Ford F-450/F-550 Chassis Cab, F-53/F-59 — G.A.S. Conversion Liquid Propane Autogas Fuel System

Revision History		
-BA	Initial Release	8/2013
-Rev	Updated Wiring Instruction	8/23/2013
-Rev	Updated Label Instruction (pg 20)	8/28/2013
-BB	Version Update	10/8/2013

Installation Instructions

CONTENTS

REMOVING THE POWERTRAIN CONTROL MODULE

1. Using a scan tool, check for all diagnostic trouble codes. Correct all trouble codes before continuing.
2. Depressurize the fuel rails using the procedure described in the *Ford Workshop Manual Section 310-00 Fuel System, General Information*.
3. Disconnect the battery terminals and remove the battery.
4. Remove the powertrain control module (PCM) following the procedure in the *Ford Workshop Manual, Section 303-14, Electronic Engine Controls.* Disconnect the three PCM connectors by lifting the levers over the connector back shell and pulling the connectors from the PCM sockets. Disconnect the OEM PCM harness push-pin to allow easier ROUSH CleanTech under hood harness installation. Remove the two nuts and position the PCM wiring harness connectors aside. Keep all fasteners for reuse. **Figures 1.1** and **1.2**.
5. Disconnect the mass air flow (MAF) sensor connector and remove the air cleaner assembly including the air filter cover, degas bottle hose, air box and intake air box adapter. Separate the air cleaner cover, MAF sensor and air box from the adapter independently. **Figures 1.3**–**1.5**.

Figure 1.1

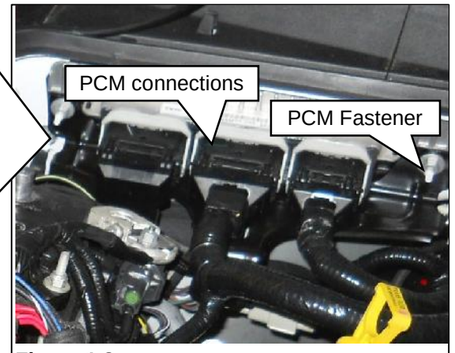


Figure 1.2

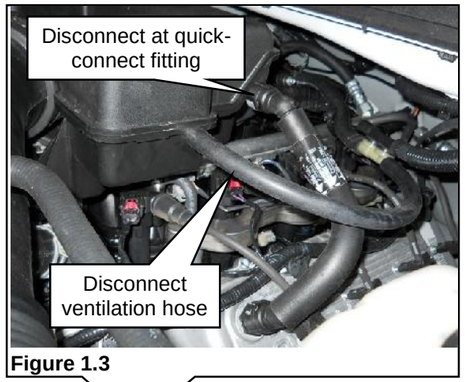
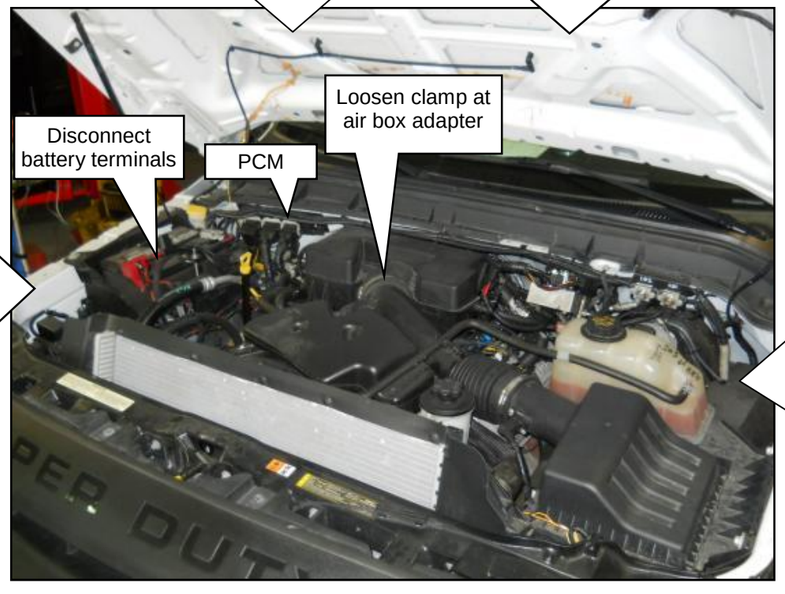
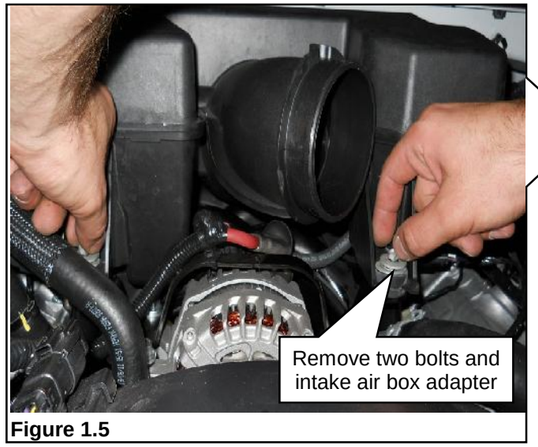


Figure 1.3





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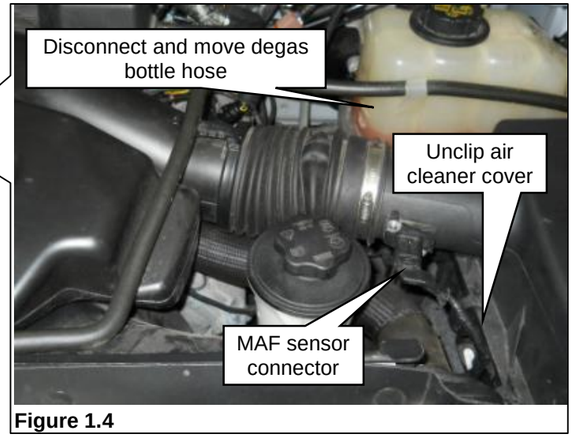


Figure 1.4

SENDING THE PCM FOR REPROGRAMMING

Figure 1.5

1. Write the requested information, including the gross vehicle weight rating (GVWR), on the PCM Return Label (P-01F010-A). The group information is found on the original vehicle emission control information (VECI) label (example: 5.4L - Group: 8FMXT05.44HF). The propane fuel tank serial number is located on the raised serial badge welded to the side of the tank. Once all information has been completed, apply the label to the back side of the PCM.

Note: Do NOT alter or remove the original VECI label from the vehicle. This label is required by law. Failure to heed this notice may void all warranties. **Figure 1.5**.

2. Pack the PCM securely in the shipping box (P10C2-SB-A) provided. Enter your name and address in the **FROM** area of the shipping label provided and apply the label to the box.
3. Call for a **FedEx package pickup. Dial 1-800-463-3339, then 0, and speak to an agent in person.** Do NOT use the automated option to schedule a pickup.

FedEx will deliver the package to ROUSH CleanTech via overnight service. ROUSH CleanTech will reprogram the PCM during the day in which it is received and return it to you via overnight service.

Included with the returned newly flashed PCM will be a ROUSH CleanTech VECI label and supplemental instructions for installing the new VECI label.

Note: ROUSH CleanTech Certified Installers authorized to perform on-site PCM flashing should consult the appropriate training materials for proper VECI label selection and disposition. Failure to follow the training guidelines properly could result in non-conformance to federal and local regulations.

REMOVING OEM FORWARD FUEL SUPPLY LINE AND MODIFYING VAPOR LINE

1. Refer to the *Ford Workshop Manual, Section 310-01, Fuel Tank and Lines*, for complete instructions on removing the original forward fuel supply line.
2. If installing this kit on an unfinished vehicle (no box or bed installed), the filler pipe, fuel supply and vapor lines (at tank) can be removed along with the fuel tank.
3. Disengage the gasoline forward fuel supply line from retention clips, disconnect from fuel rail and discard the line. **Figure 2.1**.
4. Disconnect the OEM vapor line from the VMV on the engine. **Figure 2.1**.
5. Disengage the vapor line from the retention bracket upper clip on the transmission for access for cutting the line for modification.
6. Modify the OEM steel vapor line by cutting the line in the area indicated so that the new vapor hose assembly can be installed. Use a tubing cutter to make the cut. Discard the upper portion and reuse the lower portion. **Figure 2.2**.

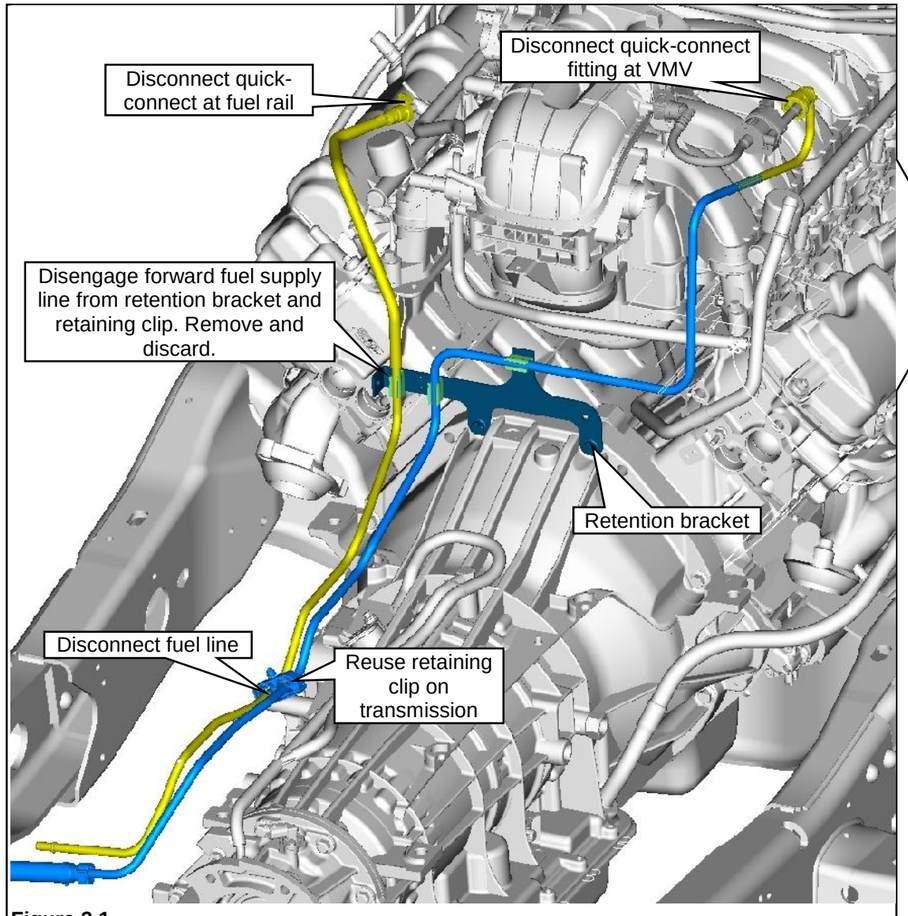


Figure 2.1

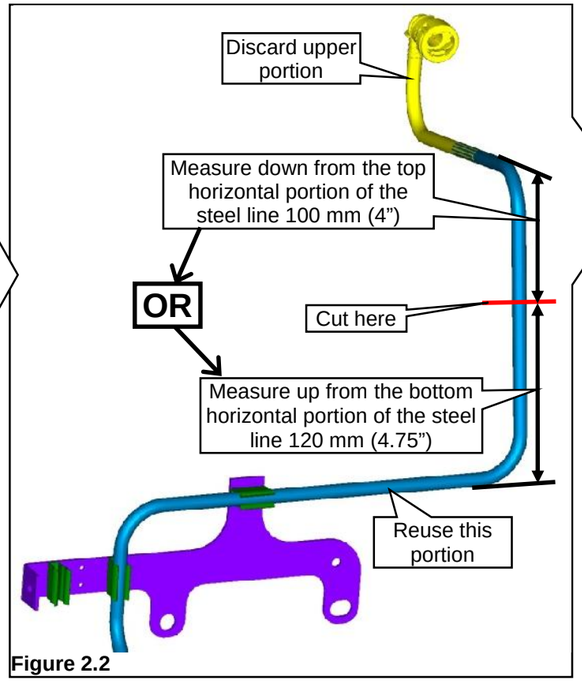


Figure 2.2

INSTALL NEW VAPOR HOSE ASSEMBLY TO MODIFIED VAPOR LINE

- Attach the ROUSH CleanTech vapor hose assembly to the modified OEM steel vapor line. Using the stepless ear clamp (14.1 x 16.6, labeled “16”), secure the hose to the line. Refer to the *Special Tools* section for more information. **Figure 2.3**.

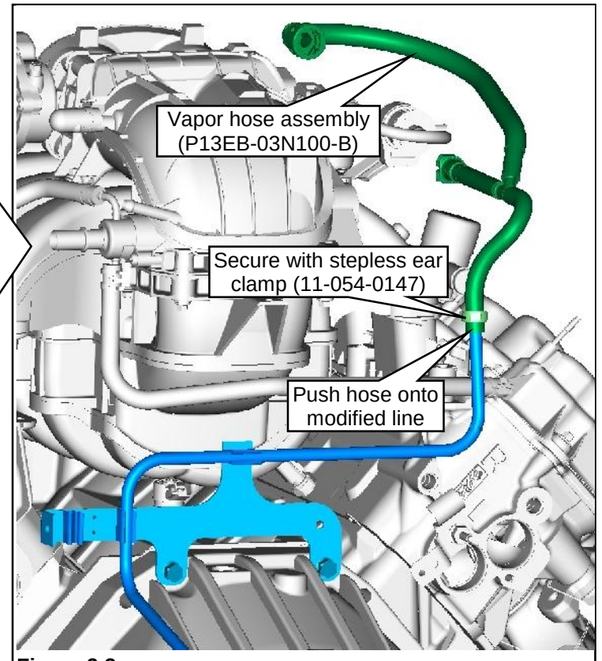
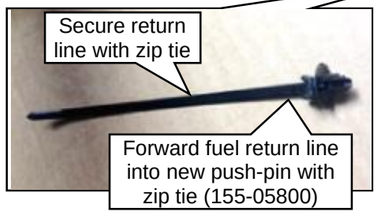


Figure 2.3

INSTALLING NEW FORWARD FUEL LINES

After removing original gasoline fuel line, temporarily position ROUSH CleanTech forward fuel supply and return lines, along with the modified vapor line and new vapor hose so lines and hose extend into the engine compartment near the intake manifold. Final installation is after fuel rail pressure control module (FRPCM) has been installed.

1. Disconnect the shifter cable bracket located on the left side of the transmission (remove and save the two bolts and disconnect the electrical connector). **Figure 3.1**.
2. Install forward fuel supply line and forward fuel return line. Follow the routing of the original line and run the new lines above the LH exhaust heat shield into transmission bracket retaining clips and up into engine compartment over to the right side of the engine. **Figures 3.2** and **3.3**.
3. Install the lines into the retention clip on the transmission. If not done, connect the modified vapor line into the OEM vapor line quick-connect fitting. **Figure 3.4**.
4. Install the shift cable bracket. Tighten the two bolts and connect the electrical connector. **Figure 3.1**.



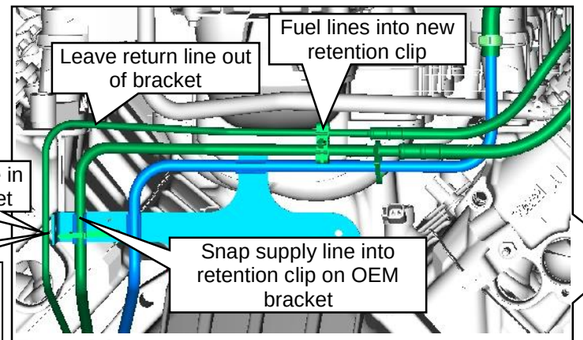


Figure 3.3

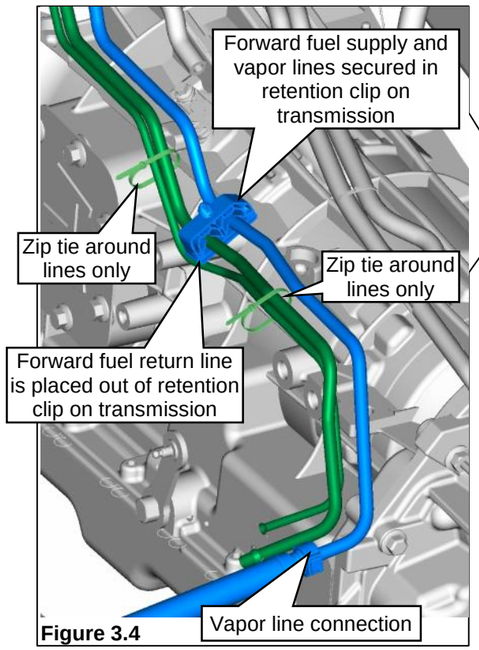
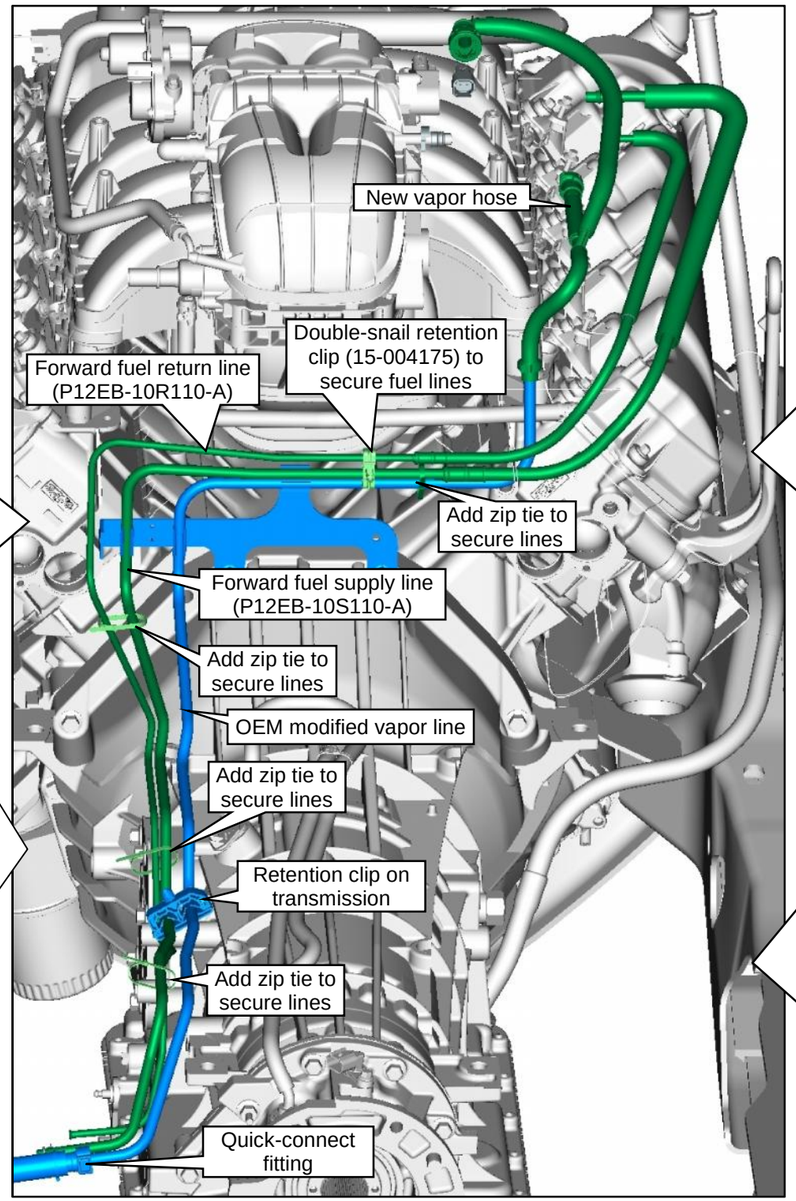


Figure 3.4



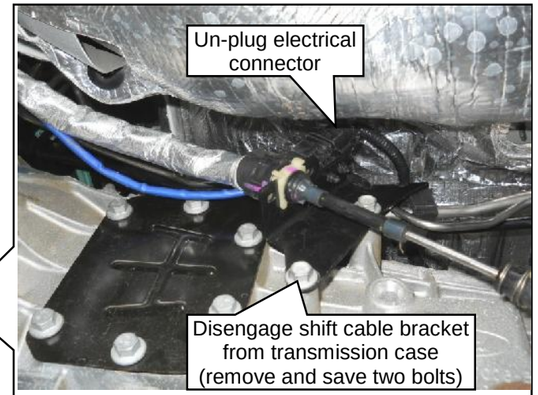


Figure 3.1

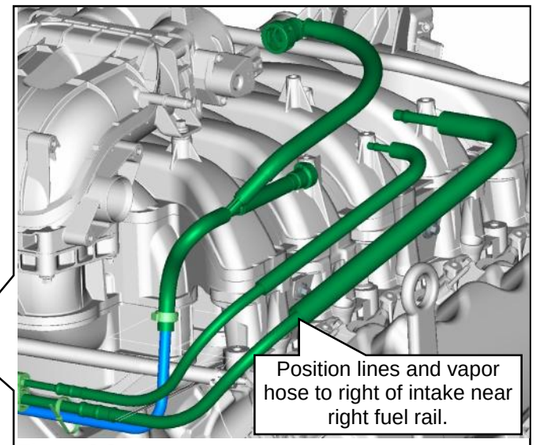


Figure 3.2

PREPARING ENGINE COMPARTMENT

Refer to the *Ford Workshop Manual, Section 303-04, Fuel Charging and Controls — 6.8L (3V)*, for complete instructions on removing the fuel rails and injectors. Some original parts will be reused. The components in this section may be saved, discarded or new. Refer to color key.

1. Disconnect the intake manifold runner control (IMRC) actuator electrical connector as needed. **Figure 4.1**.
2. Unplug the electrical harness connector from OEM VMV.
3. Disconnect the VMV hose quick-connect fitting from the throttle body adapter. **Figure 4.2**.
4. Remove the bolt securing the bracket and remove the VMV assembly (hose, VMV and bracket) for modification. **Figure 4.2**.
5. Separate the hose with quick-connect from the VMV. Pull the OEM VMV bracket out of the VMV. Discard the hose, bracket and bolt. **Figure 4.3**.
6. A new VMV mounting bracket found in hardware kit P12EB-ENGKIT-A is to be installed onto the FRPCM. The VMV and rubber isolator will be pushed onto the new bracket after the bracket has been installed. **Figure 4.3**.
7. Slide the abrasion sleeve onto the VMV engine purge hose. Connect the VMV engine purge hose assembly to the VMV and secured with a stepless ear clamp (labeled “18”). **Note:** This clamp should NOT be tightened until after the orientation between the VMV and hose is correct with the assembly installed. **Figure 4.4**.

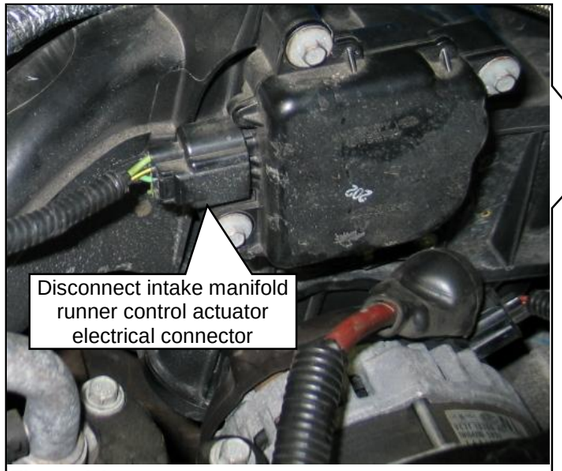
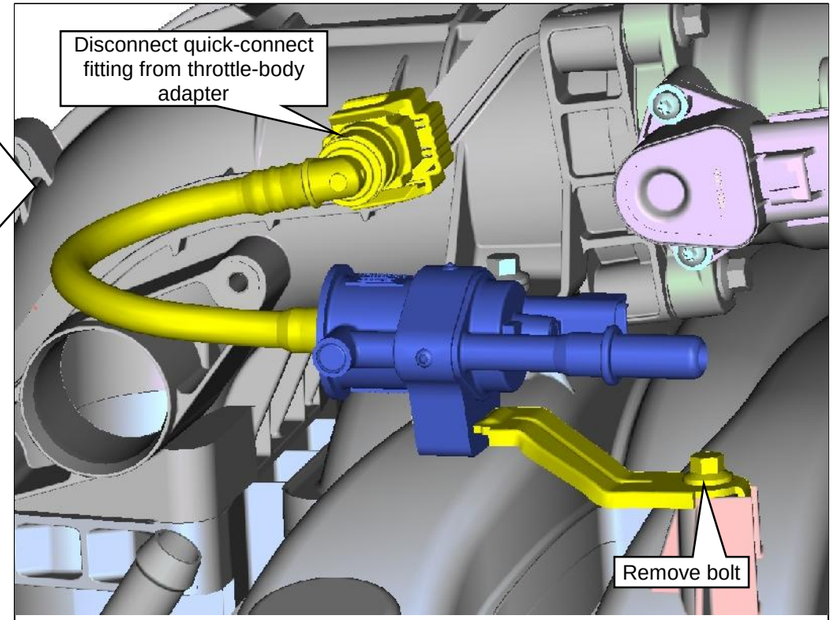


Figure 4.1



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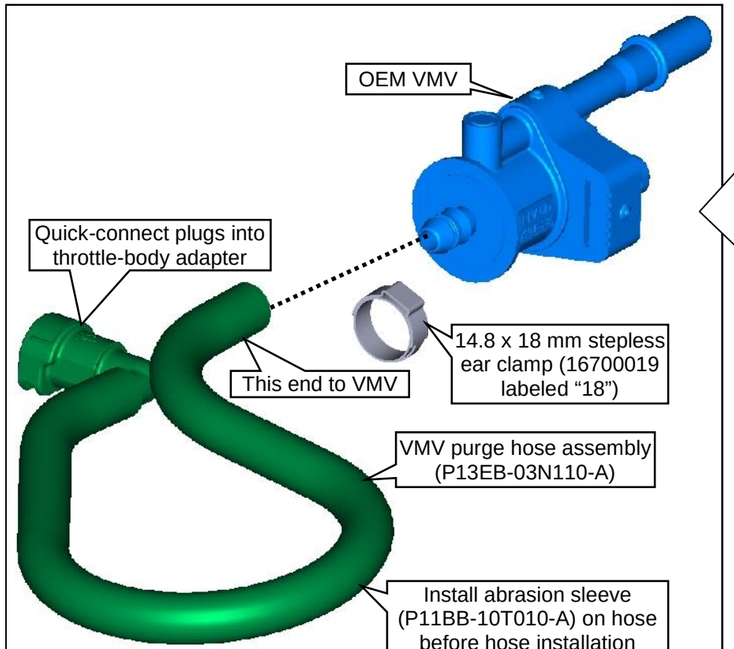


Figure 4.4

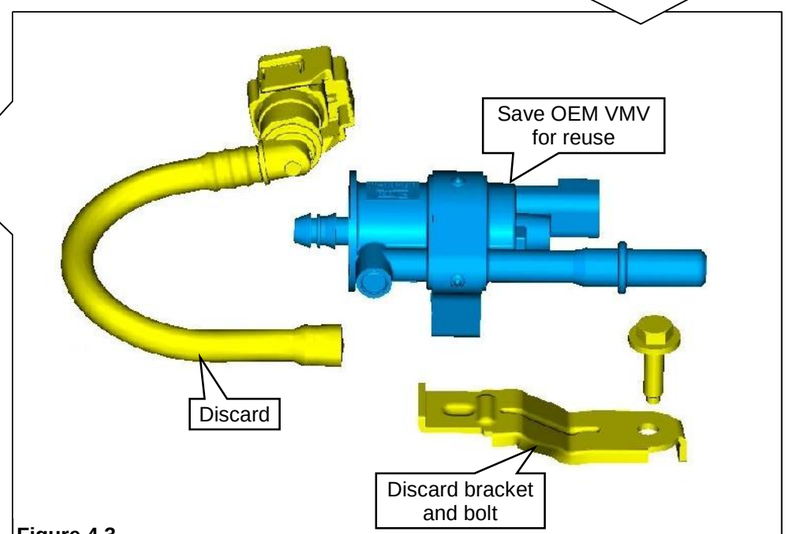


Figure 4.3

8. If necessary, remove the engine wiring harness from the mounting studs on the valve cover.
9. Disconnect electrical connector from each OEM fuel injector. **Figure 5.1**.
10. If not already done, using a Ford-approved fuel line removal tool, disconnect the fuel supply line from the left fuel rail. **Figure 5.1**.
11. Remove the six fuel rail mounting bolts and fuel rail assembly (with crossover hose). **Figure 5.2**.
12. Discard fuel rail assembly and bolts.

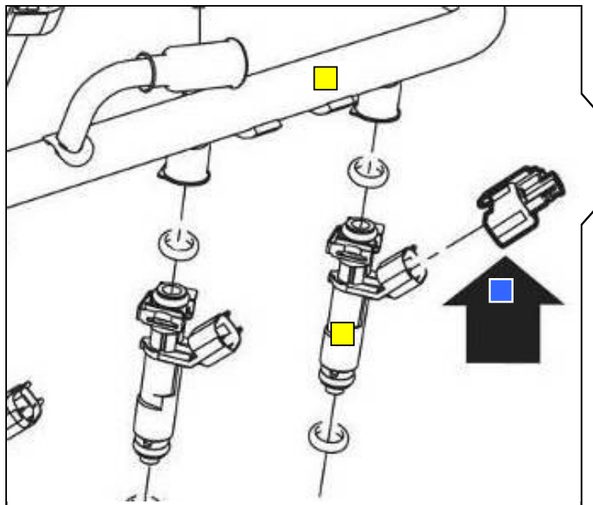


Figure 5.1

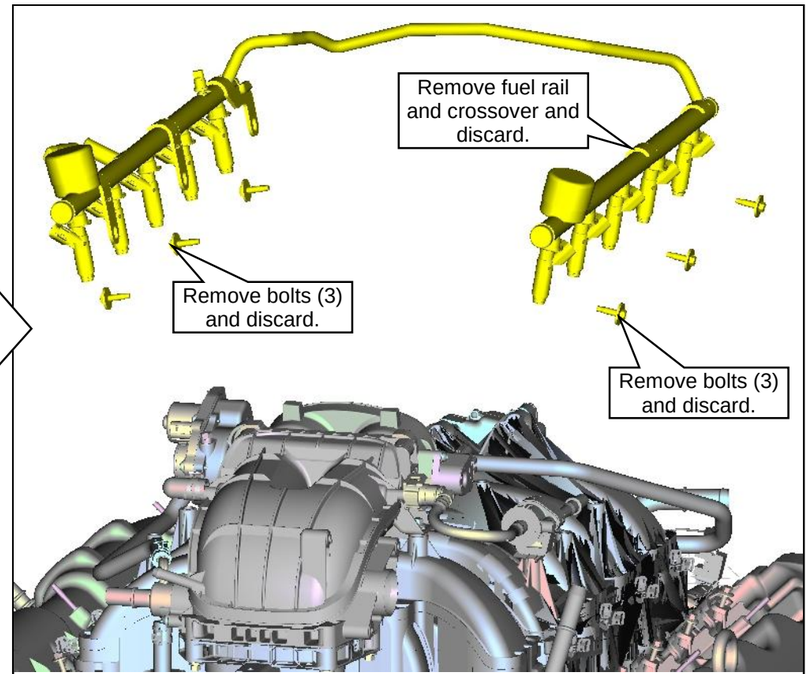


Figure 5.2

INSTALLING NEW FUEL RAILS AND FUEL RAIL RETURN FUEL LINE ASSEMBLY

1. If necessary, disconnect coil electrical wires (and ignition coils if necessary) for clearance.
2. Install three fuel rail mounting brackets to each fuel rail. Tighten the screws to 8–12 Nm. **Figures 6.2** and **6.5**.
3. Using engine oil (Motorcraft SAE 5W-20 or equivalent), lubricate lower O-rings on injector nozzles before seating rail assemblies.
4. Position left hand fuel rail assembly onto driver side of intake manifold and fully seat nozzles. Using three M6 x 1.0 x 16 bolts found in hardware kit P12EB-ENGKIT-A, secure fuel rail to intake manifold. Tighten bolts to 8–12 Nm. **Figure 6.3**.
5. Position right hand fuel rail assembly onto passenger side of intake manifold and fully seat nozzles. Using three M6 x 1.0 x 16 bolts found in hardware kit P12EB-ENGKIT-A, secure fuel rail to intake manifold. Tighten bolts to 8–12 Nm. **Figure 6.4**.
6. Orient and install fuel rail return line assembly onto forward ends of fuel rails. Push to connect fittings. **Figure 6.1**.

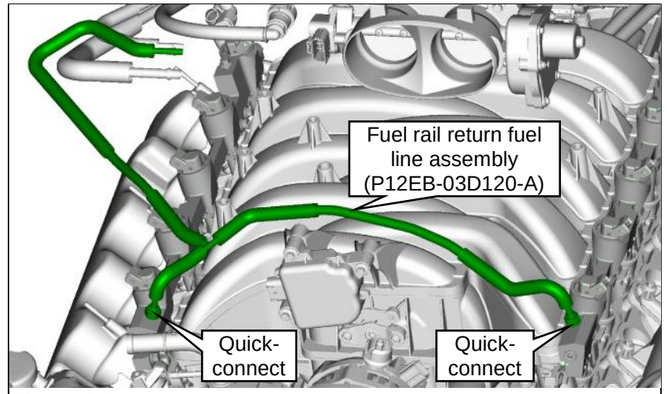


Figure 6.1

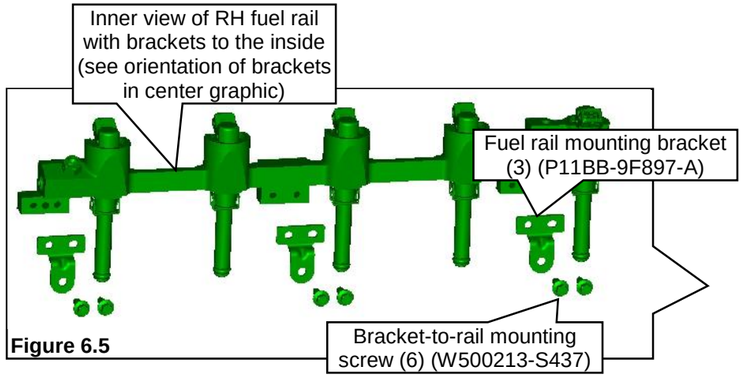
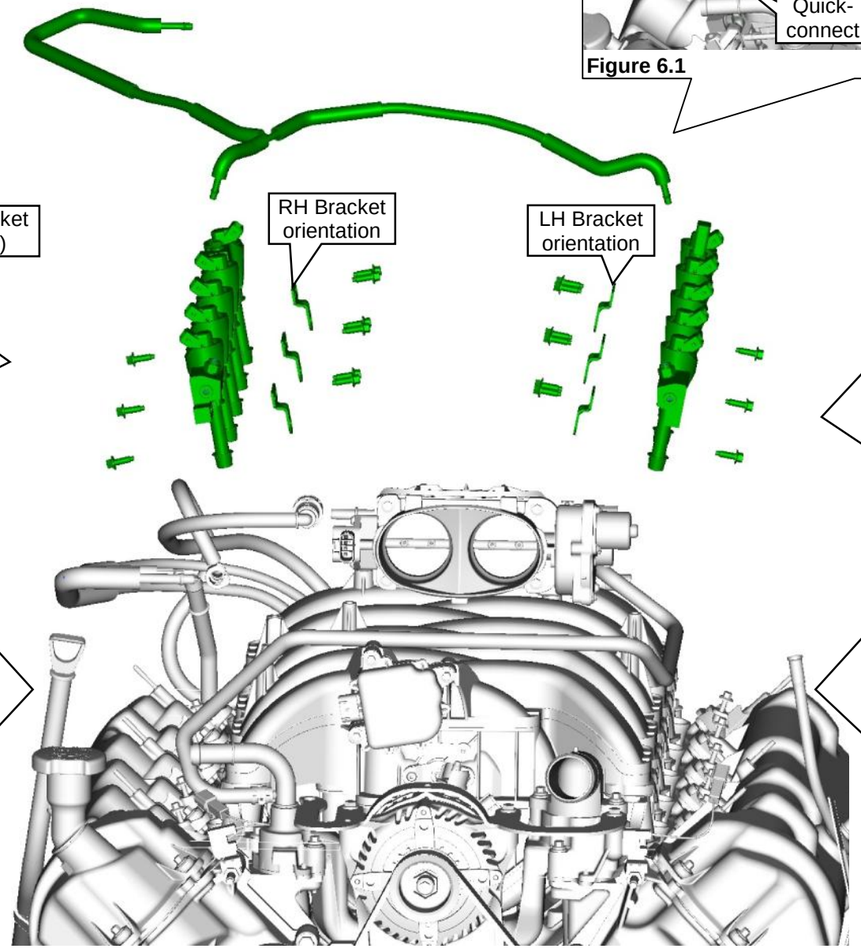


Figure 6.5



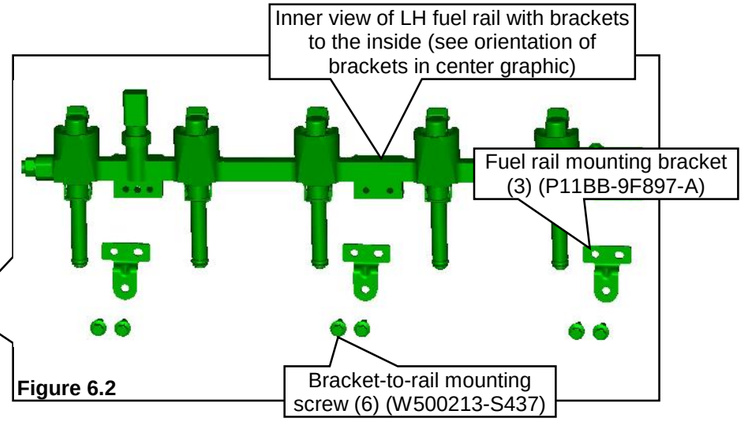


Figure 6.2

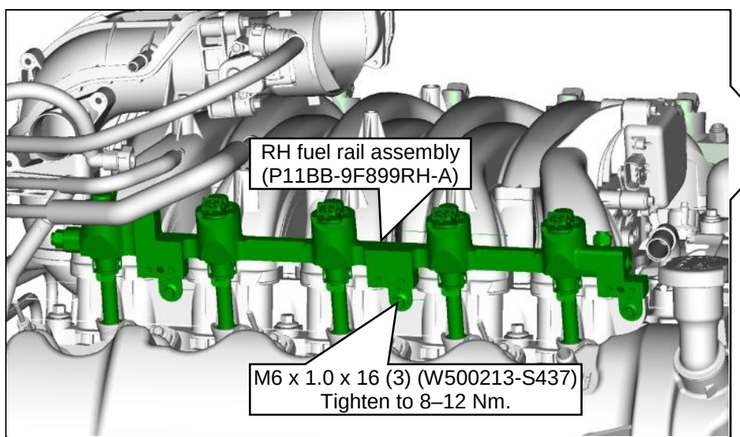


Figure 6.4

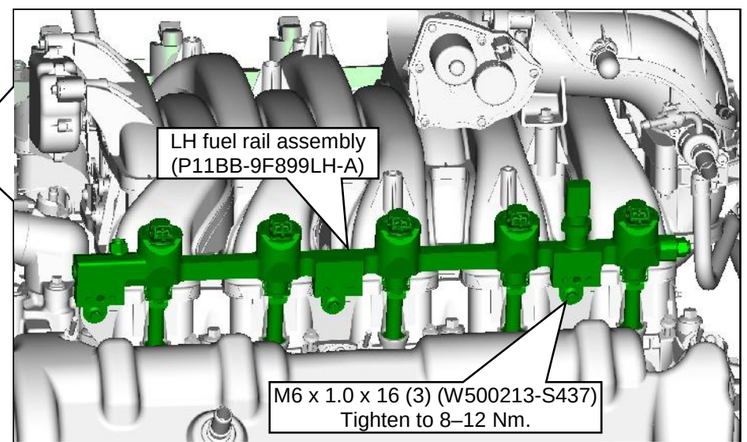


Figure 6.3

7. If applicable, connect coil wires.
8. Connect a fuel injector jumper to each original fuel injector harness connector. The ten jumpers can be found in hardware kit P12EB-ELECKIT-A. Connect opposite end of each jumper to its respective fuel injector. **Figures 7.1** and **7.2**.
9. Connect the intake manifold runner control (IMRC) actuator electrical connector. **Figure 7.3**.
10. Add a 400 mm length of 1” convolute to the OEM coolant crossover hose and secure the convolute with two zip ties, one at each end. The convolute should span to the center of the intake manifold and is installed to prevent chafing at the right fuel rail. **Figures 7.4** and **7.5**.

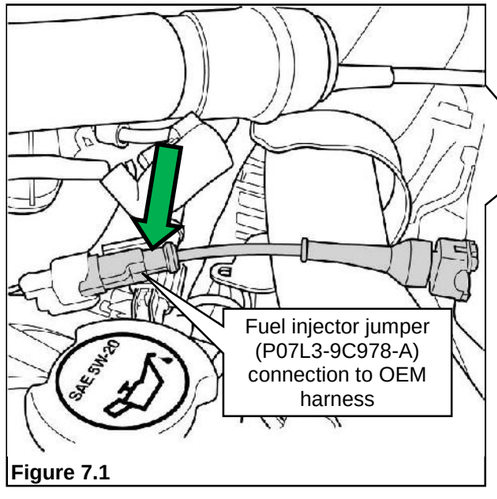


Figure 7.1

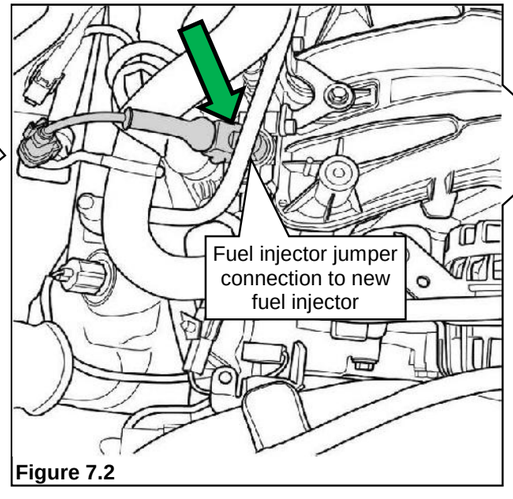
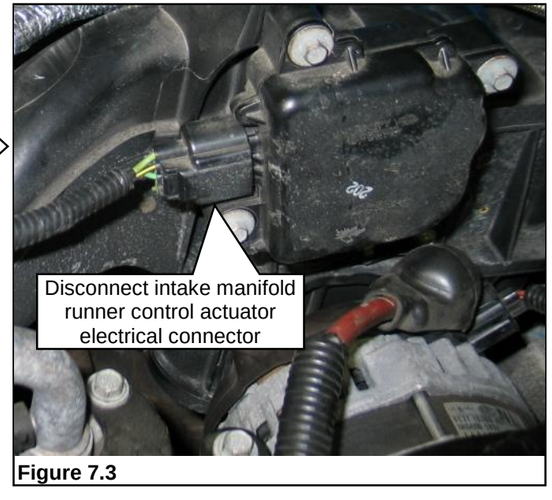


Figure 7.2



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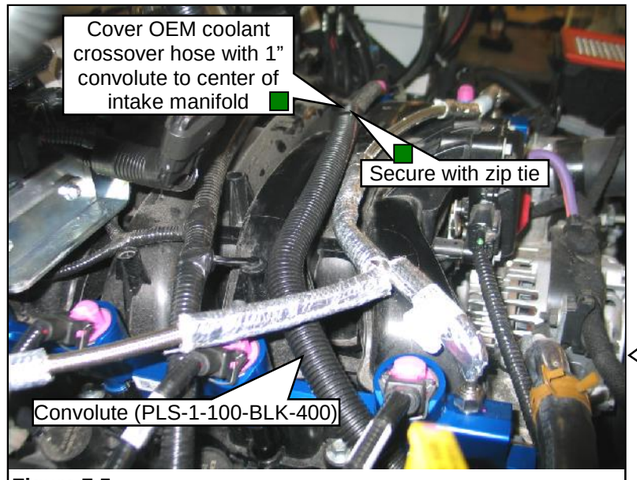


Figure 7.5

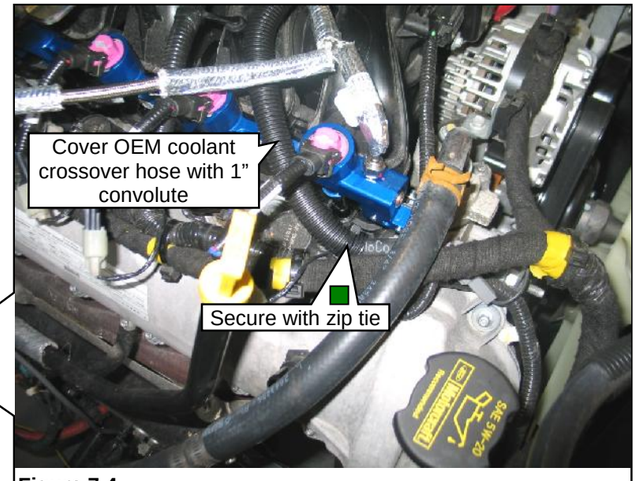


Figure 7.4

INSTALLING FUEL RAIL PRESSURE CONTROL MODULE

The following parts are found in hardware kit P12EB-ENGKIT-A.

1. Remove the OEM throttle body adapter M6 x 20 mounting bolt. Reuse this bolt to help secure the FRPCM bracket. **Figure 8.2**.
2. Position the FRPCM mounting bracket to the engine. **Figure 8.3**. Install the OEM throttle body adapter bolt, the button head bolt in the depression of the bracket and a third bolt at the rear of the bracket into the right fuel rail. Tighten bolts to 8–12 Nm.
3. Position the FRPCM to the bracket and align the four holes. **Figure 8.4**.
4. Loosely install two M6 x 16 bolts into the front bracket of the FRPCM. **Figure 8.5**.
5. Position the VMV bracket to the FRPCM inner rear hole with the tab of the bracket rearward. Loosely install two M6 x 62 bolts through the FRPCM into the FRPCM bracket. **Figure 8.6**. Tighten all four bracket bolts to 8–12 Nm.

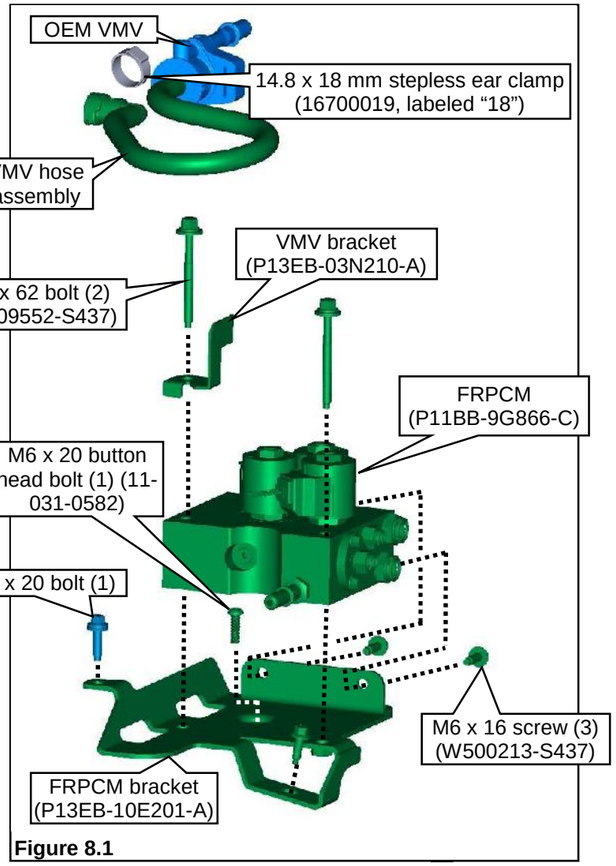


Figure 8.1

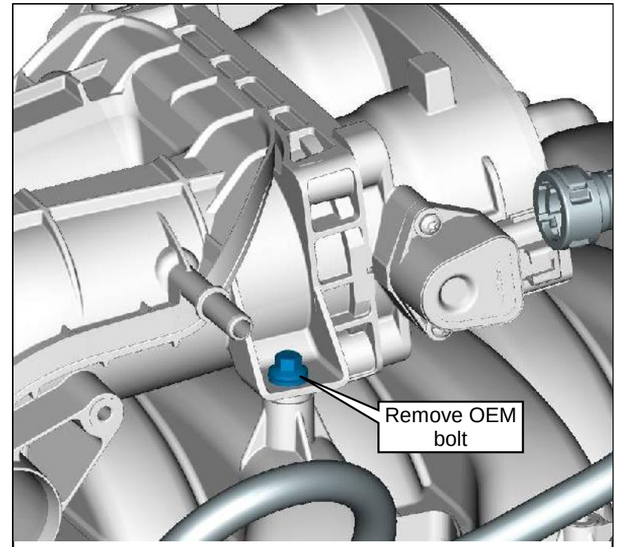
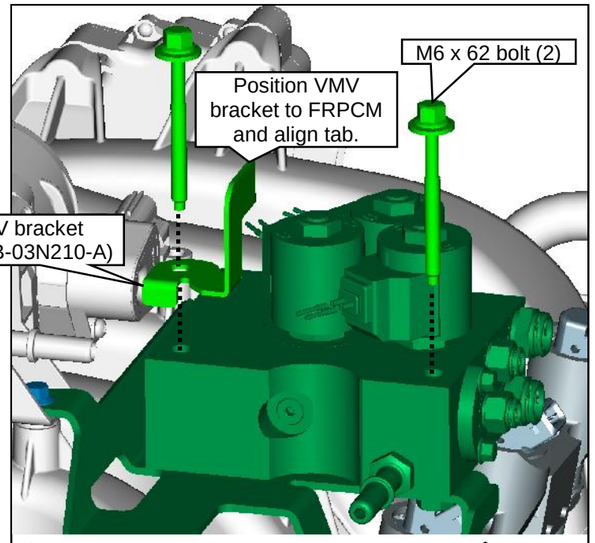


Figure 8.2



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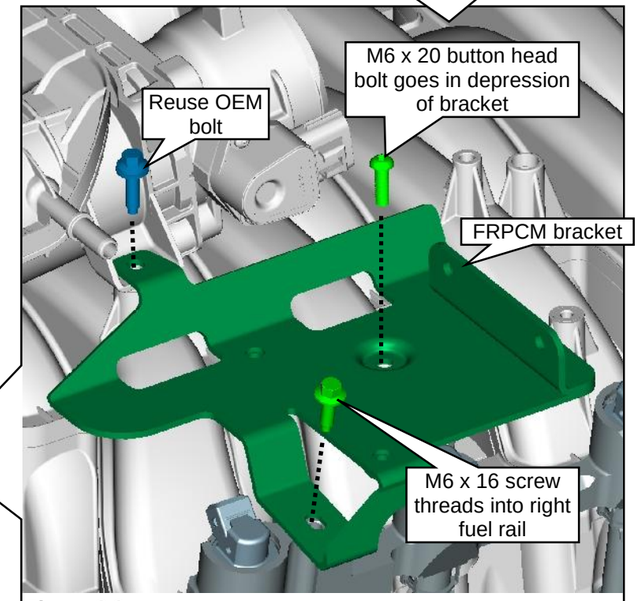
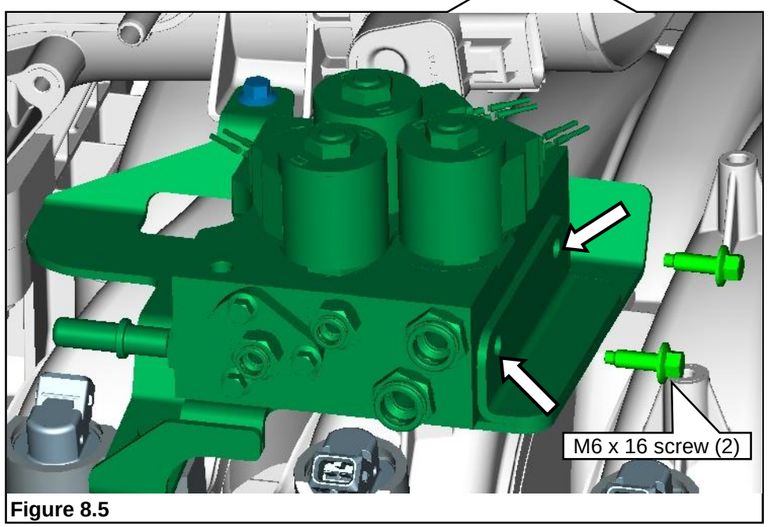


Figure 8.3



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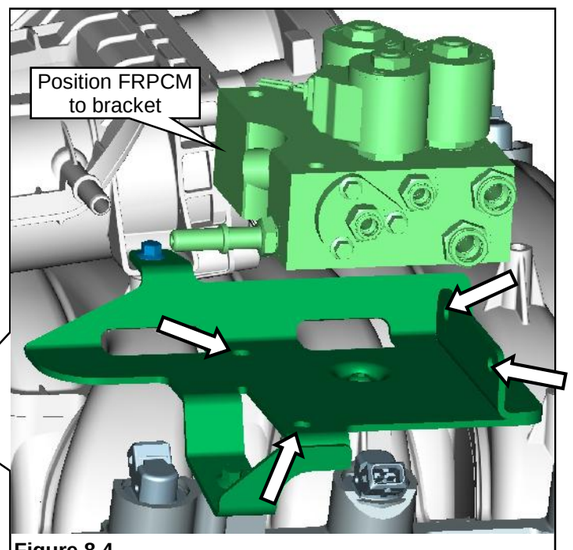


Figure 8.4

Note: For all quick-connect fittings and lines, make sure you push and pull on the lines to make sure they are securely connected.

6. If not done, slide an abrasion sleeve onto the vapor hose before installation. **Figure 9.2**.
7. Position the VMV with new vapor hose assembly to the bracket. Slide the VMV onto the bracket until secure. Plug the vapor hose assembly quick-connect fitting onto the port of the throttle body adaptor. Use a crimping tool to tighten the stepless ear clamp after the assembly is installed and correctly oriented. Refer to *Special Tools* for more information. Connect the OEM electrical connector to the VMV. **Figure 9.2**.

Note: Refer to **Figure 9.1** for FRPCM fuel line identification for line-to-port and vapor hose bleed port location.

8. Orient and install fuel rail supply line assembly onto rearward ends of fuel rails. Push to connect fittings. Plug the open end of the fuel rail supply fuel line into the FRPCM lower front 3/8” port. **Figure 9.3**.
9. Connect the forward fuel return line into the FRPCM lower rear 1/4” port. **Figure 9.5**.
10. Connect the forward fuel supply line into the FRPCM upper front 3/8” port. **Figure 9.5**. This line may be labeled with a tag indicating **TOP**.
11. Connect the fuel rail fuel return line into the FRPCM upper rear 1/4” port. **Figure 9.6**. This line may be labeled with a tag indicating **TOP**.
12. Connect the vapor canister purge hose assembly to the bleed port on the FRPCM and to the VMV port. **Figure 9.7**.

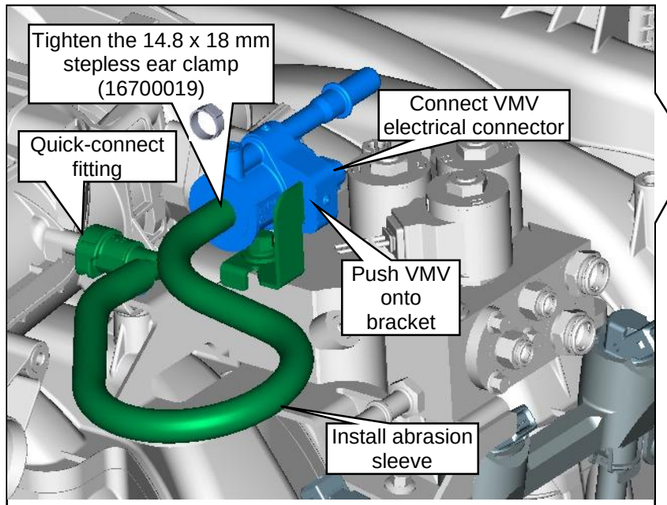


Figure 9.2

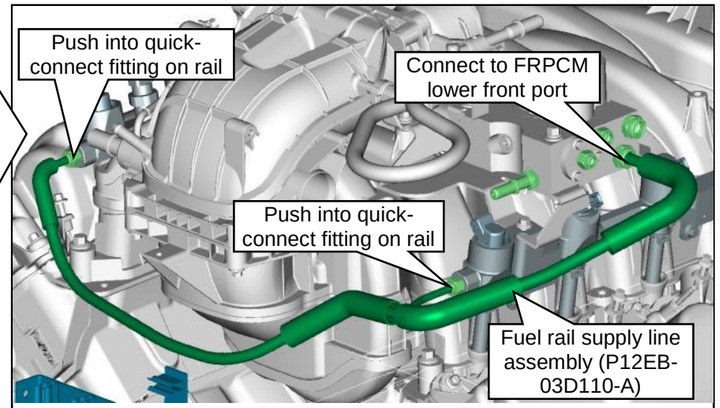


Figure 9.3

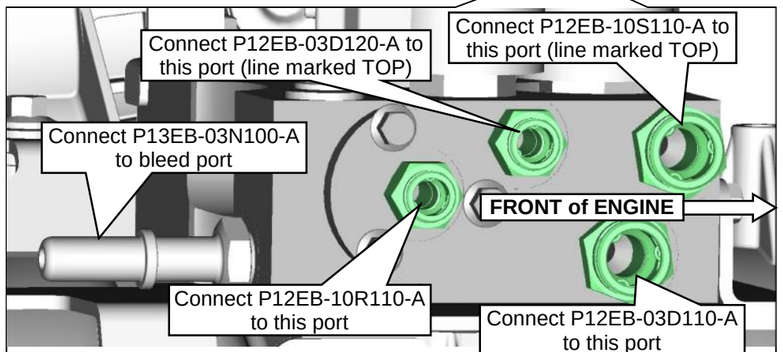
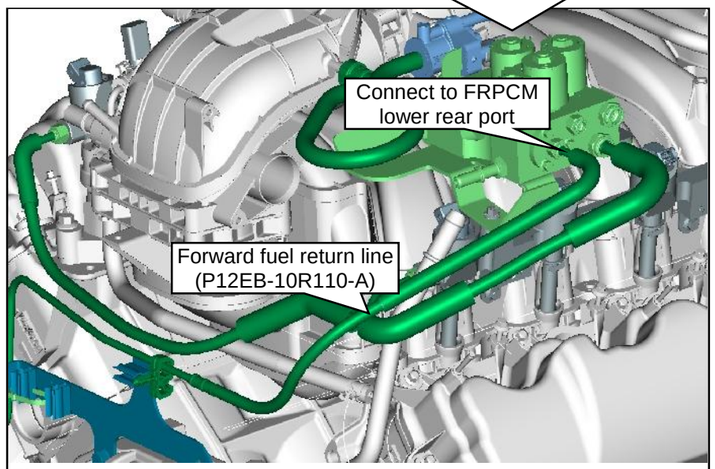


Figure 9.1



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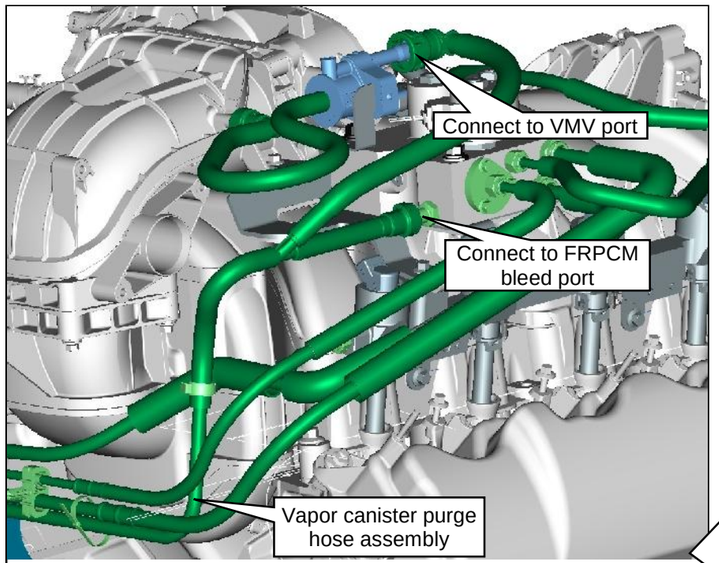

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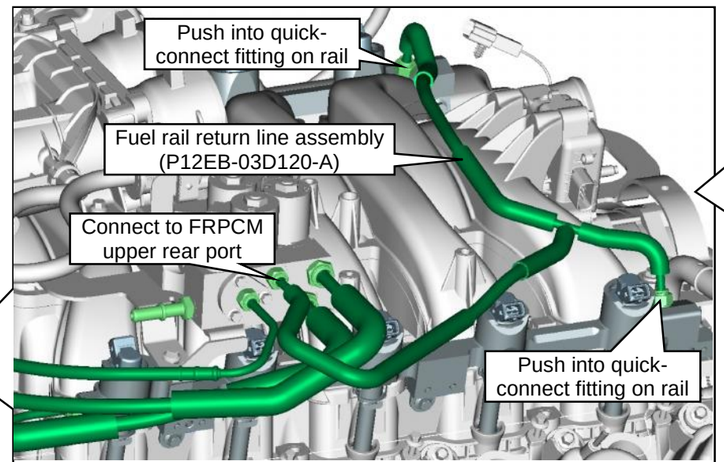


Figure 9.6

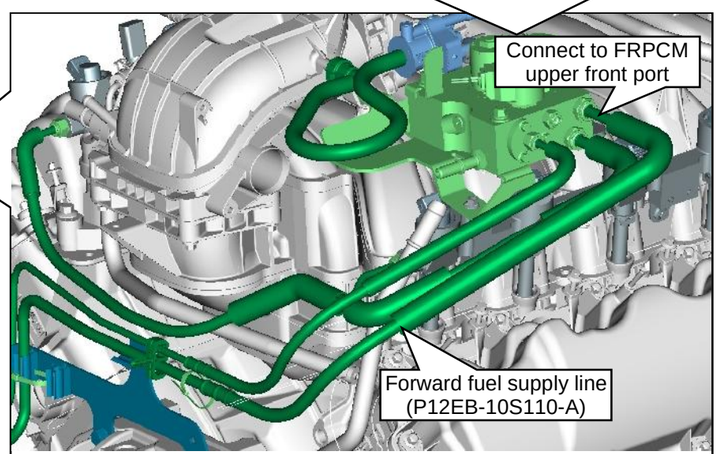


Figure 9.5

INSTALLING SMART RELAY MODULE AND RELAY FUSE BOX BRACKET

Note: Mounting location on body is shown for F-450/F-550. F-53/F-59 will need a similar, suitable mounting location.

Note: All parts for installing the smart relay module and the relay fuse box bracket are supplied in hardware kit P12EB-ELECKIT-A. The SRM is supplied in hardware kit P12EB-ENDITEM-B.

1. Assemble the SRM to the SRM bracket using four M6 socket-head capscrews and four M6 nuts. Tighten until snug. **Note:** Make sure that the SRM is oriented in the SRM bracket so that the electrical connector/harness faces downward for proper underhood harness routing. **Figure 10.1**.
2. Remove the bolts at the top of the fender. These bolts are used to secure the SRM assembly. Save for reuse. **Note:** The front battery tray bolt is used at the top rear of the SRM bracket. The rear lip of the bracket must be placed under the front lip of the battery tray. **Figure 10.2**.
3. Position the SRM bracket on the right inner fender in front of the battery tray, on top of the fender. Install the top front fender bolt to position and stabilize the bracket. **Figure 10.3**.
4. Install one M6 bolt at the bottom front of the bracket. Tighten the bottom front bolt to specification. **Figure 10.3**.
5. Attach the fuse box bracket to the SRM bracket and secure with one M6 bolt and one M6 nut. **Figure 10.4**.
6. Install the upper front bolt through the SRM bracket and into the fender. Tighten the upper front fender bolt to specification. **Note:** Leave the battery tray bolt out until after the underhood electrical harness has been installed. Install the bolt when the battery tray is installed and tighten to 18–21 Nm. **Figure 10.5**.

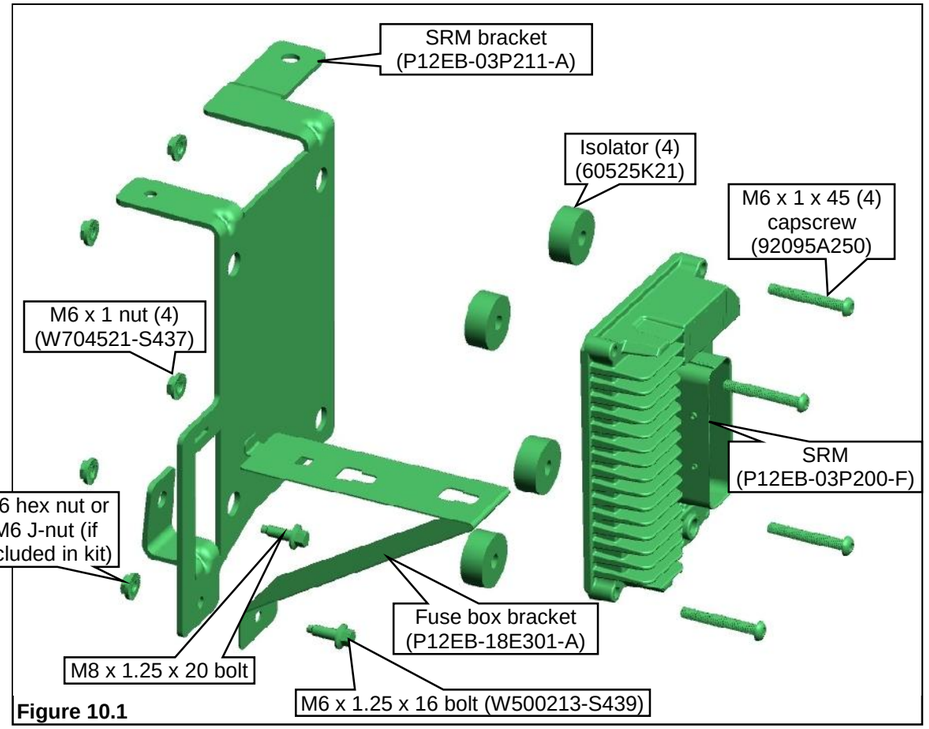


Figure 10.1

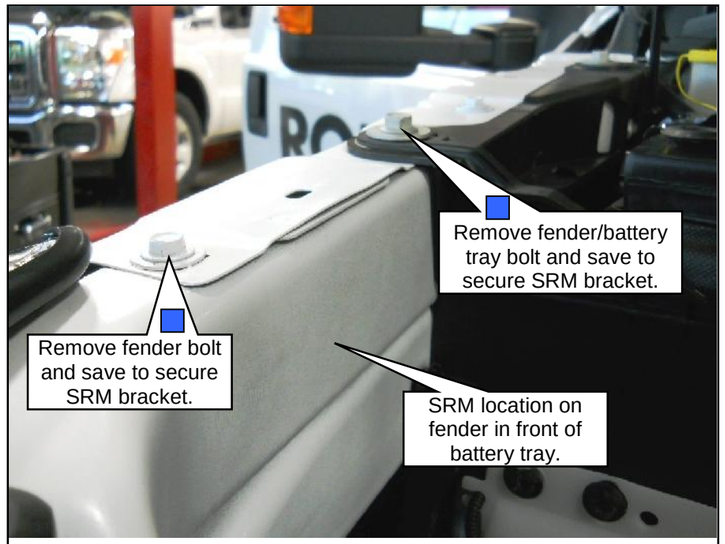


Figure 10.2

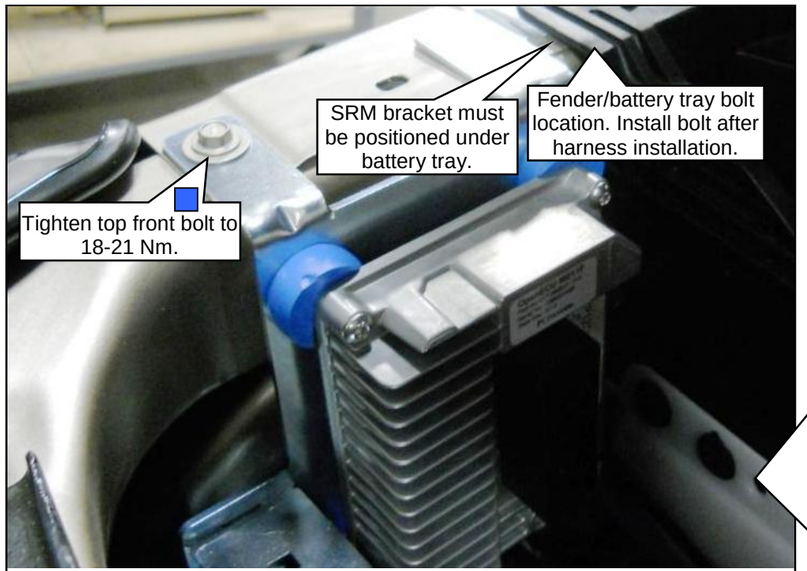
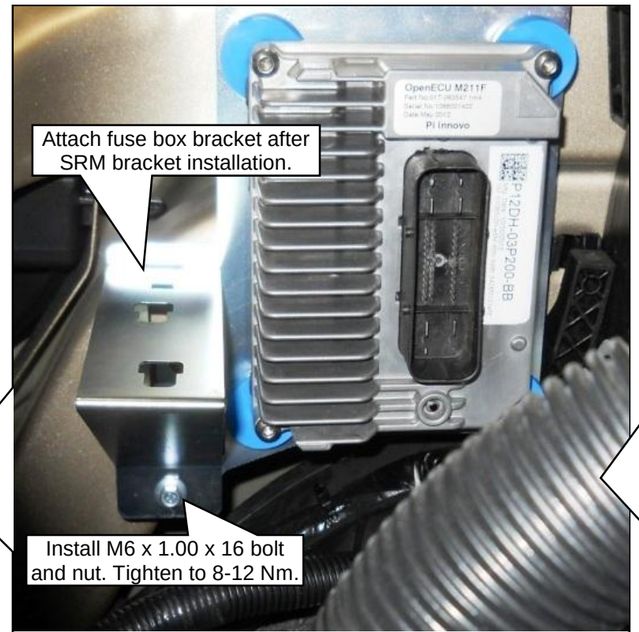


Figure 10.5



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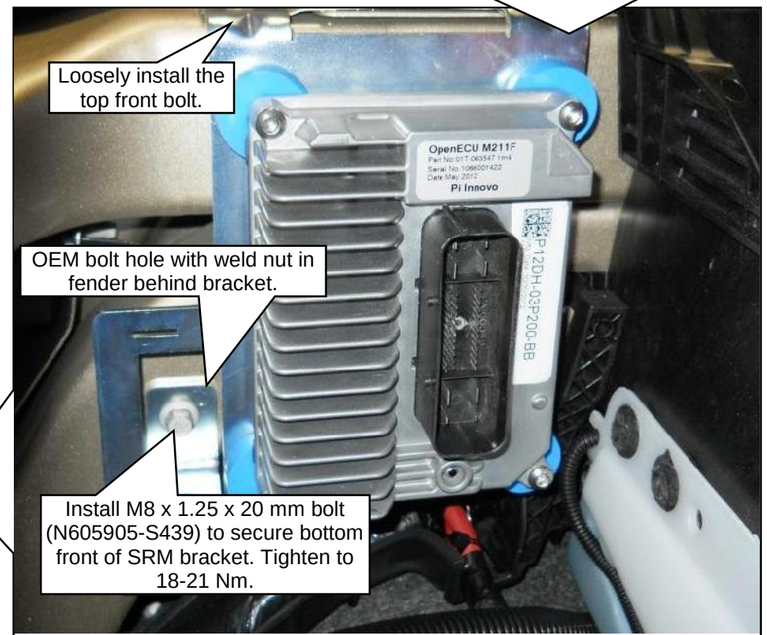


Figure 10.3

F-450/F-550 CAN HARNESS INSTALLATION

Note: F-450/F-550 ONLY, refer to page 13 for F53/F-59 CAN harness installation.

Note: Refer to pages **22**, **23** and **24** for Schematics and Wiring Harness and Connector Layouts.

Note: A hole must be drilled so that the controller area network (CAN) bus harness can be routed from the interior into the engine compartment.

1. Pull back the carpet from under the dash next to the right kick panel. Remove the right kick panel if needed. Mark the location (as shown) to drill a 29 mm (1-1/8”) hole. **Note:** If equipped, remove any sound deadening material from the location to drill. This material might cause improper seating of the harness grommet. **Figure 11.1**.
2. Drill the hole using a 29 mm (1-1/8”) hole saw. **Note:** Use care when drilling to avoid damaging anything behind the panel. The pilot bit of the hole saw should not be extending any more than 13 mm (1/2”) beyond the saw teeth. When drilling, push the drill no deeper than what is necessary to cut through the metal panel. **Figure 11.1**.
3. Open the glove box and push in the right side near the catch. Lower the glove box out of the way. **Figure 11.2**.
4. Remove the upper instrument panel center finish panel screw covers (2). **Figure 11.3**. Remove the two panel screws. **Figure 11.4**.
5. Remove the finish panel and remove the radio and radio connections to gain access for CAN bus harness installation and routing. **Figure 11.5**.
6. Feed the CAN bus harness through the finish panel opening, under the lower bracket and to the right rear side of the radio opening. Use any opening to route the CAN connector through. **Figure 11.6**.
7. Route the CAN bus harness from the radio opening onto the top and to the right of the HVAC unit. **Figures 11.7 and 11.8**.

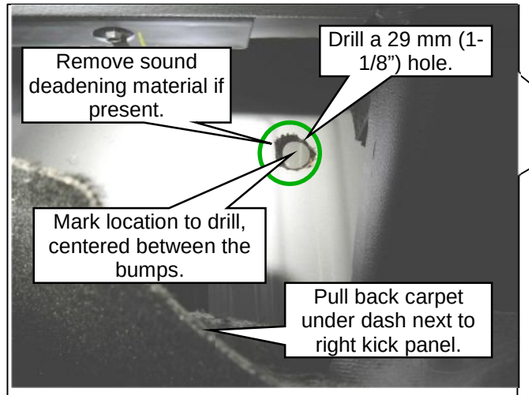


Figure 11.1

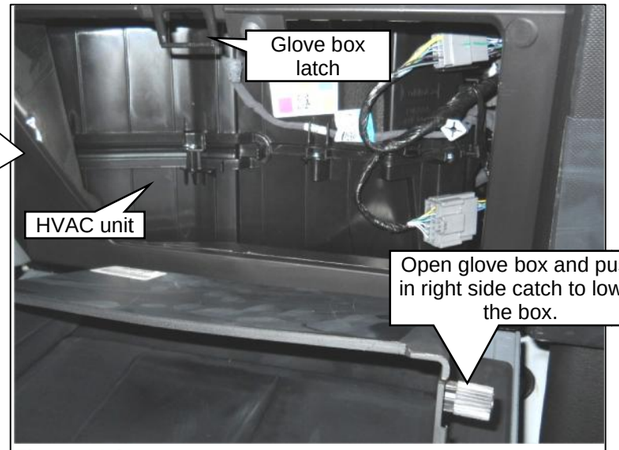


Figure 11.2

Figure 11.3

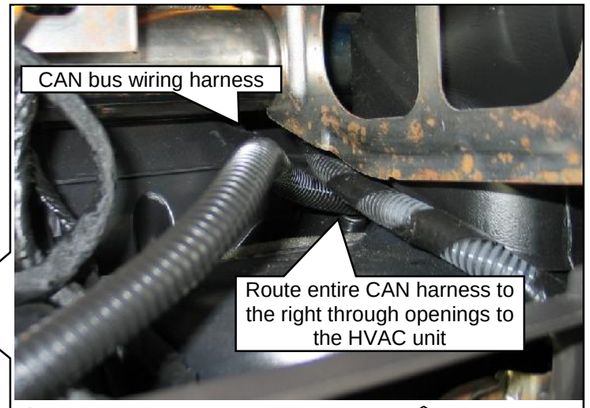


Figure 11.6

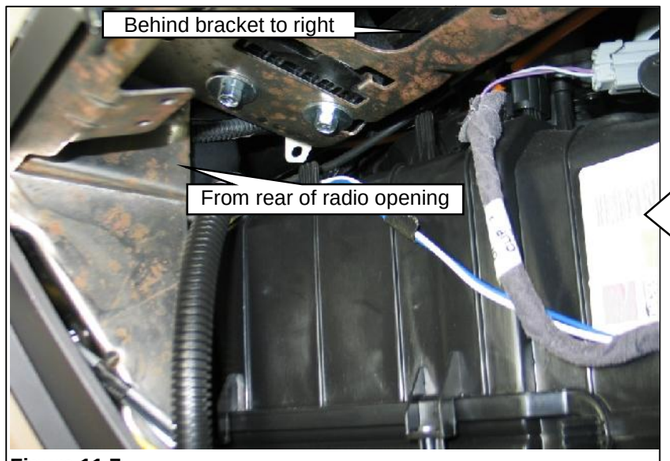


Figure 11.7

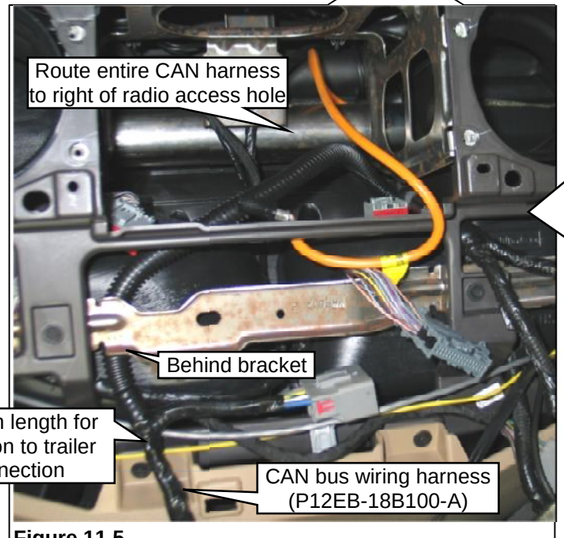


Figure 11.5

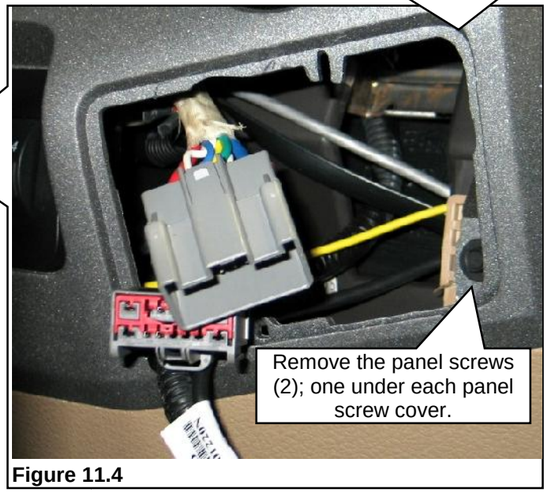


Figure 11.4

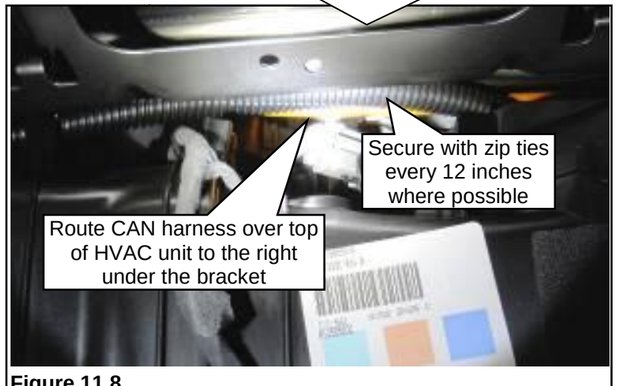


Figure 11.8

8. Continue down the unit at the right next to the OEM module and down to the 29 mm drilled opening. **Figure 12.1**.
9. Push the underhood harness connector end of the CAN bus harness into the drilled hole. Push the CAN harness through the hole until the grommet is attached and secure. **Figure 12.2**.
10. Have an assistant pull the harness up into the engine compartment until the harness is exposed behind the battery tray. **Figure 12.3**.
11. Locate the CAN bus harness breakout in the underhood harness and make the connection with the CAN bus harness connector. Tuck the harness back into place and secure with zip ties as needed. **Figure 12.4**.
12. Secure the CAN bus harness to the instrument panel bracket using a zip tie**.** Install the radio, make all radio connections and secure radio with the four bolts. **Figure 12.5**.
13. Position the upper instrument panel center finish panel close to the instrument panel and connect all disconnected electrical connections. Make the connection between the CAN bus harness and the trailer brake controller harness and the controller. **Figure 12.6**.
14. Zip tie the harness along the routing as needed.
15. Install the upper instrument panel center finish panel and the two screws to secure. Install the screw covers. **Figure 12.7**. Lift the glove box into place while pinching the catch area into the panel opening. Close the box.
16. Position the floor carpeting back into place and install the right side kick panel (if removed).

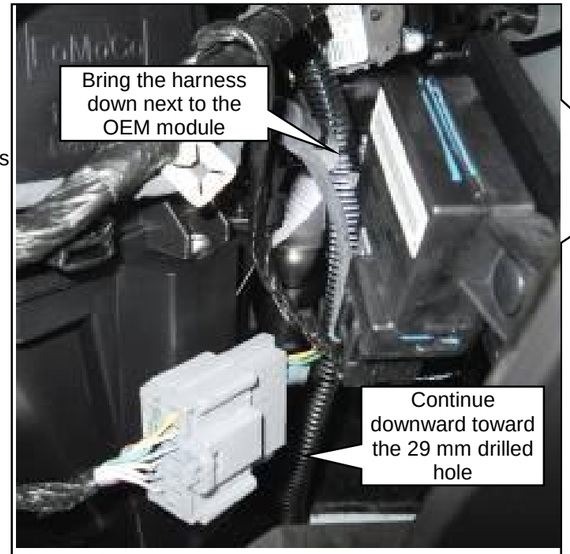


Figure 12.1

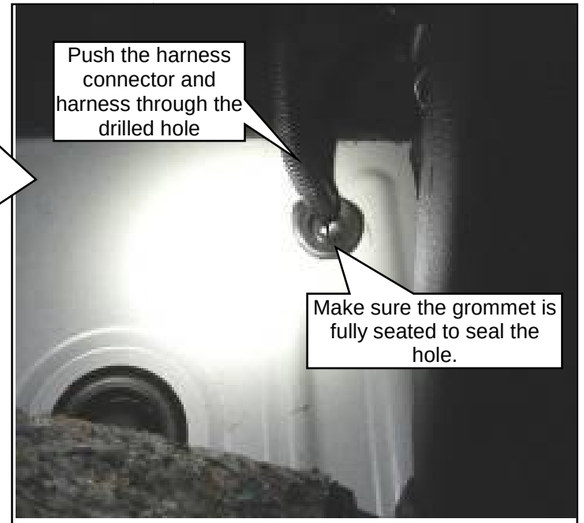


Figure 12.2

Figure 12.3

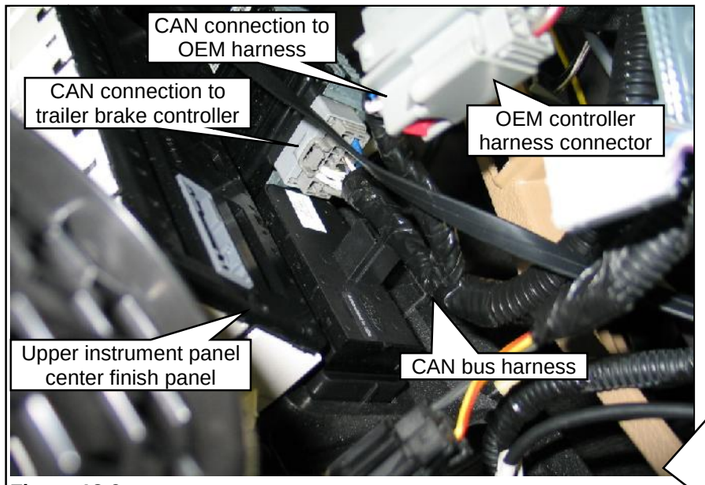
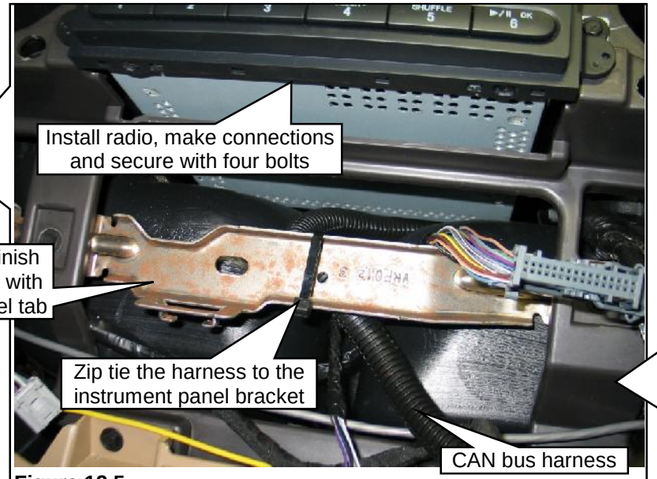


Figure 12.6



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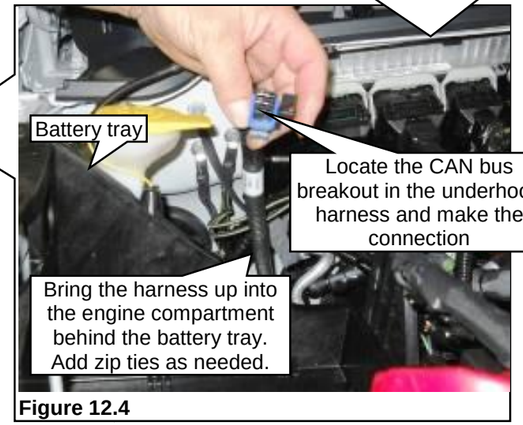


Figure 12.4

Figure 12.7

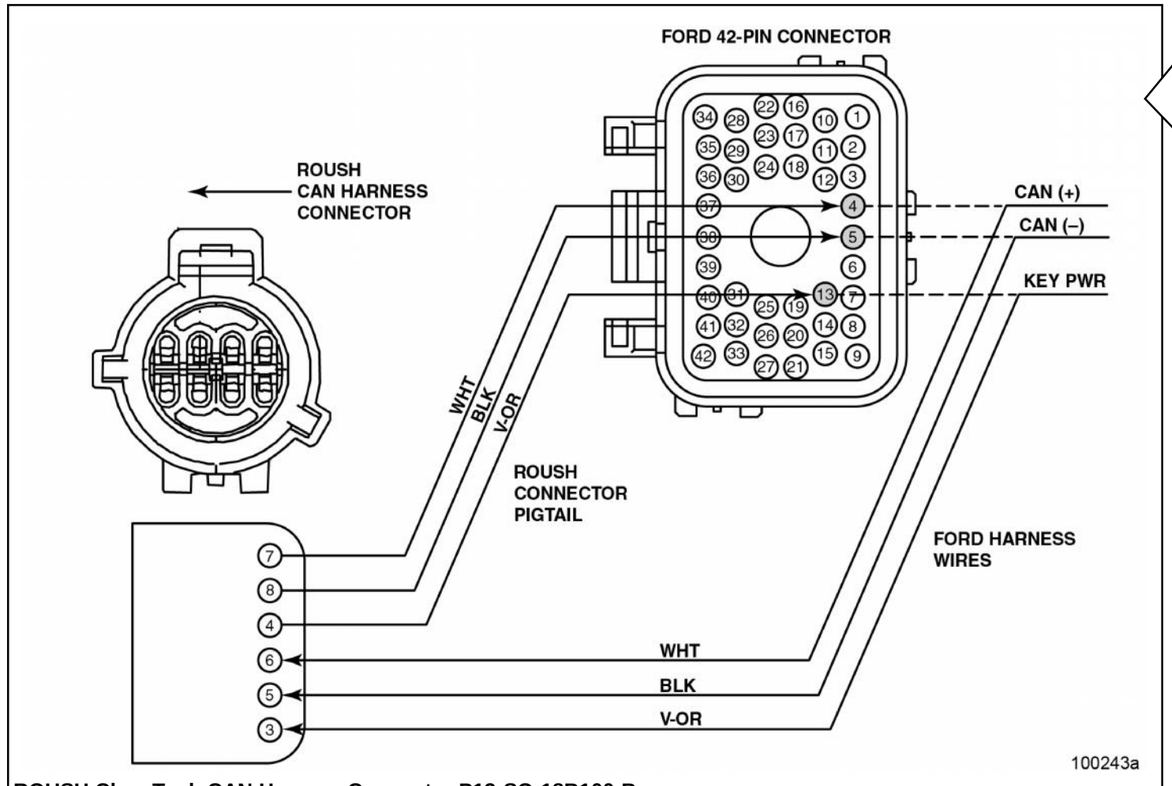
F-53/F-59 STRIPPED CHASSIS CAN HARNESS INSTALLATION

The ROUSH CleanTech CAN harness, P13-SO-18B100-B connects to the ROUSH CleanTech underhood harness, P12EB-18A100-A, with a 6-pin connector; the other end connects to the Ford harness with a short 3-wire pigtail. The 3-wire pigtail is connected into the Ford harness, 14401, at the 42-pin connector under the instrument panel as shown.

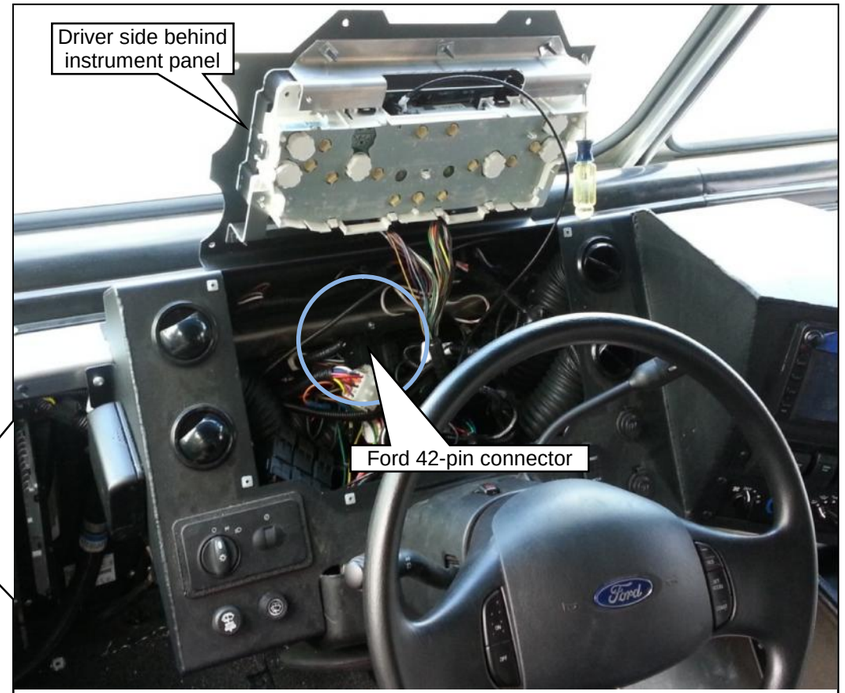
Procedure

The terminal connections are done in three steps:

1. Remove wire terminal pins 4, 5 and 13 (WHT, BLK and V-OR wires) from the back of the 42-pin connector in Ford harness 14401.
2. Next, insert the removed Ford harness terminal pins 4, 5 and 13 into pin locations 6, 5 and 3 respectively at the back of the ROUSH CAN harness connector as shown in the illustration.
3. Insert the ROUSH CleanTech connector pigtail WHT, BLK and V-OR wires into pin locations 4, 5 and 13 respectively, at the back of the Ford connector.



ROUSH CleanTech CAN Harness Connector P13-SO-18B100-B



Ford 42-pin connector location

INSTALLING UNDERHOOD WIRING HARNESS

Note: All parts for installing the ROUSH CleanTech underhood harness are supplied in hardware kit P12EB-ELECKIT-A.

Note: Refer to pages **22**, **23** and **24** for Schematics and Wiring Harness and Connector Layouts.

1. Drape the underhood harness on the right side of the engine compartment with the fuse box and SRM connector at the right front.
2. Attach the SRM connector to the SRM, push the connector into place until fully seated and close the connector latch securely. **Note:** The SRM connector must be oriented downward for proper harness installation. **Figure 14.1**.
3. Position the fuse box (part of harness) onto the bracket and slide it in until locked in place. Check to make sure that the fuse box tabs are fully seated and that the lock tab is latched. **Figure 14.1**.
4. Plug in the fuel level interface module (FLIM) connector (and in-line fuse) to the underhood harness FLIM connection. Use two zip ties to secure the FLIM to the OEM wiring harness as shown. **Figure 14.2**.
5. Bundle the underhood harness toward the front of the inner fender down in the corner. Tuck the underhood harness under the fuse box bracket and SRM as neatly as possible. **Figure 14.2**.
6. Pull in on the battery tray and route the underhood harness behind the tray and then up the back side of the tray to the right of the PCM. Tuck the harness under the inner fender. **Figure 14.3**.
7. Leave the red battery power harness (breakout from fuse box harness) with electrical eyelet on the front side of the battery tray at the bottom. Connect the power lead to the positive terminal of the battery. Tighten the nut to secure. **Figures 14.4** and **14.5**.

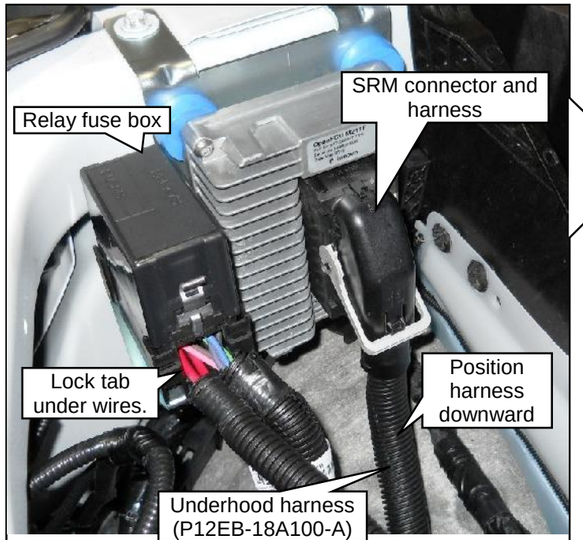


Figure 14.1

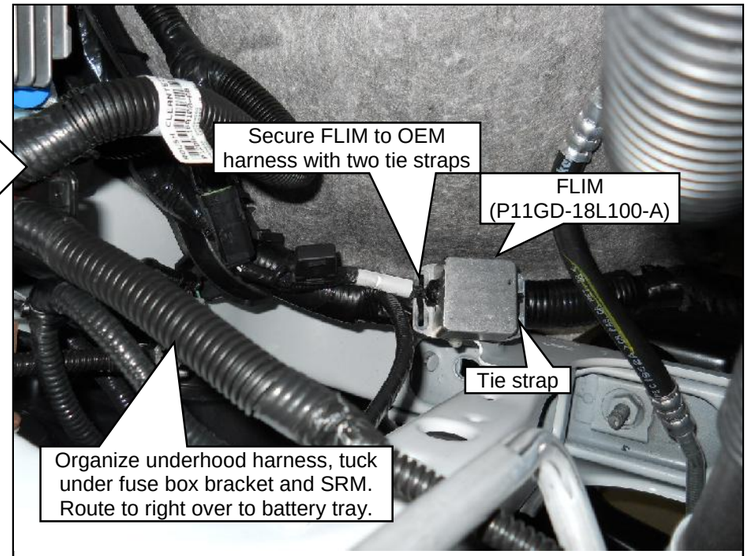


Figure 14.2

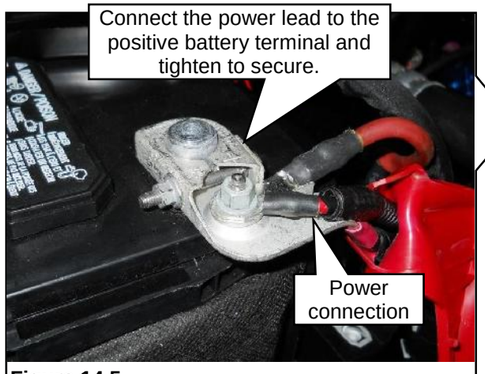


Figure 14.5

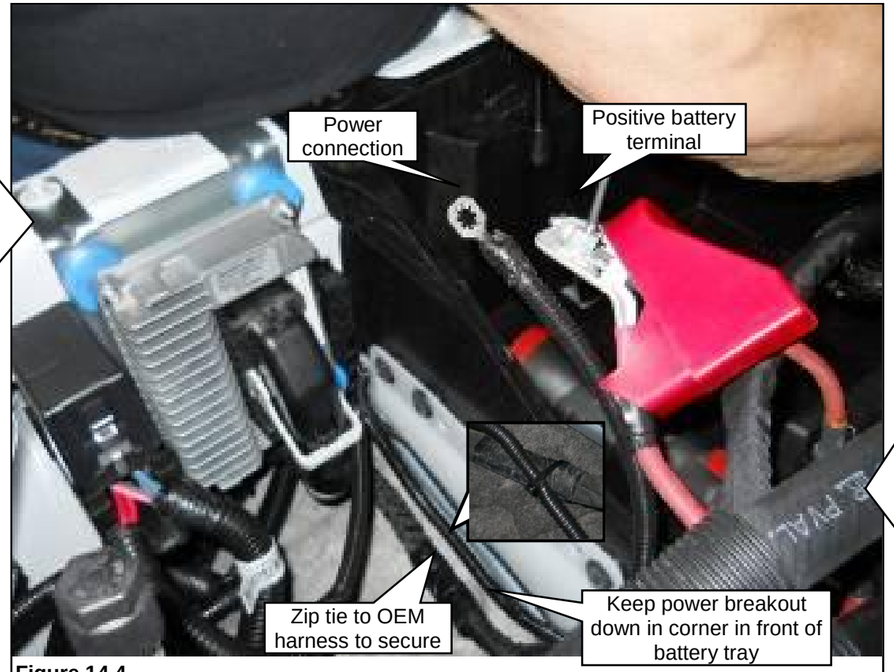


Figure 14.4

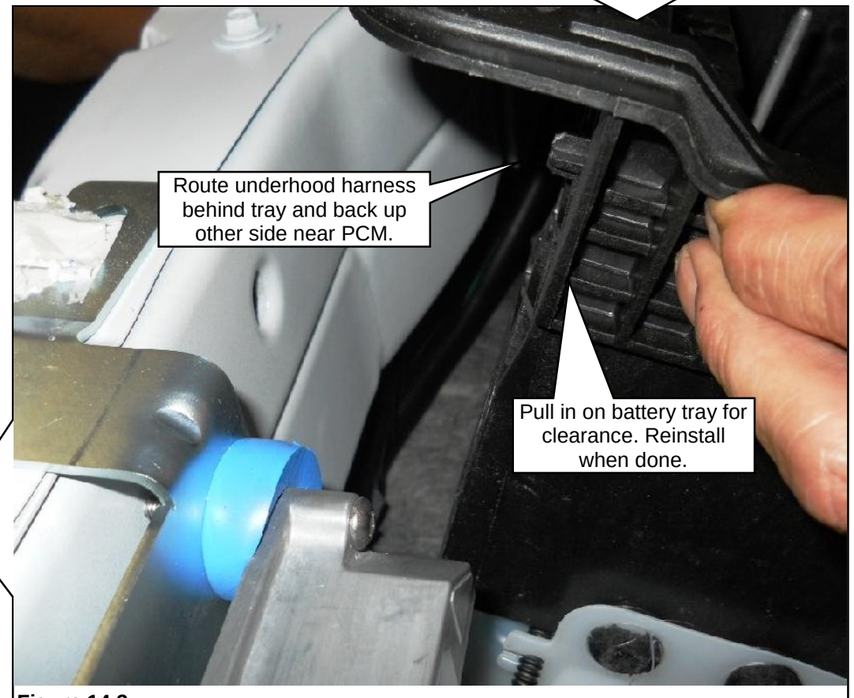


Figure 14.3

Note: It is recommended to route the entire harness and make all connections prior to retaining the harness with zip ties. Retaining the harness with zip ties should be the final step.

8. Attach the two ground connections (breakout from main harness with CAN bus harness connection) to the OEM ground attachments next to the PCM. They are the fuel pump and SRM grounds. Connect the underhood harness ground eyelets to the existing Ford ground location on right side next to the PCM. **Figure 15.1**.
9. Install five cable tie edge clips to the top of the cowl area as shown. Route the underhood harness across the cowl over to the left of the brake booster. Attach the harness to the edge clips. **Figure 15.2**.
10. Route the harness breakout with the integrated pressure temperature sensor (IPTS) connector (on right fuel rail) along the top left of the engine. Attach the breakout harness connector to the sensor. **Figure 15.3**.
11. Route the lower end of the underhood harness with the 6-pin and 2-pin connectors down along the wheel well to the left of the steering column and back toward the left side frame rail. Following the Ford chassis harness. **Note:** Make sure to secure the ROUSH CleanTech underhood harness to keep it away from the steering column and other heated or moving components. **Figure 15.4**.
12. Tighten the cable tie edge clips around the harness to secure the harness. Make sure all connections are routed correctly and attached before tightening. **Figure 15.2**.
13. Reposition the battery tray, install the five bolts and tighten to secure. Install the fender bolt to secure both the top of the battery tray and the rear end of the SRM bracket. Tighten the bolt to 18–21 Nm. **Figure 15.3**.
14. Insert and connect the in-line power pack connector (part of the underhood harness) into the Ford harness. **Figure 15.5**.
15. If the PCM is available and re-attached, connect the three PCM connectors and lock in place. Use a zip tie to secure the harness of the inner PCM connector. Tie the harness to the bracket in place of the OEM push-pin of the harness. **Figure 15.6**.
16. Make the CAN bus harness and the FRPCM harness breakout connections to the underhood harness. **Figure 15.7** and **15.8**.

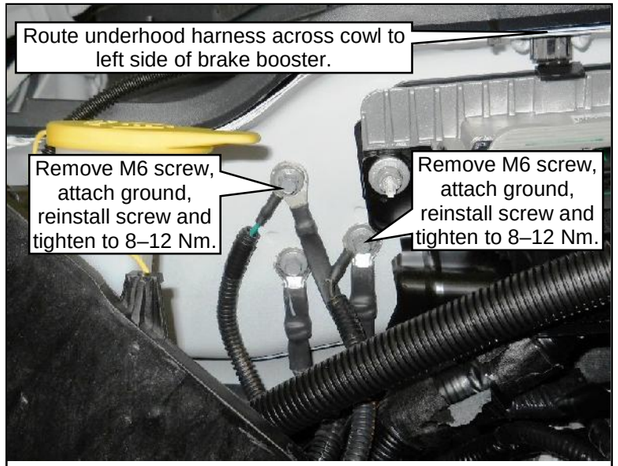


Figure 15.1

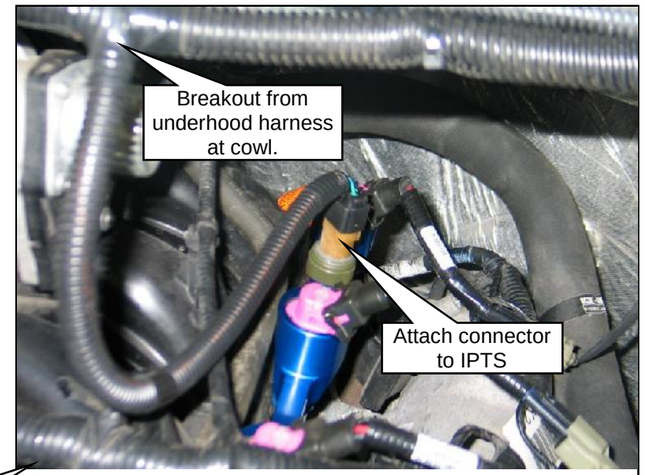
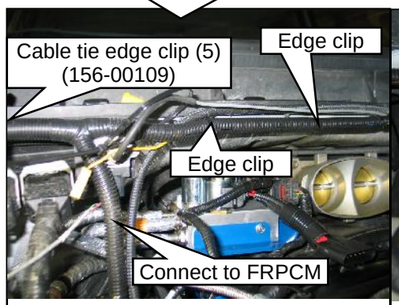


Figure 15.3



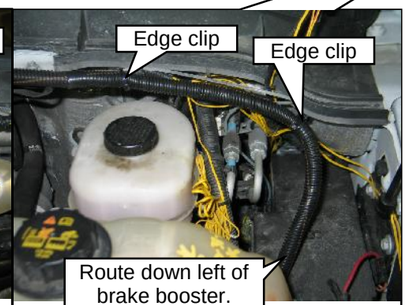


Figure 15.2

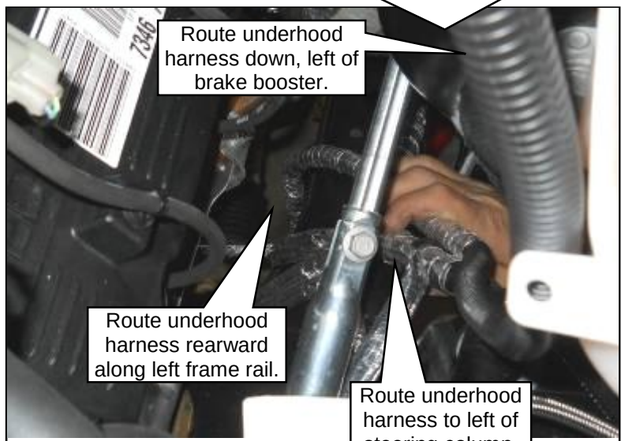


Figure 15.4

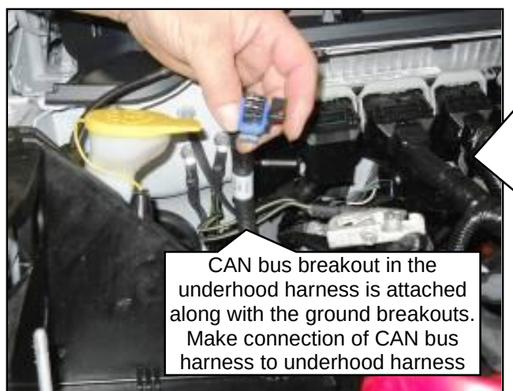


Figure 15.8

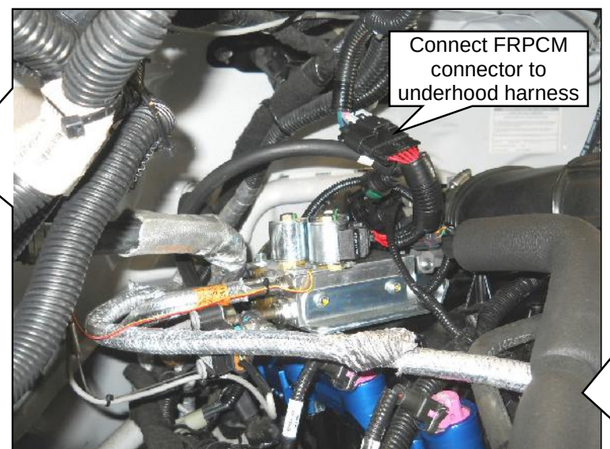


Figure 15.7

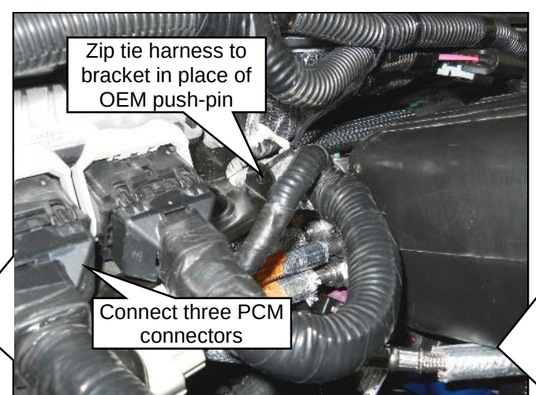


Figure 15.6

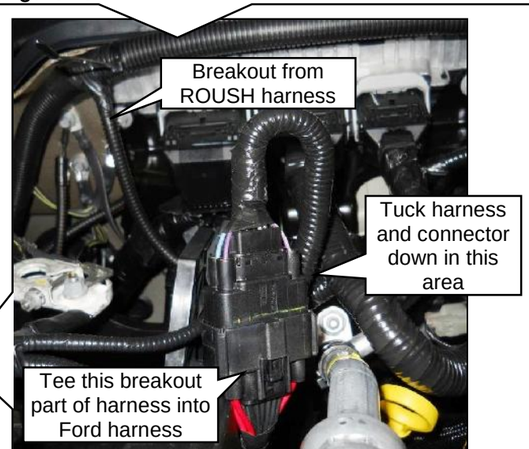


Figure 15.5

INSTALLING NEW REAR WIRING HARNESS

Note: Refer to pages **22**, **23** and **24** for Schematics and Wiring Harness and Connector Layouts.

1. Finish routing the bottom end of the underhood harness inside the left frame rail along the OEM vehicle harness toward the rear until the end terminates. **Figure 16.1**.
2. Connect the rear harness to the underhood harness and zip tie to the vehicle harness. **Figure 16.2**. Continue to route the rear frame harness along the OEM vehicle harness and lines to the rear. **Figure 16.2**.
3. Route the rear frame harness along the OEM harness from the end of the underhood harness along the left frame rail. Temporarily drape the harness along the routing so electrical connections can be made. **Note:** Do NOT secure the harness with zip ties until all electrical connections have been made and the harness is routed correctly. **Figures 16.2**, **16.3**, **16.4**, **16.5** and **16.6**.
4. Route the end of the rear frame harness (extension) between the vapor canister bracket and left frame rail and under the crossmember. The rear frame harness connections for the OEM EFPR and the new EFPR are made after the EFPR installation. **Figure 16.8**. Also refer to page **17** for EFPR installation. **Figures 17.1**–**17.4**.
5. Bundle the rear harness together after all connections have been made. Route the bundling as needed along the OEM vehicle harness to the rear and to itself as needed. Use zip ties to secure. **Note:** The three fuel tank connections are made after the tank is installed. **Figures 16.6** and **16.7**.
6. Route the tank connection breakout of the rear frame harness up to the rear of the tank area. Make these connections after the fuel tank is installed. **Figure 16.9**.

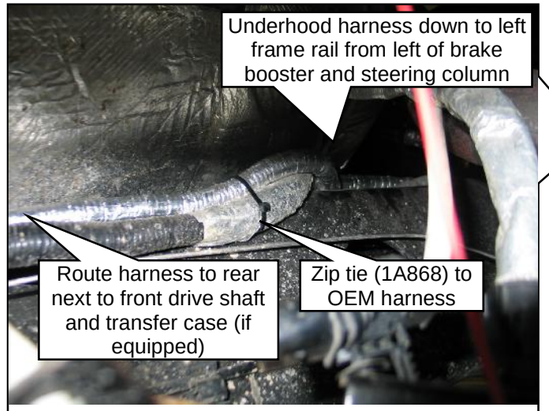


Figure 16.1

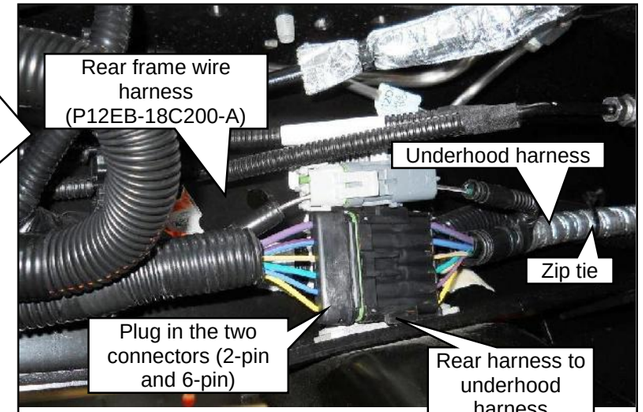


Figure 16.2

Front of vehicle

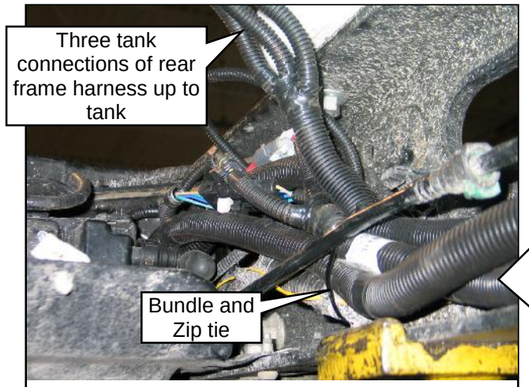


Figure 16.6

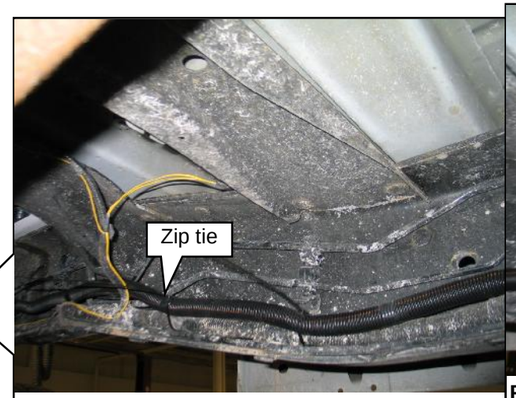


Figure 16.5

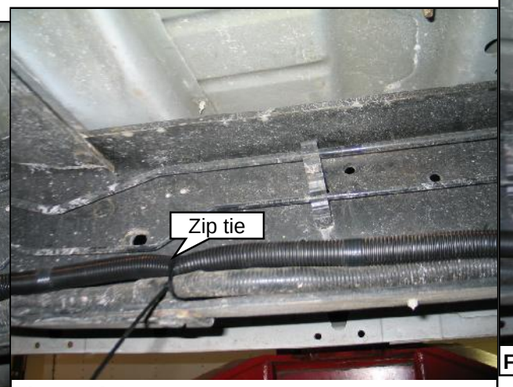


Figure 16.4

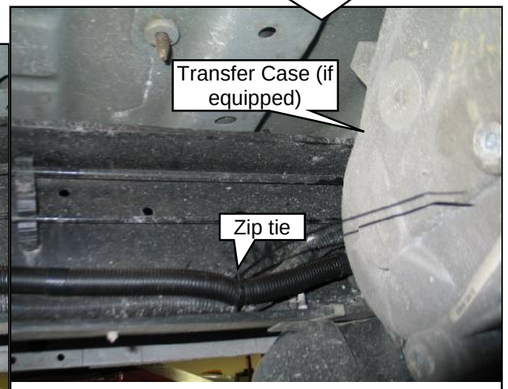


Figure 16.3

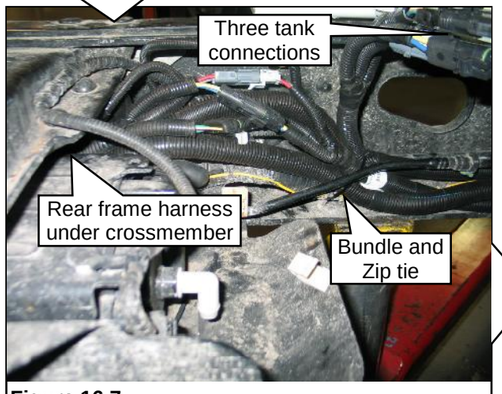


Figure 16.7

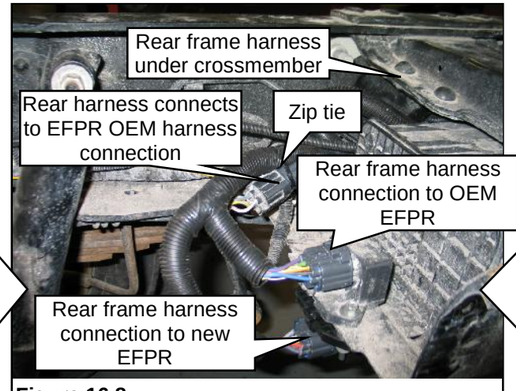


Figure 16.8

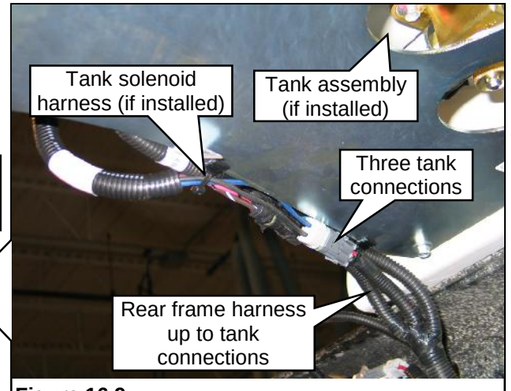


Figure 16.9

EFPR Location Originally Equipped with Aft-axle Gasoline Tank

Note: EFPR mounting shown here is specific to a vehicle originally equipped with an aft-axle gasoline tank. A vehicle originally equipped with a mid-ship gasoline tank requires the EFPR to be mounted in a location unique to the vehicle you have.

7. Disconnect the electrical connector from the OEM EFPR. **Figure 17.1**.
8. Position the EFPR drilling template to the outside of the vapor canister bracket as shown. Mark the two bolt hole locations, as well as the EFPR bracket locator hole and remove the template. **Figure 17.2**.
9. Drill the two marked bolt holes to 5/16” (8mm) and the EFPR locator marked hole to 1/4” (6 mm). **Figure 17.3**.
10. Install the new EFPR to inside of the vapor canister bracket and align with the locator tab and the two bolt holes. Install the two M8 bolts and nuts. Tighten to specification. The new EFPR and fasteners are supplied in hardware kit P12EB-ELECKIT-A. **Figure 17.4**.
11. Connect the rear frame harness ground lead and the fuel tank jumper harness ground lead to the left frame rail using an M6 x 1.0 x 16 bolt and nut. Use the slotted hole as shown in **Figure 17.5** or similar available hole in frame rail. Tighten the ground to 8–12 Nm. **Figure 17.6**. **Note:** To make sure a good connection to ground is made, remove the paint around the slotted hole and under the ground eyelet location. **Figure 17.5**. Ground bolt and nut are supplied with the kit.

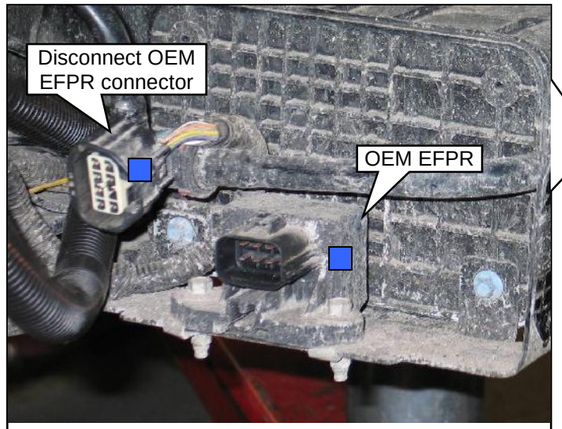


Figure 17.1 — OEM Aft-axle Tank Version

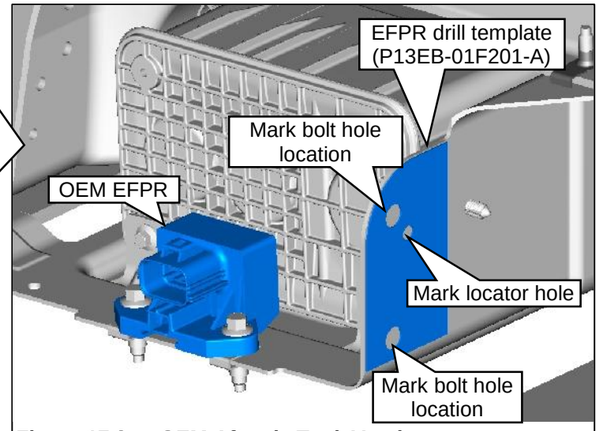


Figure 17.2 — OEM Aft-axle Tank Version

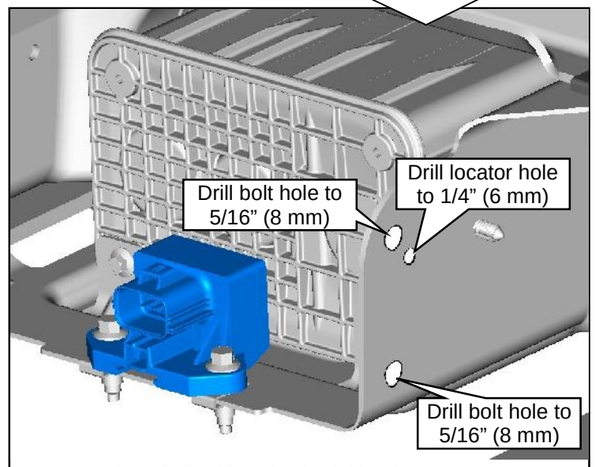


Figure 17.3 — OEM Aft-axle Tank Version

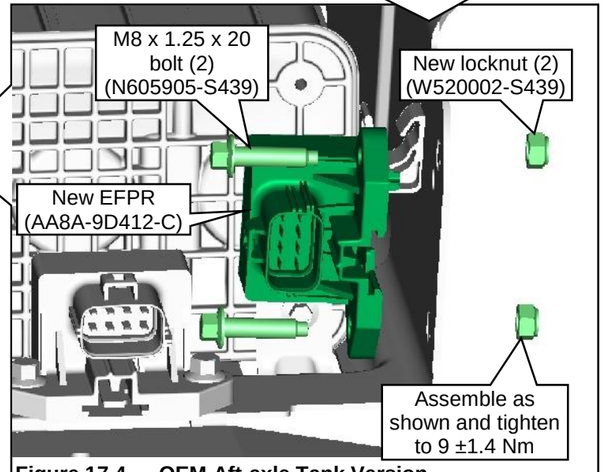


Figure 17.4 — OEM Aft-axle Tank Version

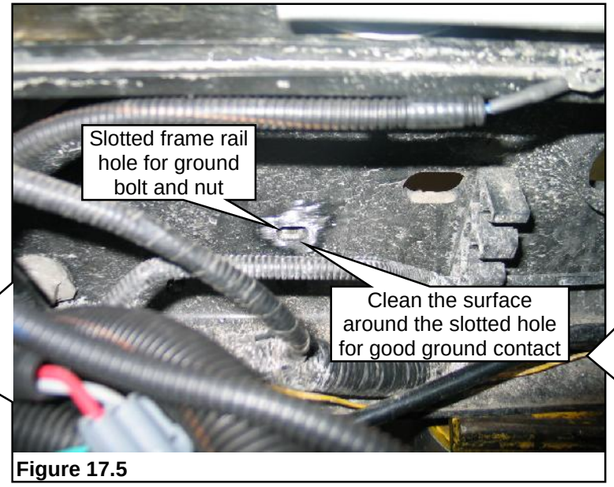


Figure 17.5

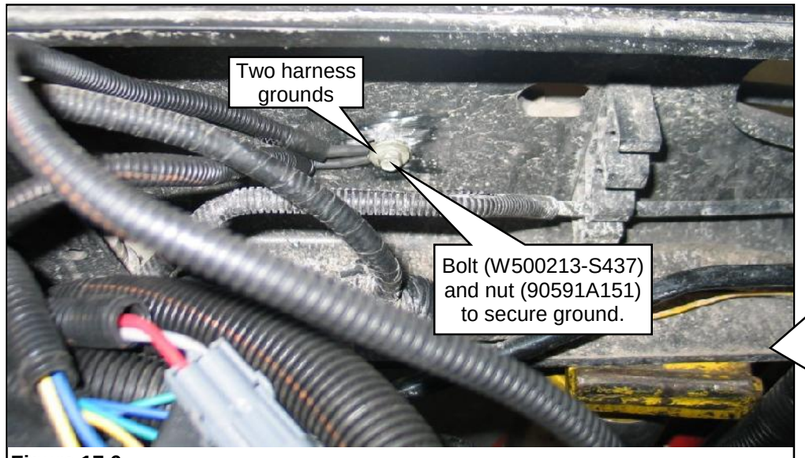


Figure 17.6

INSTALLING NEW FUEL FILL SYSTEM

1. Remove nut and washer from fuel fill valve and assemble valve to fuel fill bracket. Support fill valve and bracket assembly and tighten nut securely. **Figure 18.1**. These parts are in hardware kit P11GD-FILLKIT-A and P12EB-FILLKIT-A
2. If applicable, install fuel fill valve and fuel fill bracket behind factory fill area using three M5 x 16 mm bolts and washers. Tighten the bolts to 5–7 Nm. **Figures 18.2** and **18.3**.
3. If applicable, install the fuel fill line (P-10D121-C-1700) to the fuel fill valve. **Figure 18.4**. Route the line as necessary, secure the line using cable tie edge clips as needed and attach the line to the fuel filter and tighten to 53–61 Nm after the tank is installed. Refer to *Installing the New Fuel Tank (Aft Cab)* for more information.

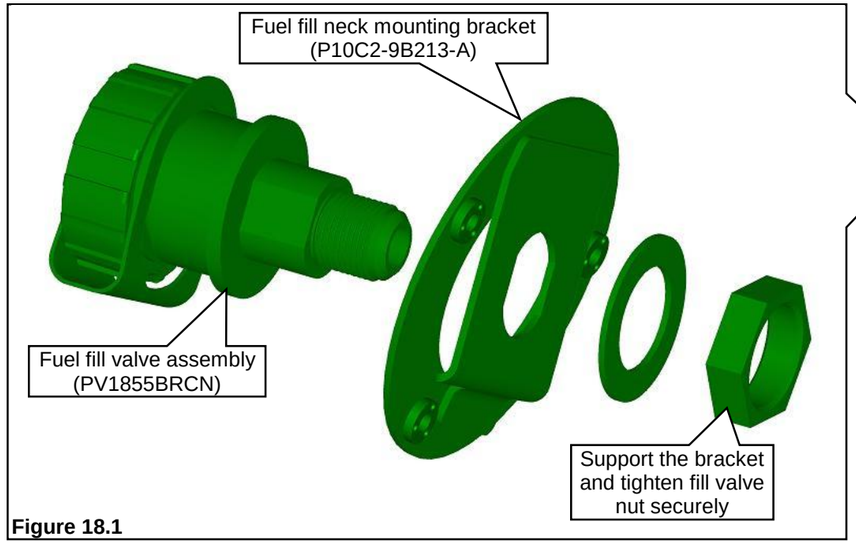


Figure 18.1

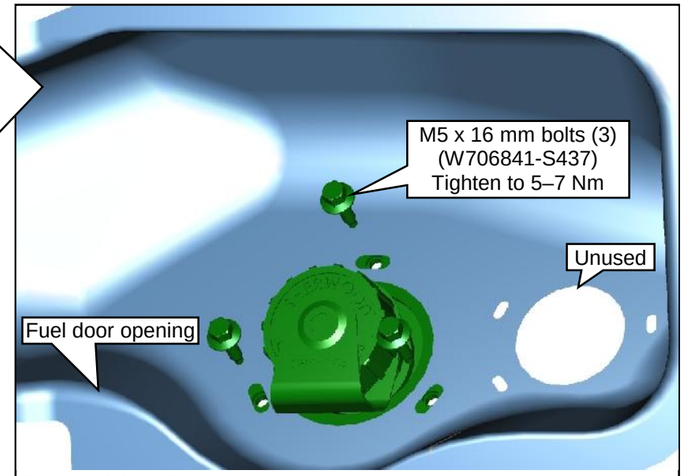


Figure 18.2 — Example Installation

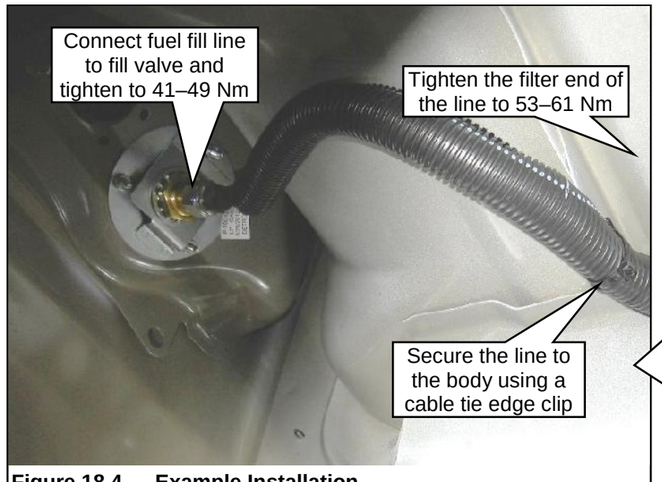


Figure 18.4 — Example Installation

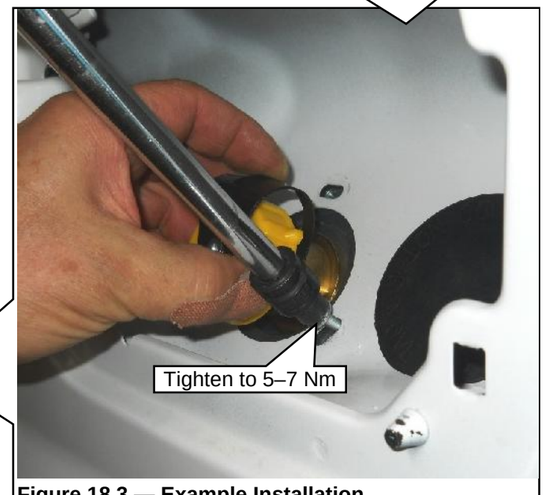


Figure 18.3 — Example Installation

PLUGGING VAPOR CANISTER PORT AND SEALING FTPT CONNECTOR

1. Preassemble quick-connect fitting and vacuum cap found in hardware kit P12EB-VAPOR-A. **Figure 19.1**.
2. Install assembly onto vapor canister top front port or upper rear port. **Figures 19.2** and **19.3**. **Note:** OEM gasoline tanks can be either aft-axle or mid-ship configurations. The vapor canister location differs based on which OEM gasoline tank the vehicle had. Both versions require the installation of the quick-connect fitting with vacuum cap.
3. The rear frame harness includes a connector lead for a fuel temperature pressure transducer (FTPT). This lead is not used on F-450/F-550 Liquid Propane Autogas vehicles and requires connector end be sealed and secured. **Figure 19.4**.
   - Pack connector terminals with Ford dielectric grease, or equivalent.
   - Seal open end of connector with electrical tape.
   - Use zip ties to secure rear wiring harness and FTPT connector to Ford vehicle harness.

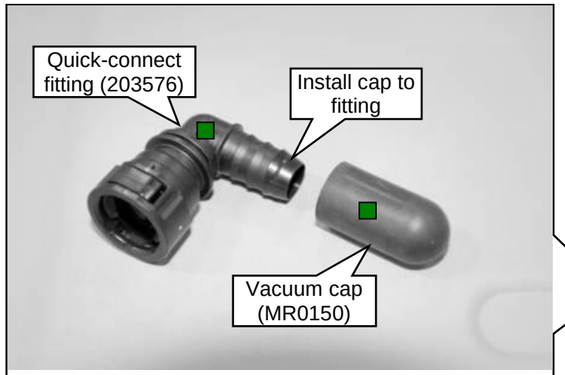


Figure 19.1

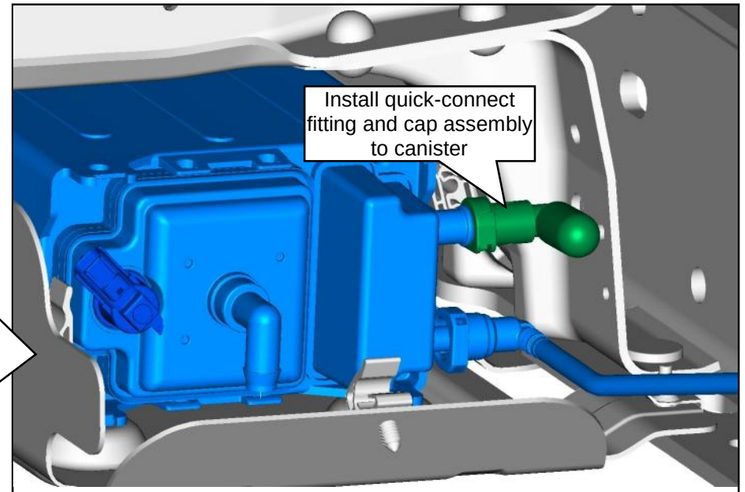


Figure 19.2 — OEM Aft-axle Tank Vapor Canister Location

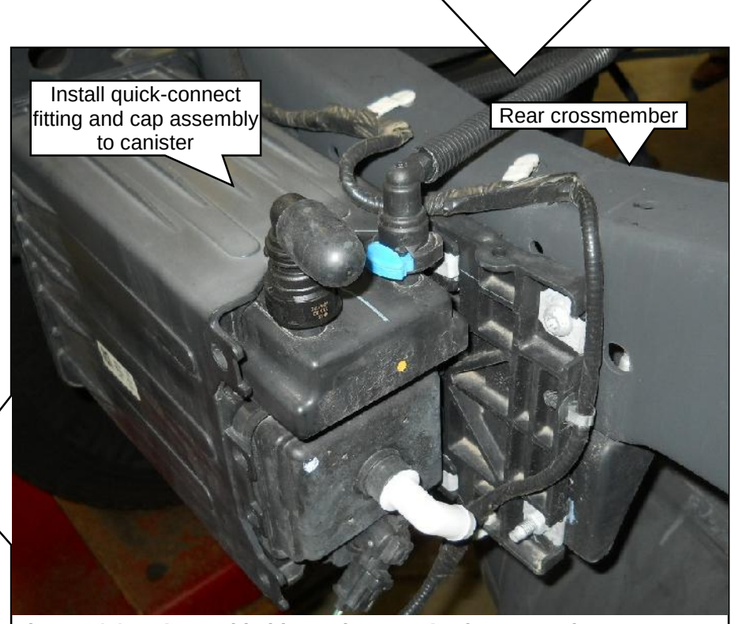


Figure 19.3 — OEM Mid-ship Tank Vapor Canister Location

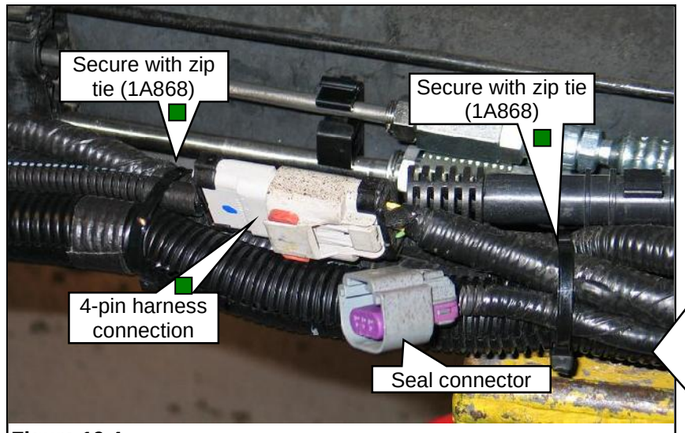


Figure 19.4

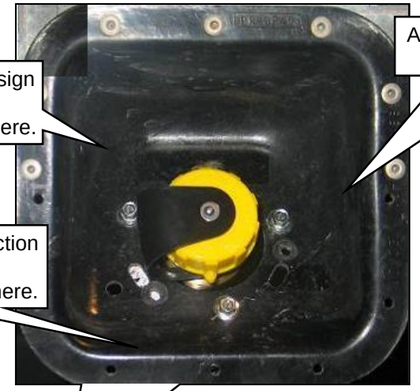
INSTALLING BADGES AND LABELS AND COMPLETING THE KIT INSTALLATION

ROUSH VECI Decal returned with PCM

Note: This label is vehicle-specific and is required by law to be applied to the vehicle to which it is assigned.

ROUSH	VEHICLE EMISSIONS CONTROL INFORMATION SUPPLEMENTAL LABEL 1 OF 2
Authorized to convert the following Ford Motor Co. Vehicles 2012 F-450/550/650 Incomplete & Stripped Chassis	
Engine MY: 2011	OEM Gasoline Test Group: BFMXE06.8BW5
This vehicle/engine is equipped with a Roush clean alternative fuel conversion system that allows it to operate on dedicated LPG fuel.	
Conversion Information: Model Year: 2012	Test Group: CRIIE06.8BW5
CA Standards: N/A OBD: N/R	EVAP: CRIIF0265LPG
FOR USE ONLY IN HDV WITH GVWR ABOVE 14,000 lbs.	
This conversion is manufactured and installed consistent with the principles of good engineering judgment and all EPA Regulations.	
Roush Industries, Inc. 12445 Levan Road Livonia, MI 48150 1-800-59-ROUSH	TWC/HO2S/AFS/SFI This clean alternative fuel conversion has been certified to meet EPA Emissions Standards. ▽P12EB-01D049-**AA**

PCM Tamper Label (R07100008-10-A)

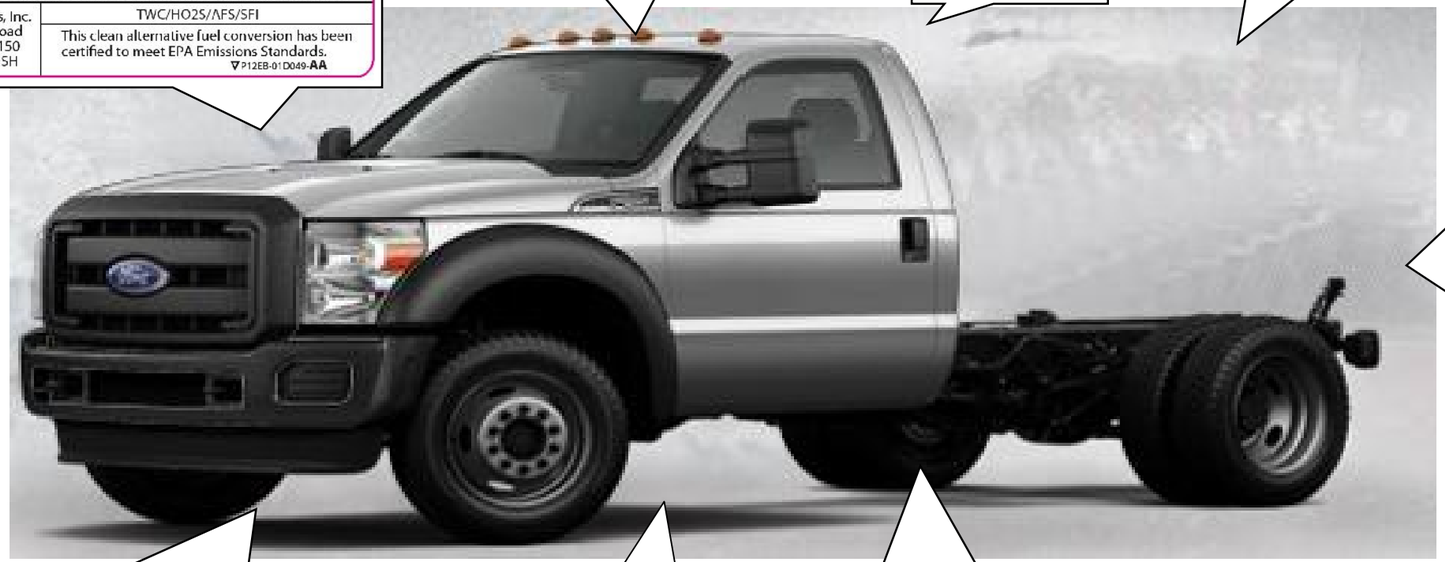


Apply propane fuel only label (P07L3-9A095-A) here.

Apply 350 psig design pressure label (P07L3-9A095-I) here.

Apply overflow protection device label (P11BB-01C200-B) here.

Hang Tag Label (P11BB-01A020-A)



Diamond Propane Reflective (D85)

Badges and Labels

1. Clean and dry all surfaces before applying new self-adhesive badges and labels. All labels are found in hardware kit P13EB-LABELS-A.
2. Apply labels in locations shown.
3. Apply the ROUSH CleanTech VECI label to the location specified in the supplemental instructions included with the returned PCM. **Note:** These labels are vehicle-specific and are required by law to be applied to the vehicle to which they are assigned. Use the labels included with the PCM when returned to you by ROUSH CleanTech.

ROUSH CleanTech Logo Dome Badge (P-01G100-A)

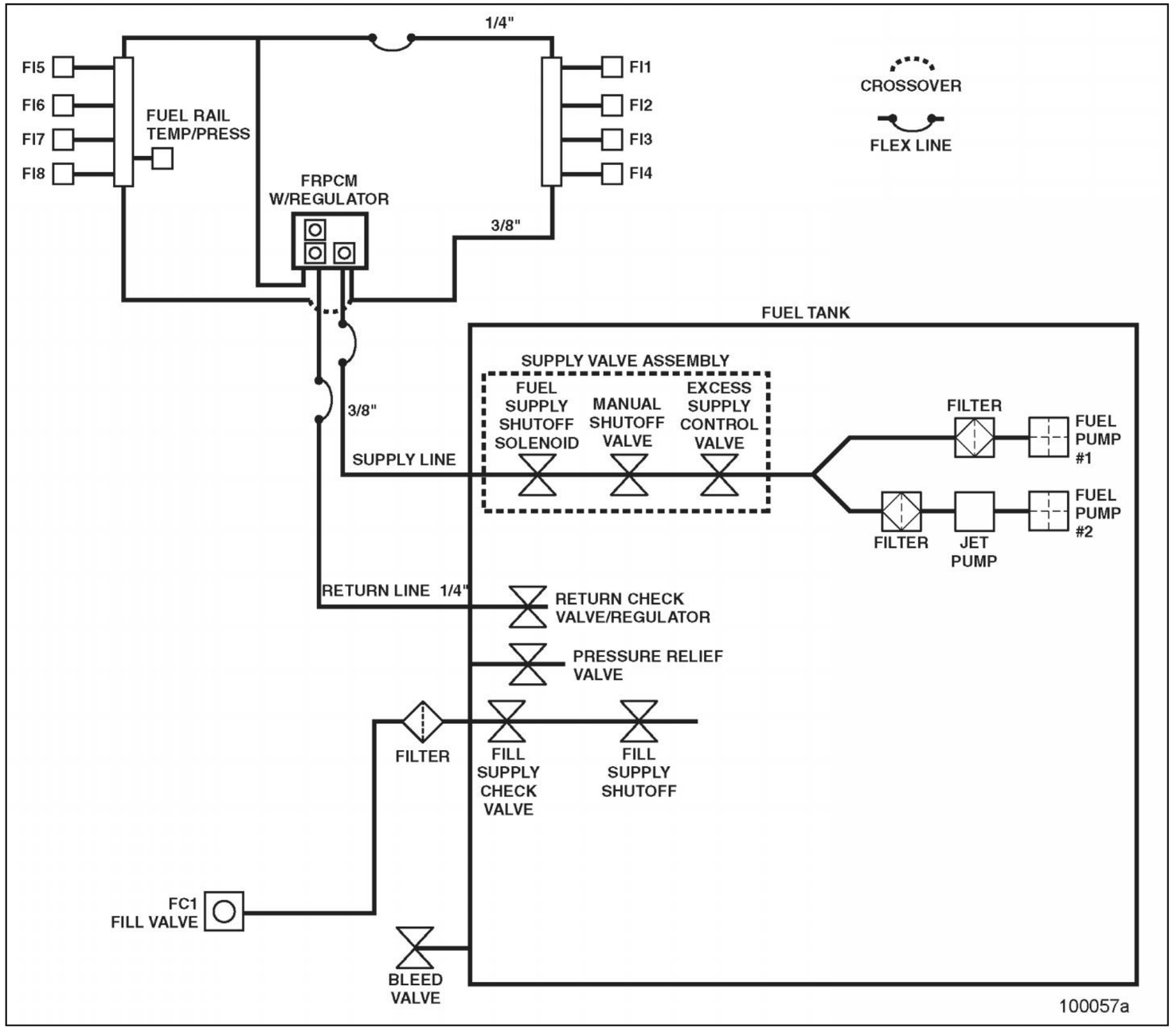
PCM Tamper Warning Label (R07100008-10-A) on knee bolster above OBDII diagnostic port

Bleeder Valve Inspection Label (P07L3-9A095-C) to end of driver door

Completing the Kit Installation

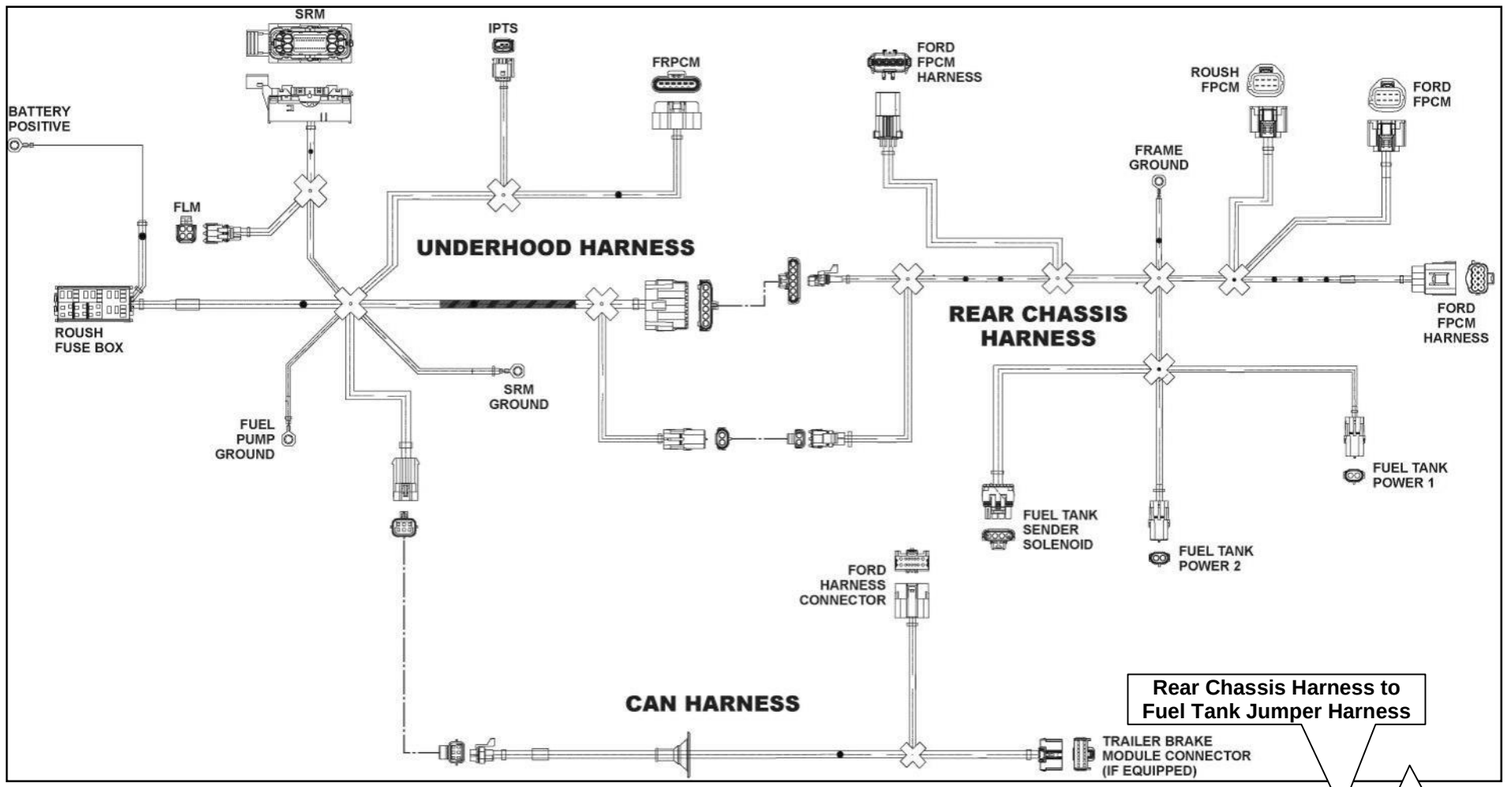
1. If not done, install reprogrammed PCM following procedure in the *Ford Workshop Manual, Section 303-14, Electronic Engine Controls*.
2. Install vehicle battery and connect positive and negative terminals. Tighten to 8–12 Nm.
3. Perform system leak check following established ROUSH CleanTech procedure.
4. Install air induction system.
5. Connect MAF sensor.

SCHEMATIC — ROUSH FUEL SYSTEM (TYPICAL)



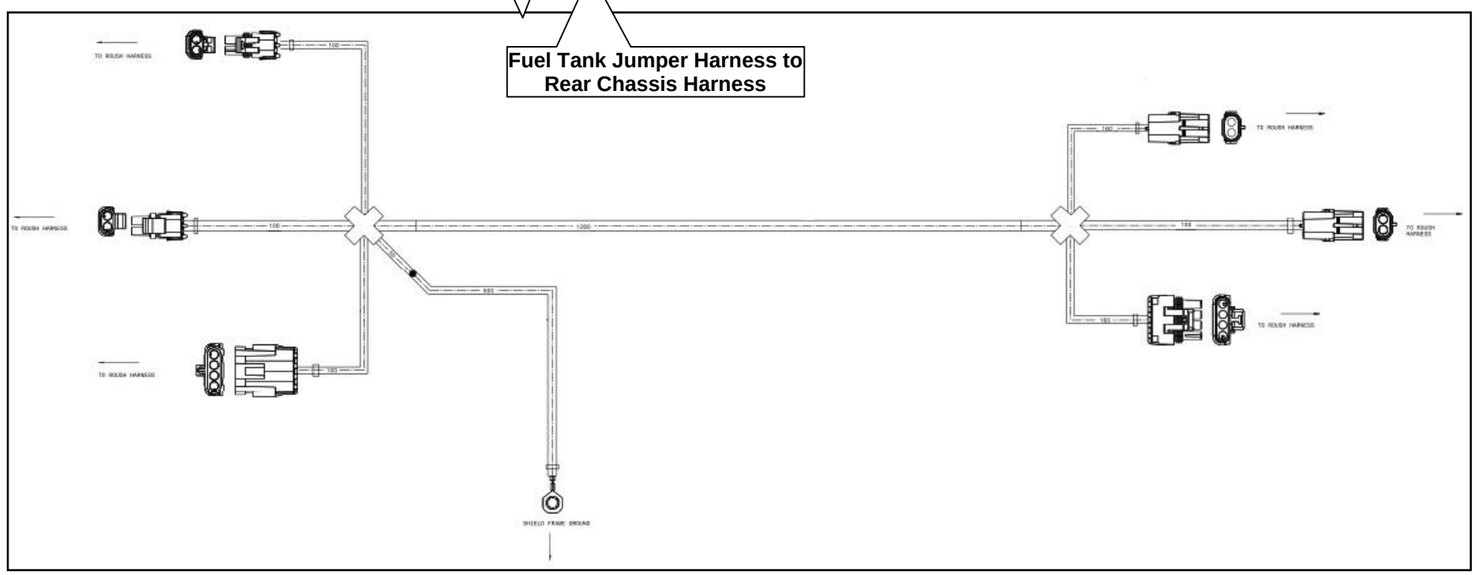
SCHEMATIC — ROUSH WIRING HARNESS (F-450/F-550 TYPICAL)

Note: This wiring harness print does not include the attachment locations for the ROUSH CleanTech tank jumper harness to the rear chassis harness.

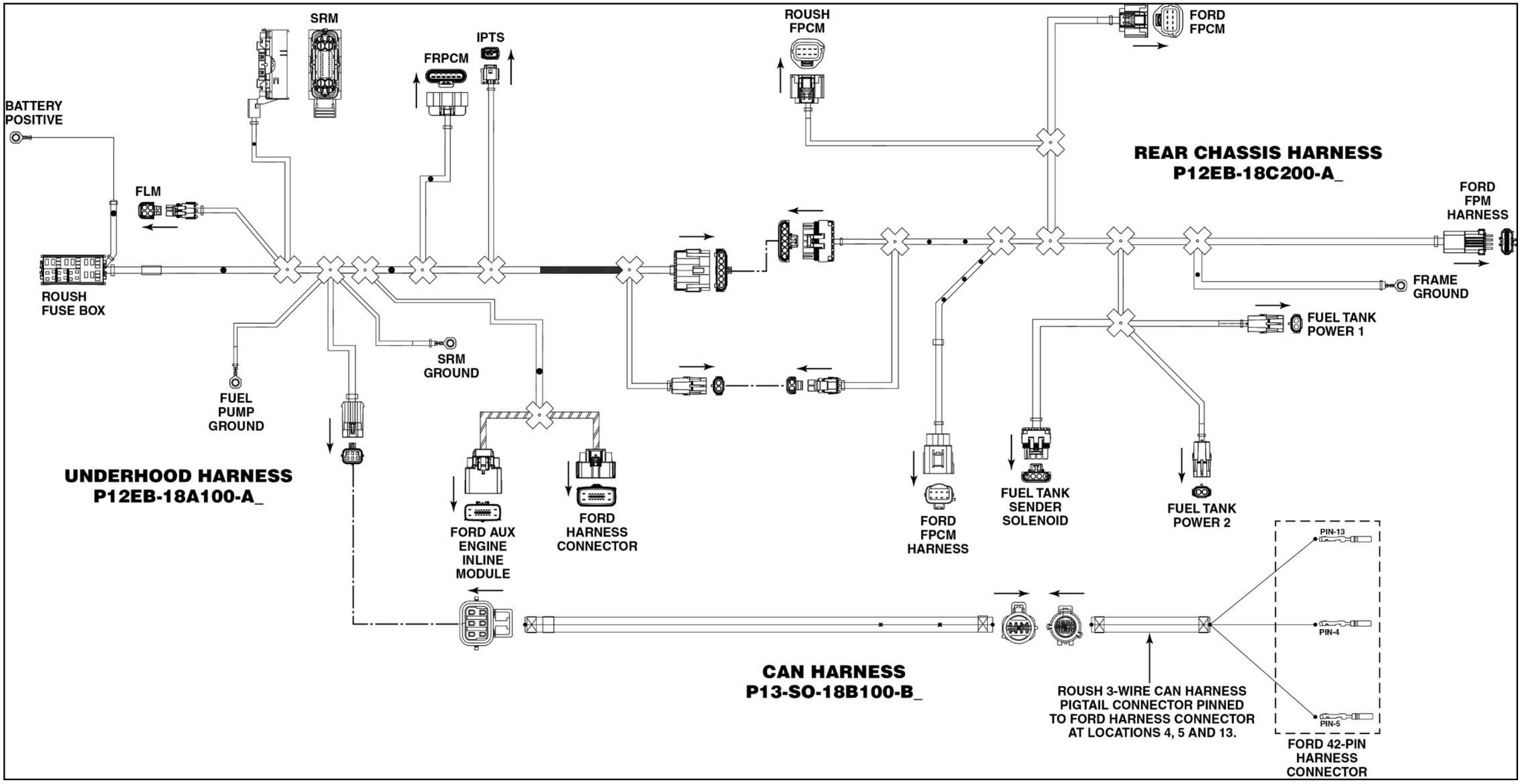


Rear Chassis Harness to Fuel Tank Jumper Harness

Fuel Tank Jumper Harness to Rear Chassis Harness



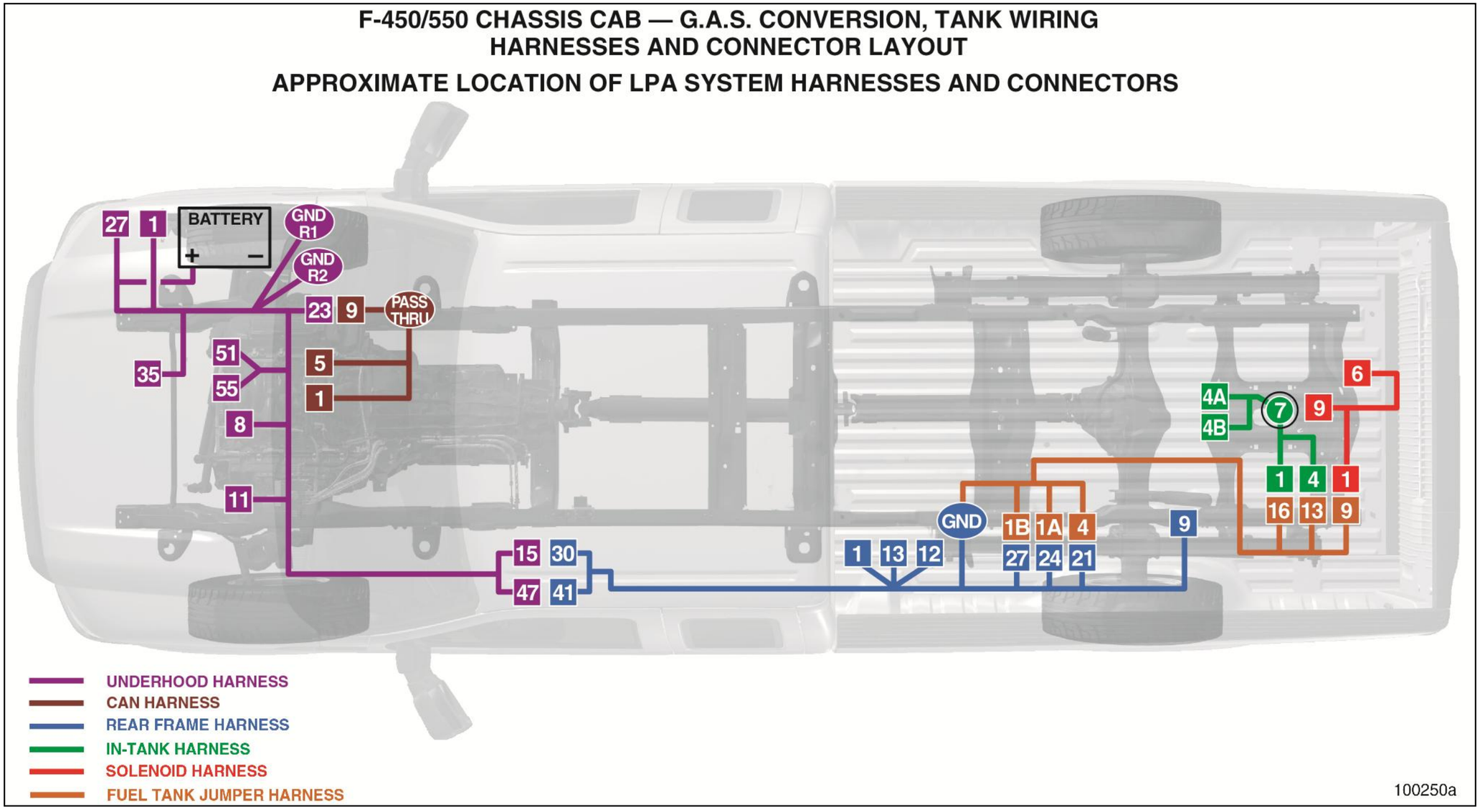
SCHEMATIC — ROUSH WIRING HARNESS (F-53/F-59)



WIRING HARNESS CONNECTOR LAYOUT — F-450/F-550 CHASSIS CAB G.A.S. CONVERSION

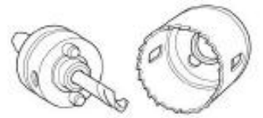
F-450/550 CHASSIS CAB — G.A.S. CONVERSION, TANK WIRING HARNESSES AND CONNECTOR LAYOUT

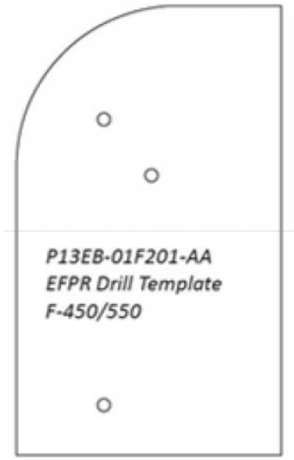
APPROXIMATE LOCATION OF LPA SYSTEM HARNESSES AND CONNECTORS



100250a

SPECIAL TOOLS

								
Touch-Up Paint	**Liquid Leak Detector**	**Premium Aerosol Undercoating**	**Torque Wrenches (to 22 Nm and to 200 Nm)**	**A/C Manifold Gauge Kit**	**Gloves (Approved for Propane)**	**Scan Tool**	**Jiffy-Tite Disconnect Tool (1/4” and 3/8”)**	**Hole Saw — 29 mm**

						
Vacuum Gauge	**Vacuum Pump**	**Dielectric Grease**	**Stepless Ear Clamp Pliers**	**Drill Bits — 1/8” and 1/2”**	**EFPR Template**	**Tubing Cutter**