# Ford F-250/F-350 Pickups
# Liquid Propane Autogas Fuel System — In-Bed Extended Range Tank

| Revision History | | |
|---|---|---|
| -CA | Initial Release | 5/2013 |
| | | |

# 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. 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. **Figure 1.1**. Remove the two nuts and position the PCM wiring harness connectors aside. Keep all fasteners for reuse.
4. 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 1.2**, **1.3** and **1.4**. Disconnect the battery terminals.

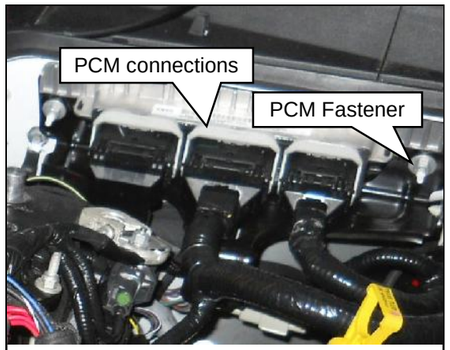


**Figure 1.1**

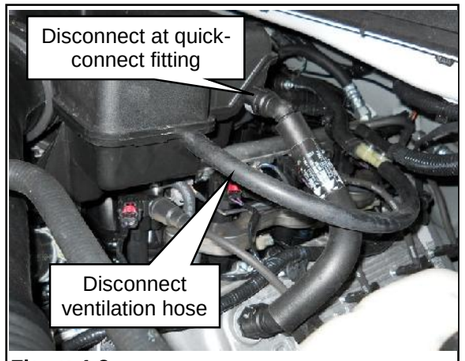
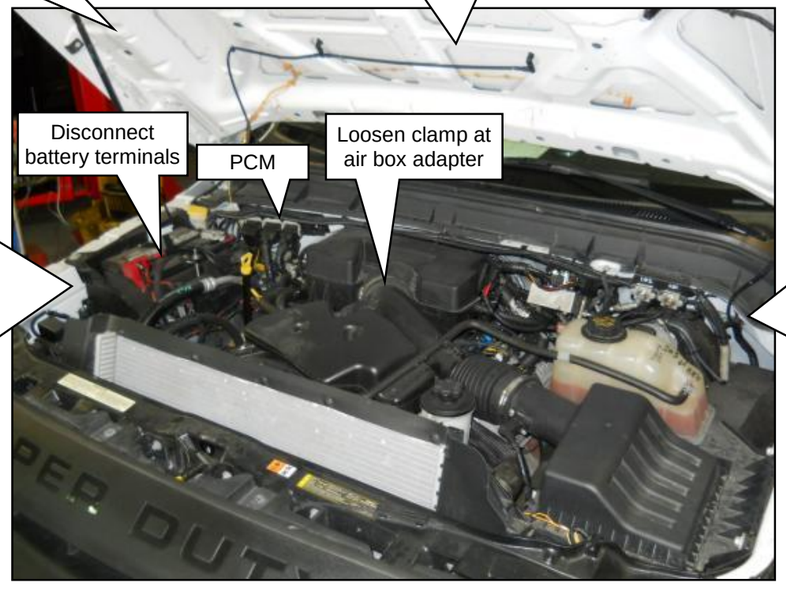


**Figure 1.2**



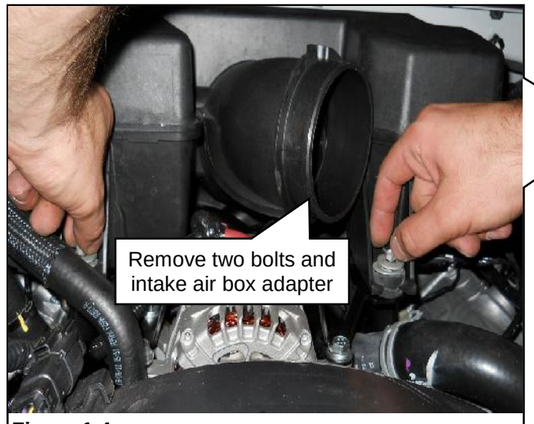



**Figure 1.4**

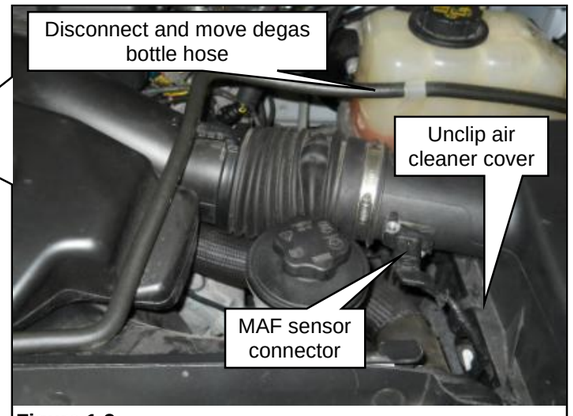


**Figure 1.3**

## 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 (P10C2-9A095-E). 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 can be found 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 who are authorized to perform on-site PCM flashing should consult the appropriate training materials for proper VECI label selection and disposition. Failure to properly follow the training guidelines could result in non-conformance to federal and local regulations.

## PREPARING ENGINE COMPARTMENT

1. Disconnect and remove the positive crankcase ventilation (PCV) tube to gain clearance. **Figure 2.1**.
2. Disconnect the OEM fuel line from the left side fuel rail and move out of the way. **Figure 2.2**.
3. Disconnect the electrical connectors from the ignition coils and remove the plug wires. **Note:** Make sure to label the coil connectors and plug wires to correctly connect them during installation. **Figure 2.2**.
4. Remove the battery from the vehicle. Dislodge the battery tray for underhood harness installation. **Figures 2.3** and **2.4**. **Note:** The right side hood support must be disconnected from the inner fender to move the battery tray. Support the hood before disconnecting the hood support, or remove hood if necessary. Refer to the *Ford Workshop Manual 414-01 Battery, Mounting and Cables* and also *501-02 Front End Body Panels*.

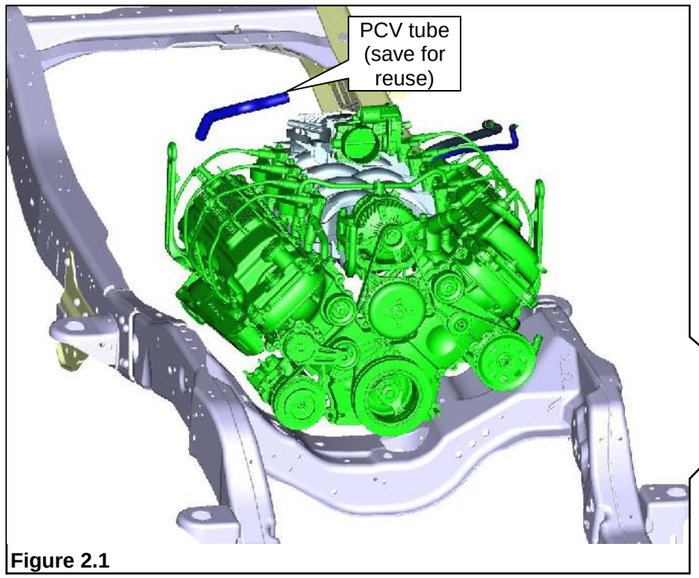


Figure 2.1

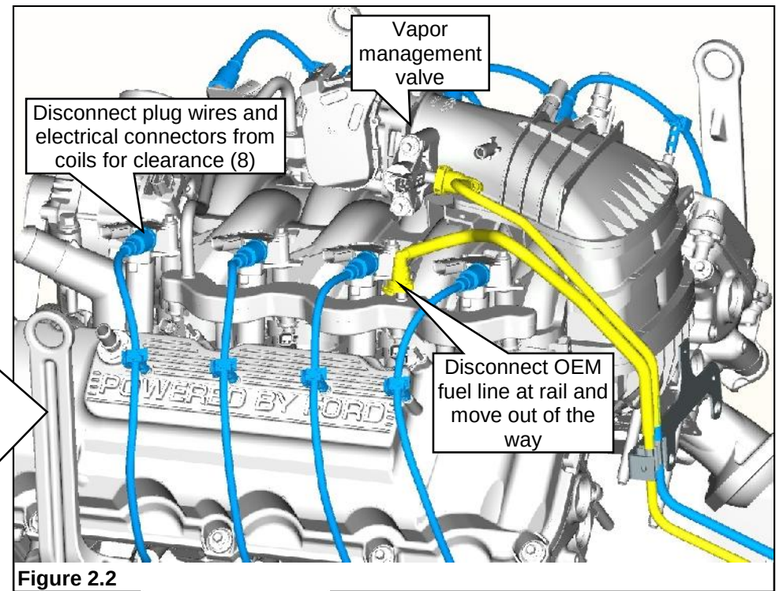


Figure 2.2

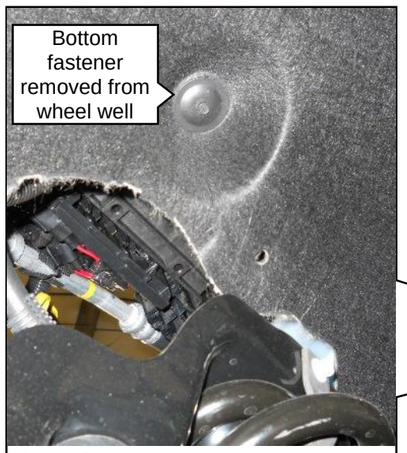


Figure 2.4

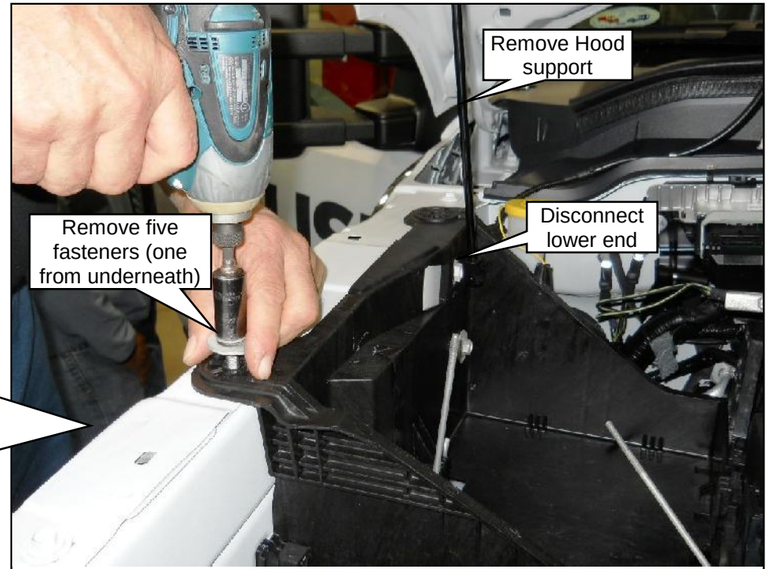


Figure 2.3

## INSTALLING NEW FUEL RAILS

1. Disconnect the wiring harness connectors from the fuel injectors.
2. Remove the four mounting bolts, the two fuel rails and eight fuel injectors as an assembly from the engine. Save the four fuel rail mounting bolts for reuse. **Figure 3.1**.

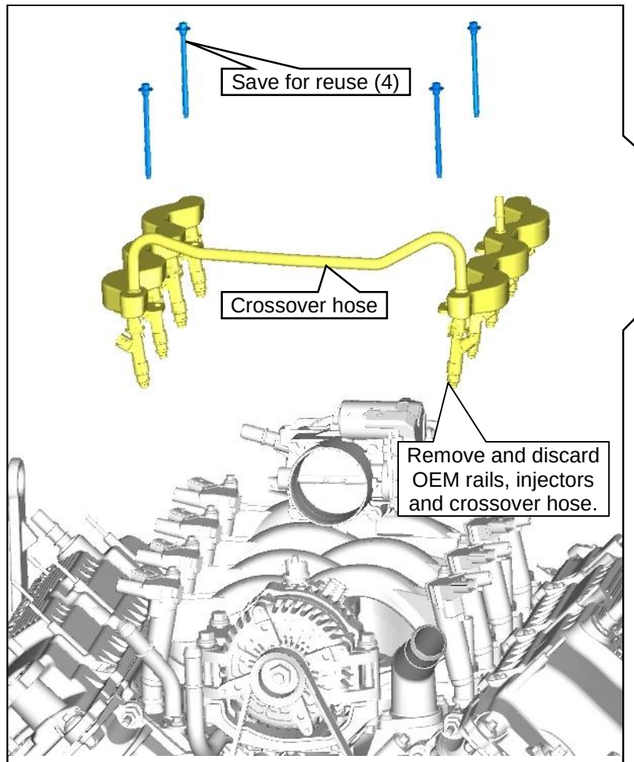


**Figure 3.1**

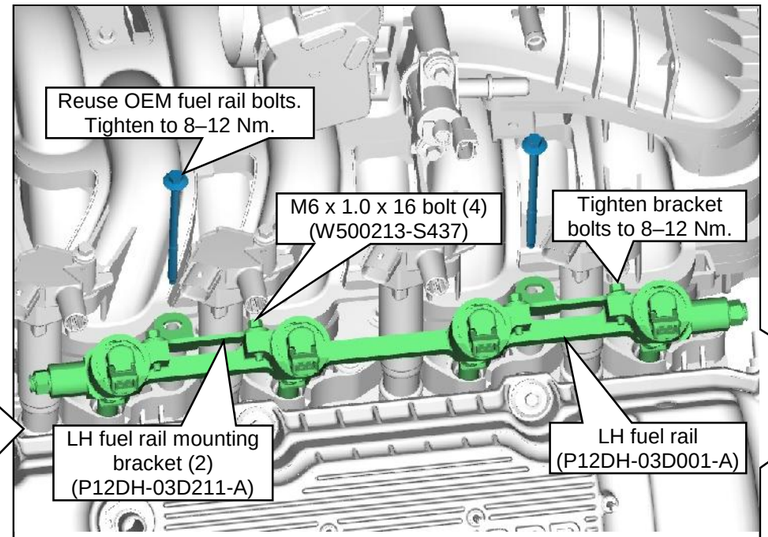


**Figure 3.2**

3. Using engine oil (Motorcraft SAE 5W-20 or equivalent), lubricate the lower O-rings on the injector nozzles before seating the fuel rail assemblies into the intake manifold injector bores.
4. Attach the two LH fuel rail mounting brackets to the fuel rail using four M6 x 1.0 x 16 bolts found in P12DH-ENGKIT-A. Tighten to specification. **Figure 3.2**.
5. Install the LH fuel rail assembly on the driver side of the intake manifold. Fully seat the nozzles in the injector bores. Reuse two OEM fuel rail bolts to secure the fuel rail. Install bolts by hand to avoid cross-threading. Tighten to specification. **Figure 3.2**.
6. Repeat Step 4–5 to install the RH fuel rail assembly on the passenger side of the intake manifold. **Figure 3.3**.

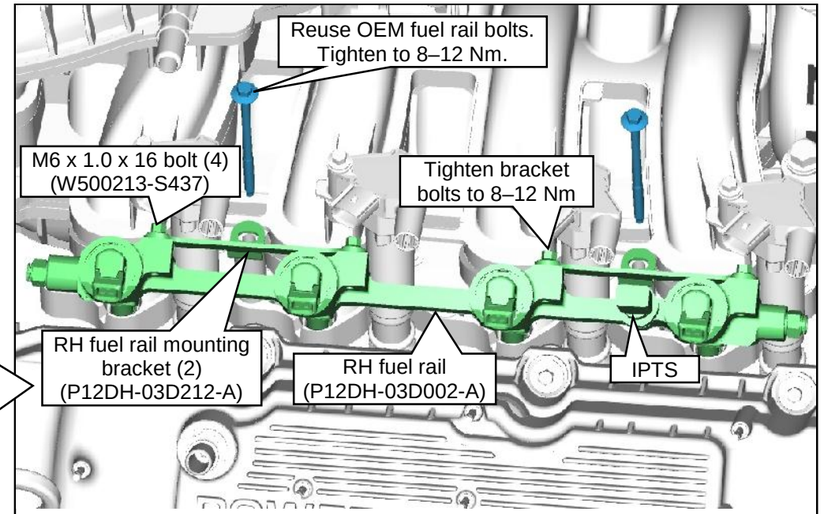


**Figure 3.3**

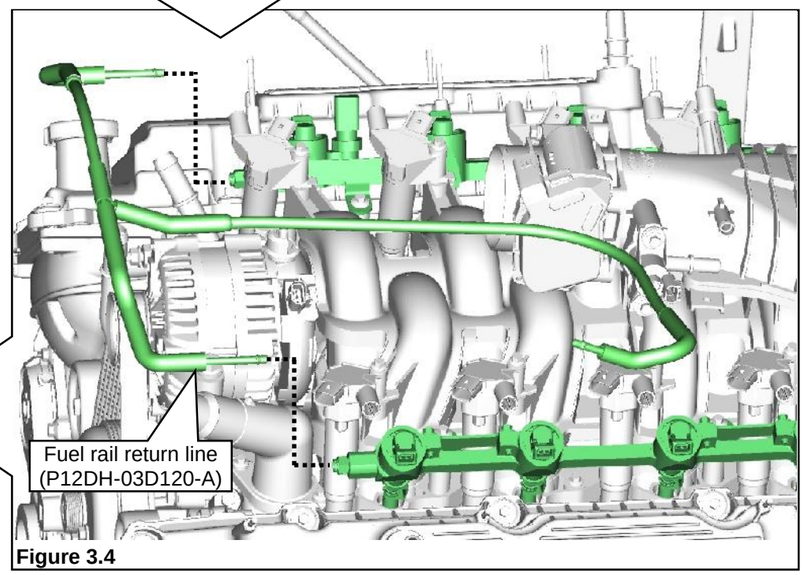


**Figure 3.4**

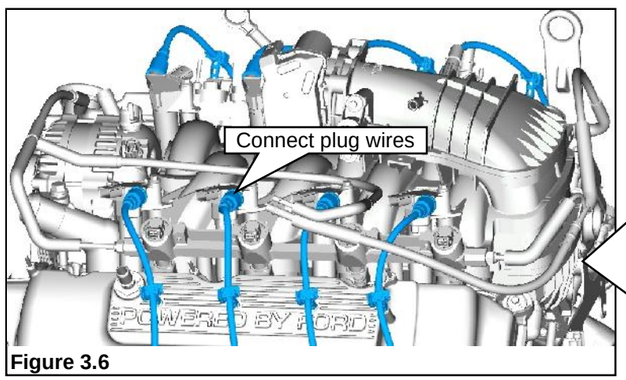


**Figure 3.6**

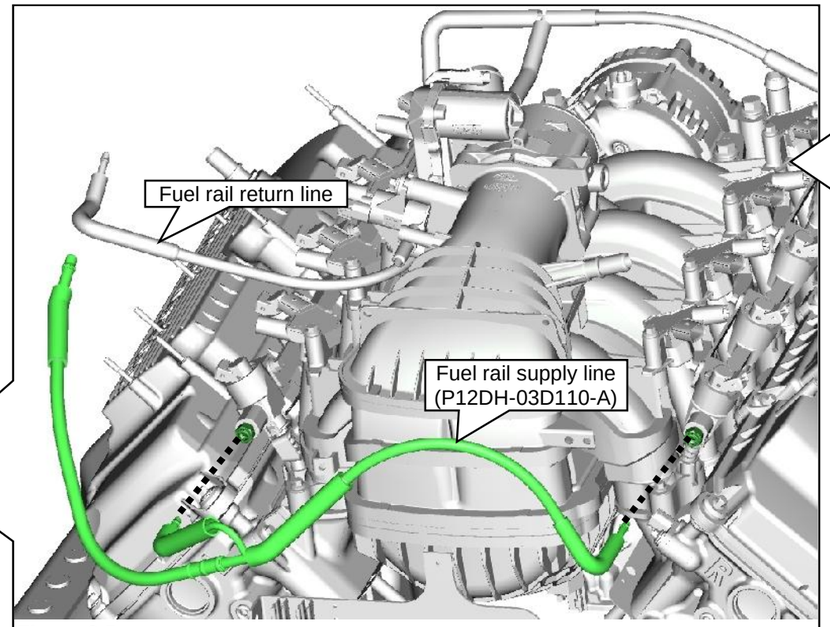


**Figure 3.5**

7. Orient and install the fuel rail return line onto the forward end of the fuel rails. Push the line ends into the quick-connect fitting on each rail until secure. Pull on the line ends to make sure they are correctly engaged with the fittings. **Note:** The unconnected end of the fuel rail return line is connected after the FRPCM is installed. **Figure 3.4**.
8. Orient and install the fuel rail supply line onto the rearward end of the fuel rails. Push the line ends into the quick-connect fitting on each rail until secure. Pull on the line ends to make sure they are correctly engaged with the fittings. **Note:** The unconnected end of the fuel rail supply line is connected after the FRPCM is installed. **Figure 3.5**.
9. Connect the electrical connectors to the ignition coils and install the plug wires. **Note:** Make sure the coil connectors and plug wires are correctly connected. **Figure 3.6**.

# INSTALLING FUEL RAIL PRESSURE CONTROL MODULE BRACKET

1. Attach the small FRPCM mounting bracket to the cowl area (two studs) above the engine using two M6 x 1 nuts. Leave the nuts loose at this time. **Important:** There **MUST NOT** be any material between the bracket and cowl sheet metal where the OEM studs are located. If equipped with heat shield material, remove a minimum of 1/2” of material from behind the small FRPCM bracket where the fasteners are installed before installing the bracket and nuts. These parts are supplied in hardware kit P12DH-ENGKIT-A. **Figure 4.1**.
2. Attach the large FRPCM mounting bracket to the small bracket and to the cowl area stud using one M6 x 1 nut and one M8 bolt. Adjust the brackets as needed for installation. Tighten the three nuts to 8–12 Nm and the bolt to 18–21 Nm. **Figure 4.2**.
3. Connect one fuel injector jumper to each original injector harness connector and to the new injector (8 locations). These jumper harnesses are supplied in hardware kit P12DH-ELECKIT-A. Make sure that each jumper is attached to the correct injector connector to avoid cross wiring. **Figure 4.3**.

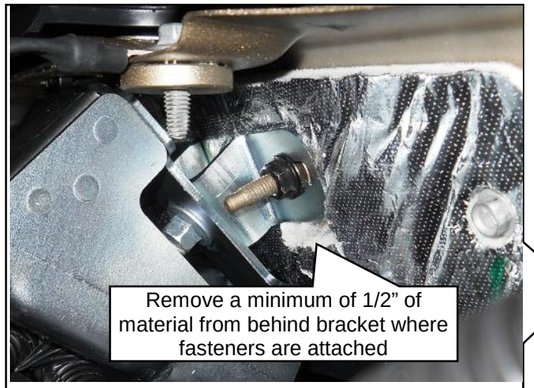



**Figure 4.1**

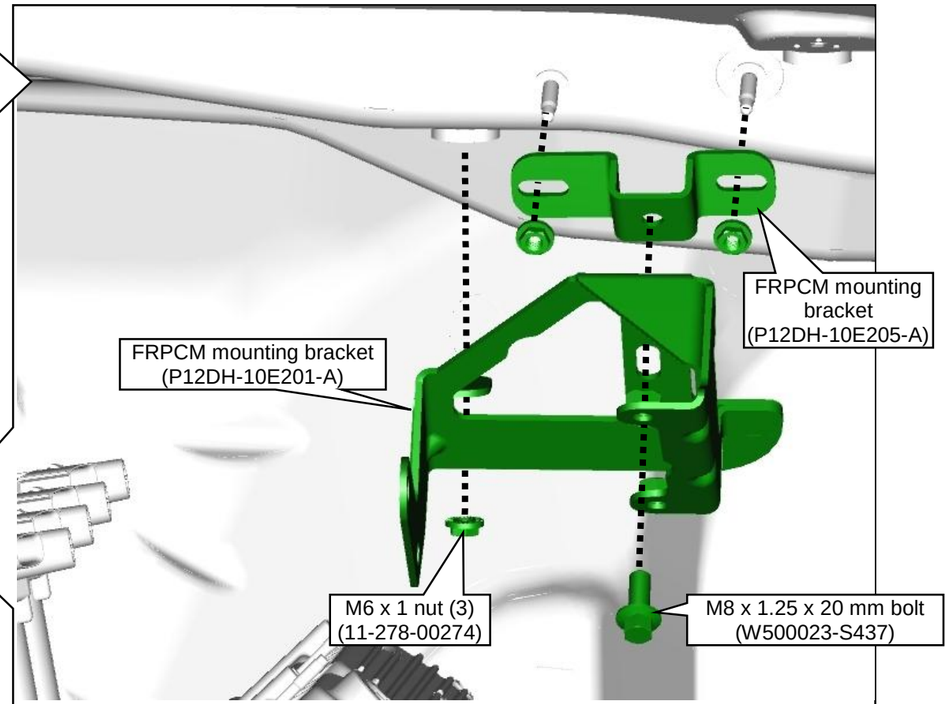
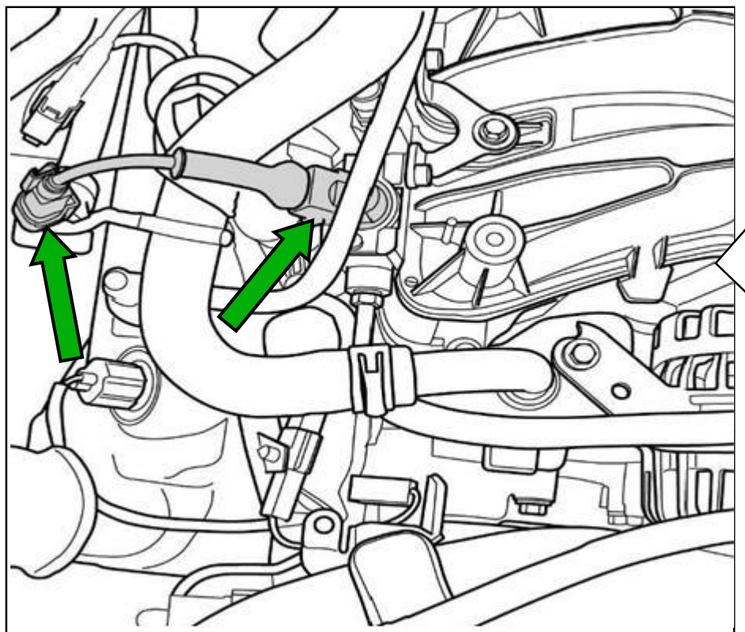



**Figure 4.2**



Fuel injector jumper (P07L3-9C978-A). Install between each injector and engine injector harness.

**Figure 4.3**

# INSTALLING SMART RELAY MODULE AND AUXILLIARY FUSE BOX BRACKET

**Note:** All parts for installing the smart relay module (SRM) and the auxiliary fuse box bracket are supplied in hardware kit P12DH-ELECKIT-A.

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 5.1**.
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 5.2**.
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 5.3**.
4. Install one M6 bolt at the bottom front of the bracket. Tighten the bottom front bolt to specification. **Figure 5.3**.
5. Attach the fuse box bracket to the SRM bracket and secure with one M6 bolt and one M6 nut. Place the bolt behind the SRM bracket and with the nut visible on the inside. **Figure 5.4**.
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. **Figure 5.5**.

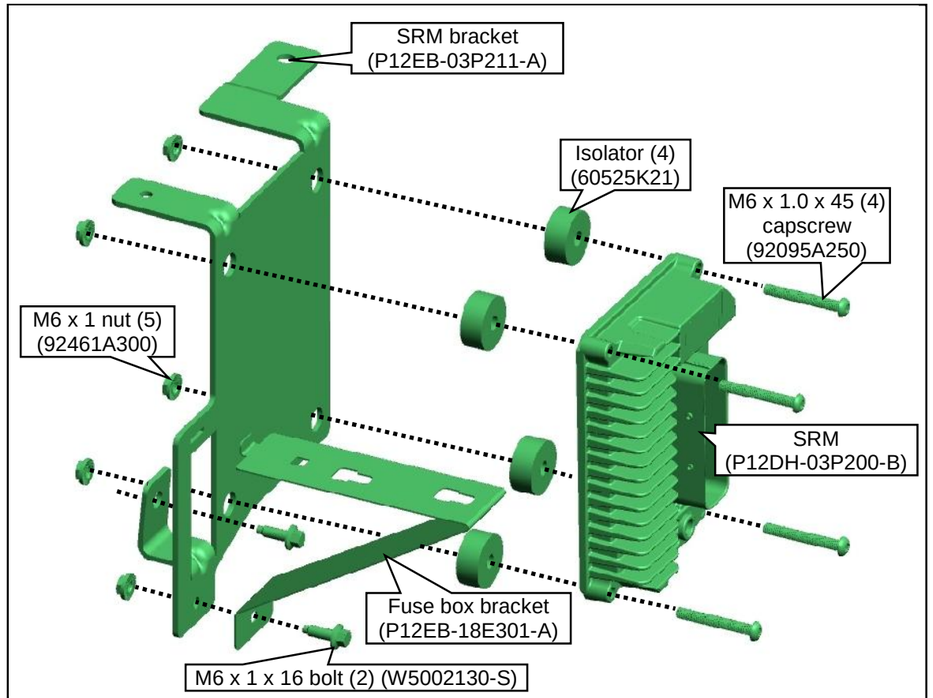


**Figure 5.1**

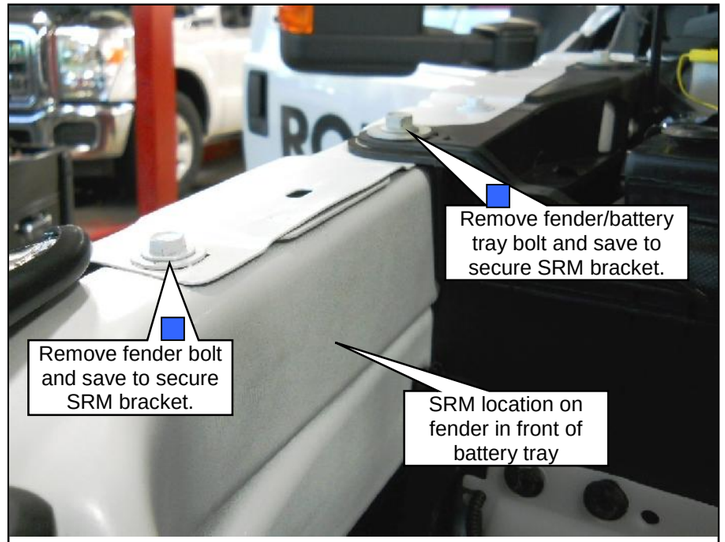


**Figure 5.2**

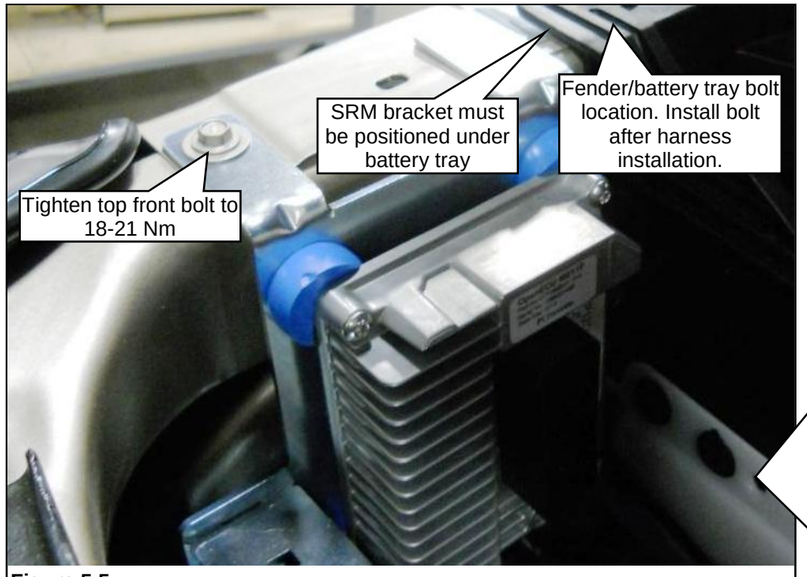


**Figure 5.5**

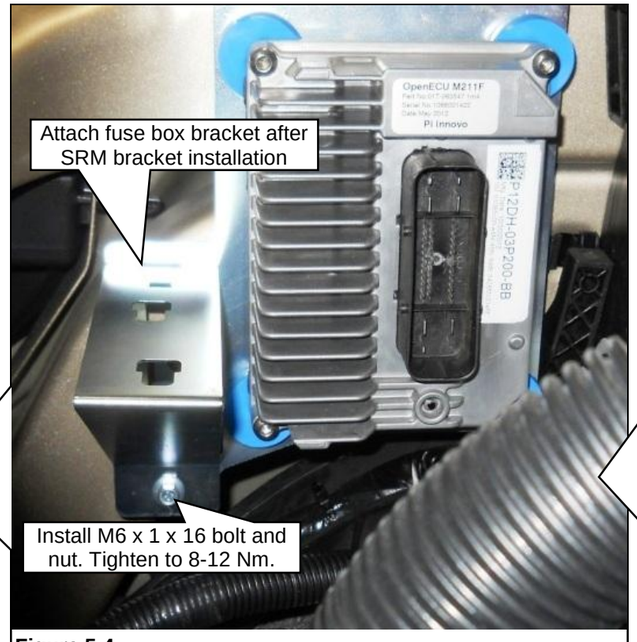


**Figure 5.4**

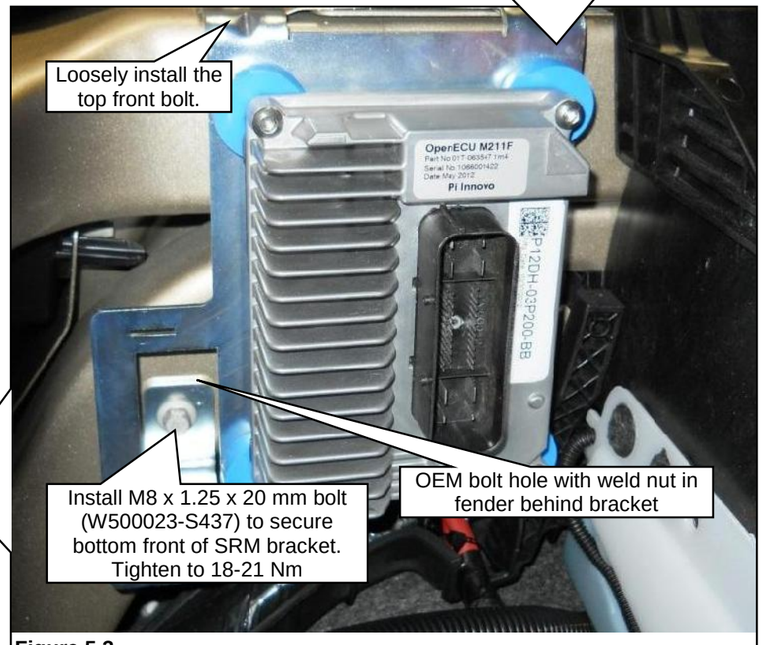


**Figure 5.3**

# INSTALLING UNDERHOOD WIRING HARNESS

**Note:** All parts for installing the ROUSH CleanTech underhood harness are supplied in hardware kit P12DH-ELECKIT-A.

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 6.1**.
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 6.1**.
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 6.2**.
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 6.2**.
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 6.3**.
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 6.4** and **6.5**.

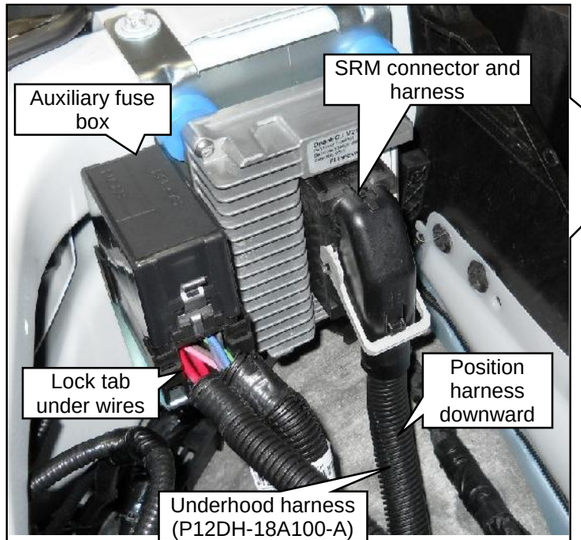


**Figure 6.1**

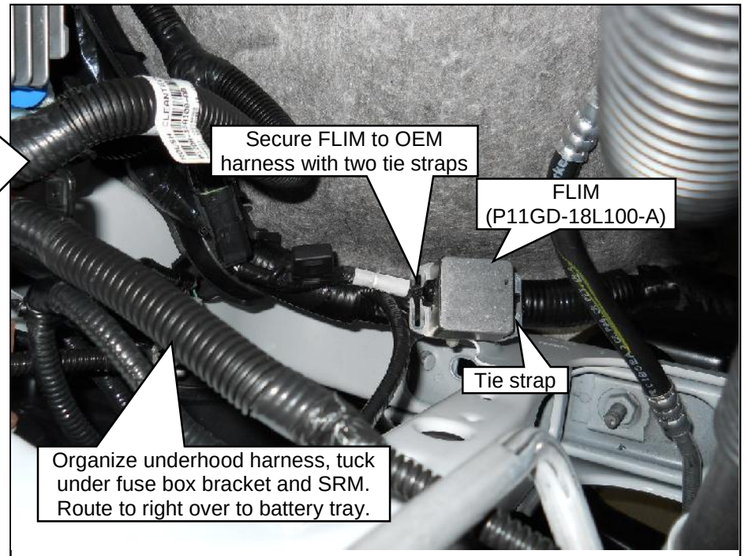


**Figure 6.2**

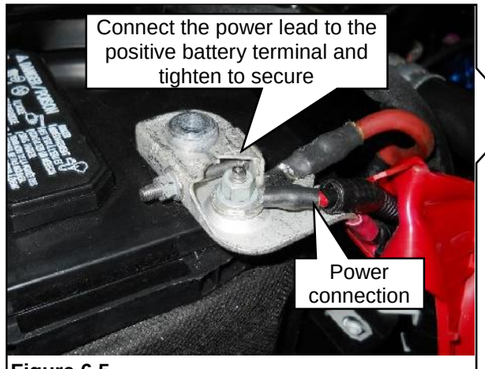


**Figure 6.5**

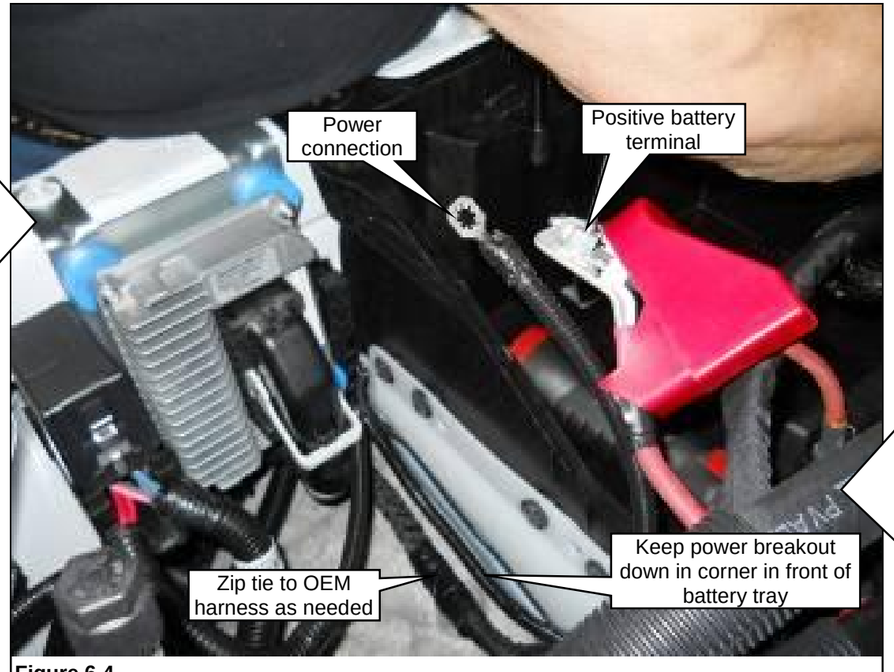


**Figure 6.4**

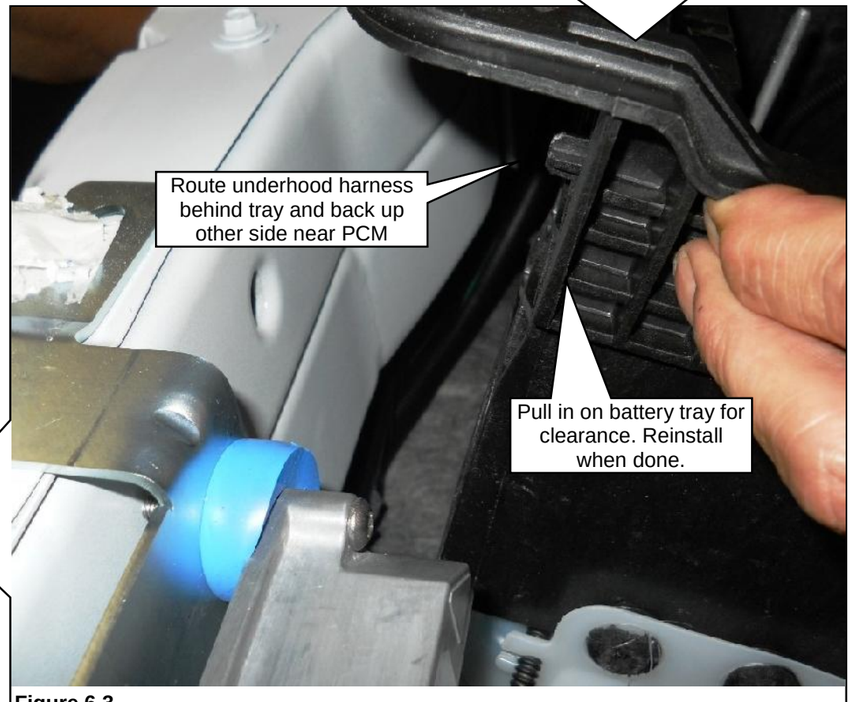


**Figure 6.3**

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 7.1**.
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 7.2**.
10. Route the harness breakout with the integrated pressure temperature sensor (IPTS) connector (on right fuel rail) along the top right of the engine. Attach the breakout harness connector to the sensor. **Figure 7.3**.
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 7.4**.
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 7.2**.
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. **Figure 6.3**.
14. Insert and connect the in-line power pack connector (part of the underhood harness) into the Ford harness. **Figure 7.5**.

**Note:** Two connections are made later, the instrument panel harness for the CAN bus connection and the harness connection to the FRPCM.
**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.

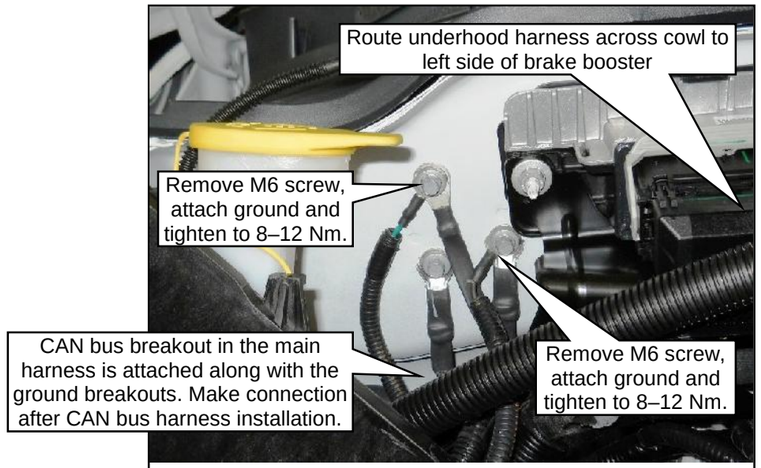


**Figure 7.1**

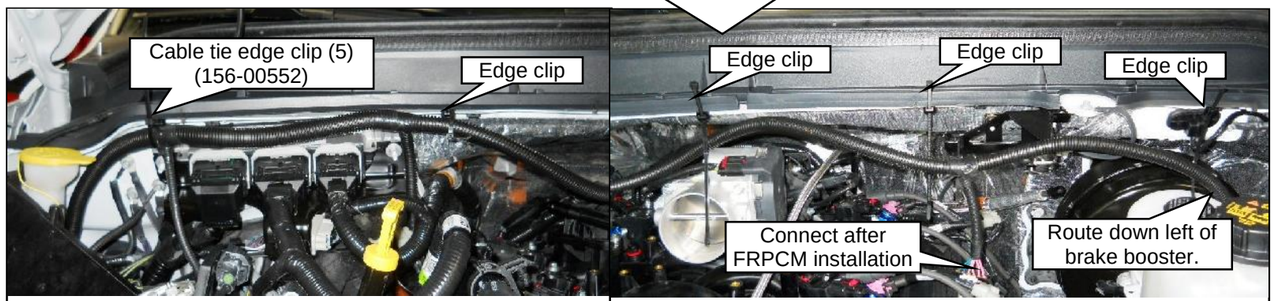


**Figure 7.2**

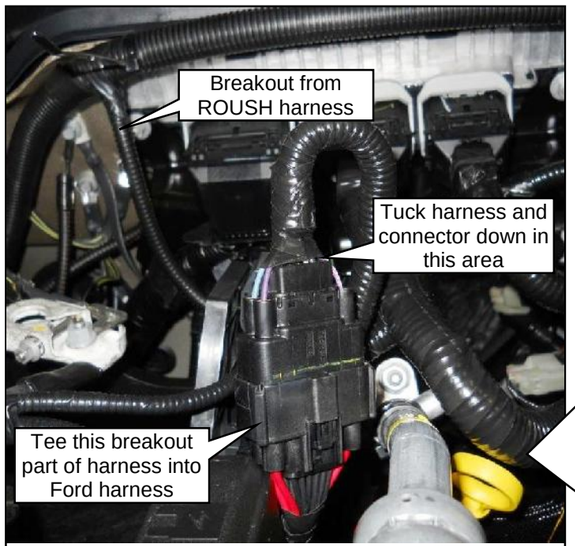


**Figure 7.5**

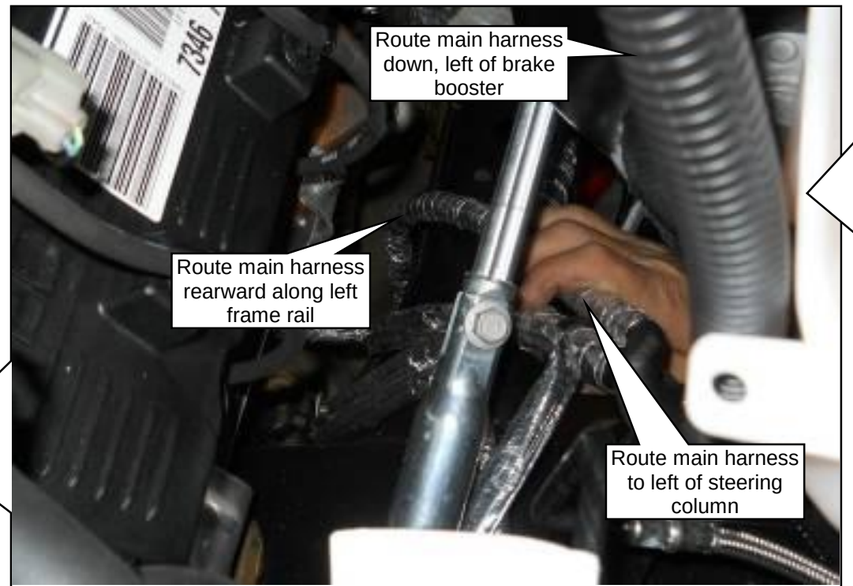


**Figure 7.4**

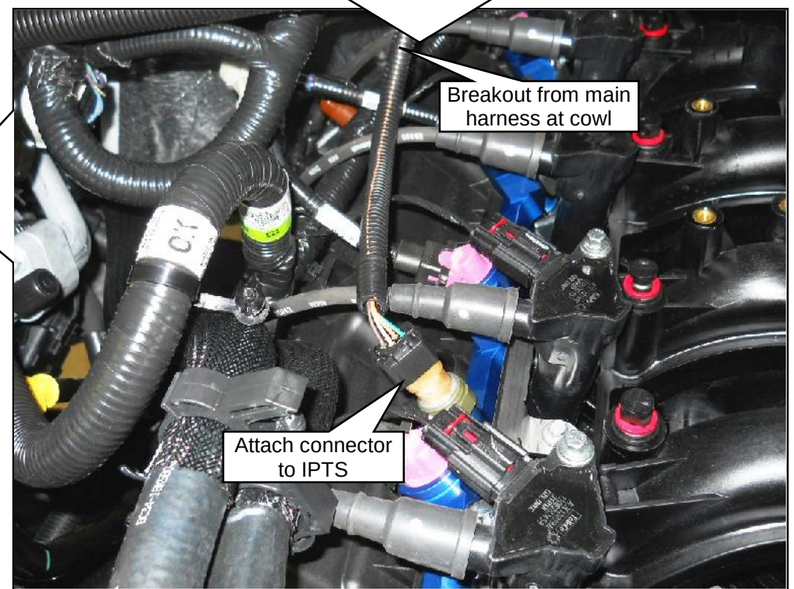


**Figure 7.3**

# INSTALLING INSTRUMENT PANEL (CAN BUS) WIRING HARNESS

**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 8.1**.
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 8.1**.
3. Open the glove box and push in the right side near the catch. Lower the glove box out of the way. **Figure 8.2**.
4. Remove the coin holder from the lower right center of the upper instrument panel center finish panel for access to the trailer brake controller (if equipped) harness connection. **Figure 8.9**.
5. Feed the CAN bus harness through the coin holder opening.
6. Continue routing the CAN bus harness to the right on top of the HVAC unit, and then down the unit at the right next to the OEM module. Continue down to the 29 mm drilled opening. **Figures 8.4** and **8.5**.
7. Push the underhood harness connector end of the CAN bus harness into the drilled hole and have an assistant pull the harness up into the engine compartment until the harness is exposed behind the battery tray. Push the harness in until the grommet is secure in the drilled hole. **Figures 8.6** and **8.7**.
8. 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 8.8**.
9. Make the connection between the CAN bus harness and the trailer brake controller harness. **Figure 8.9**.
10. Zip tie the harness along the routing as needed.
11. Install the coin holder. Lift the glove box into place, pinch the catch area of the box to attach it to the panel opening and then, close the box.
12. Position the floor carpeting back into place and install the right side kick panel (if removed).

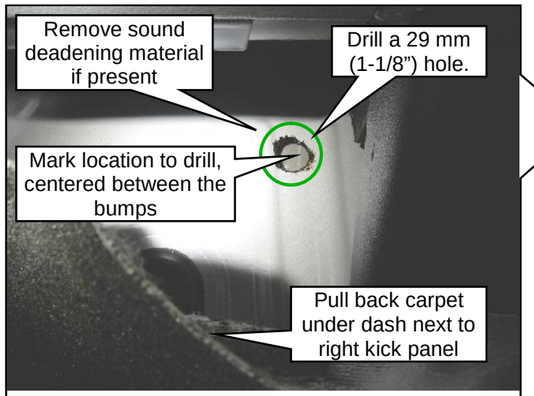


**Figure 8.1**

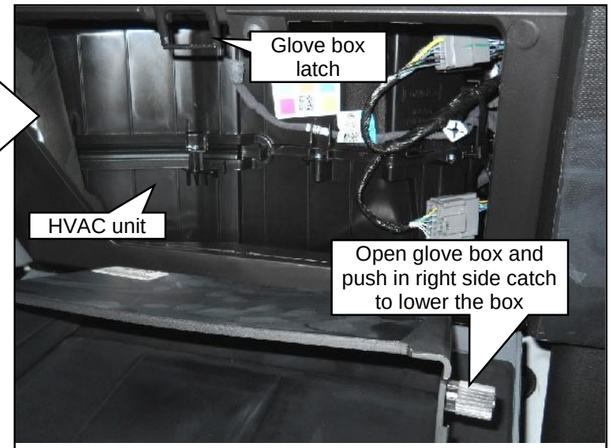


**Figure 8.2**

**Figure 8.7**

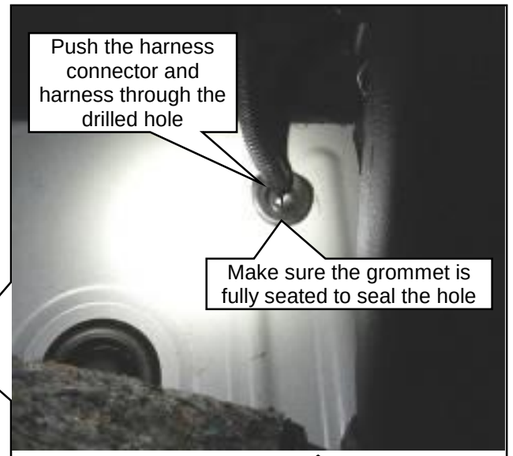


**Figure 8.6**

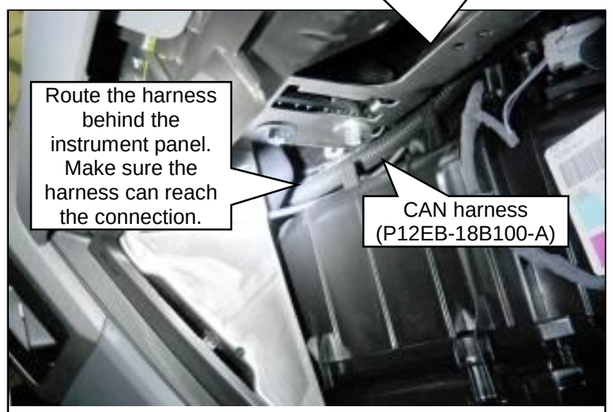


**Figure 8.3**

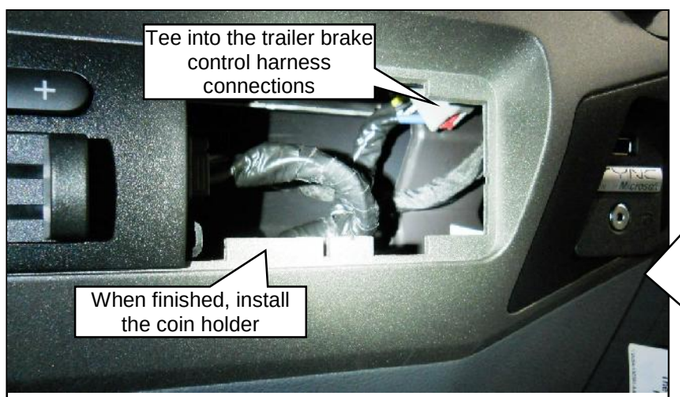


**Figure 8.9**

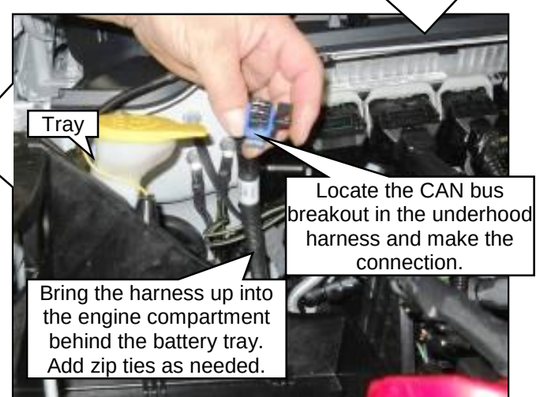


**Figure 8.8**

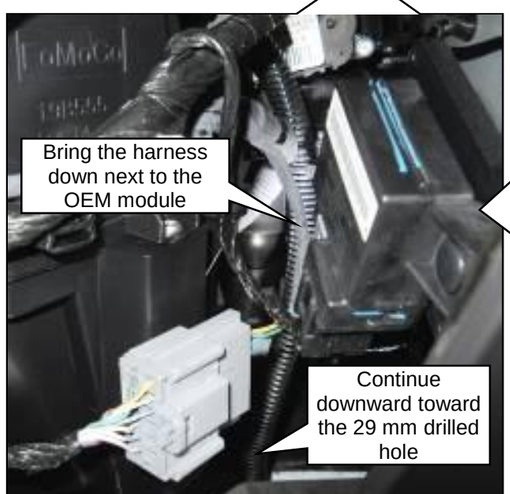


**Figure 8.5**

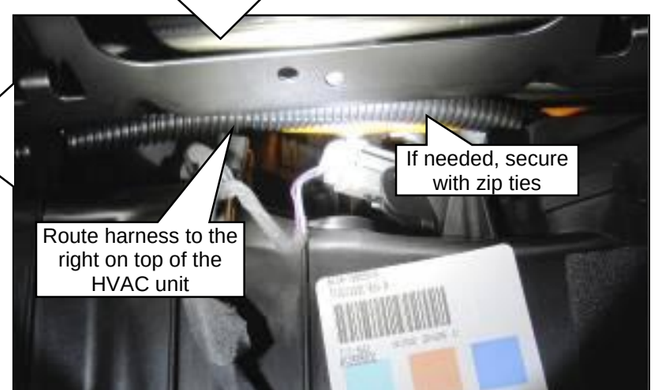


**Figure 8.4**

# REMOVING THE ORIGINAL FUEL TANK, FUEL SUPPLY LINE AND VAPOR LINES

There are various fuel tank, vapor line and vapor canister configurations based on wheelbase, cab style and whether the vehicle has two-wheel or four wheel drive. Refer to the appropriate *Ford Workshop Manual* for the vehicle you are working on.

1. Detach all vapor lines at quick-connect fittings on fuel tank. Leave the vapor purge line between the canister and engine in place. Detach the fuel supply line from the fuel tank. Remove and discard the fuel supply line from the frame. **Figures 9.1** and **9.4**.
2. Following the instructions in the *Ford Workshop Manual, Section 310-01, Fuel Tank and Lines,* remove the gasoline fuel tank, along with the fuel supply and vapor lines. **Note:** Do NOT remove brake lines. **Figure 9.7**.
3. Remove and discard the fuel fill tube assembly and gas cap, including mounting bracket, between the fuel door and the fuel tank. **Figure 9.8**.
4. Slit the vapor line as indicated to remove the FTPT, line and quick-connect fitting. Save for reuse. **Figure 9.2**.
5. Rotate the quick-connect fitting of the vapor line so that the FTPT, in relation to the quick-connect fitting, is as shown. **Figure 9.3**.
6. Remove the OEM fuel supply line from the engine and discard. Remove from clips and quick-connect fitting, if not already done. **Figures 9.5** and **9.6**.
7. Remove the OEM vapor hose and vapor line from the vehicle. Disconnect at the clips on bracket and from quick-connect fitting near frame rail. **Figures 9.5** and **9.6**.
8. Some vehicles are equipped with an OEM fuel tank guard (bracket assembly) mounted on the outside of the left frame rail in front of the front spring hanger. Remove and discard this guard bracket if it interferes in any way with positioning and mounting the ROUSH CleanTech fuel tank mounting. **Figure 9.9**.

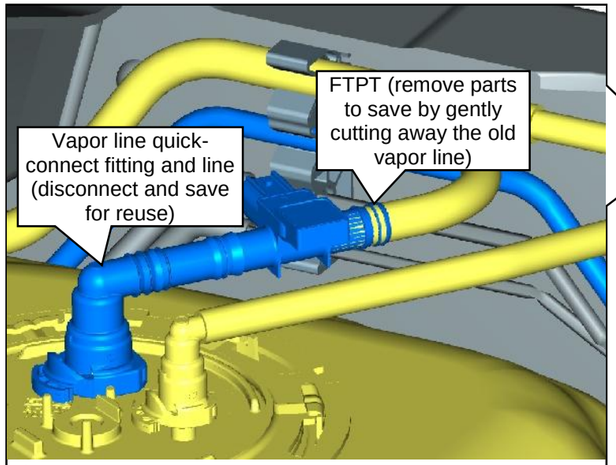


Figure 9.1

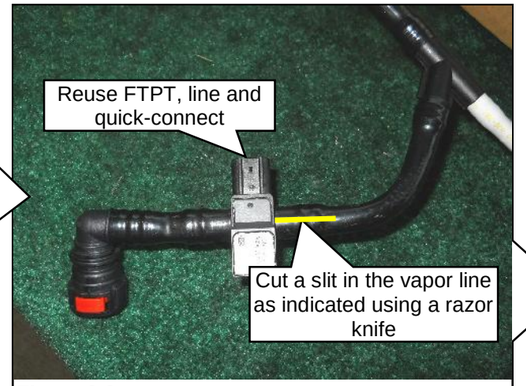


Figure 9.2

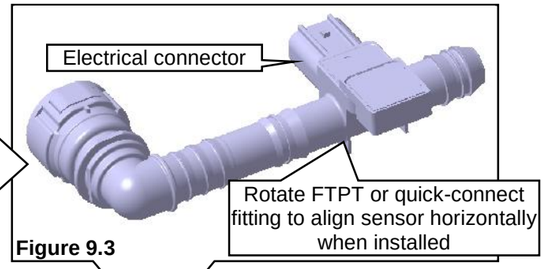


Figure 9.3

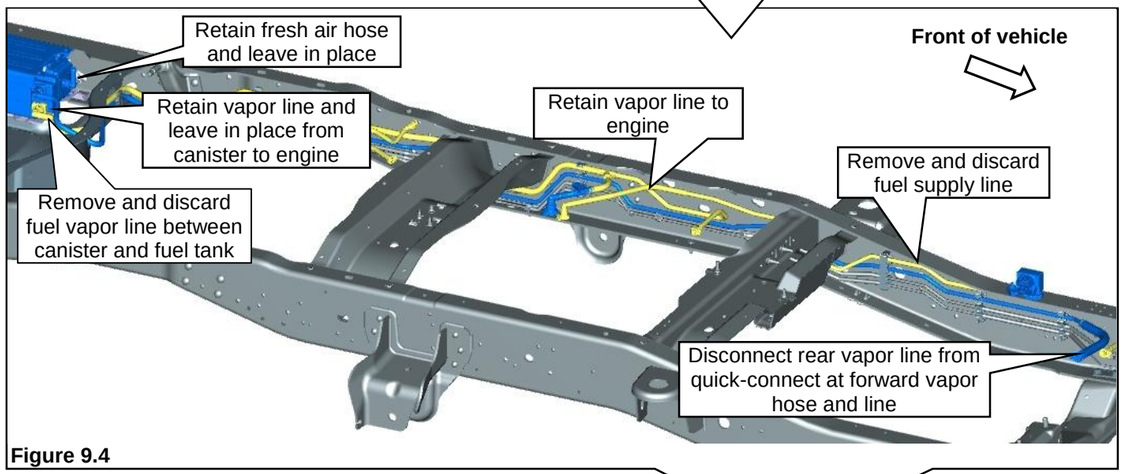


Figure 9.4

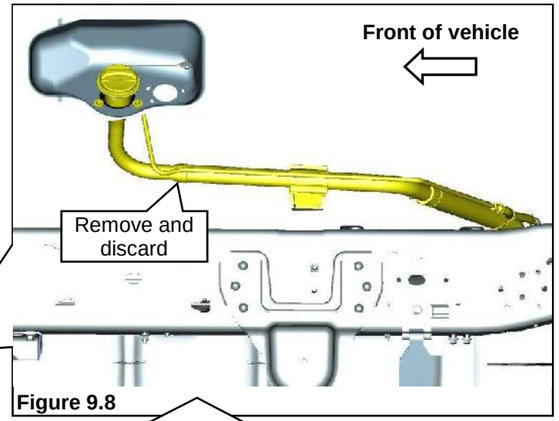


Figure 9.8

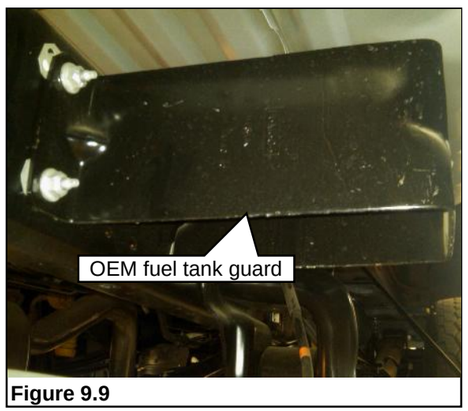


Figure 9.9

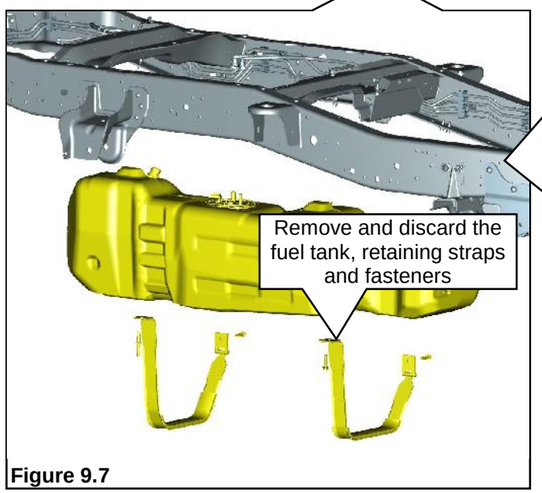


Figure 9.7

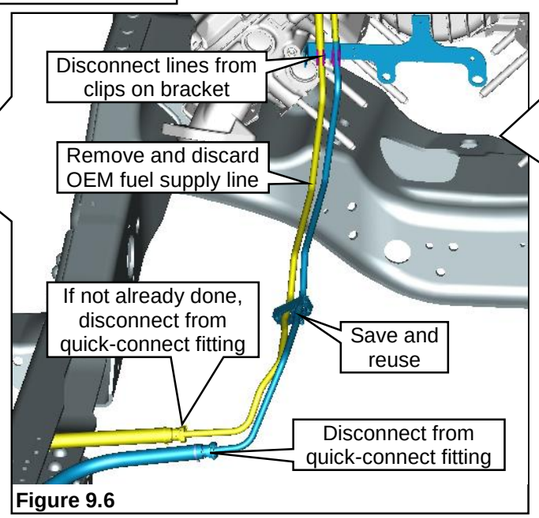


Figure 9.6

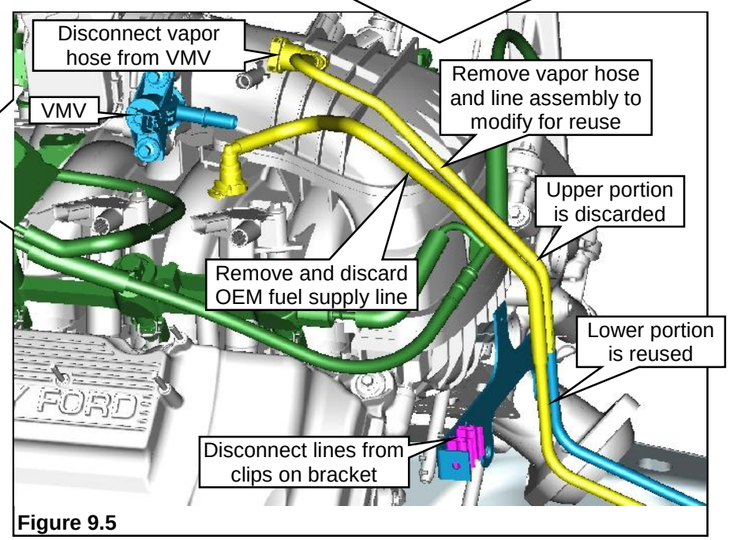


Figure 9.5

# INSTALLING NEW FORWARD FUEL LINES, MODIFYING VAPOR LINE AND NEW VAPOR PURGE HOSE

**Note:** On 4 x 4 vehicles, remove the driveshaft between the transfer case and the front axle to gain access for installation of forward fuel lines and wiring harness.

1. Place the OEM vapor hose and vapor line assembly on a bench and slice the hose using a razor knife where the hose connects to the steel line. Separate the plastic hose from the steel line and discard the hose. **Figure 10.1**.
2. Install the new vapor purge hose assembly to the steel vapor line. Use a constant tension clamp to secure the hose to the line. **Figure 10.2**.
3. Run the fuel lines next to the transmission. **Figure 13.3**. Use zip ties as needed. The forward fuel supply line clips into the retainer. **Figure 10.4**.
4. Install the modified vapor line with new vapor hose to its original position. Plug the short end of the purge hose onto the VMV. The longer end quick-connect fitting plugs onto the FRPCM after it is installed. **Figure 10.5**.
5. From underneath the vehicle, route the forward fuel supply and return lines over the transmission, up into the engine compartment just under the cowl and dash panel. The forward fuel lines can be found in P12DH-ENGKIT-A. Press the forward fuel return lines into retaining clip in OEM bracket. **Figures 10.6** and **10.7**.

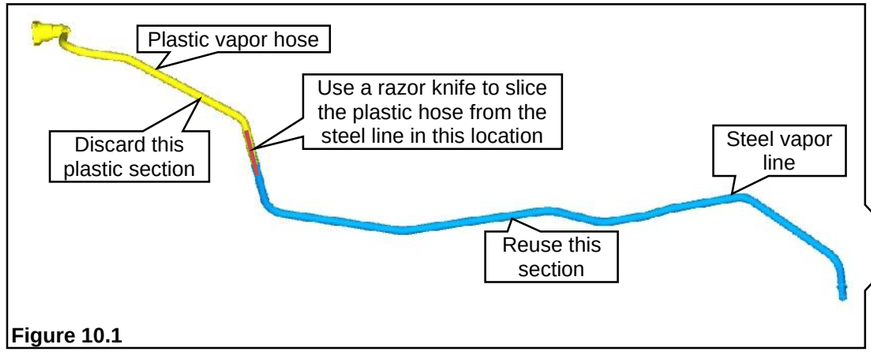



**Figure 10.1**

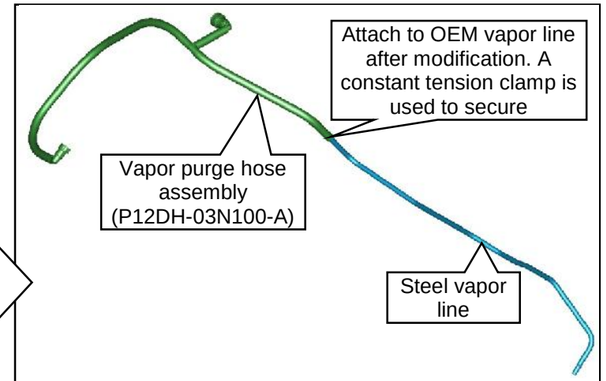



**Figure 10.2**

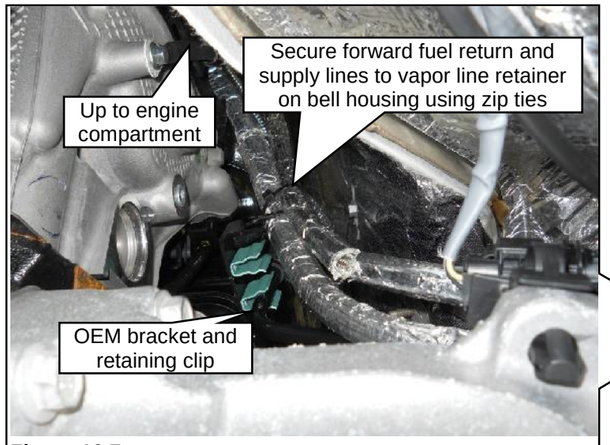



**Figure 10.7**

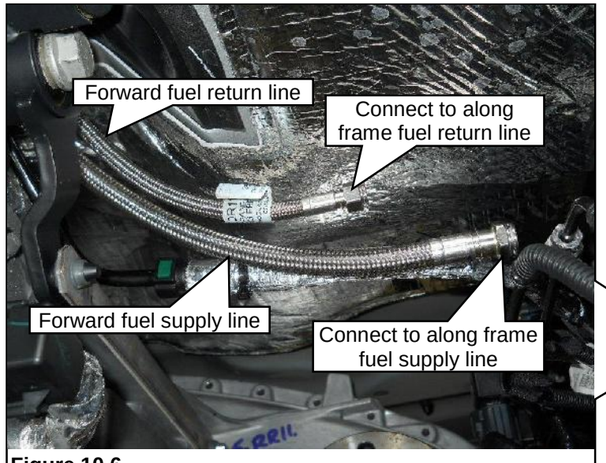



**Figure 10.6**

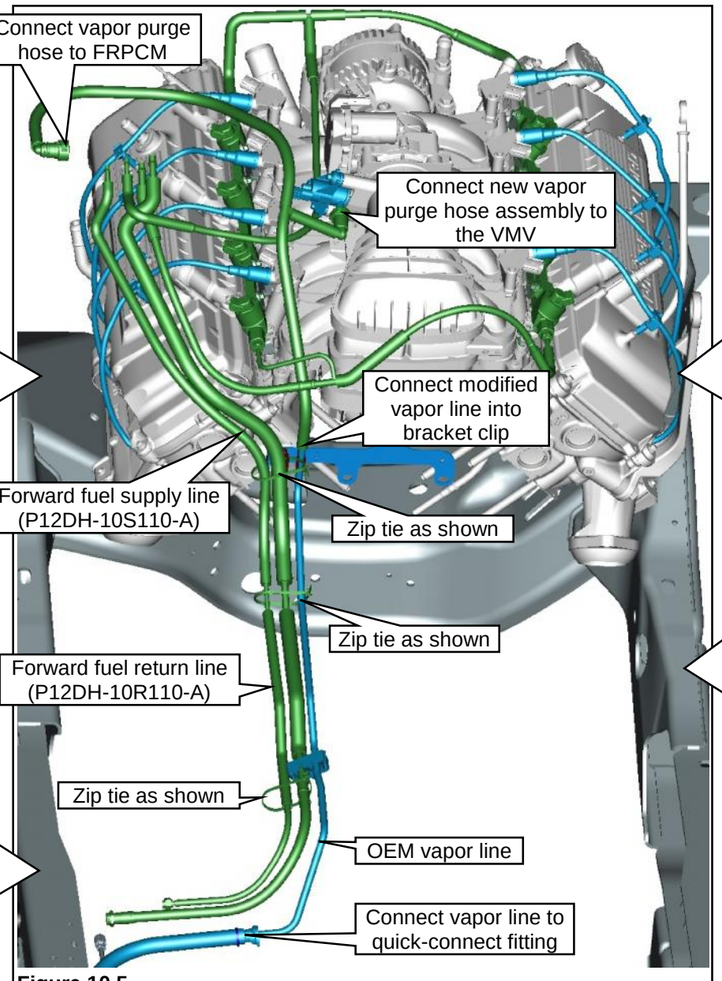



**Figure 10.5**

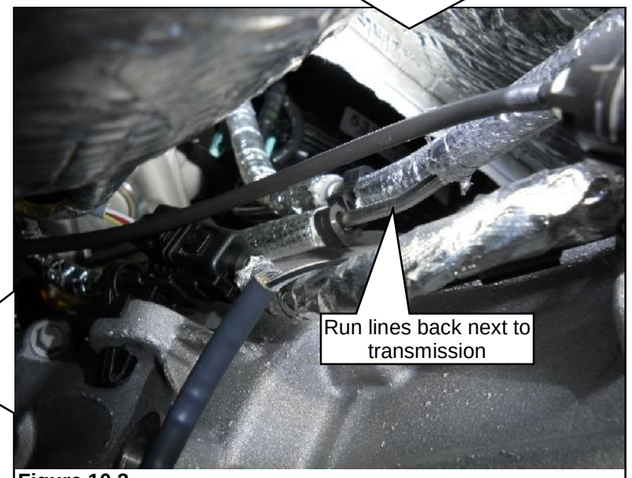



**Figure 10.3**

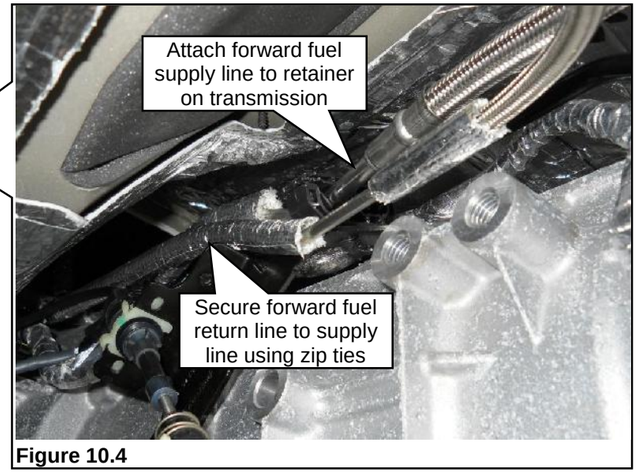



**Figure 10.4**

# INSTALLING NEW REAR FUEL LINES

1. Install the rear fuel supply line from the forward fuel supply line into the top slot of the OEM retention clips on the frame rail. **Note:** The rear fuel supply line should pass behind the EFPR. **Figure 11.1**.
2. Connect the rear fuel supply line into the quick-connect fitting of the forward fuel supply line. **Figure 11.1**.
3. Install the rear fuel return line against the fuel supply line and secure it to the supply line using six double snail retainer clips. **Note:** The rear fuel return line should pass behind the EFPR. **Figure 11.2**.
4. Connect the rear fuel return line into the quick-connect fitting of the forward fuel return line. **Figures 11.2** and **11.3**.

**Note:** Rear fuel supply and return line part numbers are based on vehicle configuration such as body style and wheelbase length.

Available rear fuel supply line: P12DH-10S120-A/B/C/D/E/I/J/K/L

Available rear fuel return line: P12DH-10R120-A/B/C/D/E/I/J/K/L

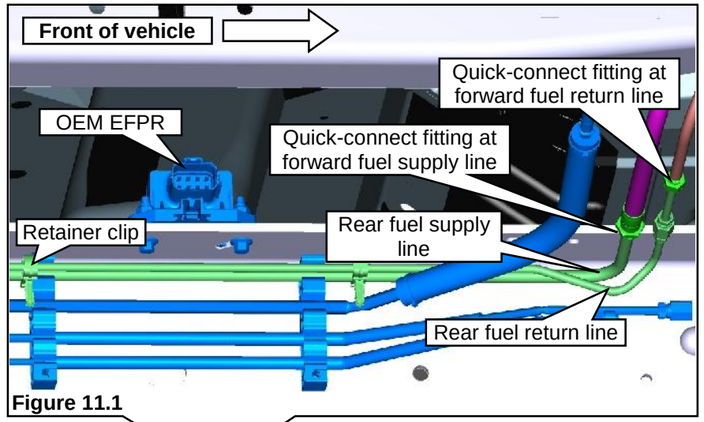



**Figure 11.1**

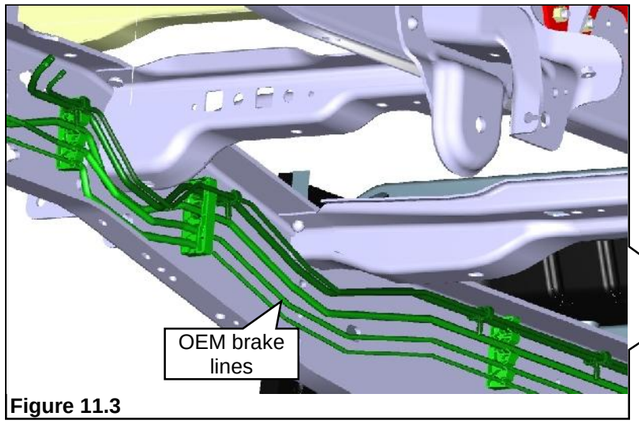



**Figure 11.3**

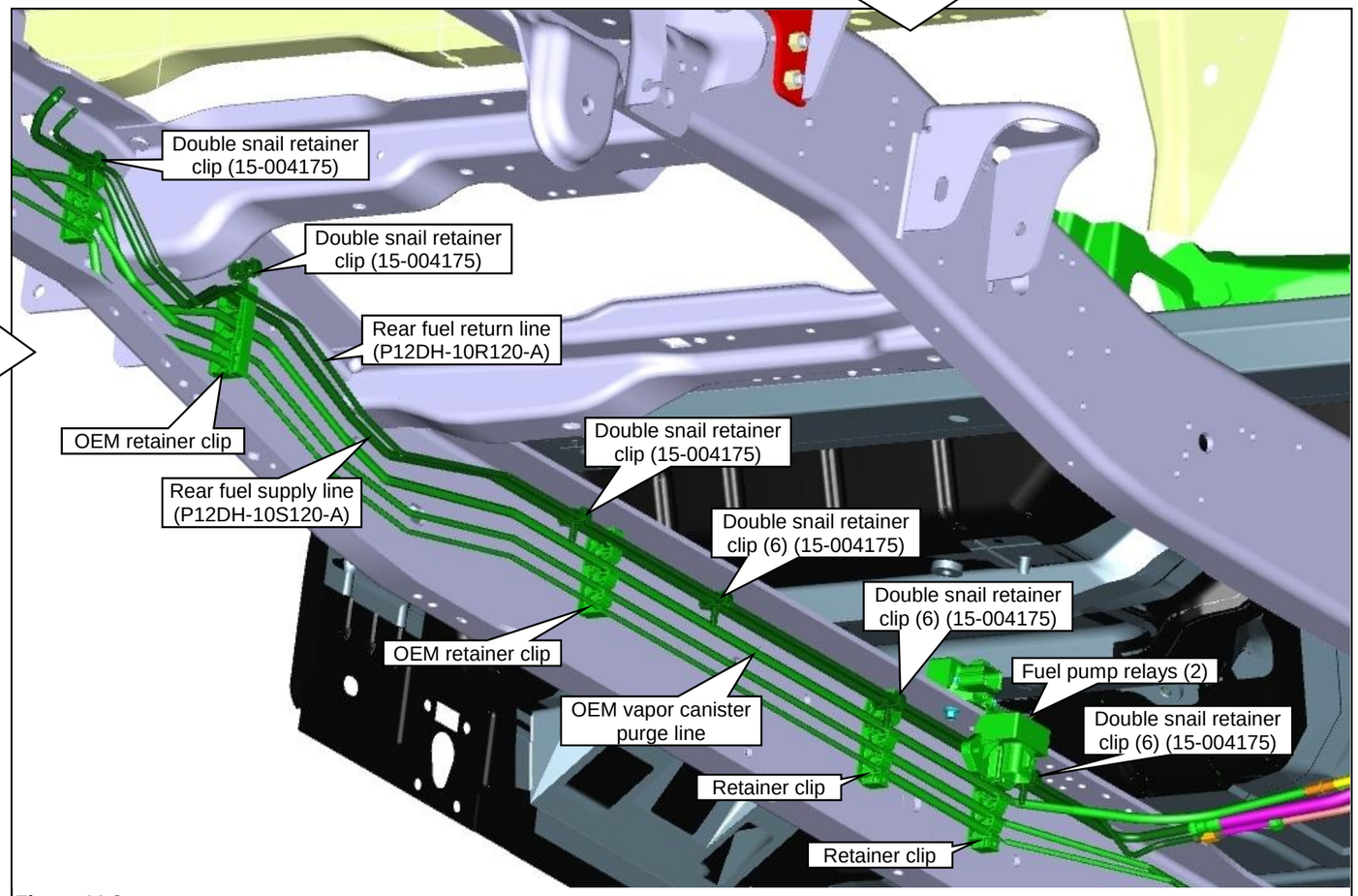



**Figure 11.2**

## INSTALLING NEW REAR WIRING HARNESS

1. Install and route the ROUSH CleanTech rear frame harness along the original vehicle harness from the ROUSH CleanTech underhood harness along the left frame to the rear of the vehicle. Do NOT secure the harness with zip ties until all connections have been made. **Figures 12.3**, **12.4** and **12.5**.
2. Attach the new EFPR to the new bracket by snapping it in place. **Figure 12.2**.
3. Remove OEM washer plate and bolts. Install the new EFPR with bracket on top of the frame rail and under the OEM EFPR. Install the new bracket (with new EFPR attached), position the OEM EFPR to the bracket and install the two washer plate bolts through the frame rail, bracket and OEM EFPR. Install two locknuts and tighten to specification. The new EFPR is supplied in hardware kit P12DH-ELECKIT-A. **Figures 12.1** and **12.2**.
4. Connect the rear frame harness to the OEM EFPR and the new EFPR. The third part of the harness goes forward along frame rail to the underhood harness. Use zip ties to secure the new harness to the vehicle harness. Leave enough length so that the rear harness can be attached to the underhood harness and secured to the vehicle harness. **Figure 12.4**.
5. Connect the rear harness to the underhood harness and zip tie to the vehicle harness. **Figure 12.3**. Route the rear frame harness along the vehicle harness to the rear. **Figures 12.5**, **13.4** and **13.5**.

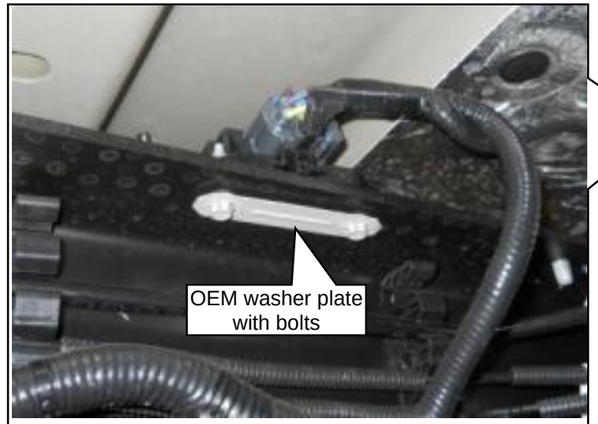


**Figure 12.1**

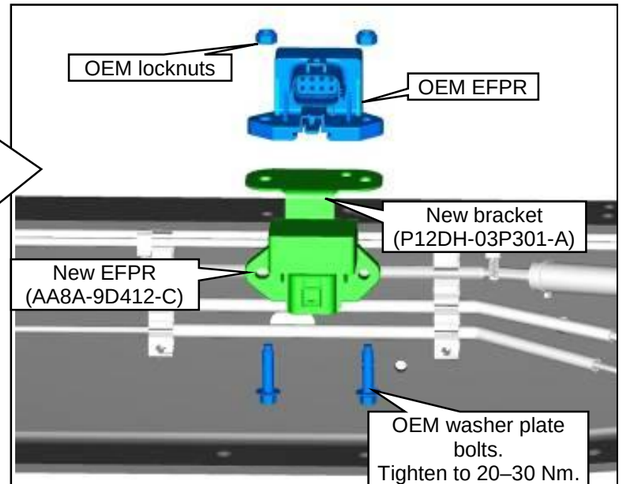


**Figure 12.2**

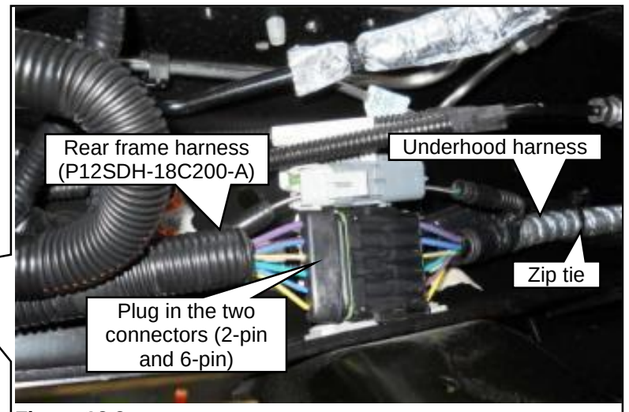
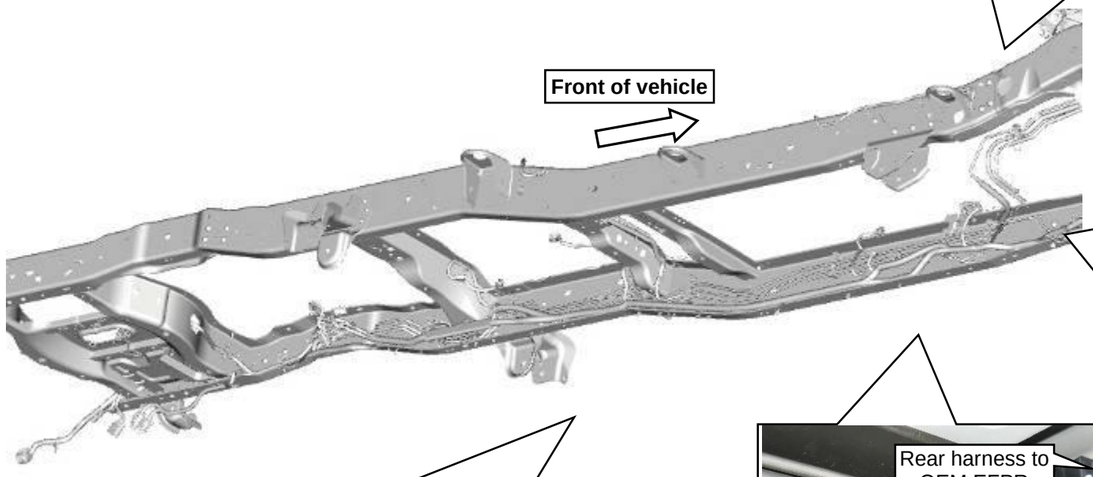


**Figure 12.3**



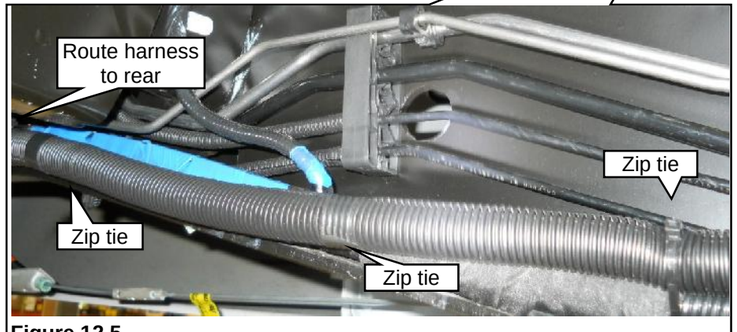



**Figure 12.5**

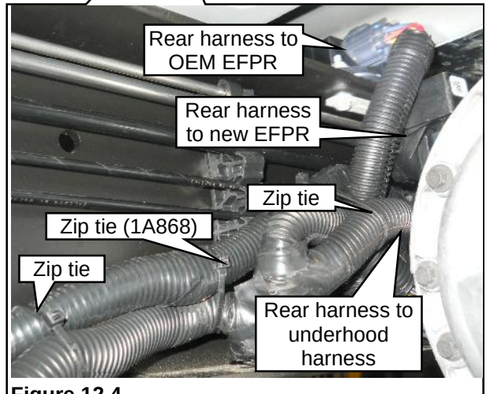


**Figure 12.4**

6. 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 will be connected after the tank is installed. The ROUSH CleanTech rear frame harness is secured to the vehicle harness inside the frame rail. **Figures 13.4** and **13.5**.
7. Connect the rear harness ground lead to the frame at OEM ground location near the front of the harness. **Figure 13.2**. Use M6 x 1.0 x 16 bolt and nut. Connect the tank harness jumper ground to the frame crossmember just above the rear axle. **Figure 13.3**. M6 x 1.0 x 16 bolt and nut. Tighten the two grounds to 8–12 Nm. **Note:** To make sure a good connection to ground is made, remove the OEM paint under the ground location. Ground bolts and nuts are supplied with the kit.
8. Install the vapor line plug over the end of the FTPT sensor. Plug the FTPT assembly quick-connect into the bottom side port of the canister. **Figure 13.6**. The top side port is reserved for the vapor line/hose to the VMV on the engine.
9. Plug the FTPT jumper harness into the FTPT and route it through the crossmember and along the left frame rail. Route the jumper harness into the OEM retaining clips that secure the VMV harness. **Figure 13.7**. Moving the harness forward, plug the jumper harness into the OEM vehicle harness. **Figure 13.1**.

**Note:** The FTPT electrical connector must be rotated so that it is horizontal when installed. Orient the FTPT with the quick-connect fitting until this is correct. Refer to **Figure 9.3** on page **9**.

**Figure 13.1**

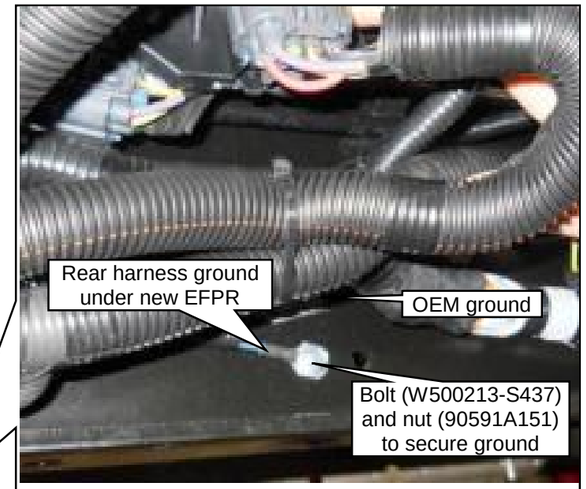


**Figure 13.2**

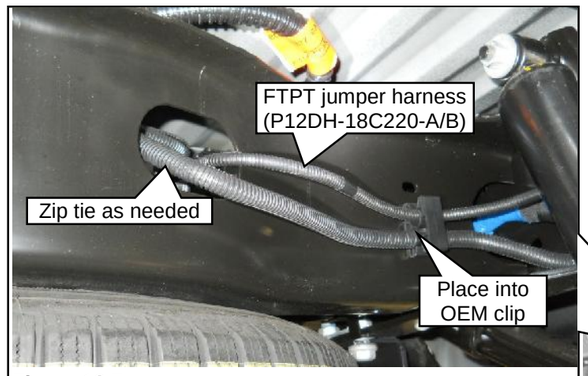


**Figure 13.7**

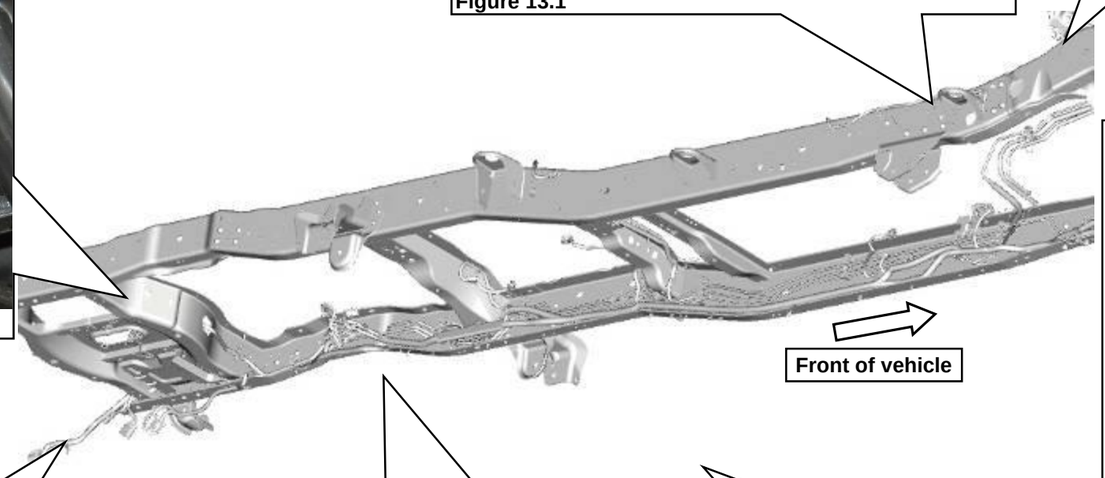



**Figure 13.3**

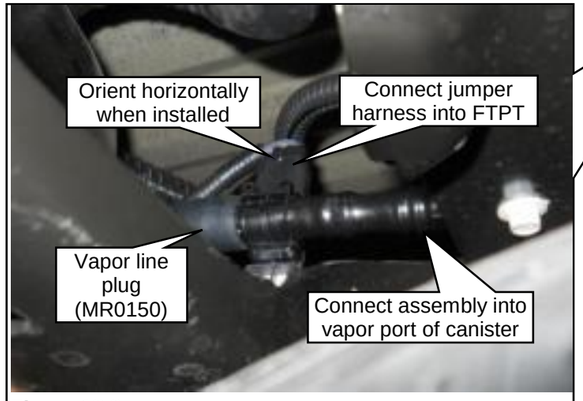


**Figure 13.6**

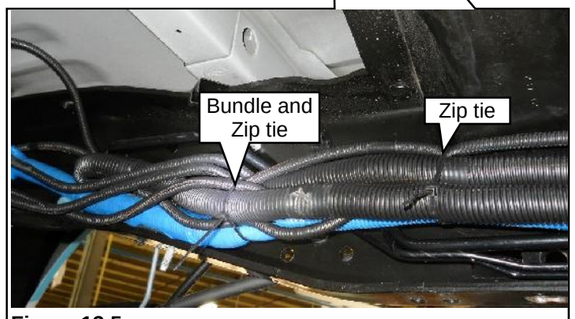


**Figure 13.5**

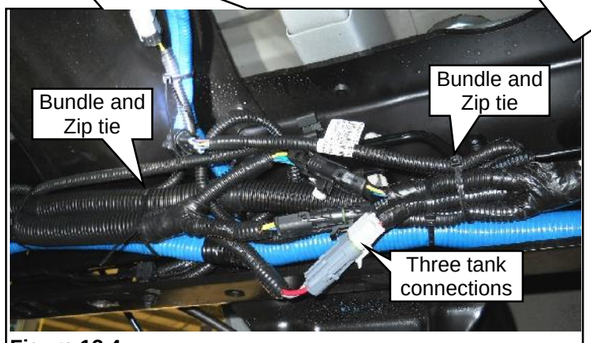


**Figure 13.4**

# PREPARING THE TRUCK BED

1. Remove the two front bed bolts and position the drilling template onto the bed. Align the front outside holes of the template with the two front bed bolt holes. **Figure 14.1**.
2. Using the template, center punch the appropriate holes for the bed you are working with (6.5’ or 8’).
3. Drill a small diameter pilot hole (1/8”) through the bed floor and crossmember at each appropriate drilling location for all bed configurations.

**Note: Figure 14.2** indicates the steps that should be followed to modify the bed for tank installation.

4. Drill two 1-1/8” diameter holes through the bed floor only at the two REAR INBOARD locations as indicated on the template for either the 8’ bed or the 6.5’ bed. **Figures 14.2**.
5. Drill two 1-1/2” diameter holes through the bed floor and crossmember at the two FRONT INBOARD locations as indicated on the template for all bed configurations. **Figures 14.2**.
6. **8’ Bed Only:** Drill a 1-5/16” diameter hole through the bed floor only at the two REAR OUTBOARD locations as indicated on the template. Drill a 14 mm (9/16”) diameter hole through the bottom of the bed crossmember from underneath the vehicle at the two REAR OUTBOARD locations using the pilot holes as a guide. **Figures 14.2**.
7. In any of the four stud locations, where there is a raised section, drill 1” clearance holes through the upper layer of the bed sheet metal only. **Note:** For 6.5’ beds, drill two front holes only. For 8’ beds, drill two rear holes only.
8. It might be necessary to remove the exhaust components near and around the bed crossmember. Refer to the *Ford Workshop Manual 309-00, Exhaust System*, for complete instructions.
9. Drill two 1-1/2” diameter holes through the bed crossmember at the two REAR INBOARD locations from the bottom of the vehicle as indicated on the template for either the 8’ bed or the 6.5’ bed. (Use pilot holes as a guide.) **Figure 14.3** shows the location of the holes for a regular cab 8’ bed configuration. **Figure 14.4** shows the location of the holes for a short cab 6.5’ bed configuration.

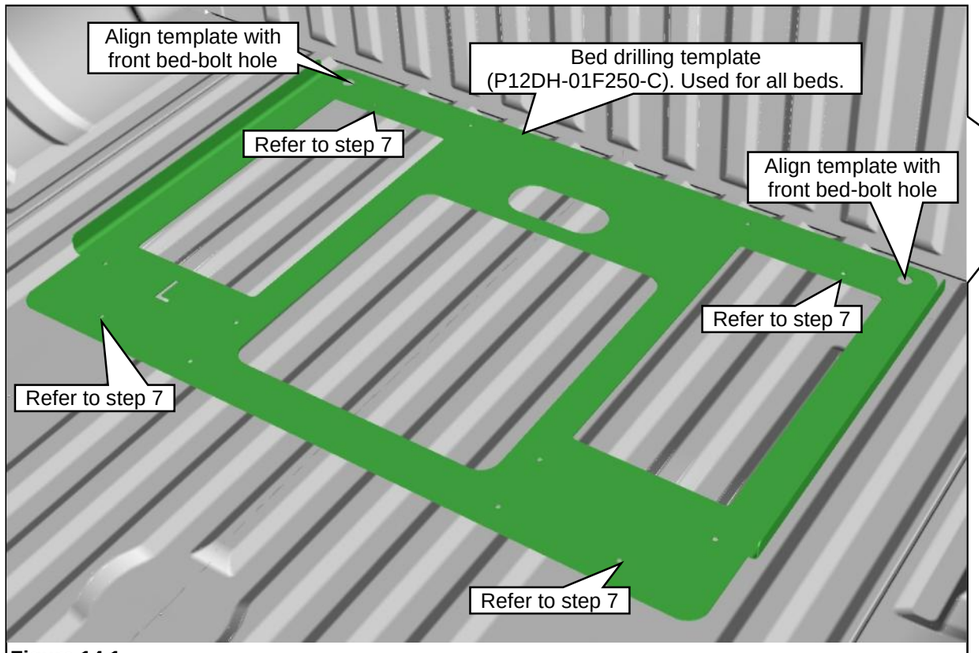



**Figure 14.1**

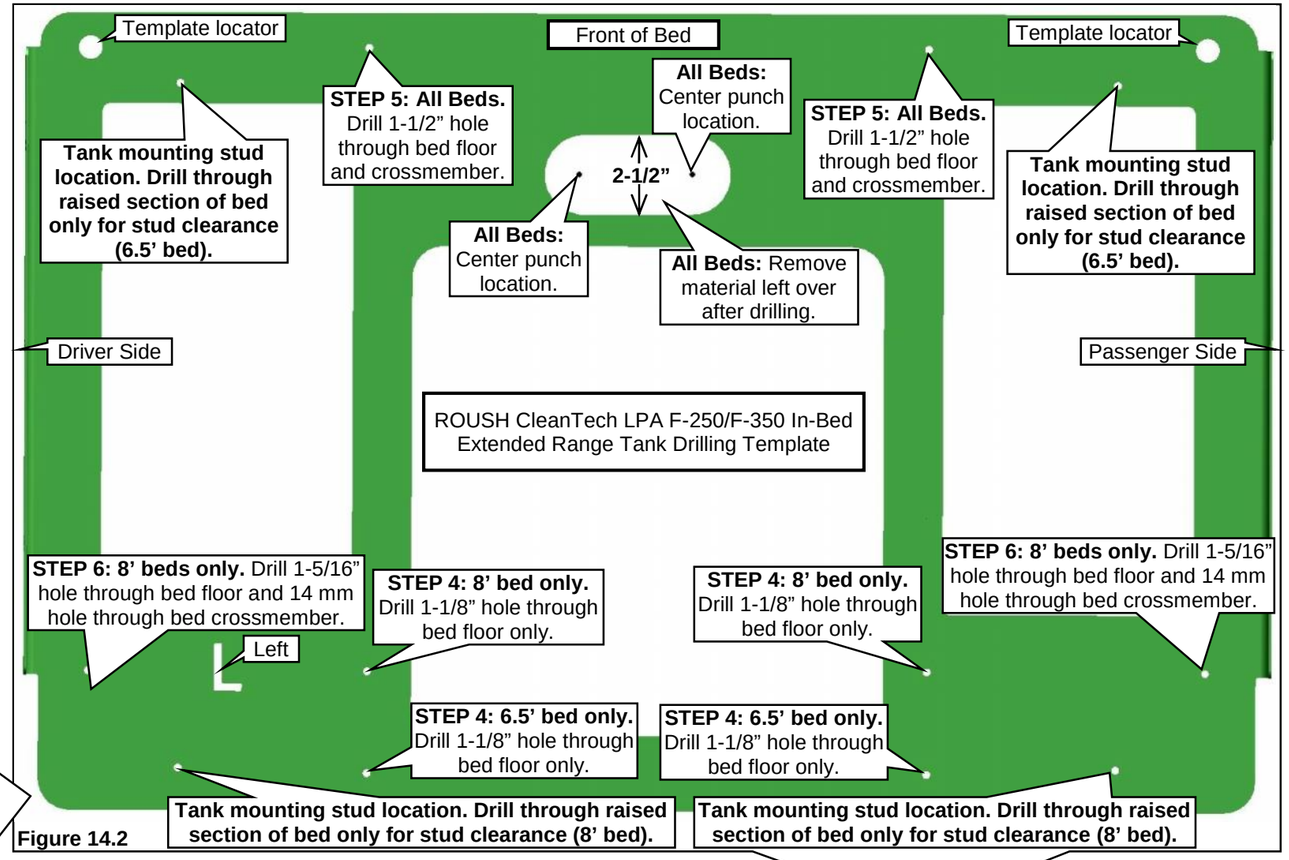



**Figure 14.2**

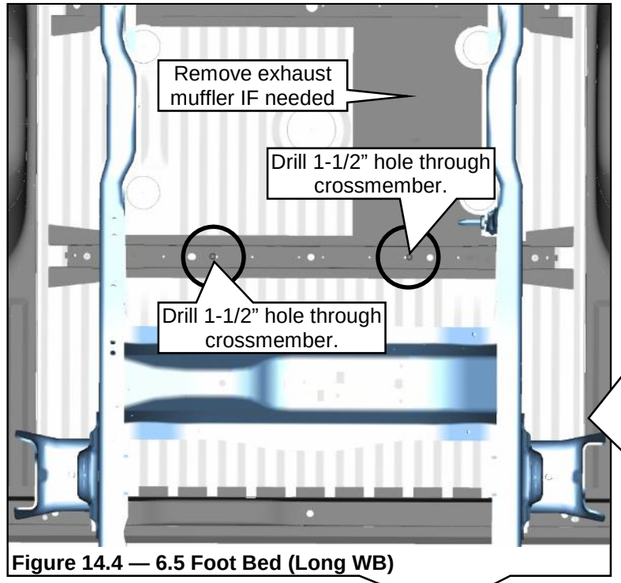



**Figure 14.4 — 6.5 Foot Bed (Long WB)**

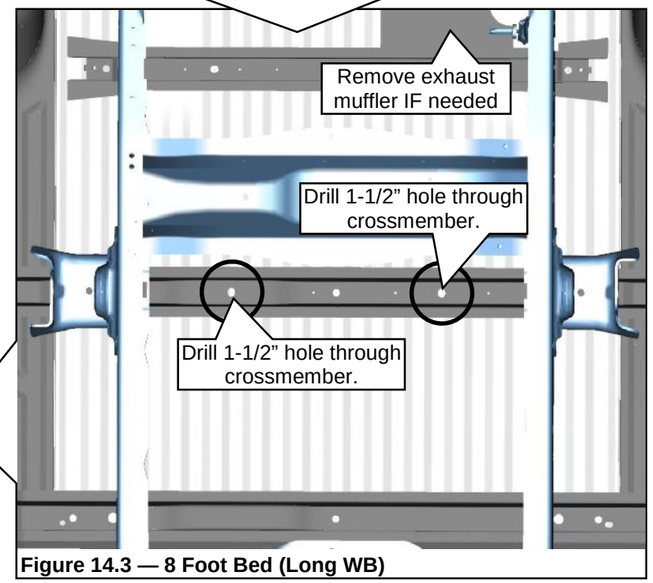



**Figure 14.3 — 8 Foot Bed (Long WB)**

10. Use a center punch to mark the center of the two holes for the bed pass-through. Use a 2-1/2” hole saw to create two holes. **Figures 14.2** and **15.1**.
11. Remove the remaining material from between the 2-1/2” holes with an air saw or similar tool. **Figure 15.2**.
12. Deburr all holes and vacuum up any metal chips created when drilling the holes. Coat the holes with touch-up paint and premium undercoating to protect the exposed surfaces. Refer to the *Special Tools* section.
13. Install the bed pass-through grommet into the elongated hole in the bed. Use silicon sealant to adhere the grommet to the bed. **Figure 15.3**.

**Figure 15.1**

**Figure 15.2**

## INSTALLING THE TANK MOUNTING HARDWARE

**Caution:** Ensure that the U-nuts and crush sleeves are correctly aligned so that the holddown bolts can be installed. Failure to heed this caution can result in component damage.

**Caution:** Hand tighten all fuel line connectors and fasteners before applying a wrench to avoid cross threading. Failure to heed this caution can result in component damage.

1. Trucks equipped with an 8’ bed require two crush sleeves. Insert the crush sleeves through the 1-5/16” REAR OUTBOARD holes. **Figure 15.3**.
2. With 6.5’ beds, if not already done, remove the four bed bolts closest to the front of the bed. **Figure 15.4**. Discard the bolts, however, use one of the bolts to tap or cut threads into the four new U-nuts (W714263).
3. With 8’ beds, if not already done, remove the two bed bolts closest to the front of the bed. **Figure 16.1** on page **16**. Discard the bolts, however, use one of the bolts to tap or cut threads into the two new U-nuts.
4. With all beds, remove the isolator discs from between the frame and bed crossmember at the newly drilled locations.

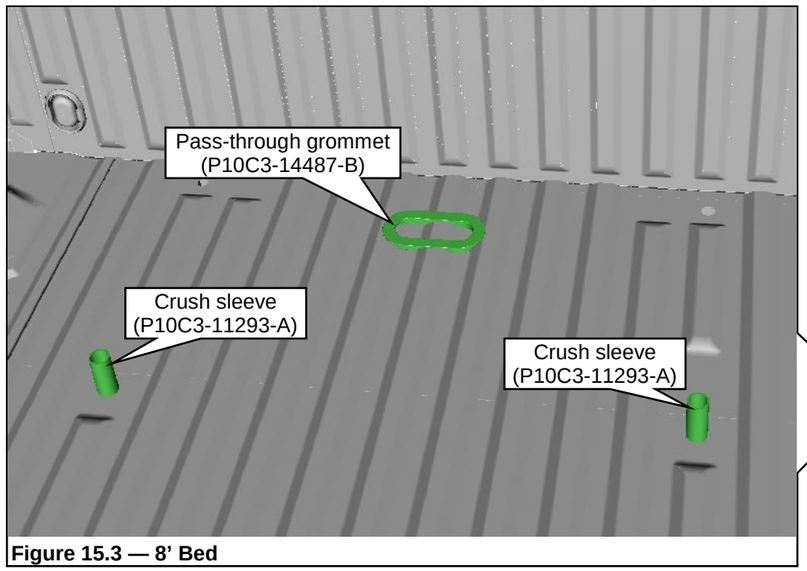



**Figure 15.3 — 8’ Bed**

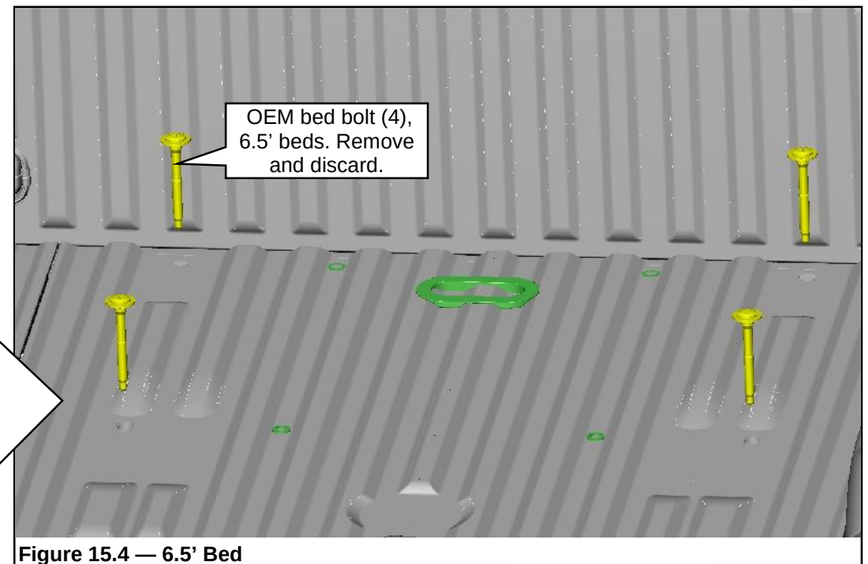



**Figure 15.4 — 6.5’ Bed**

5. At the correct locations, install new U-nuts into the bed crossmembers as shown. **Figure 16.2**.
6. Install the left and right tank mounting brackets into the bed. Make sure that the tank mounting brackets are firmly seated against the bed and that the eight holes in the brackets align with the eight holes in the bed. **Figure 16.3**.
7. With the help of an assistant, install four tank mounting bracket crushlimiter assemblies into the bottom of the bed crossmembers. **Figures 16.4A** and **16.4B**.
8. With the help of an assistant, install eight bolts through the top of the bed. **Figures 16.5A** and **16.5B**. Thread into the four U-nuts in 6.5’ bed (**Figure 16.4A**) and two U-nuts and two standard nuts in 8’ bed (**Figure 16.4b**).
9. **6.5’ beds**: Secure the tank using four inner M14 x 2.0 x 134 mm bed bolts. The four outer locations use M14 x 2.0 x 120 mm bed bolts.
10. **8’ beds**: Secure the tank using four inner M14 x 2.0 x 134 mm bed bolts. The two outer front locations use M14 x 2.0 x 120 mm bed bolts and the two outer rear locations use M14 x 2.0 x 120 mm bed bolts also, but are different part numbers.
11. Tighten all bed bolts to 100–110 Nm.

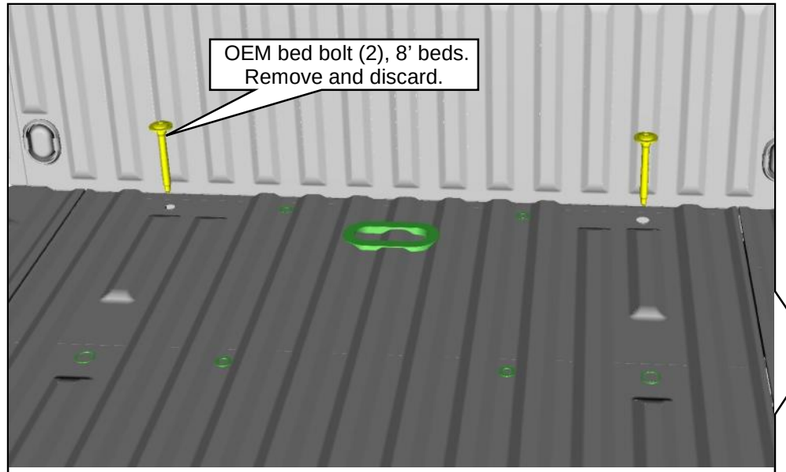


**Figure 16.1 — 8’ Bed**

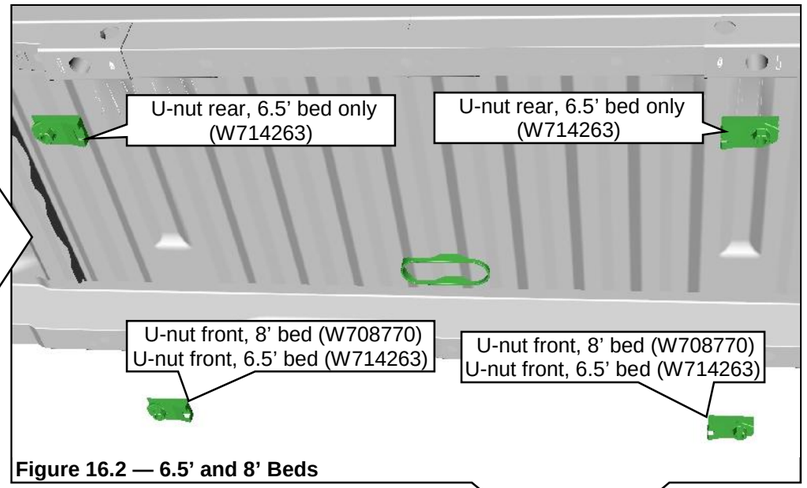


**Figure 16.2 — 6.5’ and 8’ Beds**

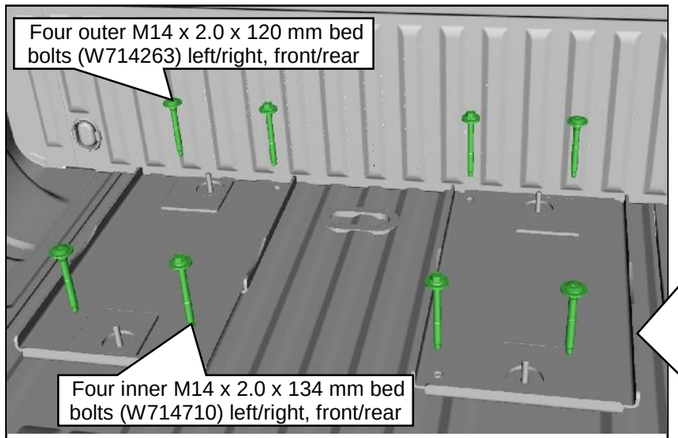


**Figure 16.5A — 6.5’ Bed**

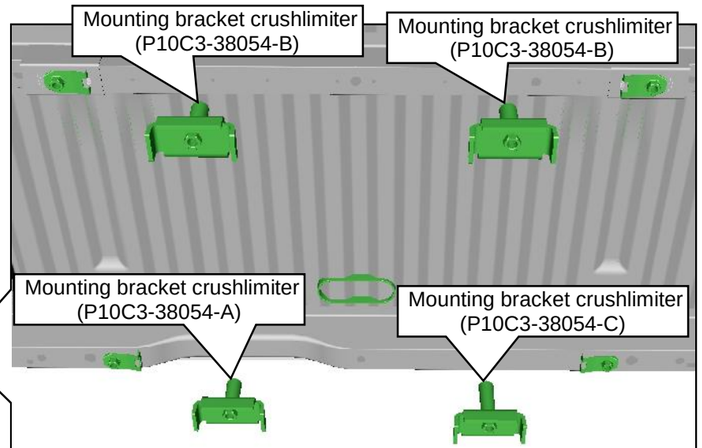


**Figure 16.4A — 6.5’ Bed**

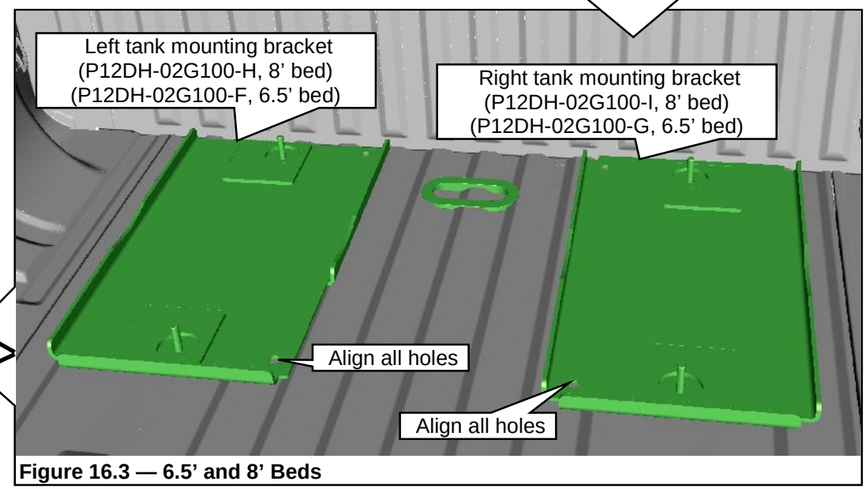


**Figure 16.3 — 6.5’ and 8’ Beds**

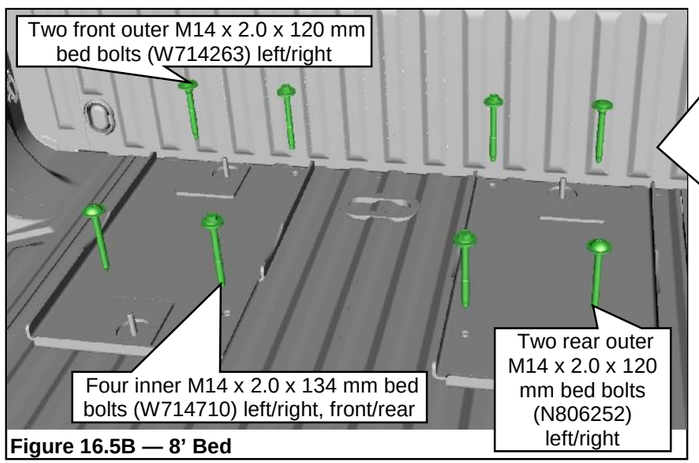


**Figure 16.5B — 8’ Bed**

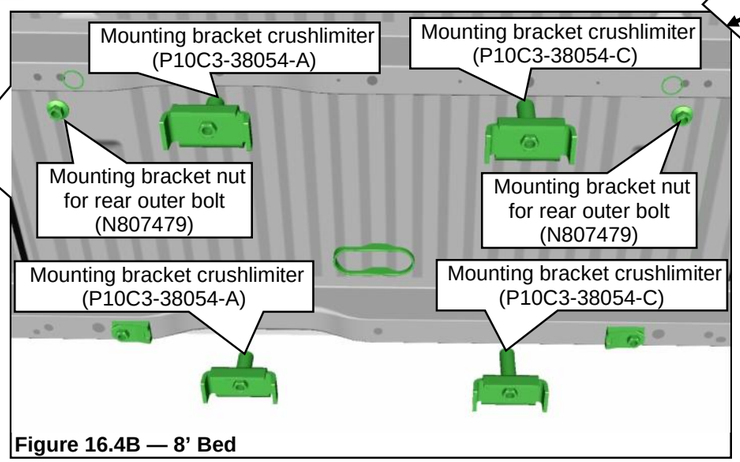


**Figure 16.4B — 8’ Bed**

# PREPARING NEW TANK ASSEMBLY

1. Obtain the fuel tank assembly and prepare the tank for assembly and installation. Support the tank brackets with blocks to raise it off of the bench.
2. If necessary, remove the two M6 nuts (with two M6 bolts) and 10 remaining M6 bolts from the tank cover plate and remove the cover plate. **Figure 17.1**.
3. Working under the tank, install the pressure relief hose onto the pressure relief fitting. Push the hose onto the fitting until fully seated. Install the plug into the end of the hose. The hose goes through the opening at the bottom of the tank and angles over to the pass-through in the bed floor. **Figure 17.2**.
4. Position the fuel filter bracket template to the outside of the filter location of the tank cover. Refer to *Special Tools* for more information. Align the notches in the template with the lower right side bolt holes of the tank cover. Mark the bolt locations using the template. Drill two holes so that the bracket and filter can be secured to the inner side of the tank cover. **Figure 17.3**.
5. Position the fuel filter bracket with clamp and install the two M6 x 1.0 x 16 mm bolts. The filter bracket goes on the inner right with the bolts coming from the outside into the bracket weld nuts. Tighten the bracket bolts to 8-12 Nm. **Figure 17.4**.
6. Unscrew the worm clamp so that the filter can be installed. Install the clamp into the bracket. Orient the clamp so that it can be easily tightened. Slide the filter over the bracket and through the clamp until the filter is correctly engaged with the bracket. The filter must be oriented so that the arrows are facing the direction of fuel flow; in from the fill valve and out to the tank. Tighten the clamp to secure the filter to the bracket. **Figure 17.5**.

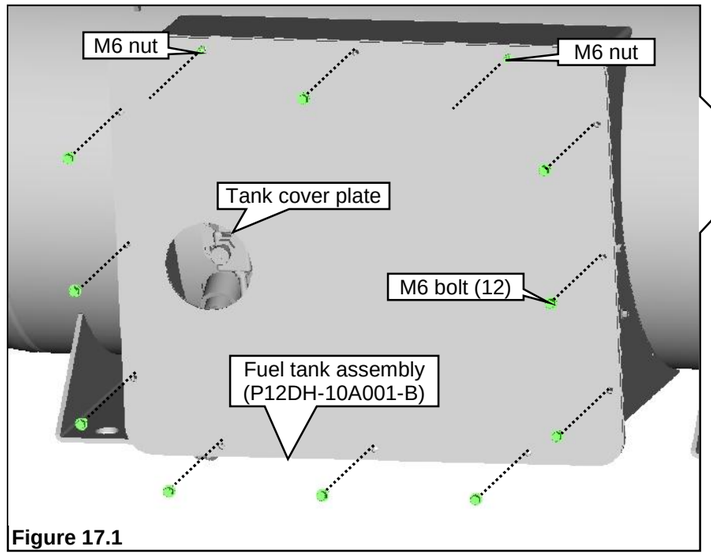


**Figure 17.1**

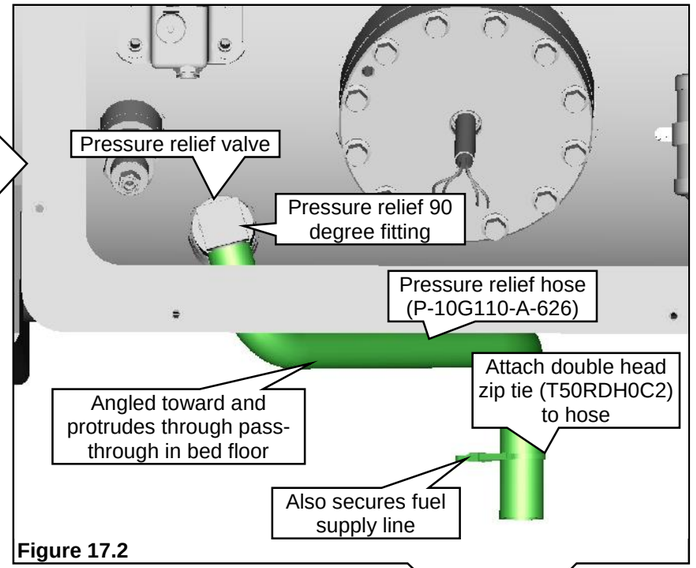


**Figure 17.2**

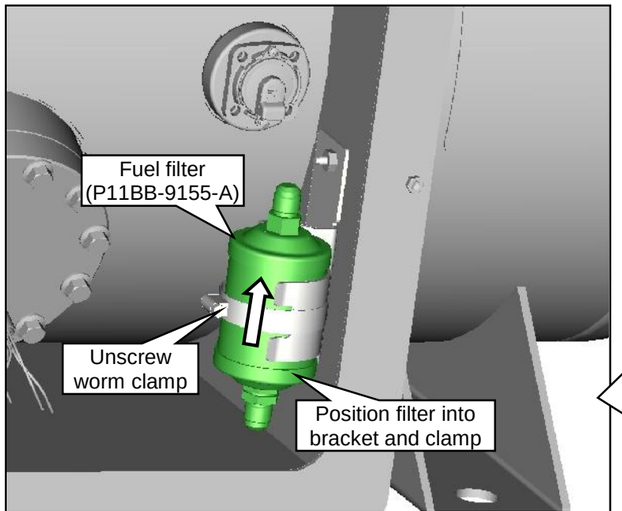


**Figure 17.5**

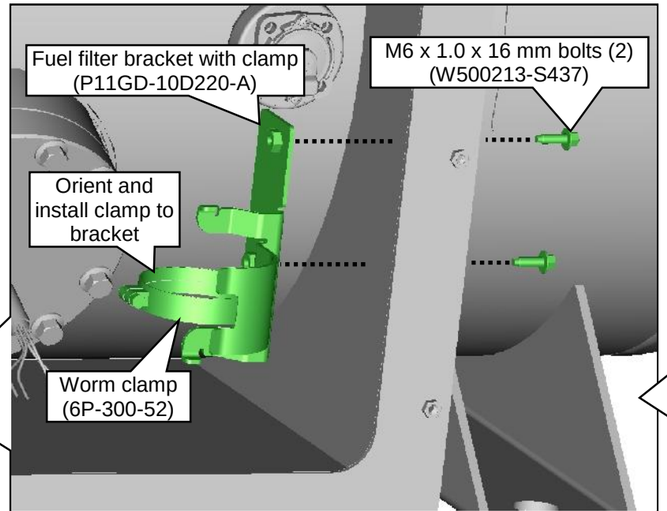


**Figure 17.4**

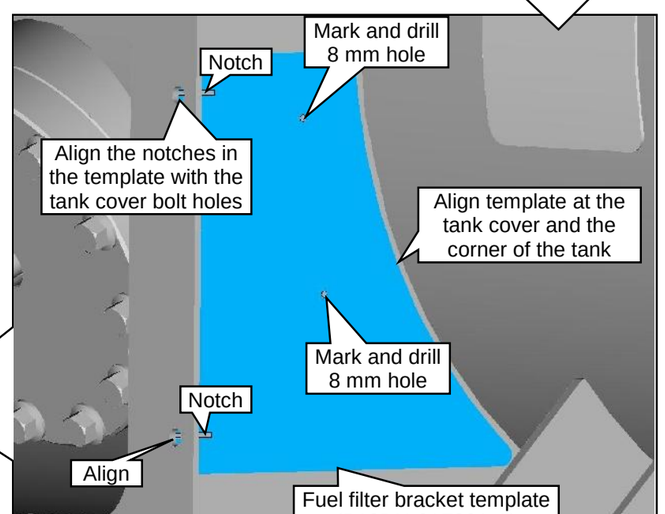


**Figure 17.3**

7. Position the fill line between the fuel filter and the overfill protection device (OPD) 90 degree fitting. Thread the line fittings into the filter and the OPD and tighten to specification. **Figure 18.1**.
8. Position the fill line between the fuel filter and down through the hole in the tank cover. Thread the line fitting into the filter and tighten to specification. **Figure 18.2**.
9. Position the tank fuel supply and fuel return lines under the tank and move the lines up through the hole at the bottom of the tank cover. Orient and connect the fuel supply line to the fuel supply circuit assembly (fuel supply valve). Orient and connect the fuel return line to the fuel return circuit assembly (fuel return valve). Push and pull on the quick-connect fittings to make sure the lines are secure. **Figure 18.3**.
10. Obtain a double head zip tie and install the zip tie to the anchor at the bottom of the tank. Attach the fuel supply and return lines to the double head zip tie on the zip tie anchor. Attach the fuel supply line to the double head zip on the pressure relief hose. **Figure 18.3**.
11. Connect the solenoid/sender harness to the fuel supply solenoid and to the fuel level sender. **Figure 18.4**.
12. Connect the fuel tank jumper harness to the solenoid/sender harness and to the two fuel pump connectors. **Figure 18.4**.
13. Position the fuel tank jumper harness pass-through end through the hole on the tank cover and under the tank. **Figure 18.4**.
14. Bundle the two harnesses together and zip tie to the welded bracket above the tank cover plate. **Figure 18.4**.
15. Full view with alternate jumper harness routing. **Figure 18.5**.

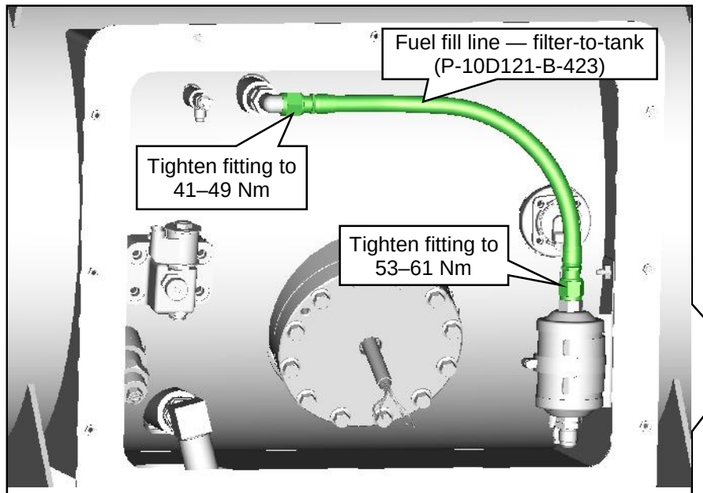


Figure 18.1

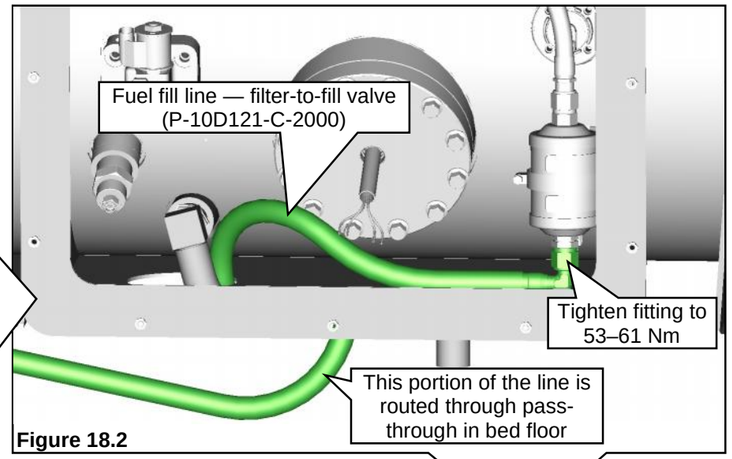


Figure 18.2

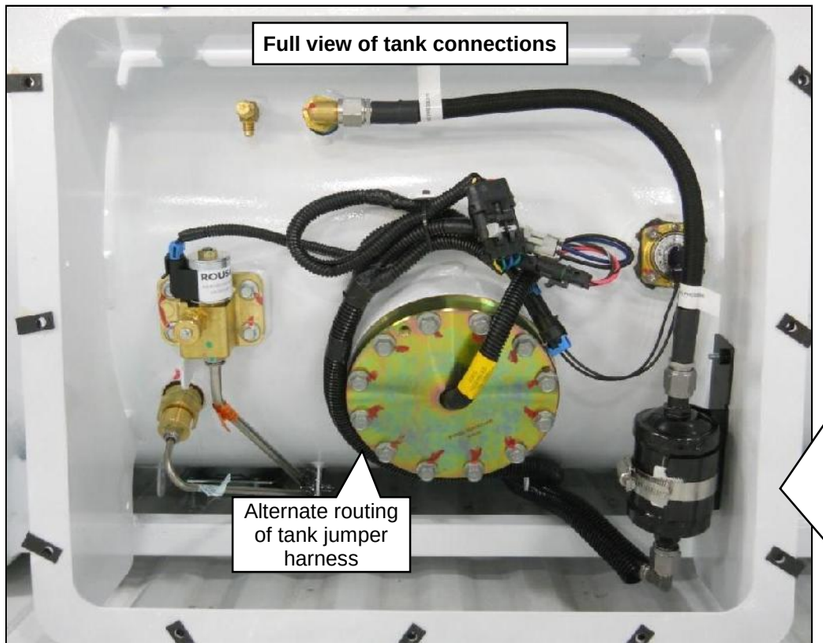


Figure 18.5

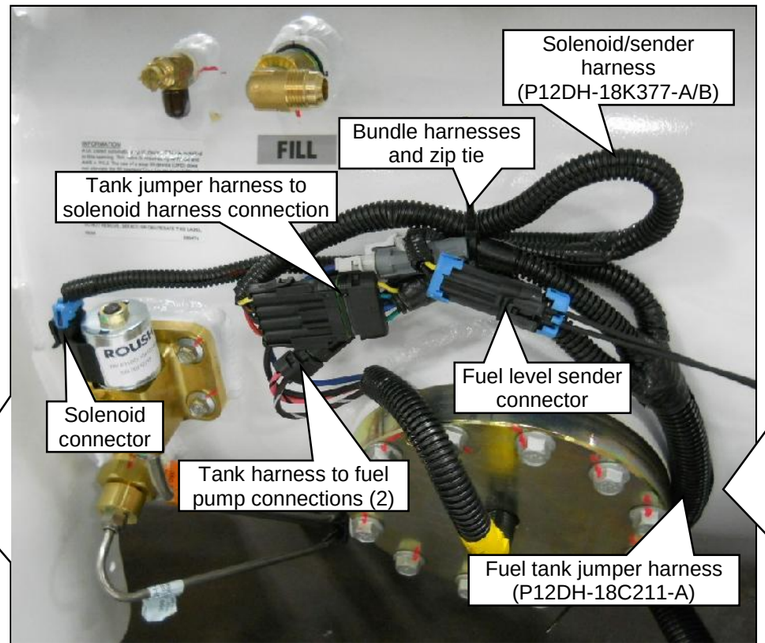


Figure 18.4

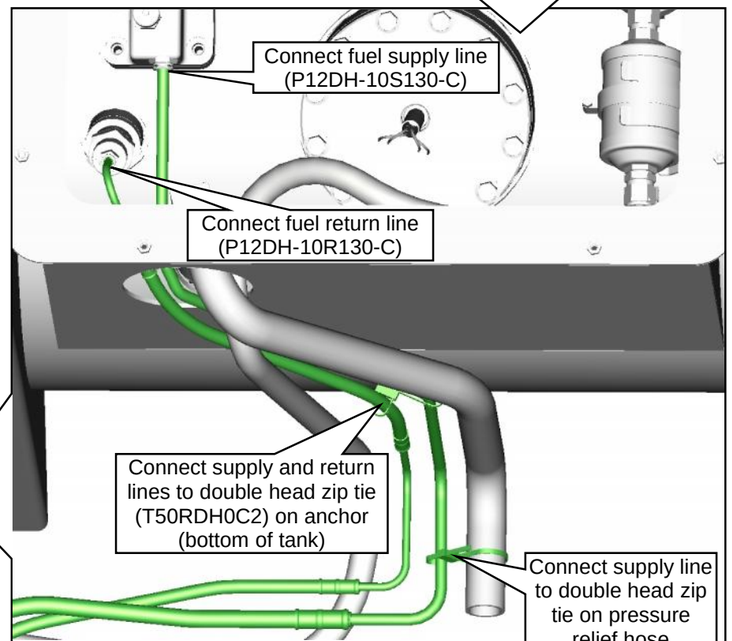


Figure 18.3

# INSTALLING NEW FUEL TANK

**Note:** The following parts are found in hardware kit P12DH-TANKMOUNT-F/G.

1. Install four rubber isolators, four isolator pads and four crushlimiters onto the four tank mounting bracket studs. **Figures 19.1**.
2. Using a suitable lifting device, attach the tank to the lift. Make sure the tank is centered and hangs horizontal to the bed and to the tank mounting brackets.
3. Position the fuel tank over the bed. Align the four mounting holes in the tank brackets with the tank mounting bracket studs. Carefully lower the tank onto the floor brackets, making sure the tank is firmly seated and all four holes are aligned with the four studs. **Note**: Make sure the tank is lowered straight down over the studs and that the pressure relief hose, fuel lines, fill line and wiring harness drop through the pass-through grommet in the bed. **Figures 19.2**. **Note**: These steps require an assistant to help install the tank and mounting hardware.
4. Install four upper rubber isolators into the tank brackets. Install one washer onto each of the four tank isolators. **Figures 19.3** and **19.4**.
5. Install the four nuts onto the tank bracket studs over the washers. Hand tighten the nuts until all are started. Tighten the fasteners to specification. **Figures 19.5** and **19.6**.

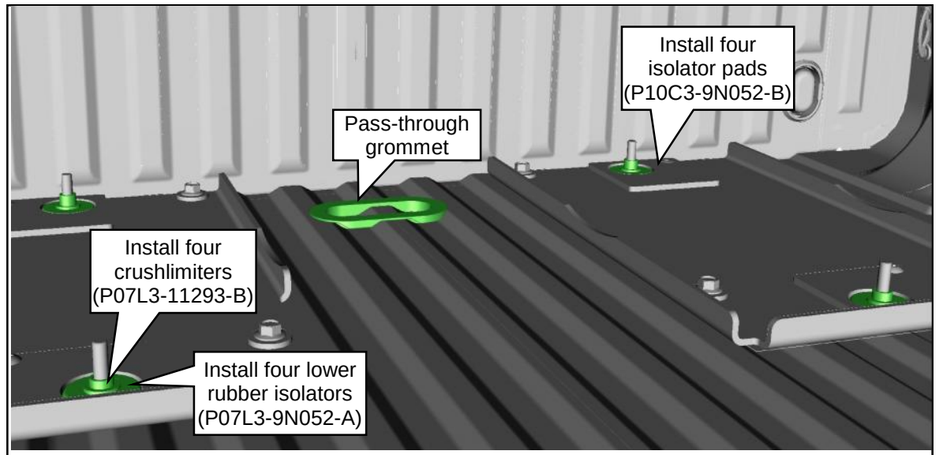



**Figure 19.1**

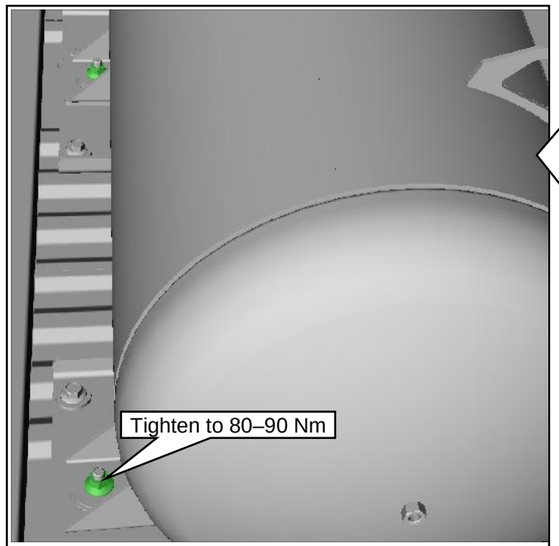



**Figure 19.5**

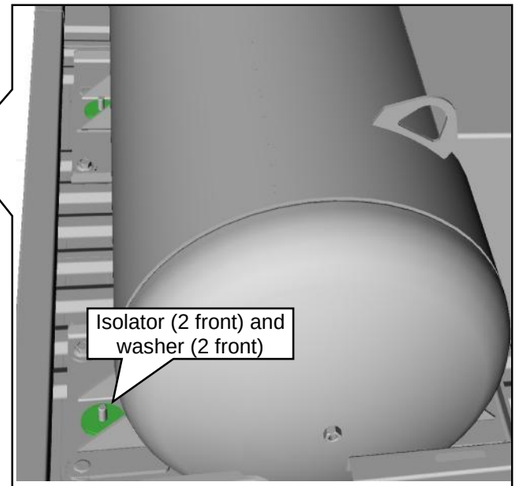



**Figure 19.4**

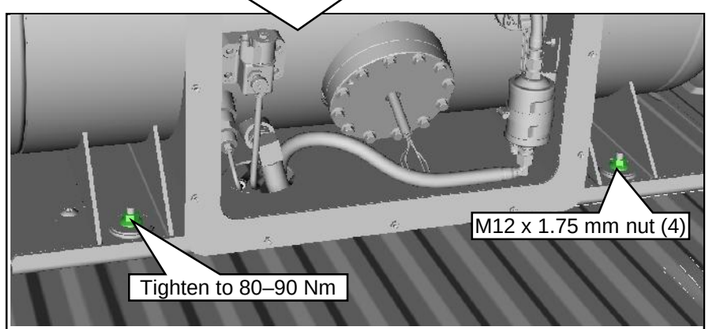



**Figure 19.6**

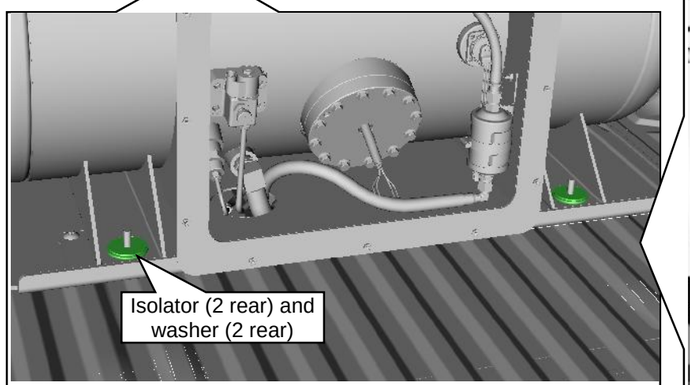



**Figure 19.3**

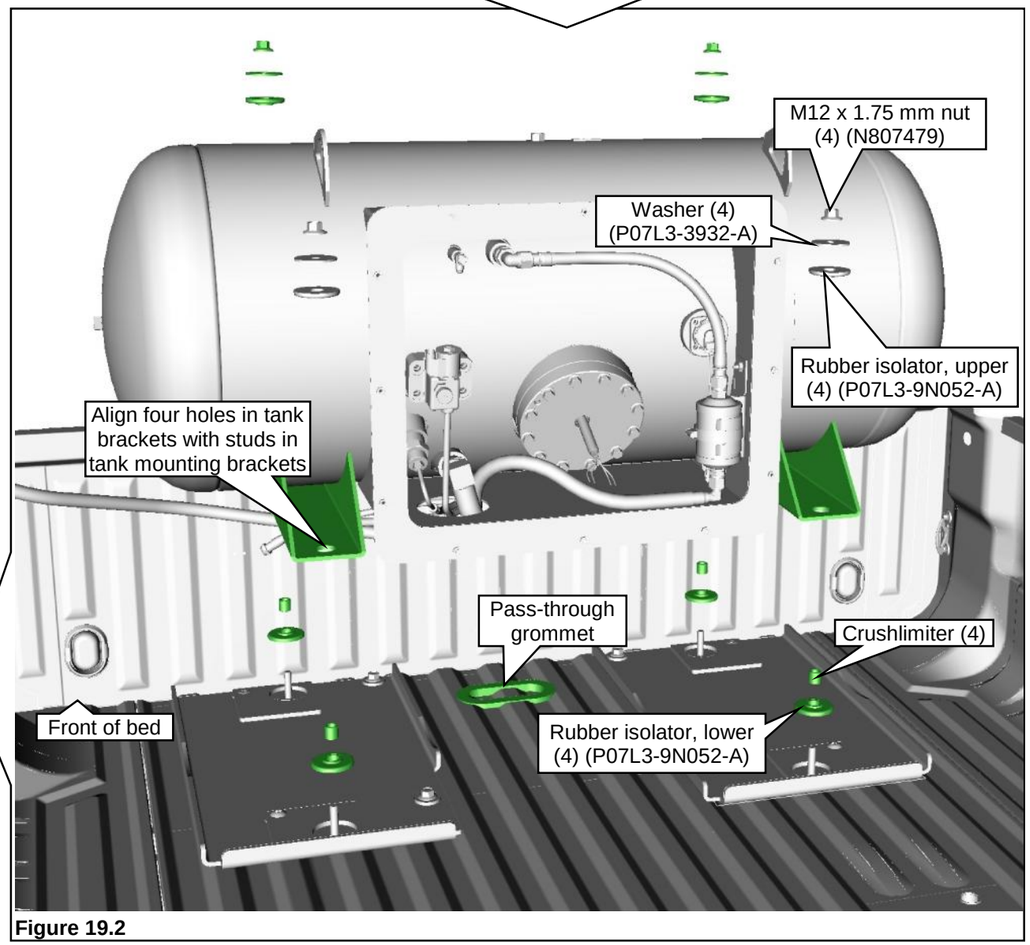



**Figure 19.2**

# INSTALLING NEW TANK FUEL SUPPLY AND RETURN LINES

1. From underneath, route the fuel supply line and return line from the tank over to the fuel lines on the frame rail. **Figure 20.2**.
2. Connect the flex portion of the tank fuel supply line to the fuel supply line on the frame rail with the quick-connect fitting. **Figure 20.1**.
3. Connect the flex portion of the tank fuel return line to the fuel return line on the frame rail with the quick-connect fitting. **Figure 20.1**.
4. If not done, zip tie the tank harness to the rear harness and make sure the three tank harness connectors are plugged in to the rear harness.

**Note:** There is various part numbers for these tank fuel supply and return lines based on vehicle configuration such as body style and wheelbase length.

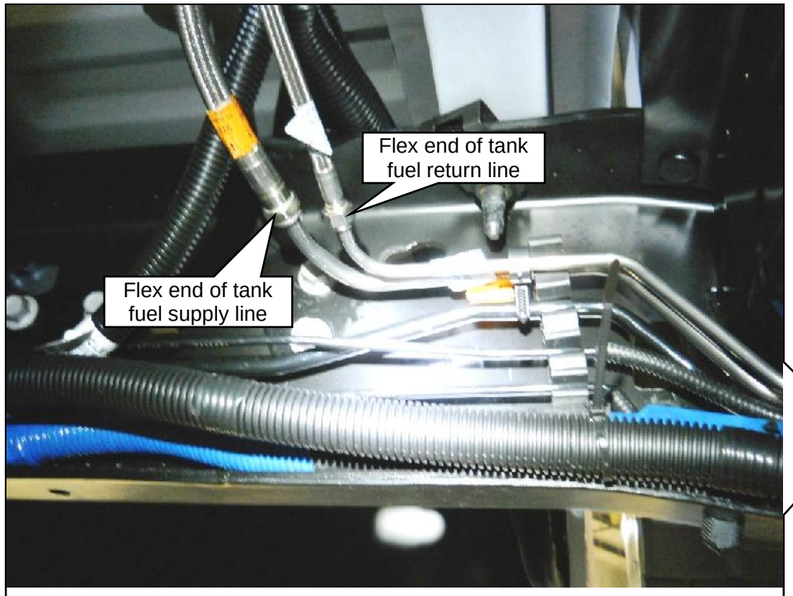


Figure 20.1

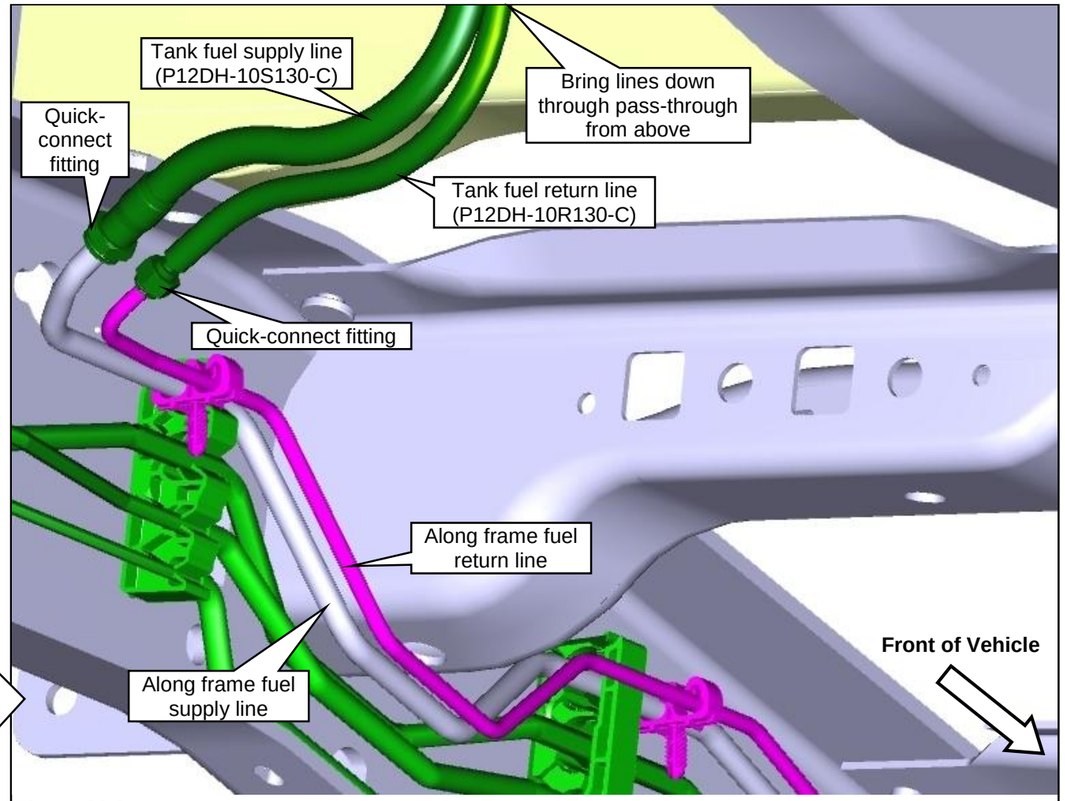


Figure 20.2

5. Make sure the tank harness ground is attached to the left frame rail. Clean the frame rail so that there is a good ground connection. **Figure 20.3**.
6. Route the tank harness over to the rear wiring harness. Bundle the harnesses together and use zip ties to secure the harnesses to each other. **Figure 20.4**.
7. Attach the three tank harness connectors to the rear harness tank connections. **Figure 20.4**.

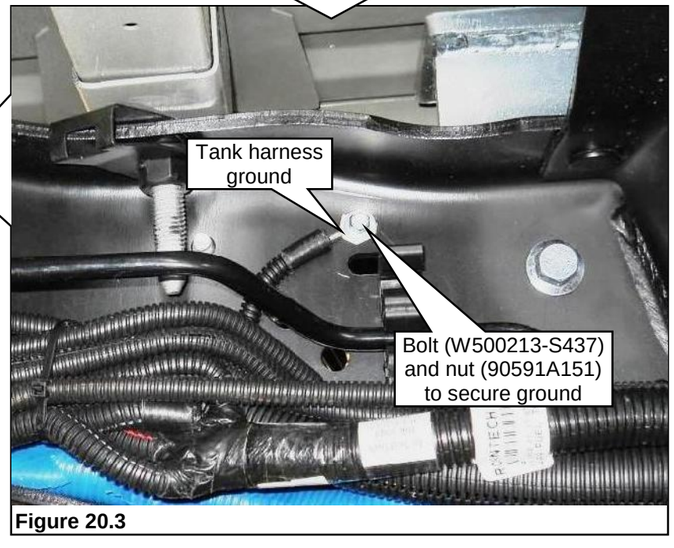


Figure 20.3

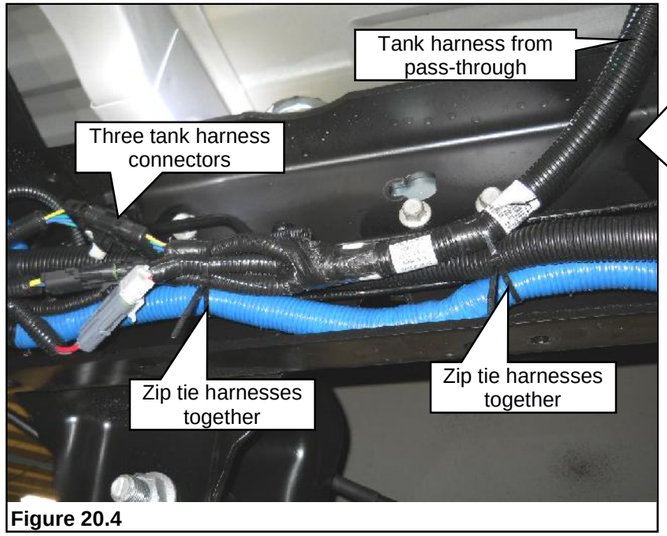


Figure 20.4

# INSTALLING NEW FUEL FILL SYSTEM

1. Attach the fuel fill valve to the fill neck mounting bracket using the washer and nut supplied with the valve. Support the assembly and tighten the nut. The fill valve and mounting bracket are found in hardware kit P12DH-FILLKIT-A. **Figure 21.1**.
2. Position the fuel fill valve and bracket into the back of the fuel fill door mount. Install the three M5 bolts supplied in hardware kit P12DH-FILLKIT-A into the fuel fill valve bracket, through the fill door opening. Tighten the bolts to specification. **Figures 21.2**.
3. Route the fuel fill line from the pass-through bracket over the left frame rail. Connect the fill line to the fill valve and tighten the fitting to specification. **Figures 21.3**, **21.4** and **21.5**.
4. Secure the fill line to the body using a cable tie edge clip. **Figure 21.4**.

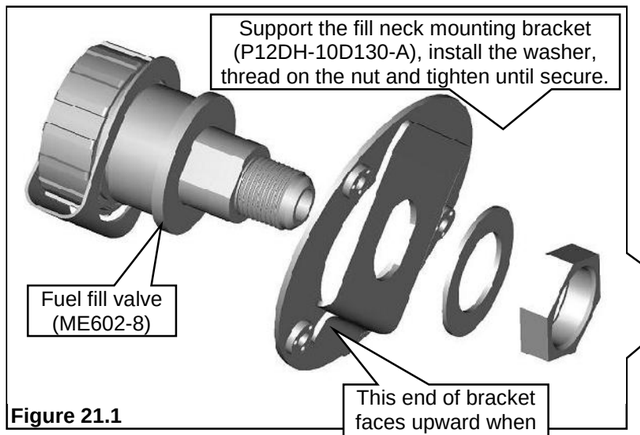



**Figure 21.1**

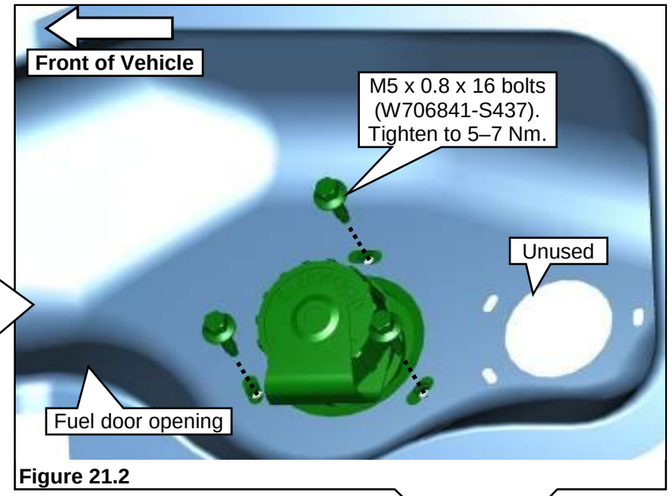



**Figure 21.2**

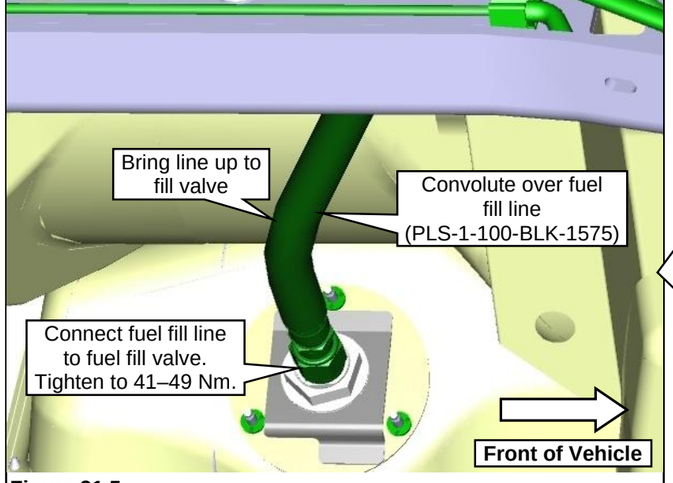



**Figure 21.5**

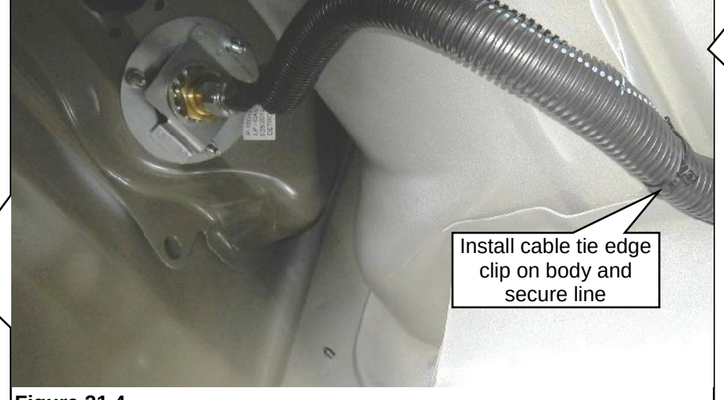



**Figure 21.4**

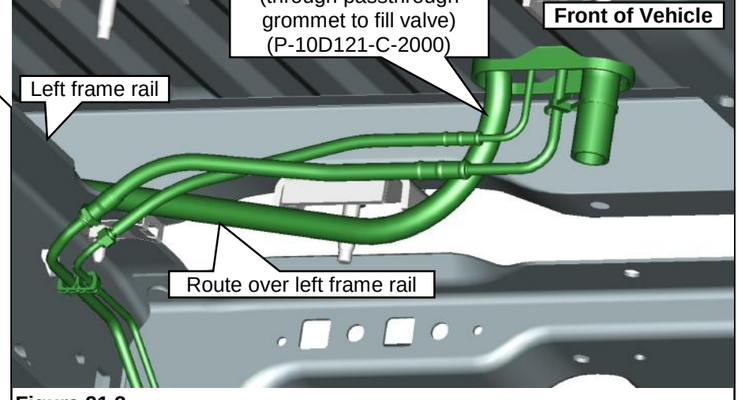



**Figure 21.3**

# INSTALLING FUEL RAIL PRESSURE CONTROL MODULE

1. Position the FRPCM close to the mounting bracket. Connect all fuel lines and the open end of the vapor purge hose assembly. Push all connections into the quick-connect fittings until secure. **Figures 22.4**, **22.5** and **22.6**.
   **Note:** Push and pull on the lines to make sure they are correctly installed in the quick-connect fittings.
   - Connect the fuel rail supply line to the bottom right port of the FRPCM.
   - Connect the forward fuel return line to the bottom left port of the FRPCM.
   - Connect the forward fuel supply line to the top right port of the FRPCM. This line is marked with a white tag indicating **TOP**. **Figure 22.5**.
   - Connect the fuel rail return line to the top left port on the FRPCM. This line is marked with a white tag indicating **TOP**. **Figure 22.5**.
2. Loosely install four M6 bolts found in hardware kit P12DH-ENGKIT-A to hold the FRPCM to the mounting bracket. **Note:** Place a P-clamp under the left front FRPCM M6 x 62 mm bolt. **Figures 22.1** and **22.2**. Tighten the four bolts to 8–12 Nm.
3. Connect the new vapor purge hose assembly to the vapor purge (bleed) port of the FRPCM.
4. Install original PVC hoses.
5. Attach the FRPCM harness connector into the underhood harness. Bundle the harnesses and use a zip tie to secure. **Figure 22.3**.
6. Using zip ties, secure the forward fuel lines and vapor line to the bracket on the transmission and along the line routing as needed.

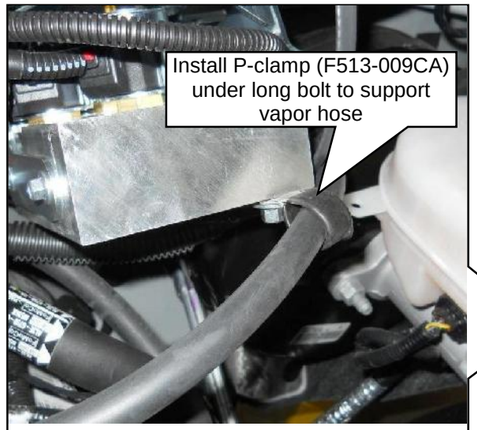



**Figure 22.1**

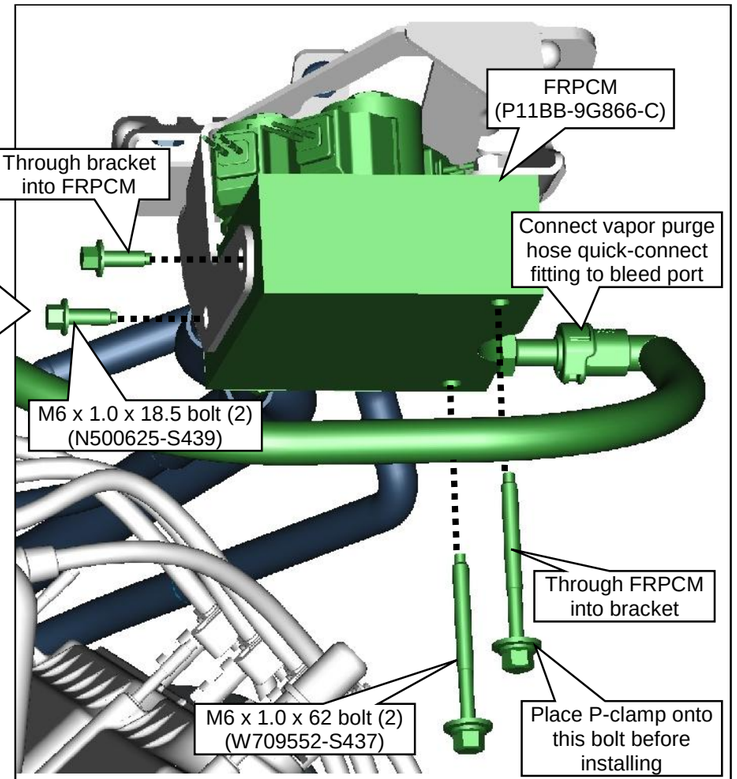



**Figure 22.2**

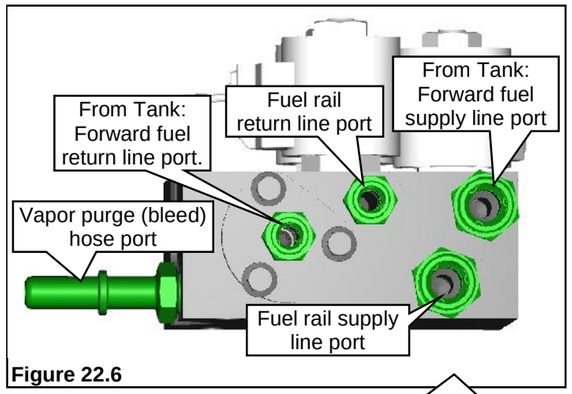



**Figure 22.6**

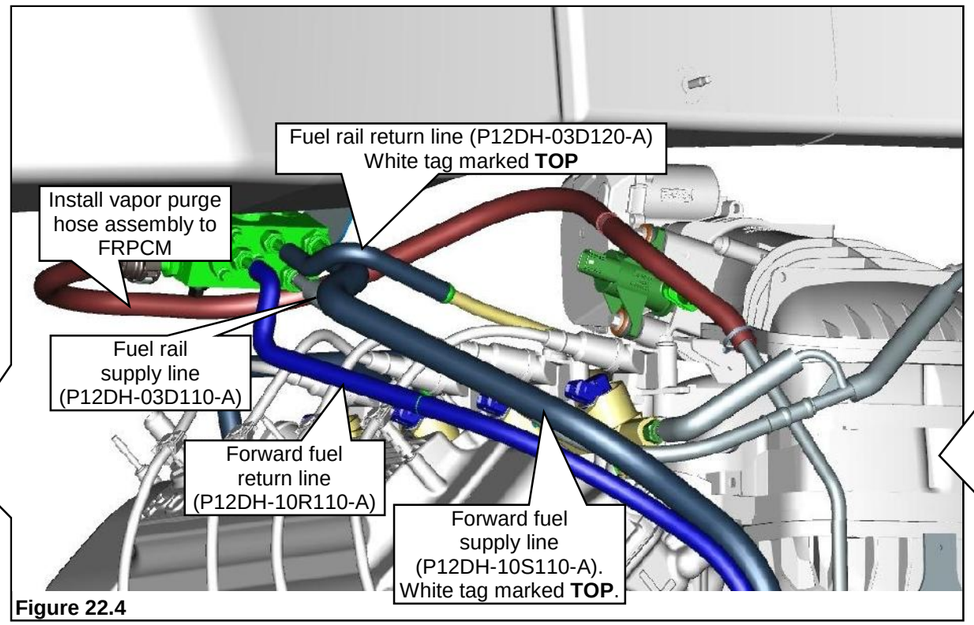



**Figure 22.4**

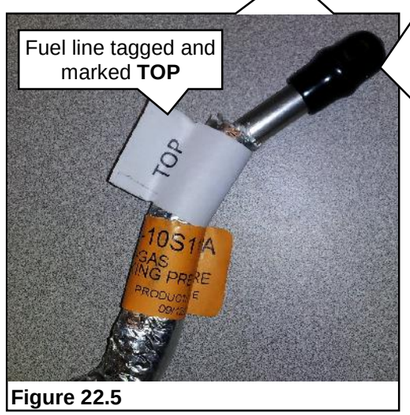



**Figure 22.5**

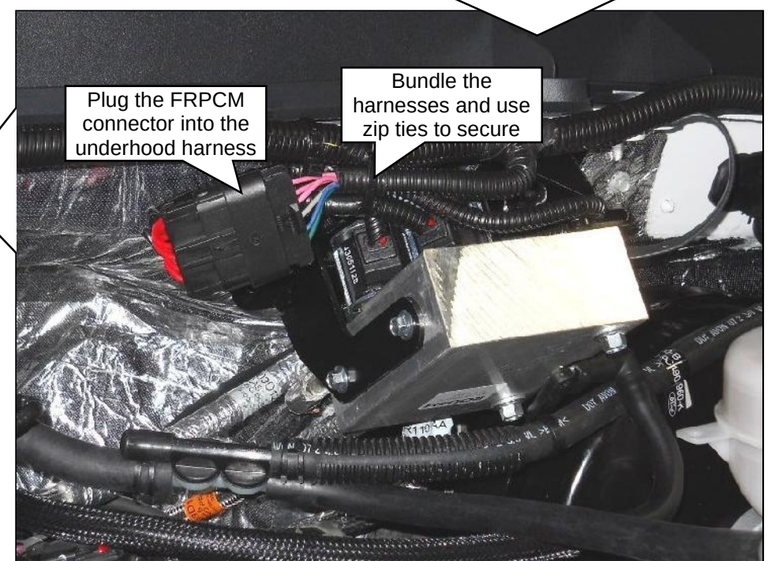
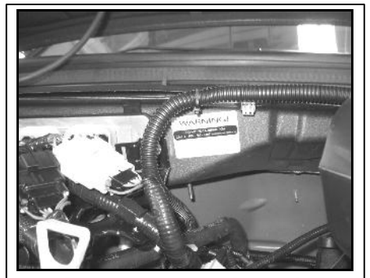



**Figure 22.3**

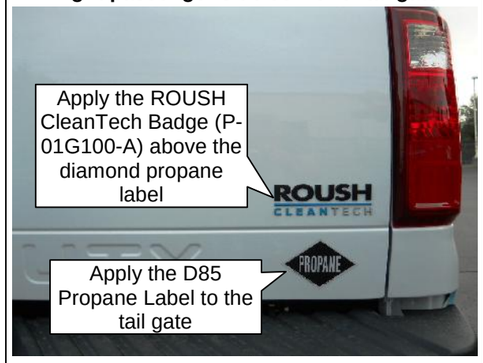
# INSTALLING BADGES AND LABELS AND COMPLETING THE KIT INSTALLATION

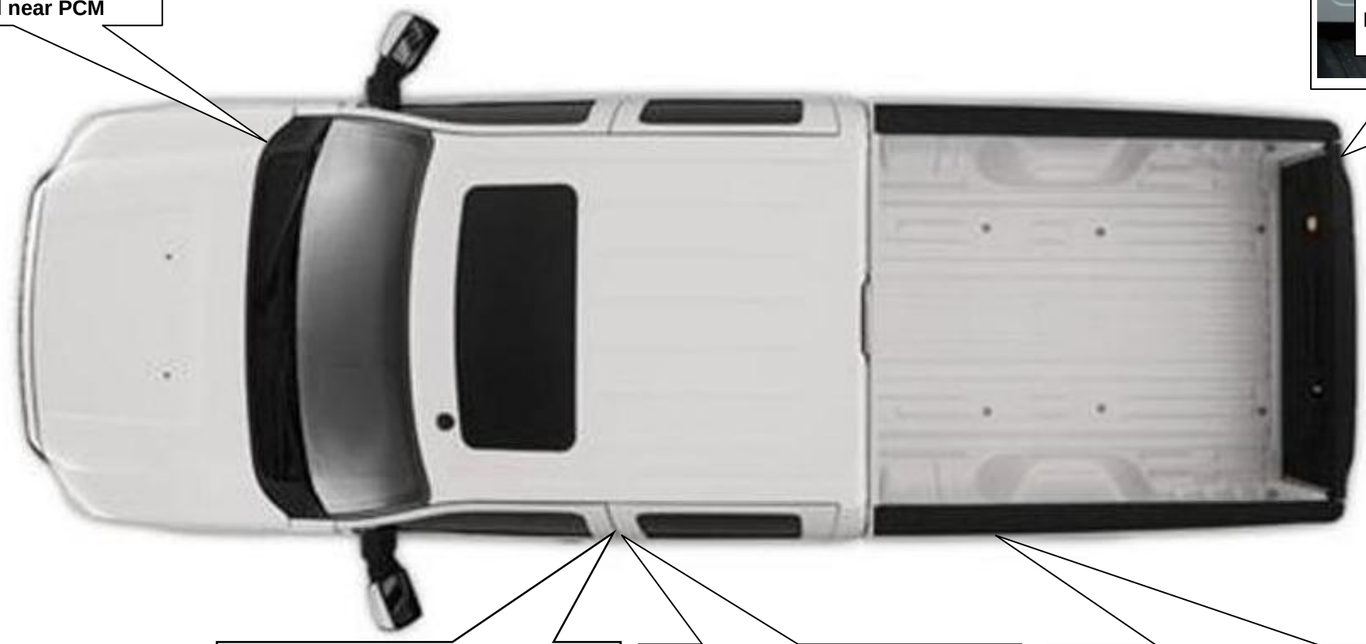


**PCM Tamper Warning Label (R07100008-A) on dash panel near PCM**

Apply the ROUSH CleanTech Badge above the diamond propane label on the right side of the tail gate using the template for correct positioning. **Note:** The template can be found on the next page of this document. Cut the template out of the page. The template page must be printed on 11x17 paper so that the template is the correct size.

**Right passenger side corner of tailgate**



## Badges and Labels

1. To prevent damage, label and badge installation should be performed in an environment with temperatures above 60°F. Clean and dry the area on the vehicle where labels will be placed. Labels can be found in hardware kit P12DH-LABELS-A.
2. Apply the labels in the locations shown.
3. Apply the ROUSH CleanTech VECI label to the location specified in the supplemental instructions included with the returned PCM. **Note:** These VECI 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.
4. Place the two PCM Tamper Warning Label (R07100008-A), one on the knee bolster, just above the OBDII diagnostic port and one on the dash panel near the PCM.
5. Install the hang tag label (P11BB-01A020-A) onto the rear view mirror of the vehicle.

## Completing the Kit Installation

1. Install the reprogrammed PCM following the procedure in the *Ford Workshop Manual, Section 303-14, Electronic Engine Controls.*
2. Install the vehicle battery and connect the positive and negative terminals. Tighten to 8-12 Nm. Make sure the power connection of the underhood harness has been installed and tightened.
3. Install the tank cover plate and tighten the cover bolts to 8–10 Nm.
4. Install the air induction system in the reverse order it was removed.
5. Reconnect the MAF sensor.
6. Four Wheel Drive Vehicles: Install front drive shaft between transfer case and front axle.
7. Perform the Fill/Start/End-of-Line Check following the established ROUSH CleanTech procedure.
8. After system leak check, close the bleeder valve on the tank and open the remote bleeder valve (if applicable) to evacuate the bleed line. When complete, close the remote bleeder valve as well as the tank bleeder valve.

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

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

**Overfill Protection Device Label (P11BB-01C200-B) at mid-door**

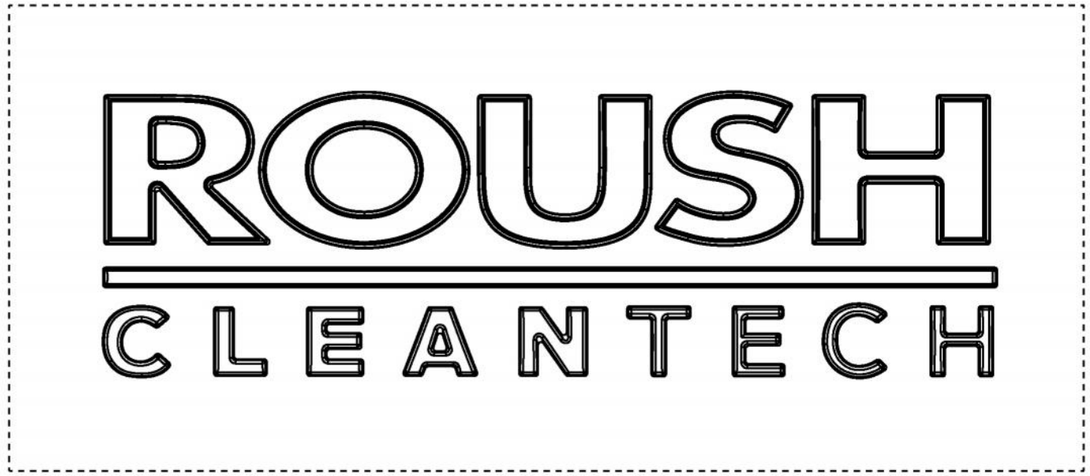
**HD5 Propane Label (P07L3-9A095-A) at top**

**350 PSI Working Pressure Label (P07L3-9A095-I) at bottom center left**

# ROUSH CLEANTECH BADGE INSTALLATION

Cut the template out of this page, and if necessary, save for reuse. Cut along all dotted lines. Use non-marring tape to secure the template to the vehicle.

**Note:** This page must be printed on 11x17 paper so that the template prints at the correct size.

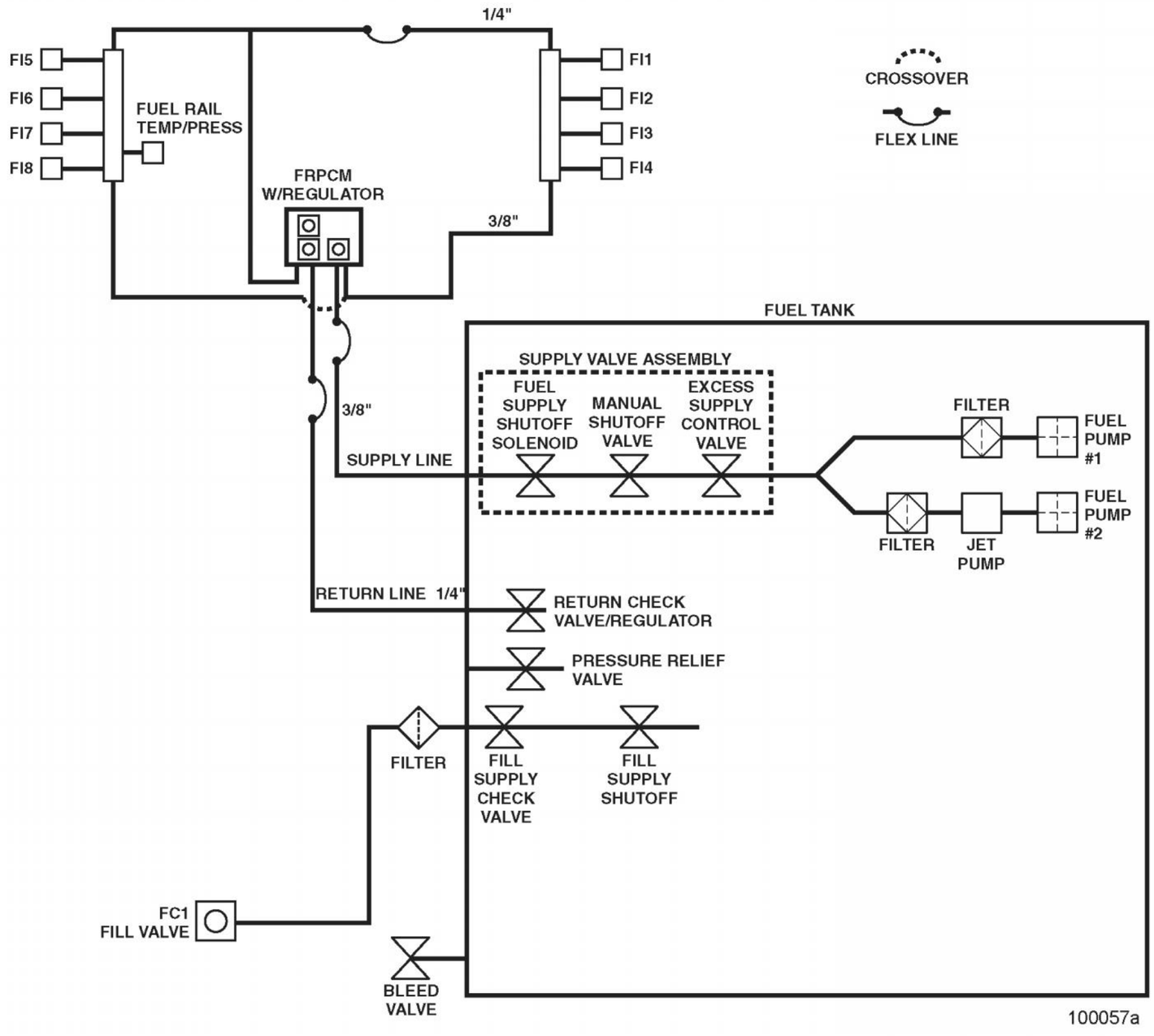



## ROUSH CLEANTECH BADGE INSTALLATION TEMPLATE

### For F-250 and F-350 Pickups

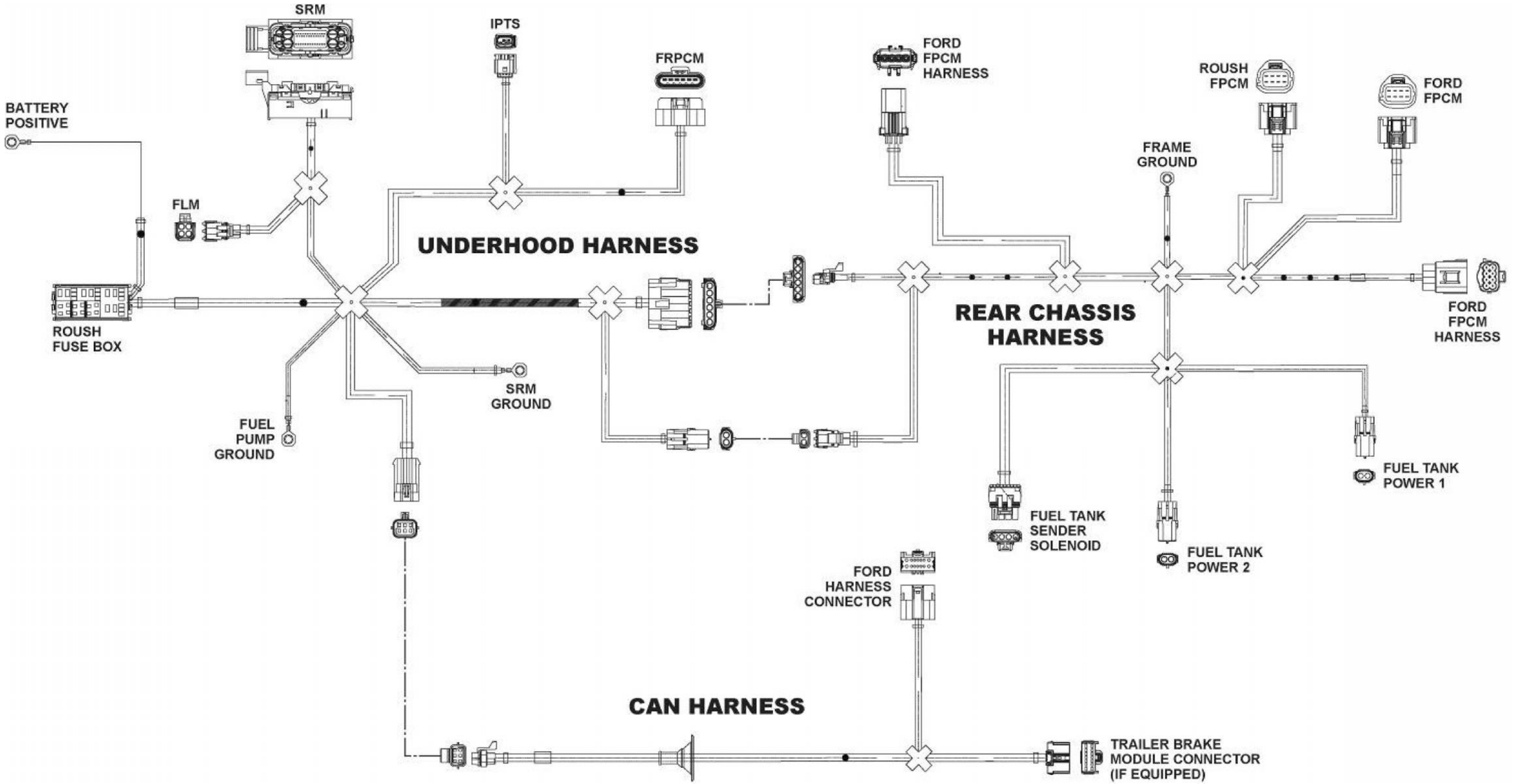
1. Clean the badge bonding area using isopropyl alcohol with a lint free towel.
2. Wipe the bonding surface dry immediately with a dry, lint free cloth or allow the solvent time to flash off.
   **Note:** The time between surface preparation and badge install must NOT exceed 20 minutes.
3. Using non-marring tape, secure this template to the left front fender of the vehicle.
4. Remove the backing by pulling it back at approximately 180 degrees.
   **Note:** The time prior to application of the badge must NOT exceed three minutes.
   **Note:** Avoid finger contact with the adhesive surface of the badge at all times.
5. Locate the badge to the body using the template for alignment.
   **Note:** Application of the badge should be done between 60–90°F (16–32°C).
6. Remove the carrier strip by pulling it back at an angle of approximately 180 degrees.
7. Pressurize the badge by applying consistent and uniform force over the entire surface of the badge, including a minimum of three seconds of dwell time.
   **Note:** If available, use a roller, a bladder or a bladder roller for best results.
8. Remove the template.

## SCHEMATIC — FUEL SYSTEM

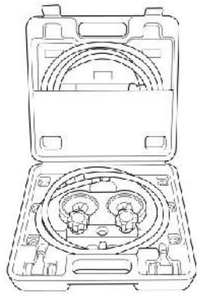


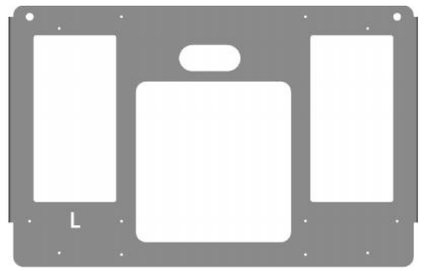
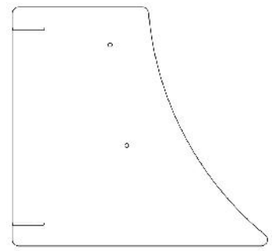
## SCHEMATIC — WIRING HARNESS

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



## 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 Saws — 1”, 29 mm, 1-1/8”, 1-5/16”, 1-1/2” and 2-1/2”** |

| | | | | | |
|---|---|---|---|---|---|
|  |  |  |  |  |  |
| **Drill Bits — 1/8”, 8 mm, 1/2” and 14 mm (9/16”)** | **Vacuum Gauge** | **Vacuum Pump** | **Dielectric Grease** | **Tank Mounting Bracket Template (P12DH-01F250-C)** | **Fuel Filter Bracket Template (P12DH-01F201-A)** |