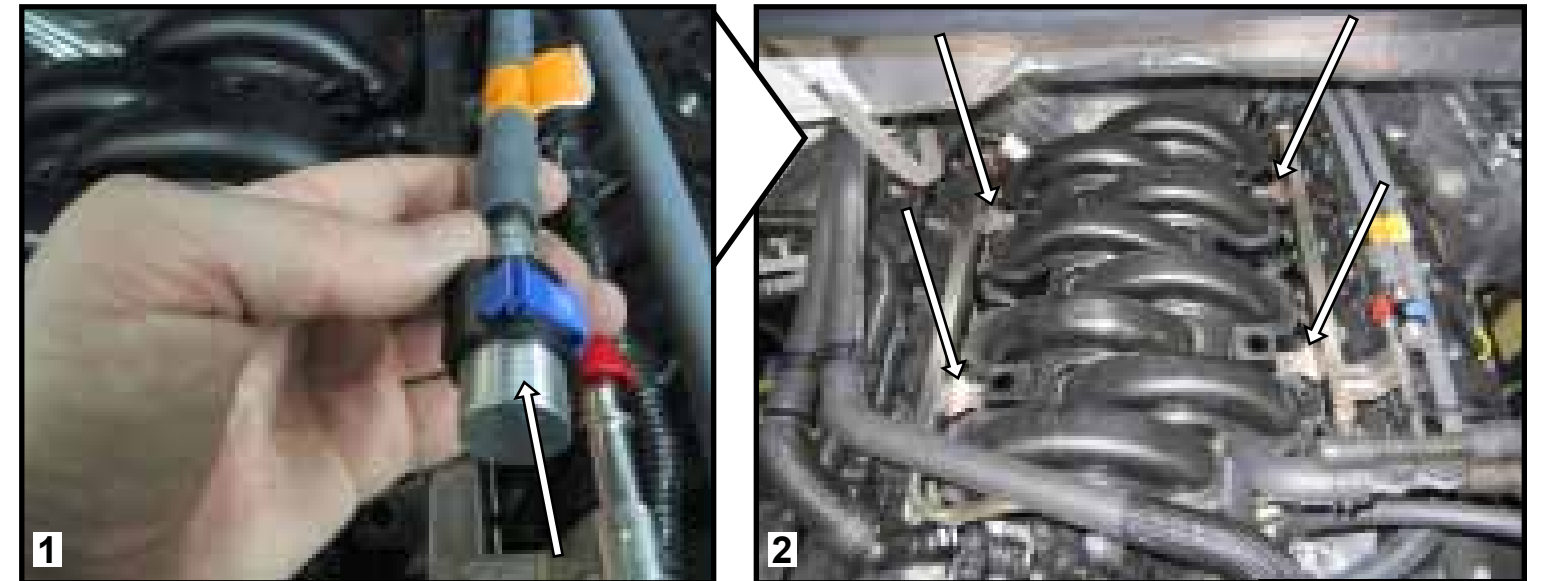
INSTALLING FUEL RAIL

Installing CNG Fuel Rails (Dedicated)

For converting a vehicle to a dedicated system, you will need to remove the OEM fuel rails.
When disconnecting the OEM fuel line there is still fuel in the lines and rails.

Left CNG Fuel Rail
Right CNG Fuel Rail
Fuel line plug
Jumpers

1. Disconnect the OEM fuel line from the fuel rail and plug with fuel line plug provided in your kit.
- 2-3. Locate the four bolts that secure the OEM fuel rails. Remove and set aside. Unplug all injectors and any other connections to the rail.
4. Remove the OEM fuel rail by carefully pulling up on one side then the other. Set aside.
5. Take the new assembled CNG fuel rail and inspect that all injectors are set and the o-rings on them lubricated. Also if not already done so, plug in all injector jumpers from your kit. Set one side at a time starting from front to back. Once set inspect to insure a correct fit.
6. Tighten the fuel rail bolt to (70in-lb) and the fuel rail connector hose fittings to (35-40ft-lb).
7. Attach the CNG low pressure hose on to the CNG fuel rail. Tighten to (35-40ft-lb).



LEAK CHECKING THE SYSTEM

After the CNG system has been installed on the vehicle, all fuel connections, fuel rails and injectors must be checked for leaks. Also check the overall installation of wiring, zip ties and components to make sure they are not loose or hanging.

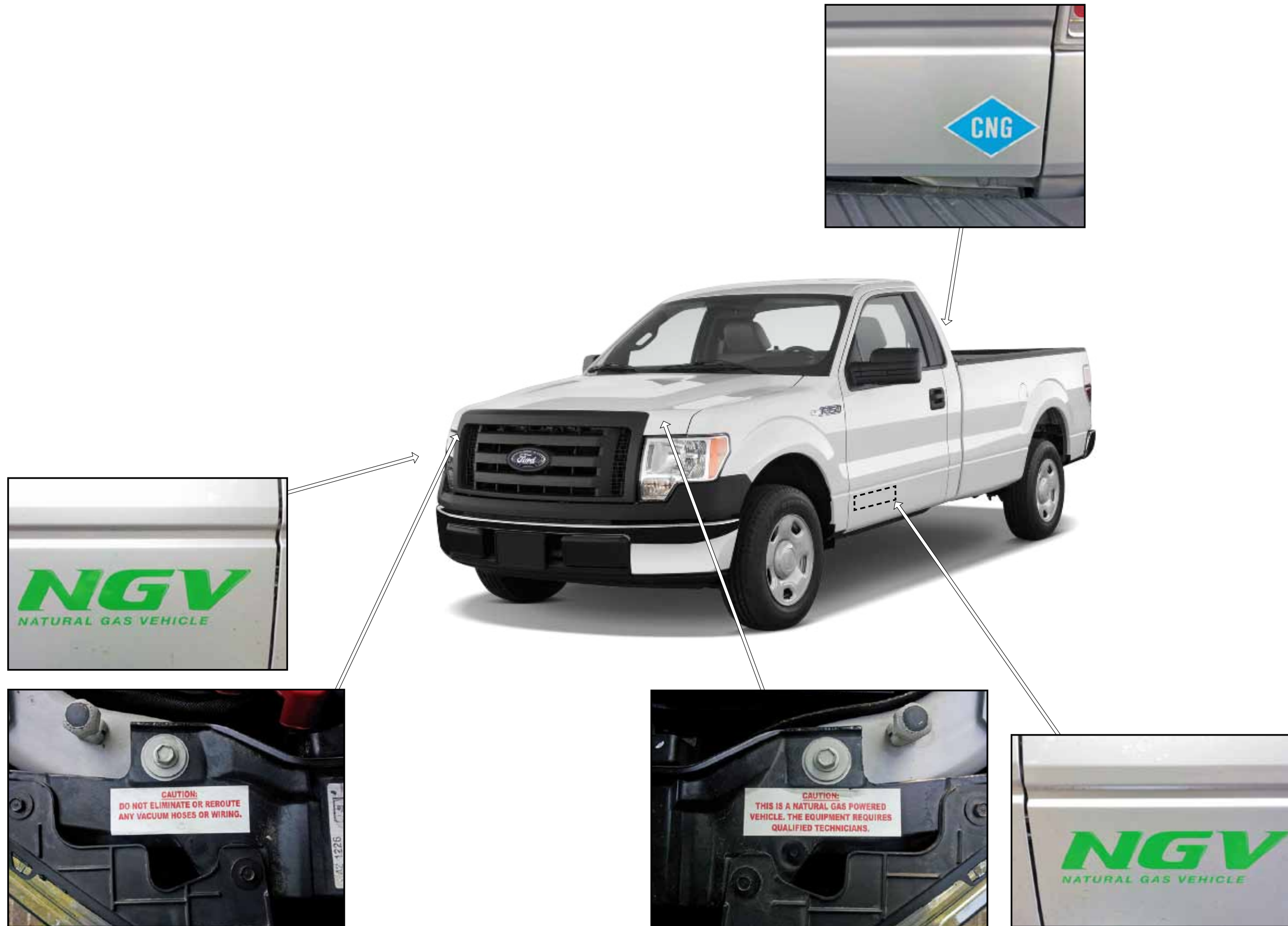
Tools:

- Soapy Water Solution or Liquid Leak Check Solution
- Combustible Gas Leak Detector TPI 721 (Davis Instruments)
- Basic Hand Tools

1. Open the manual valve on the fuel tank. Using the appropriate size Torx bit, rotate the manual valve counter clockwise until fully open.
2. Fill the tank with CNG.
3. Check and verify that all installed hoses and fittings are not loose and are secure per torque specifications.
4. Double check and verify wiring is correct and secure with nothing hanging loose. Check that zip ties are snipped properly to avoid potential injury.
5. Pressurize the system by turning the ignition on but do not start the vehicle. This opens the solenoid and fills the lines.
6. Shut off the CNG at the cylinder (tank) manually (manual shut-off valve is located on the tank).
7. Use a methane detector, bubble soap, or other approved means to leak test all hoses, lines and fittings at connection points.
 - a. PASS: Continue to step 8.
 - b. FAIL: Turn off the vehicle ignition and double check that you have performed the manual shut-off on the cylinder (tank) valve. Locate any leak(s). Then, depressurize the system and correct the issue before continuing the leak test. Correcting a leak may simply require tightening (re-tightening) the hoses, lines or fittings. If a leak cannot be corrected, notify the appropriate personnel for further instructions.
8. Turn the ignition off, then back on and start the engine. This is to pressurize the lines again. While the engine is running, perform a leak test by using a methane detector, bubble soap, or other appropriate means.
 - a. PASS: Complete required paper work and notify your supervisor.
 - b. FAIL: Turn off the ignition and manually shut-off on the cylinder (tank) valve. Depressurize the system and correct any issues. After all corrections have been made, open the manual shut-off valve and start the engine. Run the leak test again. For un-repairable issues, notify appropriate personnel for further instructions.
9. Third party installers: After completing the final checklist, it is required that an original or a copy of the entire completed checklist be sent to M-TECH. Failure to do so will void the warranty and may result in suspension of installer's license. For additional information, contact your supervisor.

Open manual valve counter-clockwise until fully open.





PARTS LIST

**2011/2013 FORD F-150 5.0L
COOLANT ASSEMBLY**

Product Description	Qty	AEC Part#
VEHICLE COOLANT ASSEMBLY - CREW CAB-		AEC_VCAF150_BCC
COOLANT Y'S	2	AEC-CHY
CABLE TIE, PUSH MOUNT, 8in	1	AEC-CTPM-8
HOSE CLAMP, 17mm	4	AEC-HC17MM
HOSE CLAMP 3/4in	4	AEC-HC8-PF
COOLANT HOSE, 17x2	34ft	AEC-CH-B-H
FLEX GUARD SLEEVE	14ft	AEC-FG-18
FLEX GUARD SLEEVE	14ft	AEC-FG-20
P-CLAMP 1 1/8in	6	AEC-PC1 1/8
P-CLAMP 15/16in	3	AEC-PC15/16x.281
12-14 x 1 SELF TAPPING SCREW	9	(135-H)
1 1/4 HEAT SHIELD	2ft	AEC-HS1 1/4
LOW PRESSURE HOSE, 15ft	1	AEC-MPH18037
CABLE TIE 7.5in	1	AEC-CT-7.5-A
CABLE TIE, 15in BLACK	1	AEC-CT-15-F
VEHICLE COOLANT ASSEMBLY - REGULAR CAB-		AEC_VCAF150_BCA
COOLANT Y'S	2	AEC-CHY
CABLE TIE, PUSH MOUNT, 8in	1	AEC-CTPM-8
HOSE CLAMP, 17mm	4	AEC-HC17MM
HOSE CLAMP 3/4in	4	AEC-HC8-PF
COOLANT HOSE, 15x2	30ft	AEC-CH-B-H
FLEX GUARD SLEEVE	11ft	AEC-FG-18
FLEX GUARD SLEEVE	12ft	AEC-FG-20
P-CLAMP 1 1/8in	8	AEC-PC1 1/8
P-CLAMP 15/16in	5	AEC-PC15/16x.281
12-14 x 1 SELF TAPPING SCREW	10	(135-H)
1 1/4 HEAT SHIELD	2ft	AEC-HS1 1/4
LOW PRESSURE HOSE, 12ft	1	AEC-MPH144
CABLE TIE 7.5in	1	AEC-CT-7.5-A
CABLE TIE, 15in BLACK	1	AEC-CT-15-F

Product Description	Qty	AEC Part#
VEHICLE COOLANT ASSEMBLY - SUPER CAB-		AEC_VCAF150_BCB_v2
COOLANT Y'S	2	AEC-CHY
HOSE CLAMP, 17mm	4	AEC-HC17MM
HOSE CLAMP 3/4in	4	AEC-HC8-PF
COOLANT HOSE, 16 1/2x2	33ft	AEC-CH-B-H
P CLAMP 1 1/8in	7	AEC-PC1 1/8
FLEX GUARD SLEEVE	12ft	AEC-FG-18
FLEX GUARD SLEEVE	12.5ft	AEC-FG-20
12-14 x 1 SELF TAPPING SCREW	10	(135-H)
1 1/4 HEAT SHIELD	2ft	AEC-HS1 1/4
LOW PRESSURE HOSE, 13ft	1	AEC-MPH156
P-CLAMP 15/16in	5	AEC-PC15/16x.281
M6-1 NYLOCK FLANGED NUT	1	(191)
STUD MOUNT TIE, 16in	1	AEC-CT-16
2011/2013 FORD F-150 5.0L WIRING ASSEMBLY - DEDICATED		
Product Description	Qty	AEC Part#
VEHICLE WIRING ASSEMBLY -CREW CAB-		AEC_WHF150_BCDC
AFCM	1	AEC-AFCM
AFCM BRACKET	2	AEC-150AFCMBR
DEDICATED CNG MAIN HARNESS (NO OBD II CONN.)	1	AEC-AFCM5.0-MWH-Ded-v2
CAN BUS PIGTAIL, TRUCK	1	AEC-CANBUS
SHRINK TUBE 1/8in	6in	AEC-ST1/8DUAL-W
10-32 x 5/8in BHCS	4	(183)
REAR WIRING HARNESS	1	AEC-F150AFCM-RWH-C15
FUEL GAUGE HARNESS	1	AEC-F150DEDGA
FUEL GAUGE	1	AEC-AUTO METER FUEL GAUGE-CV
O-RING #222	1	AEC-222
1/4in-20 SHORT U-NUT	2	(111)

Product Description	Qty	AEC Part#
1/4-20 x 3/4 CHFB	4	(175-H)
CABLE TIE 7.5in	15	AEC-CT-7.5-A
CABLE TIE PUSH MOUNT 8in	1	AEC-CTPM-8
STUD MOUNT TIE 16in	1	AEC-CT-16
POWER DISTRIBUTOR BRACKET	1	AEC-AFCM5.0-PDBRK
1/4-20 STEEL POLY-NUT	2	47455
JUMPER	8	AEC-JWH
VEHICLE WIRING ASSEMBLY -REGULAR CAB-		AEC_WHF150_BCDA
AFCM	1	AEC-AFCM
AFCM BRACKET	2	AEC-150AFCMBR
DEDICATED CNG MAIN HARNESS (NO OBD II CONN.)	1	AEC-AFCM5.0-MWH-Ded-v2
CAN BUS PIGTAIL, TRUCK	1	AEC-CANBUS
SHRINK TUBE 1/8in	6in	AEC-ST1/8DUAL-W
10-32 x 5/8in BHCS	4	(183)
REAR WIRING HARNESS	1	AEC-F150AFCM-RWH-A12
FUEL GAUGE HARNESS	1	AEC-F150DEDGA
FUEL GAUGE	1	AEC-AUTO METER FUEL GAUGE-CV
O-RING #222	1	AEC-222
1/4in-20 SHORT U-NUT	2	(111)
1/4-20 x 3/4 CHFB	4	(175-H)
CABLE TIE 7.5in	15	AEC-CT-7.5-A
CABLE TIE PUSH MOUNT 8in	1	AEC-CTPM-8
STUD MOUNT TIE 16in	1	AEC-CT-16
POWER DISTRIBUTOR BRACKET	1	AEC-AFCM5.0-PDBRK
1/4-20 POLY-NUT	2	47455
JUMPER	8	AEC-JWH

PARTS LIST DEDICATED

Product Description	Qty	AEC Part#
VEHICLE WIRING ASSEMBLY -SUPER CAB-		AEC_WHF150_BCDB
AFCM	1	AEC-AFCM
AFCM BRACKET	2	AEC-150AFCMBR
DEDICATED CNG MAIN HARNESS (NO OBD II CONN.)	1	AEC-AFCM5.0-MWH-Ded-v2
CAN BUS PIGTAIL, TRUCK	1	AEC-CANBUS
SHRINK TUBE 1/8in	6in	AEC-ST1/8DUAL-W
10-32 x 5/8in BHCS	4	(183)
REAR WIRING HARNESS	1	AEC-F150AFCM-RWH-B13.5
FUEL GAUGE HARNESS	1	AEC-F150DEDGA
FUEL GAUGE	1	AEC-AUTO METER FUEL GAUGE-CV
O-RING #222	1	AEC-222
1/4in-20 SHORT U-NUT	2	(111)
1/4-20 x 3/4 CHFB	4	(175-H)
CABLE TIE 7.5in	15	AEC-CT-7.5-A
CABLE TIE PUSH MOUNT 8in	1	AEC-CTPM-8
STUD MOUNT TIE 16in	1	AEC-CT-16
POWER DISTRIBUTOR BRACKET	1	AEC-AFCM5.0-PDBRK
1/4-20 STEEL POLY-NUT	2	47455
JUMPER	8	AEC-JWH
2011/2013 FORD F-150 5.0L WIRING ASSEMBLY - BI-FUEL		
Product Description	Qty	AEC Part#
VEHICLE WIRING ASSEMBLY -REGULAR CAB-		AEC_WHF150_BCBA
AFCM	1	AEC-AFCM
AFCM BRACKET	2	AEC-150AFCMBR
BI-FUEL CYL CNG MAIN HARNESS (NO OBD II CONN.)	1	AEC-F150AFCM-BI-WH-v2
CAN BUS PIGTAIL, TRUCK	1	AEC-CANBUS
SHRINK TUBE 1/8in	6in	AEC-ST1/8DUAL-W
10-32 x 5/8in BHCS	4	(183)

Product Description	Qty	AEC Part#
REAR WIRING HARNESS	1	AEC-F150AFCM-RWH-A12
BI-FUEL SWITCH GAUGE HARNESS	1	AEC-F150BISWGA
FUEL GAUGE	1	AEC-AUTO METER FUEL GAUGE-CV
BI-FUEL SWITCH	1	AEC-AFCMBI-SWITCH
O-RING #222	1	AEC-222
BI-FUEL INJECTOR WIRE HARNESS	2	AEC-INJWH
1/4in-20 SHORT U-NUT	2	(111)
1/4-20 x 3/4 CHFB	4	(175-H)
CABLE TIE 7.5in	15	AEC-CT-7.5-A
CABLE TIE PUSH MOUNT 8in	1	AEC-CTPM-8
STUD MOUNT TIE 16in B	3	AEC-CT-16
POWER DISTRIBUTION BRACKET	1	AEC-AFCM5.0-PDBRK
1/4-20 UNC CLICK POLY NUT	2	47455
VEHICLE WIRING ASSEMBLY -SUPER CAB-		AEC_WHF150_BCBB
AFCM	1	AEC-AFCM
AFCM BRACKET	2	AEC-150AFCMBR
BI-FUEL CYL CNG MAIN HARNESS (NO OBD II CONN.)	1	AEC-F150AFCM-BI-WH-v2
CAN BUS PIGTAIL, TRUCK	1	AEC-CANBUS
SHRINK TUBE 1/8in	6in	AEC-ST1/8DUAL-W
10-32 x 5/8in BHCS	4	(183)
REAR WIRING HARNESS	1	AEC-F150AFCM-RWH-B13.5
BI-FUEL SWITCH GAUGE HARNESS	1	AEC-F150BISWGA
FUEL GAUGE	1	AEC-AUTO METER FUEL GAUGE-CV
BI-FUEL SWITCH	1	AEC-AFCMBI-SWITCH
O-RING #222	1	AEC-222
BI-FUEL INJECTOR HARNESS	2	AEC-INJWH
1/4in-20 SHORT U-NUT	2	(111)
1/4-20 x 3/4 CHFB	4	(175-H)
CABLE TIE 7.5in	15	AEC-CT-7.5-A

Product Description	Qty	AEC Part#
CABLE TIE PUSH MOUNT 8in	1	AEC-CTPM-8
STUD MOUNT TIE 16in	1	AEC-CT-16
POWER DISTRIBUTOR BRACKET	1	AEC-AFCM5.0-PDBRK
1/4-20 UNC CLICK POLY NUT		47455
VEHICLE WIRING ASSEMBLY -CREW CAB-		AEC_WHF150_BCBC
AFCM	1	AEC-AFCM
AFCM BRACKET	2	AEC-150AFCMBR
BI-FUEL CYL CNG MAIN HARNESS (NO OBD II CONN.)	1	AEC-F150AFCM-BI-WH-v2
CAN BUS PIGTAIL, TRUCK	1	AEC-CANBUS
SHRINK TUBE 1/8in	6in	AEC-ST1/8DUAL-W
10-32 x 5/8in BHCS	4	(183)
REAR WIRING HARNESS	1	AEC-F150AFCM-RWH-C15
BI-FUEL SWITCH GAUGE HARNESS	1	AEC-F150BISWGA
FUEL GAUGE	1	AEC-AUTO METER FUEL GAUGE-CV
BI-FUEL SWITCH	1	AEC-AFCMBI-SWITCH
O-RING #222	1	AEC-222
BI-FUEL INJECTOR WIRE HARNESS	2	AEC-INJWH
1/4in-20 SHORT U-NUT	2	(111)
1/4-20 x 3/4 CHFB	4	(175-H)
CABLE TIE 7.5in	15	AEC-CT-7.5-A

2011 - 2013 FORD F-150 COMPRESSED NATURAL GAS CONVERSION SYSTEM INSTALLATION INSTRUCTIONS

Product Description	Qty	AEC Part#
CABLE TIE PUSH MOUNT 8in	1	AEC-CTPM-8
STUD MOUNT TIE 16in	1	AEC-CT-16
POWER DISTRIBUTOR BRACKET	1	AEC-AFCM5.0-PDBRK
1/4-20 UNC CLICK POLY NUT	2	47455

2011/2013 FORD F-150 5.0L FUEL DELIVERY - DEDICATED

Product Description	Qty	AEC Part#
LOW PRESSURE COMPONENT ASSEMBLY		AEC_FRF150_BC
FUEL RAIL, RIGHT	1	AEC-FR150DR
FUEL RAIL, LEFT	1	AEC-FR150DL
HOLLOW HEX PLUG, 3/4	2	8 HP50N-S
TPS 200psi 9/16 SAE	1	AEC-TRANS2TST
1/2 37° FLARE x 3/4 SAE ELBOW	3	8 C50X-S
LOW PRESSURE HOSE, 11 3/4in	1	AEC-LPH11.75
CNG FUEL INJECTOR	8	AEC-INJ821-B
F-SERIES INJECTOR ADAPTOR	8	AEC-INJADP-F-DED
INJECTOR ADAPTOR O-RING	8	AEC-INJ821ORING-BRN
INJECTOR CLIP	8	AEC-INJRETAINCLIP-4S
GASOLINE LINE PLUG	1	AEC-GLP

2011/2013 FORD F-150 5.0L FUEL DELIVERY - BI-FUEL

Product Description	Qty	AEC Part#
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Product Description	Qty	AEC Part#
LOW PRESSURE COMPONENT ASSEMBLY		AEC_INTBI5.0
INTAKE MANIFOLD	1	AEC-INTAKE5.0L
INJECTOR ADAPTOR BRASS	8	AEC-F150-INJADP-TR-V2
INJECTOR ADAPTOR O-RING	8	H70-110
CNG FUEL INJECTOR	8	AEC-INJ821-B
FUEL RAIL, RIGHT	1	AEC-FR150BR
FUEL RAIL, LEFT	1	AEC-FR150BL
HOLLOW HEX PLUG	2	8 HP50N-S
TPS 200psi 9/16 SAE	1	AEC-TRANS2TST
1/2 37° FLARE x 3/4 SAE-ORB ELBOW	3	8 C50X-S
LOW PRESSURE HOSE, 11 1/4in	1	AEC-LPH11.25
BI-FUEL FUEL RAIL MOUNTING BOLT	4	AEC-FSERFRBOLT
6mm-1.0 x 20 CHFB	4	(190-F)
INJECTOR CLIP	8	AEC-INJRETAINCLIP-4S

Product Description	Qty	AEC Part#
VEHICLE KIT INFORMATION		AEC_VKIF150_BCB
F-150 OWNER'S MANUAL	1	F150 OWNERS MANUAL
MAIN WIRING HARNESS DIAGRAM	1	AEC-F150MHD-BI-v2
PCM PIN-OUT REFERENCE	1	F150 PIN OUT
CNG BLUE DIAMOND STICKER	1	AEC-CNG-STKR
2011 BI-FUEL EPA CONVERSION DECAL	1	
2012 BI-FUEL EPA CONVERSION DECAL	1	
2013 BI-FUEL EPA CONVERSION DECAL	1	
SINGLE CYLINDER LAYOUT DIAGRAM	1	AEC-EF150CYLD
NGV DECAL-GREEN	2	AEC-NGVSTKR
WARNING 3600psi	2	AEC-PSI3600-1
CAUTION: UP TO 150psi	2	AEC-PSI150
DO NOT REMOVE	1	ELREV
CNG ONLY 3600psi	1	AEC-CNGONLY-1
CONVERSION CHECKLIST	1	CHECKLIST
PCM REQUEST FORM	1	PCM REQUEST

Product Description	Qty	AEC Part#
VEHICLE KIT INFORMATION		AEC_VKIF150_BCD
F-150 OWNER'S MANUAL	1	F150 OWNERS MANUAL
MAIN WIRING HARNESS DIAGRAM	1	AEC-F150MHD-BI-v2
PCM PIN-OUT REFERENCE	1	F150 PIN OUT
CNG BLUE DIAMOND STICKER	1	AEC-CNG-STKR
2011 DEDICATED EPA CONVERSION DECAL	1	
2012 DEDICATED EPA CONVERSION DECAL	1	
2013 DEDICATED EPA CONVERSION DECAL	1	
SINGLE CYLINDER LAYOUT DIAGRAM	1	AEC-EF150CYLD
NGV DECAL-GREEN	2	AEC-NGVSTKR
WARNING 3600psi	2	AEC-PSI3600-1
CAUTION: UP TO 150psi	2	AEC-PSI150
DO NOT REMOVE	1	ELREV
CNG ONLY 3600psi	1	AEC-CNGONLY-1
CONVERSION CHECKLIST	1	CHECKLIST
PCM REQUEST FORM	1	PCM REQUEST