Ford F-250/F-350 Pickups and Chassis Cab
Liquid Propane Autogas Fuel System — In-Bed Tanks

Revision History		
-AA	Initial Release	12/2012
-AB	Revised FTPT (pg 9, pg 14) Revised Fuel Line to FRPCM (pg 21)	2/2013

Installation Instructions

P12DH-01F001-AB

December, 2012
Rev, February 2013

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 1.2–1.4**. Disconnect the battery terminals.

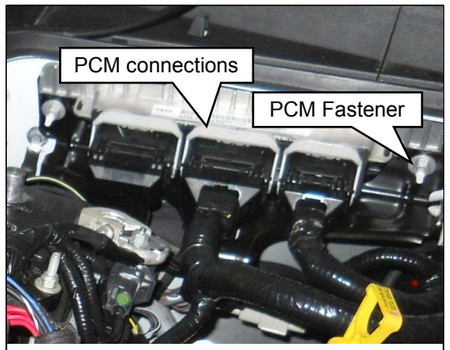


Figure 1.1

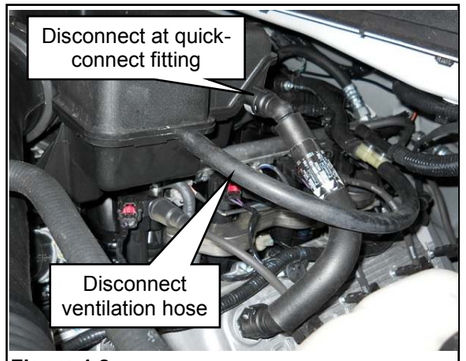
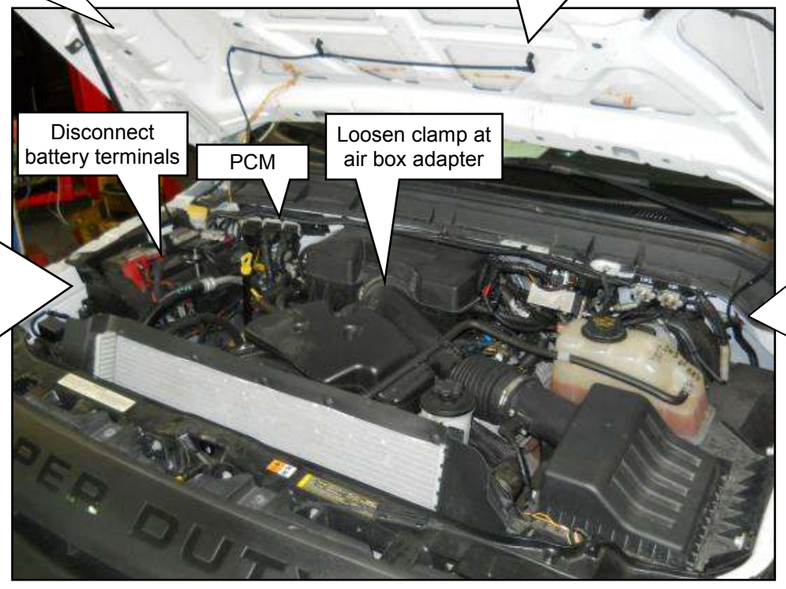
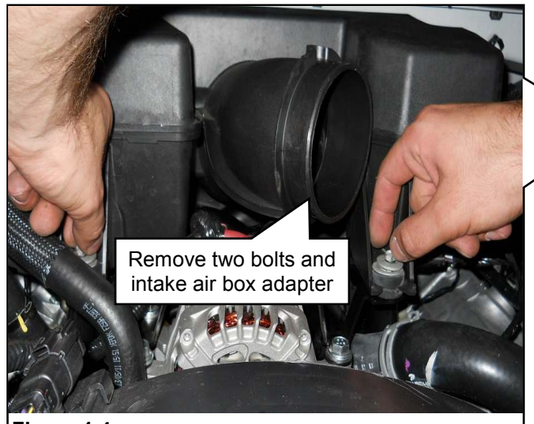


Figure 1.2





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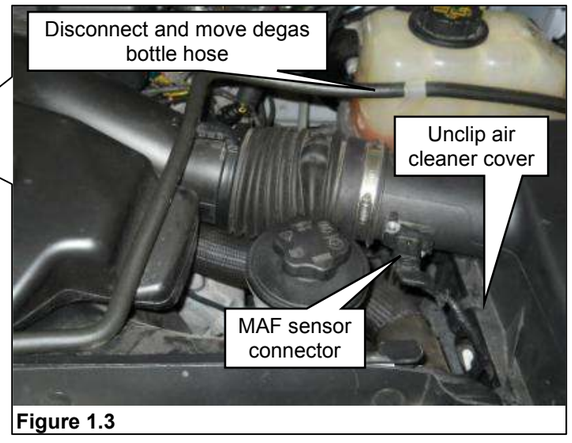


Figure 1.3

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.

DISCARD REUSE NEW

PREPARING ENGINE COMPARTMENT

1. Disconnect and remove the positive crankcase ventilation (PCV) tube to gain clearance. **Figure 2.1**.
2. Disconnect the tube from the VMV. Do not remove the VMV from the engine. **Figure 2.2**.
3. Disconnect the OEM fuel line from the left side fuel rail. **Figure 2.2**.
4. 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**.
5. Remove the battery from the vehicle. Dislodge the battery tray for underhood harness installation. **Figures 2.3–2.4**. **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*.

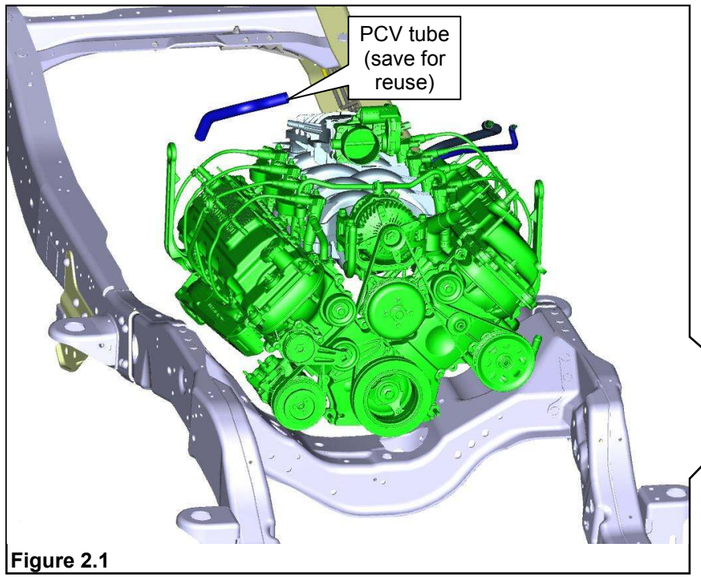


Figure 2.1

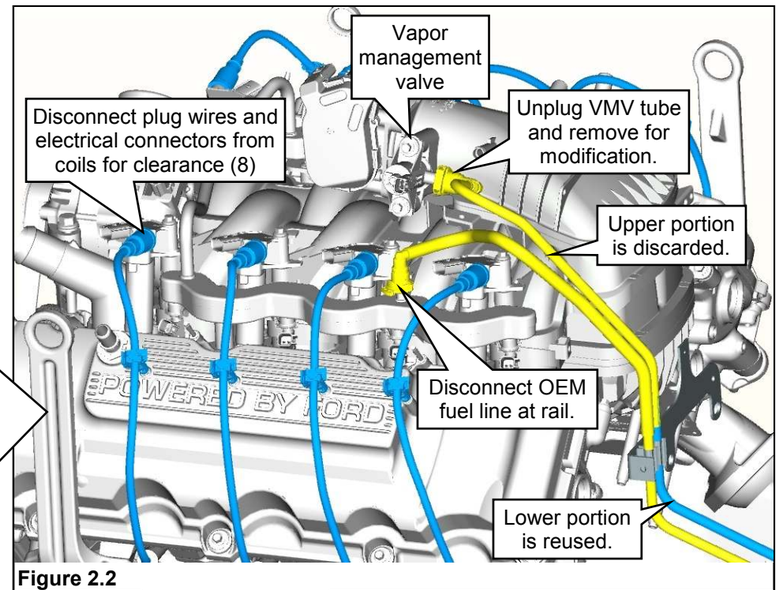


Figure 2.2

Figure 2.4

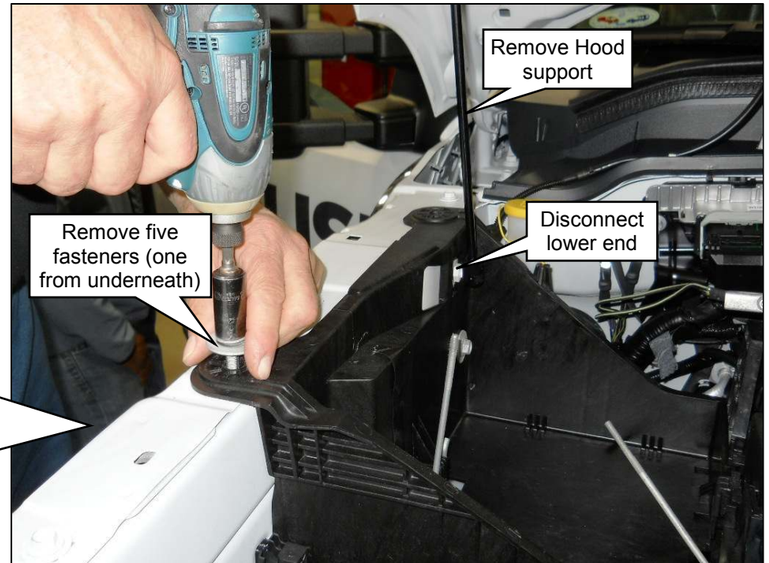


Figure 2.3

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.**

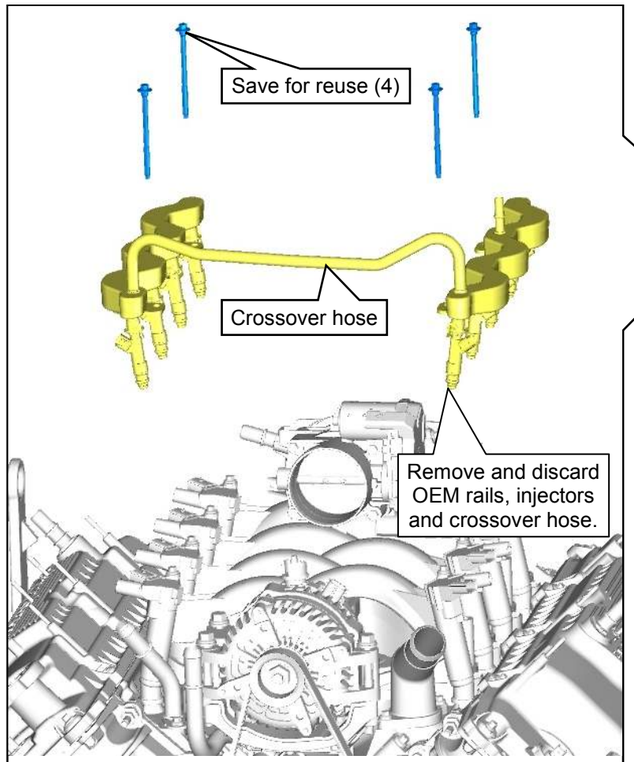


Figure 3.1

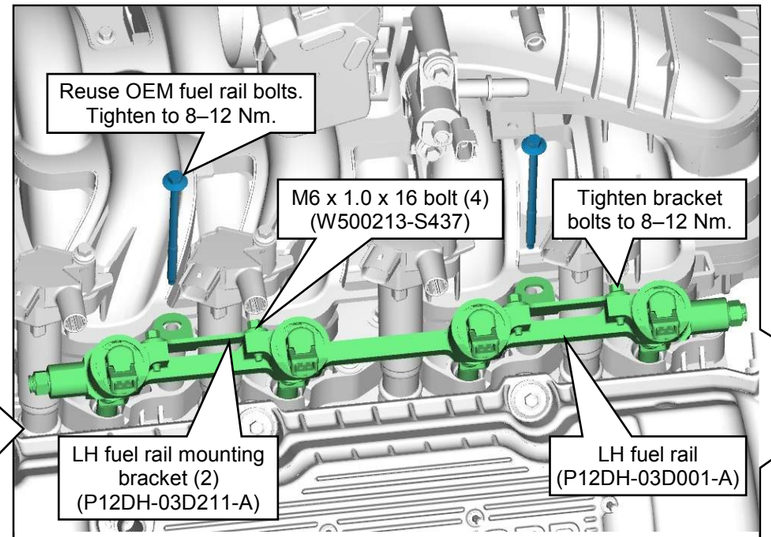


Figure 3.2

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**.

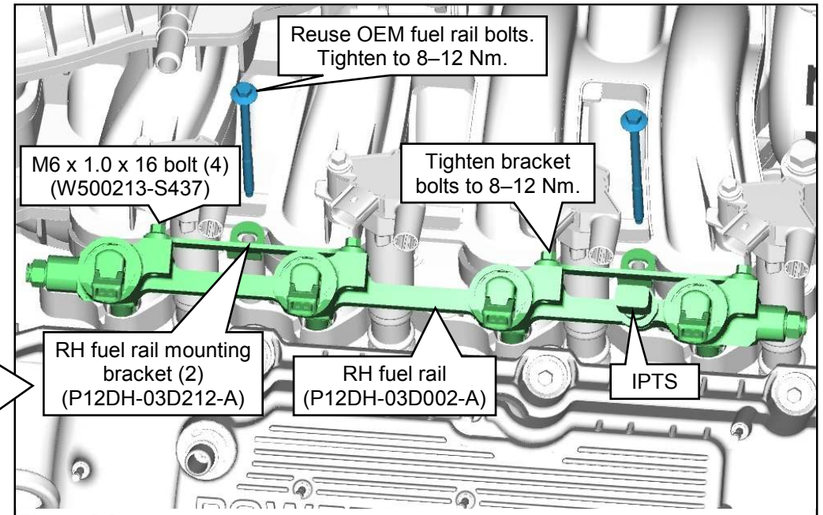
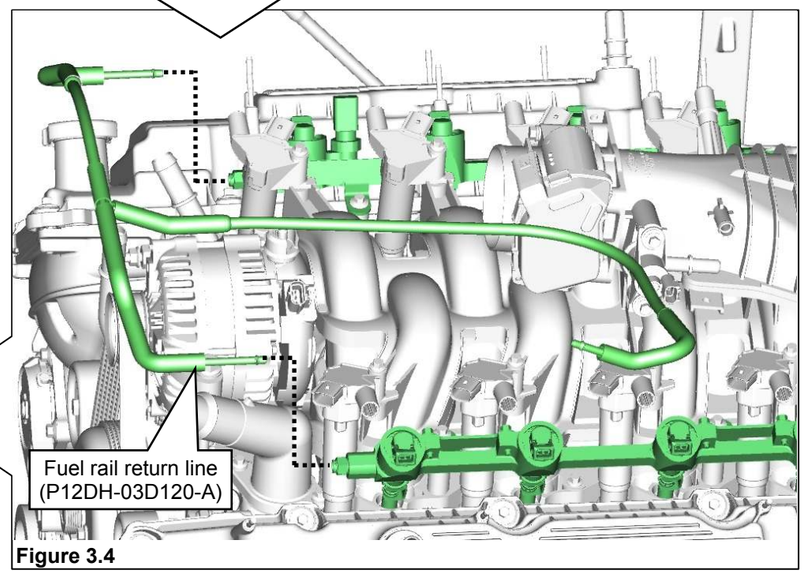


Figure 3.3



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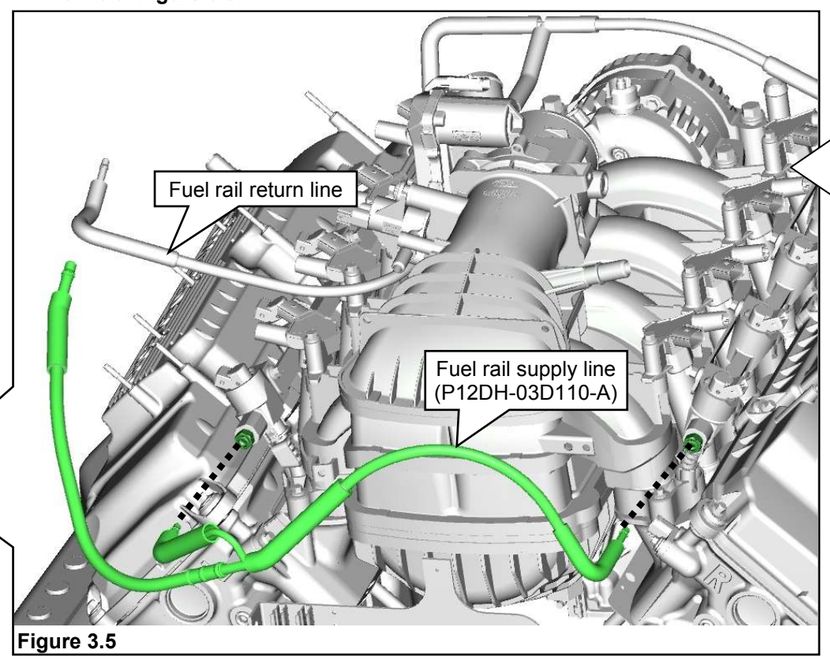


Figure 3.5

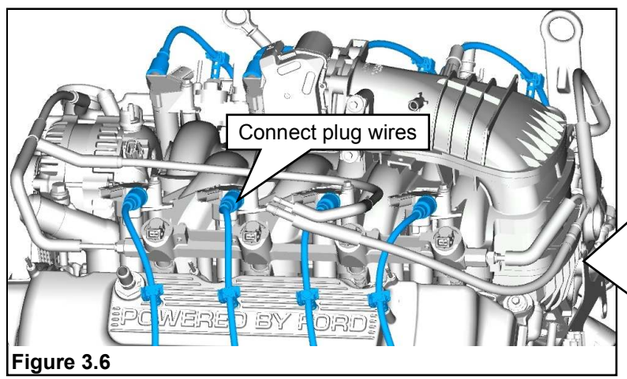


Figure 3.6

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**.

DISCARD REUSE NEW

INSTALLING FUEL RAIL PRESSURE CONTROL MODULE BRACKET AND VAPOR PURGE HOSE

1. Position and install the vapor purge hose to the vapor line coming from the vapor canister (must be modified, refer to page 12) and to the vapor management valve (VMV) on the intake manifold. The open end of the purge hose is connected after the fuel rail pressure control module (FRPCM) is installed. **Figure 4.1**.
2. 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 4.2**.
3. 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 4.3**.
4. 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 4.4**.

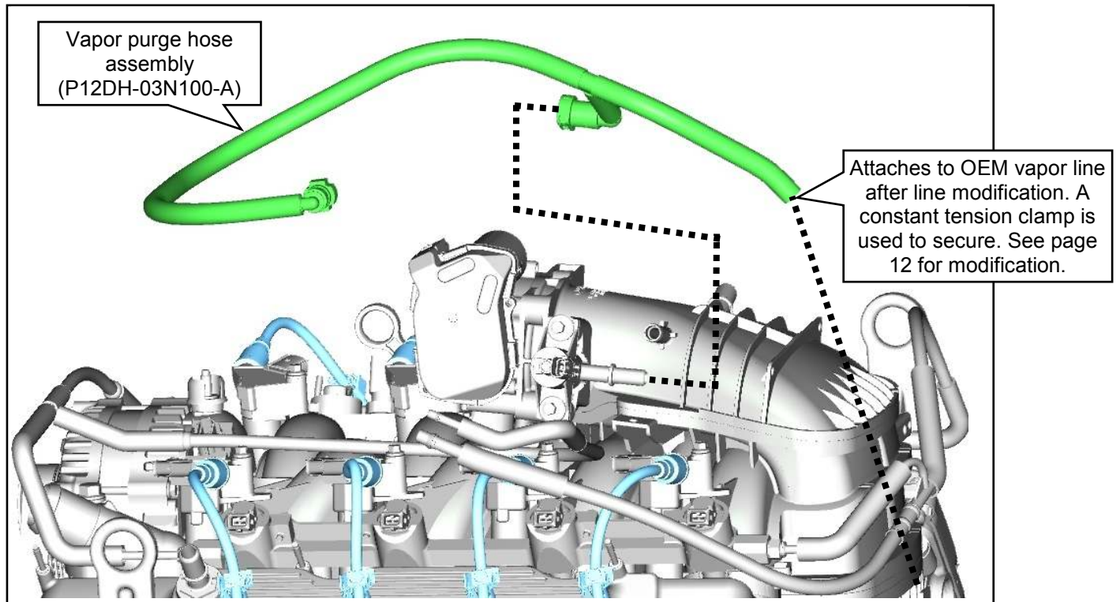


Figure 4.1

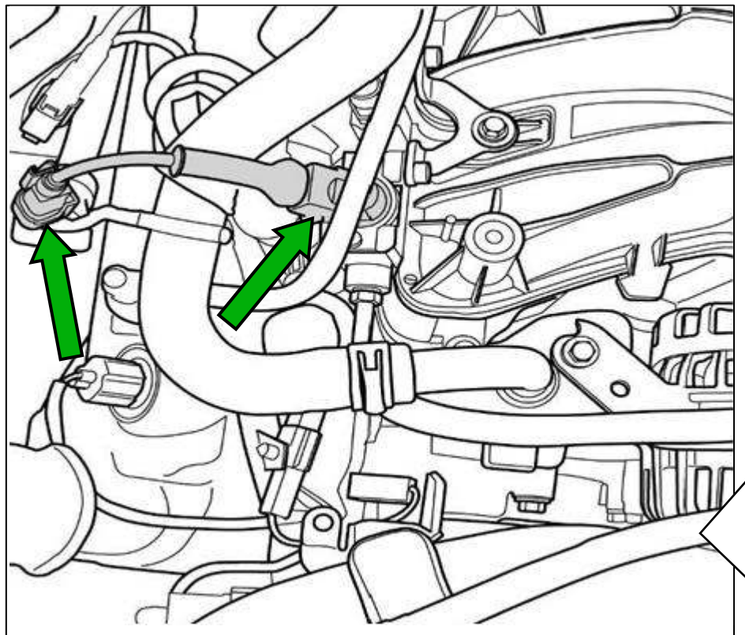

Fuel injector jumper (P07L3-9C978-A). Install between each injector and engine injector harness.

Figure 4.4

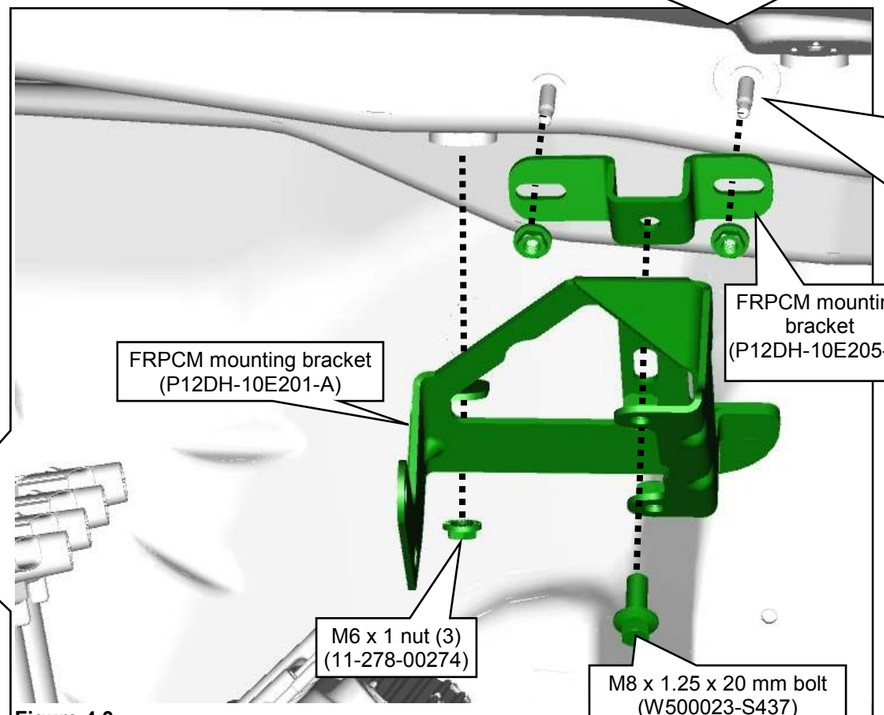


Figure 4.3

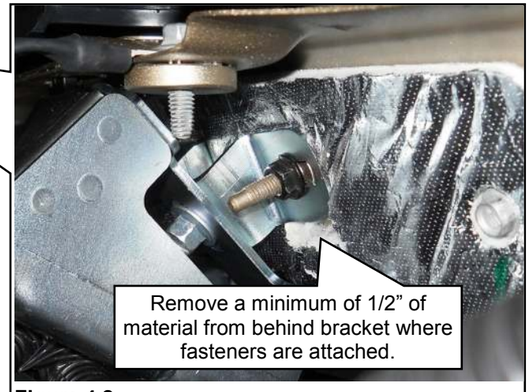


Figure 4.2

DISCARD REUSE NEW

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**.

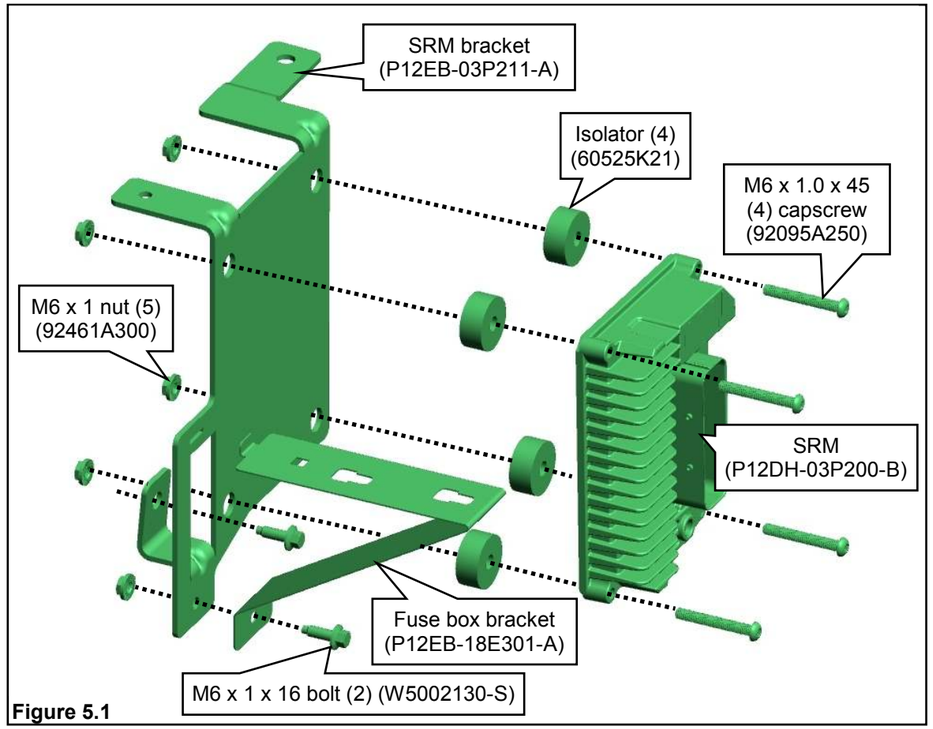
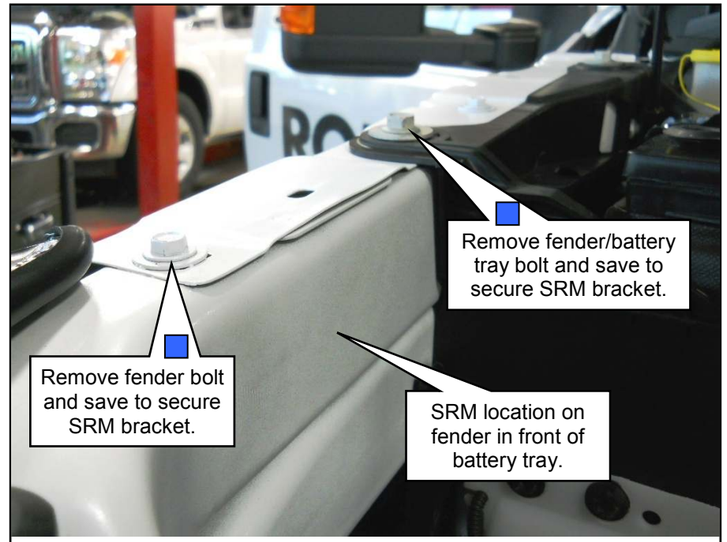


Figure 5.1



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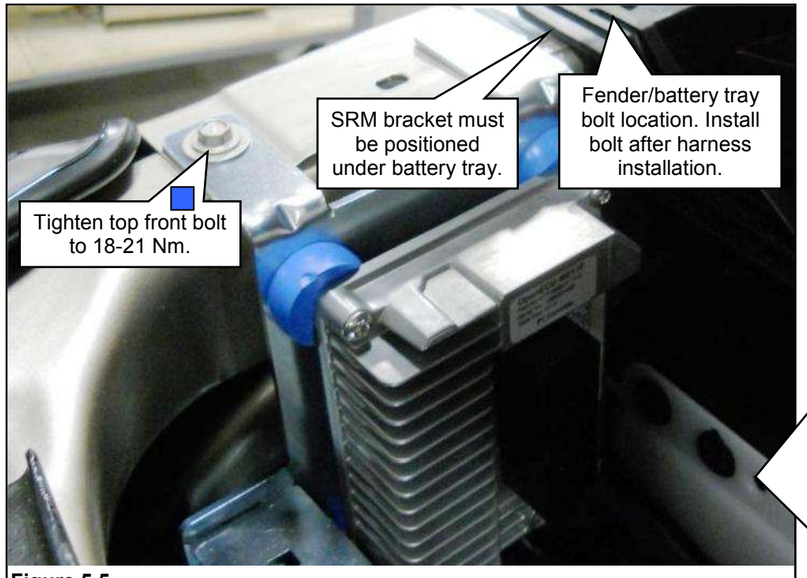


Figure 5.5

Figure 5.4

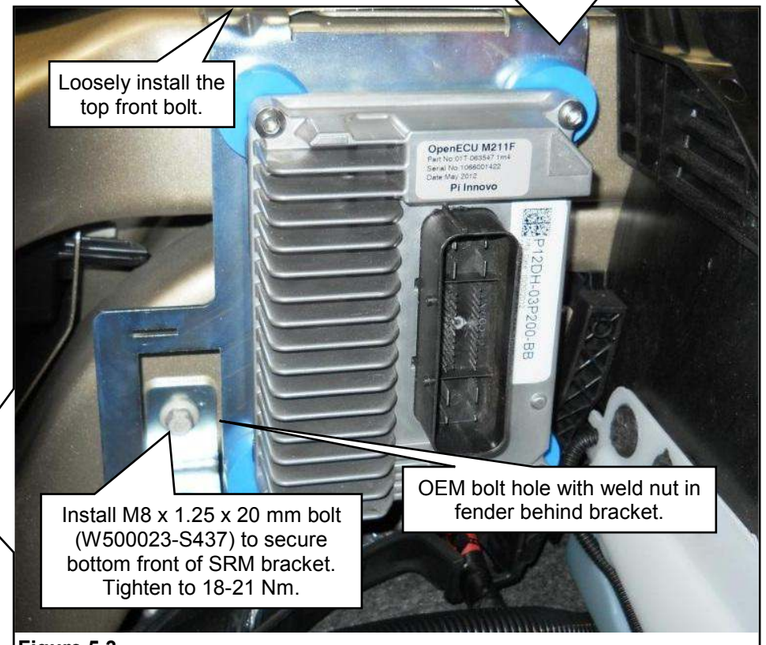


Figure 5.3

DISCARD REUSE NEW

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. **Figure 6.4 and Figure 6.5**.

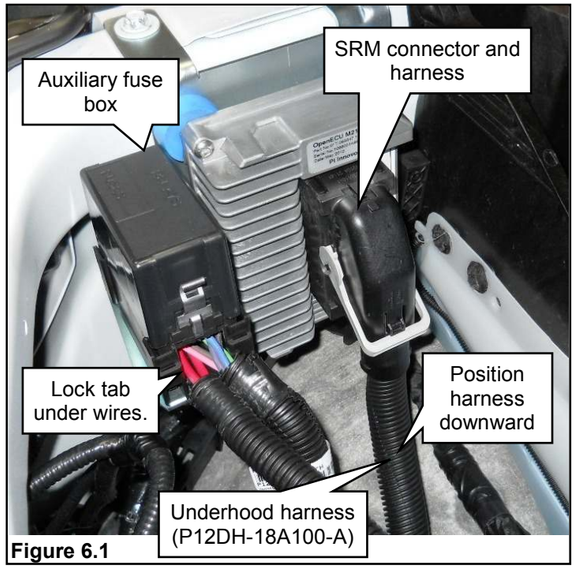


Figure 6.1

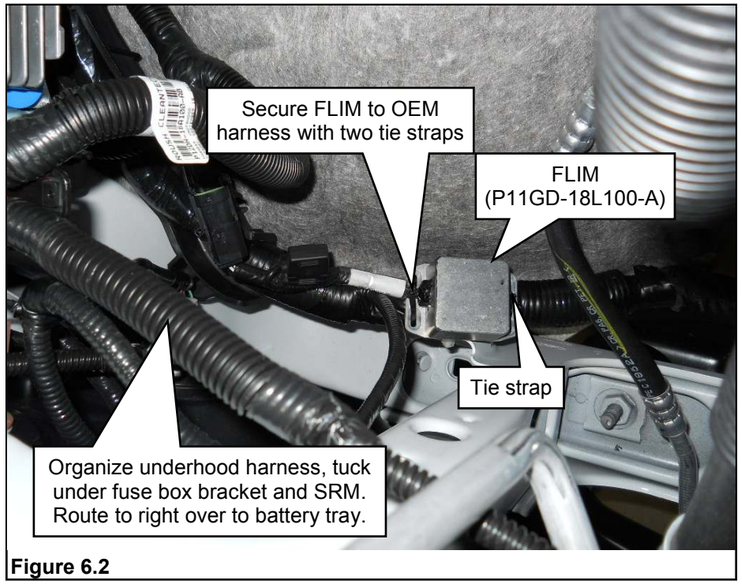


Figure 6.2

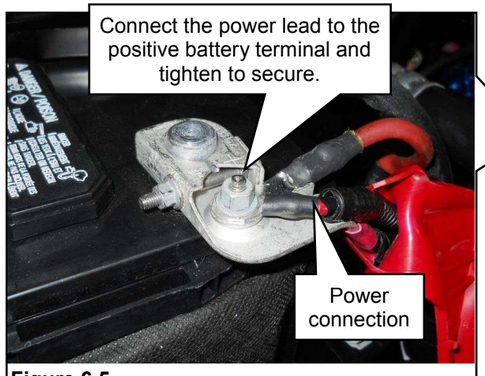


Figure 6.5

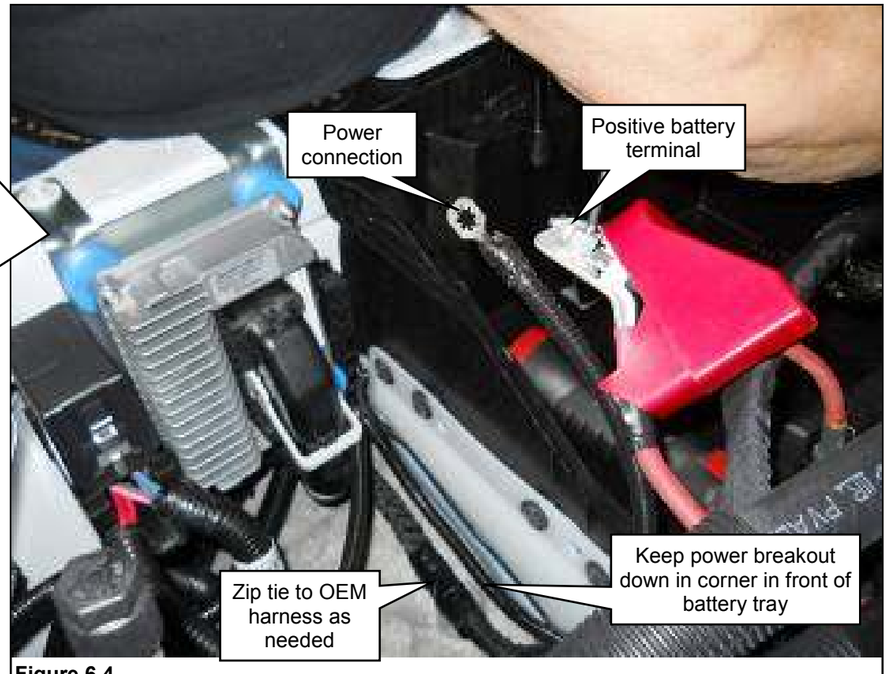


Figure 6.4

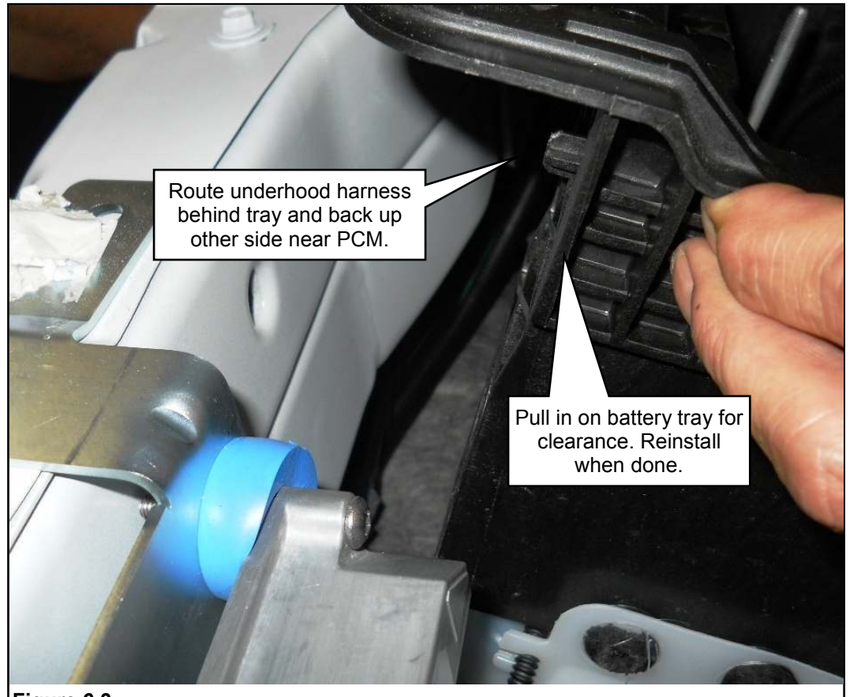


Figure 6.3

DISCARD REUSE NEW

INSTALLING UNDERHOOD WIRING HARNESS (CONTINUED)

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.

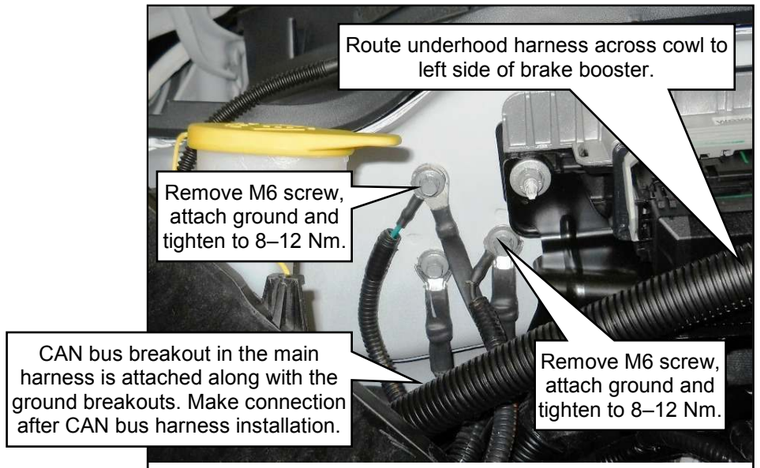
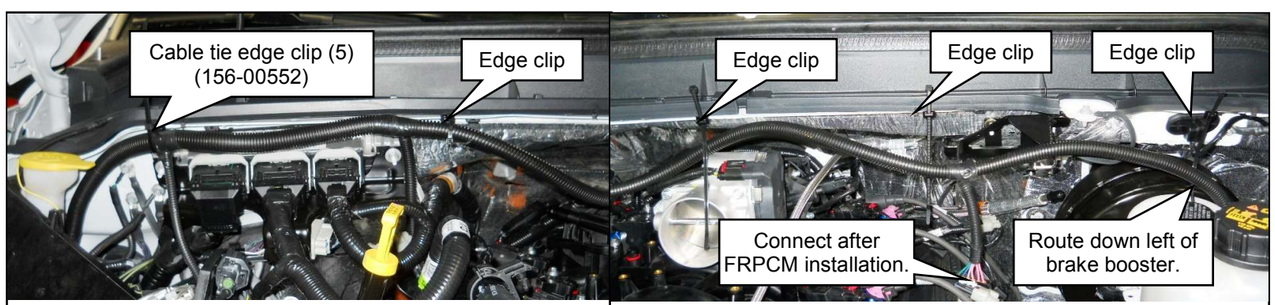


Figure 7.1



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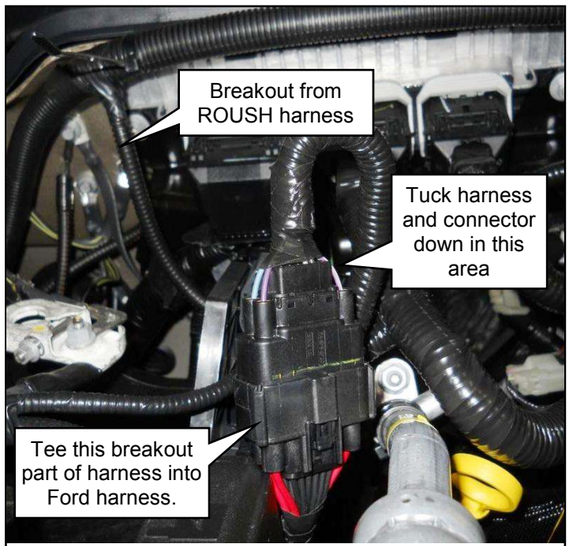

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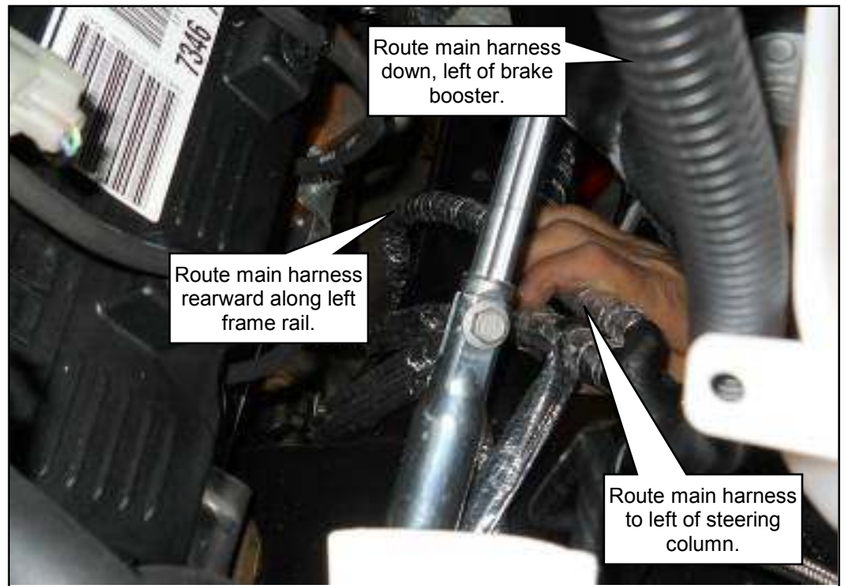

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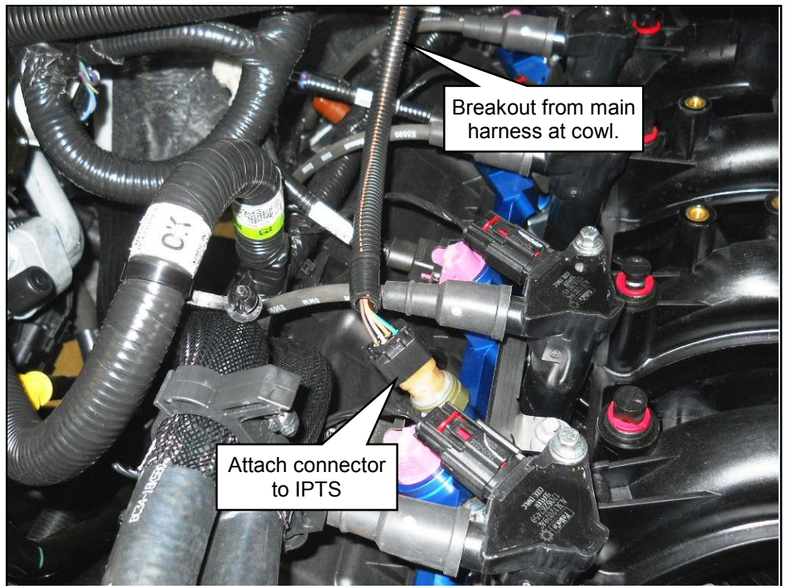


Figure 7.3

DISCARD REUSE NEW

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. Route the CAN bus harness over the HVAC unit and toward the center behind the center panel. The harness must reach for enough to plug into the trailer brake control behind the coin tray. **Figure 8.3**.
5. 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 PEM module. Continue down to the 29 mm drilled opening. **Figures 8.4 and 8.5**.
6. 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. **Figure 8.6 and 8.7**.
7. 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**.
8. 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.
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).

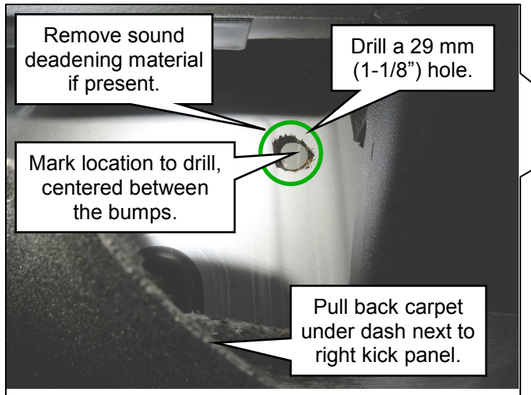


Figure 8.1

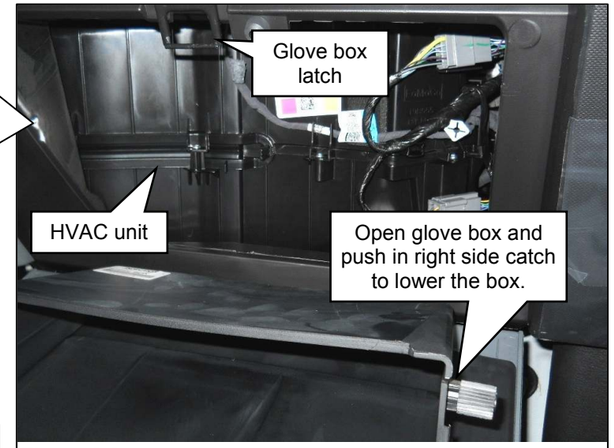


Figure 8.2

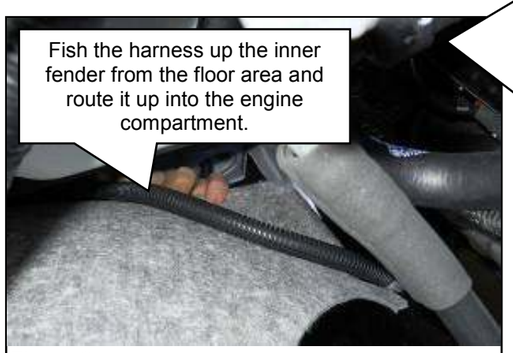


Figure 8.7

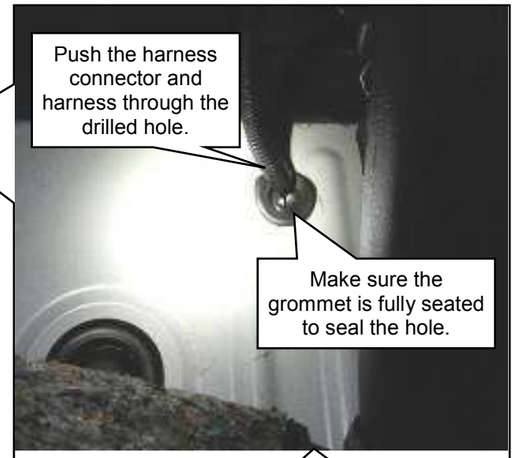


Figure 8.6

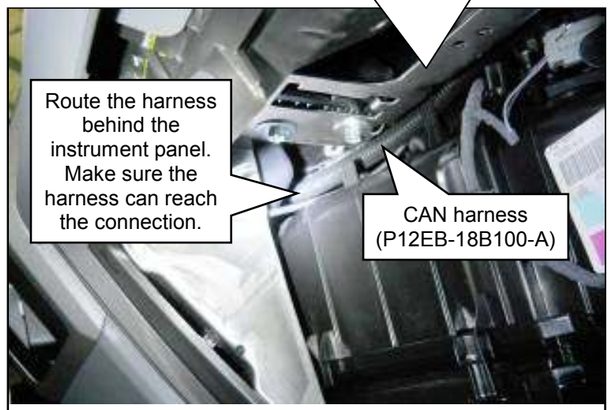


Figure 8.3

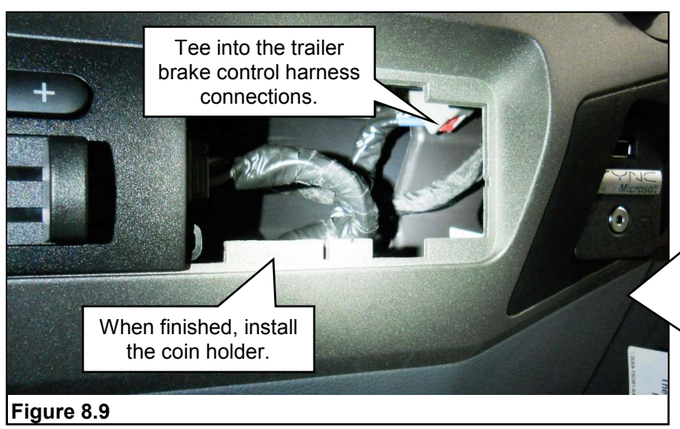


Figure 8.9

Figure 8.8

Figure 8.5

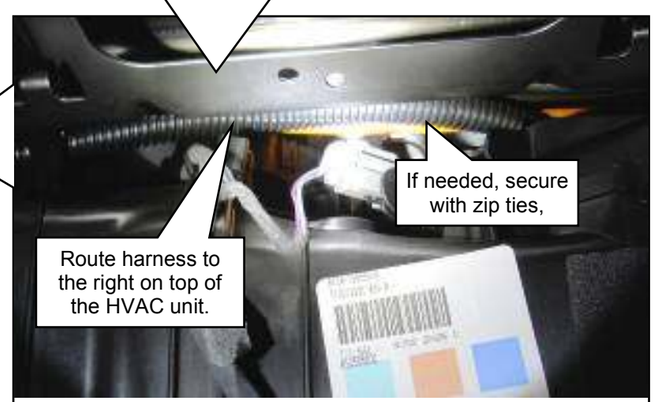


Figure 8.4

DISCARD REUSE NEW

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. **Figures 9.1 and 9.2**.
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 9.3**.
3. Remove and discard the fuel fill tube assembly and gas cap, including mounting bracket, between the fuel door and the fuel tank. **Figure 9.4**.
4. Slit the vapor line as indicated to remove the FTPT, line and quick-connect fitting. Save for reuse. **Figure 9.5**.
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 9.6**.
6. 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 left side fuel tank mounting bracket. **Figure 9.7**.

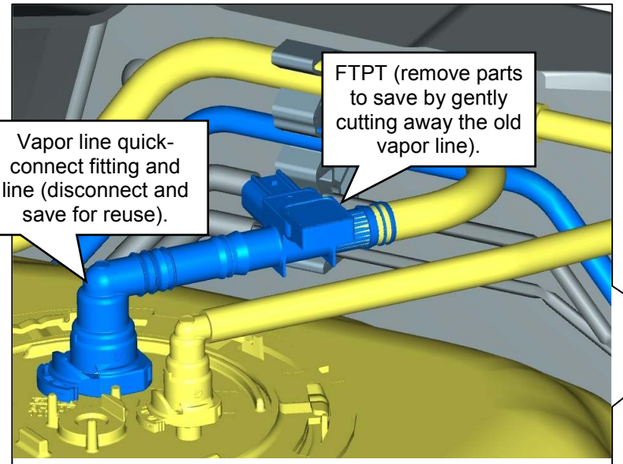


Figure 9.1

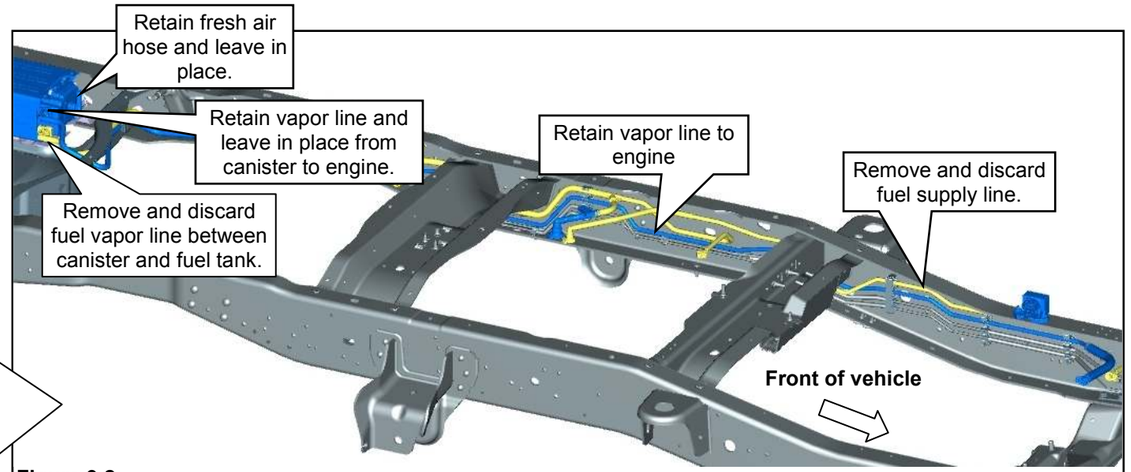


Figure 9.2

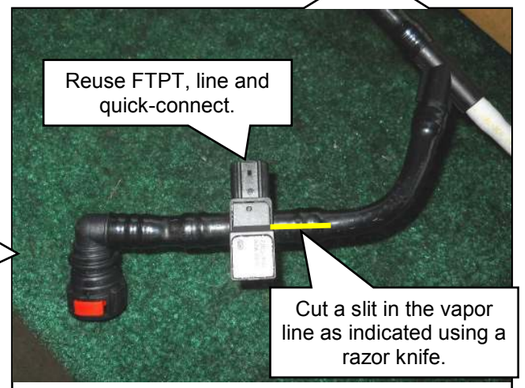


Figure 9.5

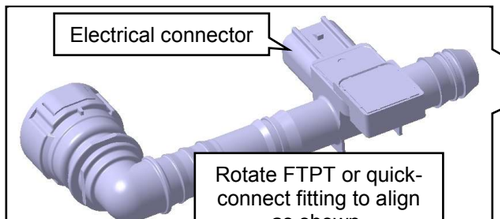


Figure 9.6

Figure 9.7

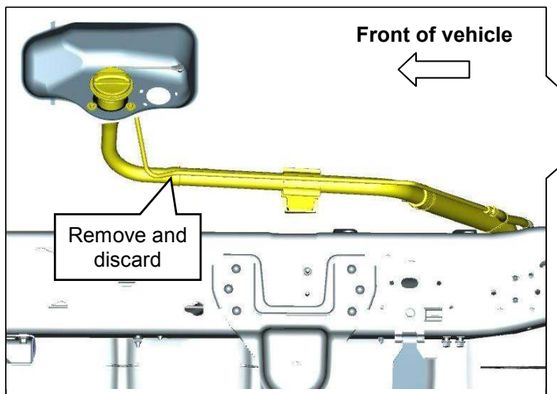


Figure 9.4

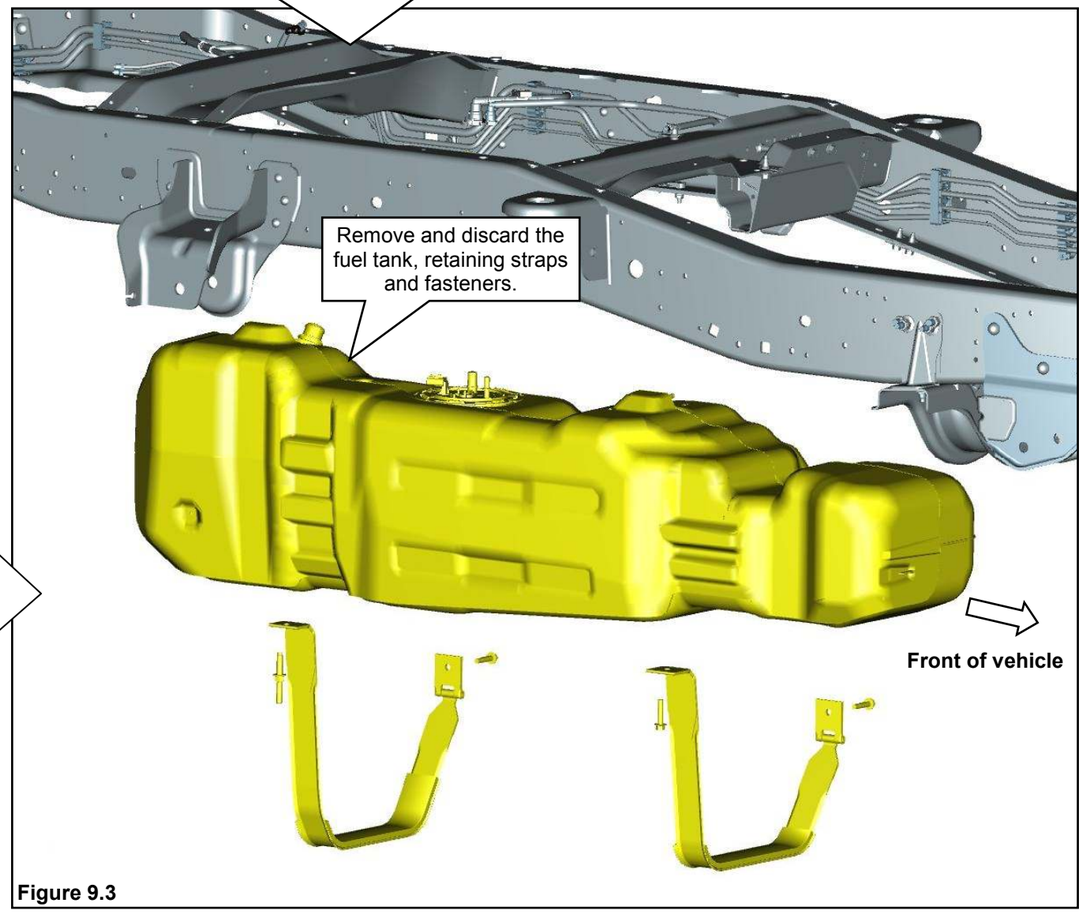


Figure 9.3

DISCARD REUSE NEW

PREPARING FOR TANK MOUNTING BRACKET INSTALLATION

Left Frame Rail

1. Remove the two parking brake cable standoff brackets as needed. **Figure 10.2**.
2. If necessary on 8ft bed Crew Cabs, remove the nuts of two fuel/brake line retention clips and pull the fuel and brake bundle well away from the frame rail. Retain the retention clip nuts. **Figure 10.3**.
3. Install the LH drilling template (available from ROUSH CleanTech; refer to the *Special Tools* section). **Note:** There are different drilling templates for 6 ft and 8 ft bed lengths, and different templates for left and right sides. Refer to the *Special Tools* section.
4. **8 ft bed:** Position the left template onto the left frame rail using the two push-pins for correct location. The rear location of the template fits inside the spring hanger. **Figure 10.1**.
5. **6 ft bed:** Position the left template onto the left frame rail using the two push-pins for correct location. The front location of the template fits inside the spring hanger. **Figure 10.4**.
6. Use a centerpunch to mark the drilling locations. There are six locations to mark in the left template for 8 ft beds and four locations in the left template for 6 ft beds. Remove the template. **Note:** On 6 ft bed versions, the bottom center hole is pre-existing in the frame rail. This hole must be drilled out to 1/2” (13 mm) only before installing the bracket.
7. Drill small pilot holes in each of the other locations using a 1/8” bit.
8. Using a step bit or gradually increasing bit size, drill the bottom center hole to 1/2” (13 mm) and the remaining holes to a final diameter of 9/16” (14 mm). **Important:** The lowest center hole must be drilled to 1/2” diameter only for both 8 ft and 6 ft bed versions.
9. Debur and coat all bare metal using a premium undercoating. Refer to the *Special Tools* section.

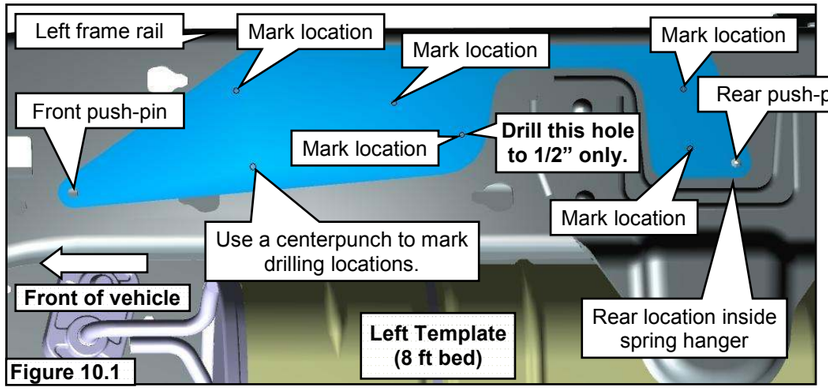


Figure 10.1

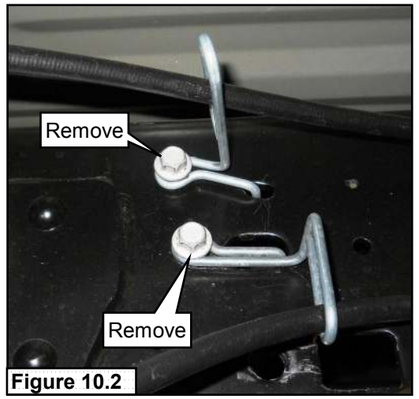


Figure 10.2

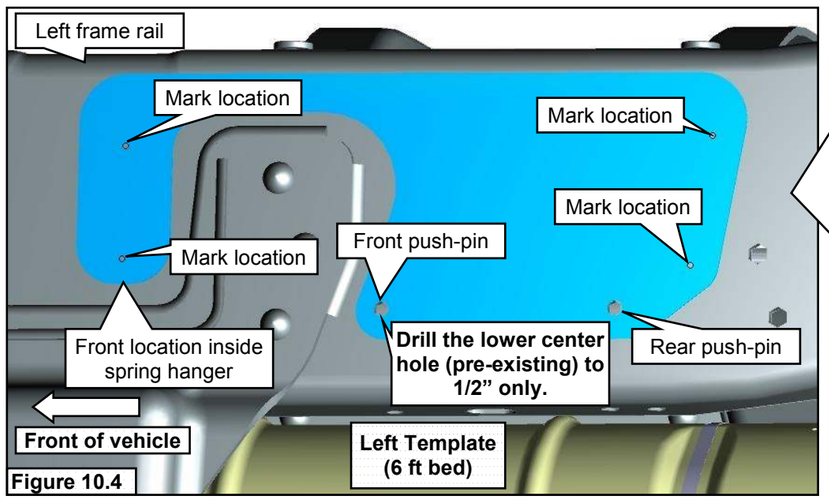


Figure 10.4

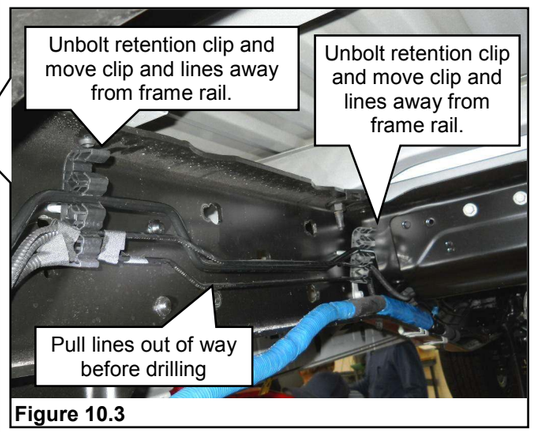


Figure 10.3

Right Frame Rail

1. Remove the exhaust hanger nuts. Remove the exhaust hanger from the isolator and retain the nuts.
2. Install the RH drilling template (available from ROUSH CleanTech; refer to the *Special Tools* section). **Note:** There are different drilling templates for 6 ft and 8 ft bed lengths, and different templates for left and right sides. Refer to the *Special Tools* section.
3. **8 ft bed:** Remove the two exhaust hanger nuts. Locate the template over the exhaust hanger studs in the right frame rail and install and loosely tighten the hanger nuts. A push-pin is used at the rear of the template for location. **Figure 10.5**.
4. **6 ft bed:** Position the right template onto the right frame rail using the two push-pins for correct location. The front location of the template fits inside the spring hanger. **Figure 10.6**.
5. Use a centerpunch to mark the drilling locations. There are six locations to mark in the right template for 8 ft beds and five locations in the right template for 6 ft beds. Remove the template. On vehicles with 8ft bed, reinstall the two exhaust hanger nuts and tighten to 8–12 Nm.
6. Drill small pilot holes in each location using a 1/8” bit.
7. Using a step bit or gradually increasing bit size, drill the bottom center hole to 1/2” (13 mm) and the remaining holes to a final diameter of 9/16” (14 mm). **Important:** The lowest center hole must be drilled to 1/2” diameter only for both 8 ft and 6 ft bed versions.
8. Debur and coat all bare metal using a premium undercoating. Refer to the *Special Tools* section.

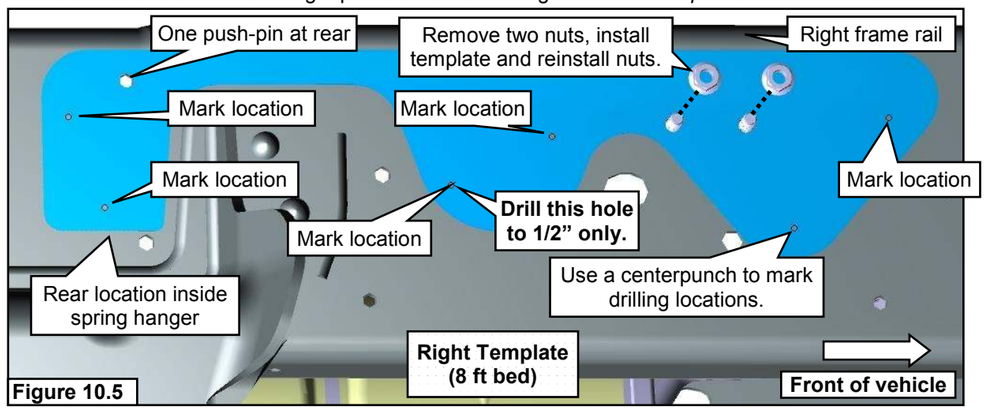


Figure 10.5

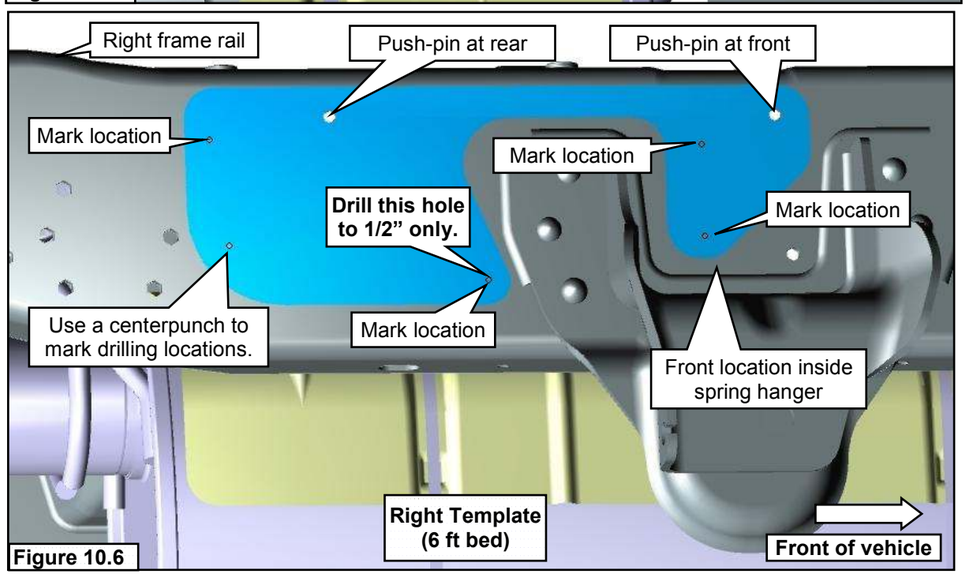


Figure 10.6

INSTALLING TANK MOUNTING BRACKETS

Note: Have an assistant help position and hand start the bolts.

1. Place the LH tank mounting bracket in position on the frame rail and insert the six M12 x 1.75 x 40 mm bolts (8 ft bed) or five M12 x 1.75 x 40 mm bolts (6 ft bed) in the mounting holes. Start all bolts by hand. Tighten the bolts initially to 5–10 Nm to snug the bracket to the frame. **Note:** The final torque for these bolts is 80–90 Nm which should be done after the tank is installed and attached to the brackets. **Figures 11.1 and 11.2**.

   Important: If the bracket does not install correctly due to misaligned or misdrilled holes, support the bracket, remove all bolts except the one in the 1/2” (13 mm) diameter hole. Identify which bolt hole is misaligned and drill out (up to two of the holes) to 5/8” diameter. The lowest center 1/2” hole must not be changed. Reinstall the bracket and all bolts and tighten to an initial torque of 5–10 Nm. After the tank is installed and aligned, these bolts must be torque to 80–90 Nm.

2. Position the fuel/brake line bundle and two retention clips against the frame rail. Install the two nuts and tighten to 8–12 Nm.

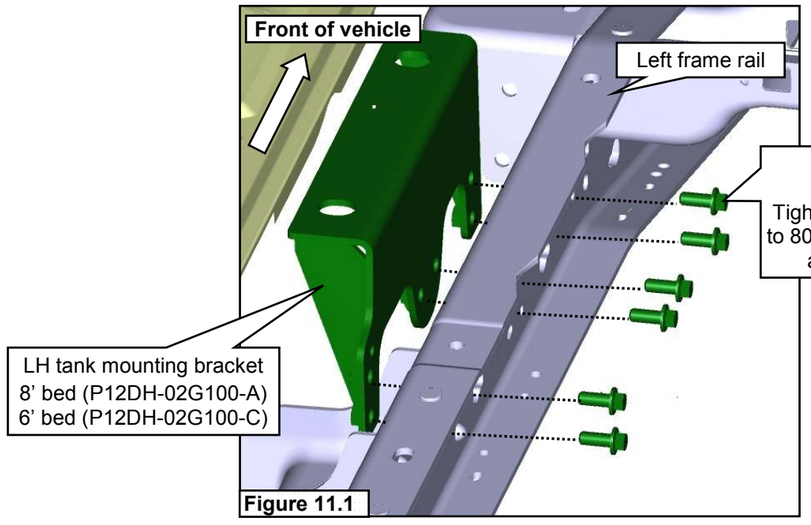


Figure 11.1

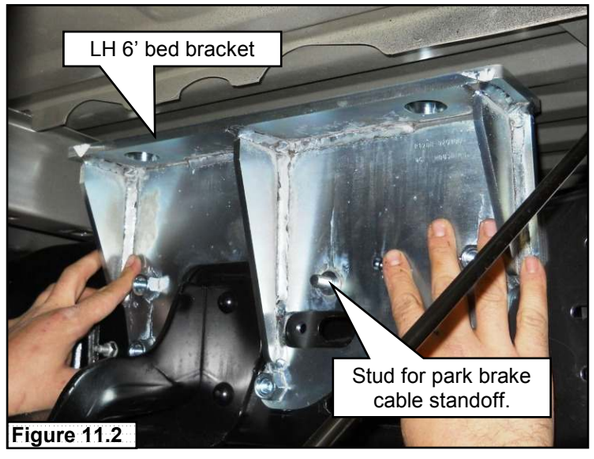


Figure 11.2

Note: Have an assistant help position and hand start the bolts.

3. Place the RH tank mounting bracket in position on the frame rail and insert the six M12 x 1.75 x 40 mm bolts (8 ft bed) or five M12 x 1.75 x 40 mm bolts (6 ft bed) in the mounting holes. Start all bolts by hand. Tighten the bolts initially to 5–10 Nm to snug the bracket to the frame. **Note:** The final torque for these bolts is 80–90 Nm which should be done after the tank is installed and attached to the brackets. **Figures 11.3 and 11.4**.

   Important: If the bracket does not install correctly due to misaligned or misdrilled holes, support the bracket, remove all bolts except the one in the 1/2” (13 mm) diameter hole. Identify which bolt hole is misaligned and drill out (up to two of the holes) to 5/8” diameter. The lowest center 1/2” hole must not be changed. Reinstall the bracket and all bolts and tighten to an initial torque of 5–10 Nm. After the tank is installed and aligned, these bolts must be torque to 80–90 Nm.

4. Position the exhaust hanger into the isolator and exhaust hanger into the frame rail. Install the two nuts and tighten to 8–12 Nm.

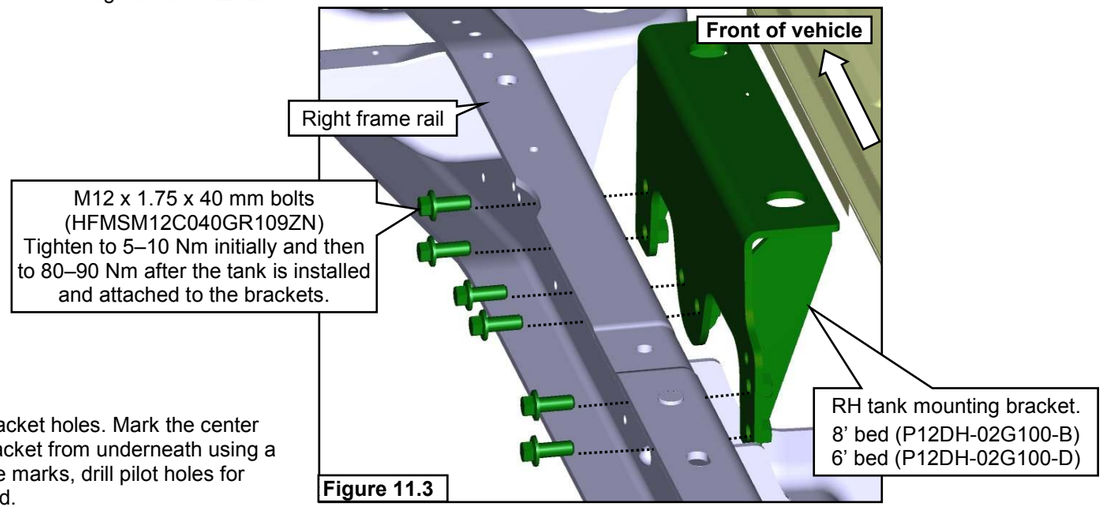


Figure 11.3

5. Trace around each of the four tank bracket holes. Mark the center of the tank mounting holes in each bracket from underneath using a permanent marker. In the center of the marks, drill pilot holes for the four tank mounting holes in the bed.
   Note: These pilot holes are used to determine the location of the 3” tank mounting hardware holes. The 3” holes are drilled from inside the bed with the vehicle lowered. **Figure 11.5**.

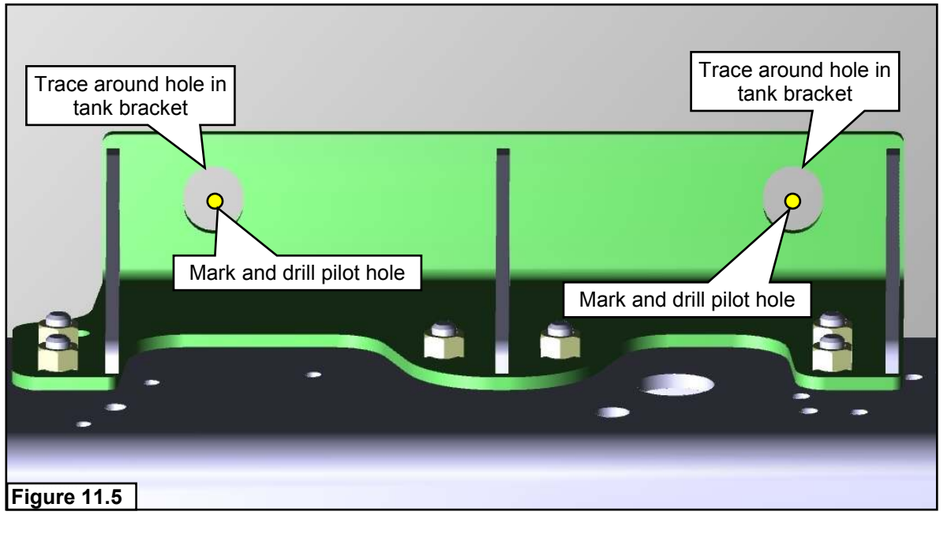


Figure 11.5

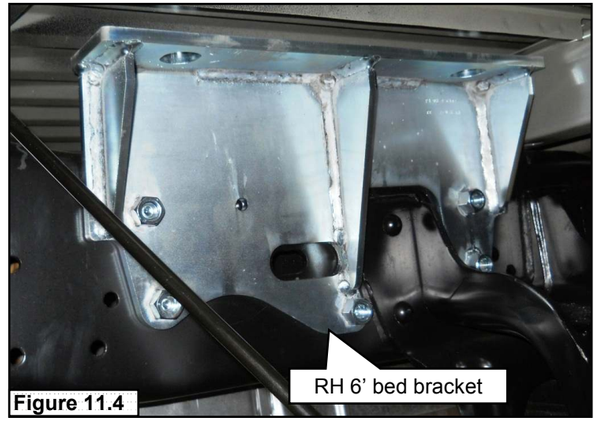


Figure 11.4

DISCARD REUSE NEW

INSTALLING NEW FORWARD FUEL LINES AND MODIFYING VAPOR LINE

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. Remove the OEM vapor hose and steel line at its attachment points; at the retention bracket on the transmission bellhousing and near the frame rail at the quick-connect fitting. **Figure 12.4**.
2. Place the vapor line on a bench and slice the hose using a razor knife where the hose connects to the steel line. Separate the hose from the steel line and discard the hose. Install the steel vapor line to its original position. **Figure 12.1**.
3. 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. **Figure 12.4**.
4. Press the forward fuel return lines into retaining clip in OEM bracket. **Figure 12.6**.

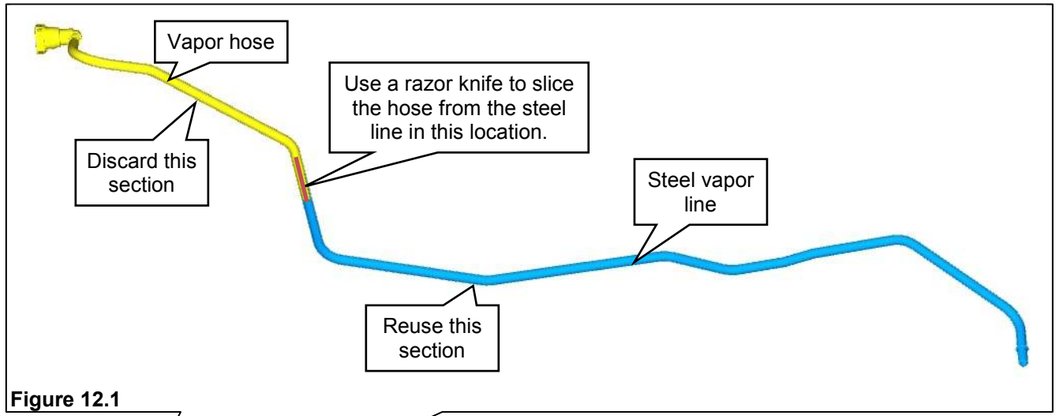


Figure 12.1

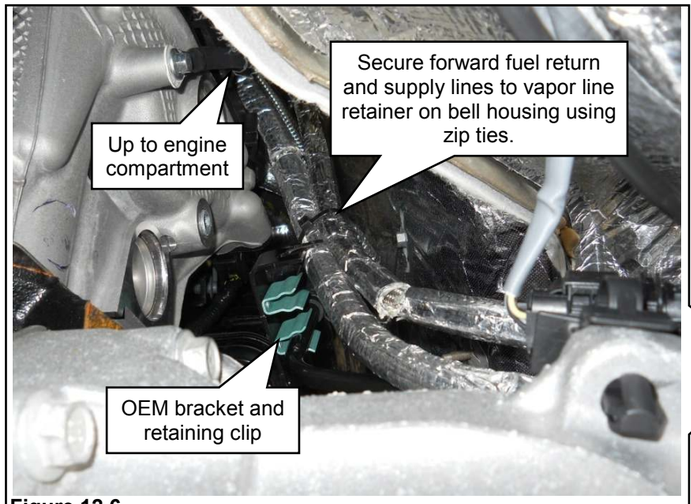


Figure 12.6

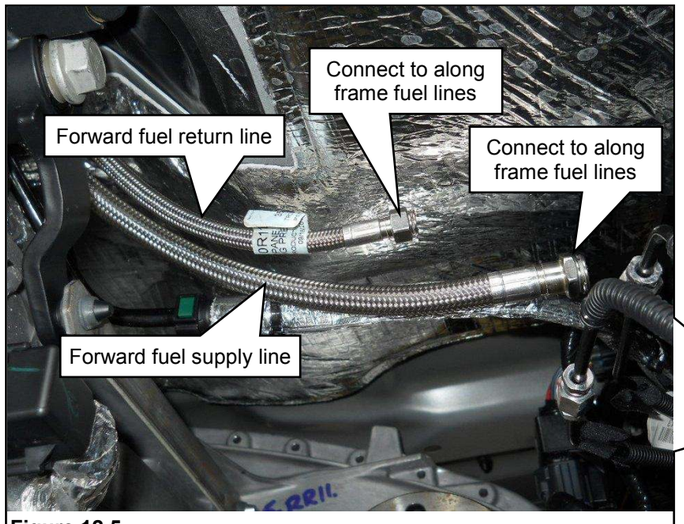


Figure 12.5

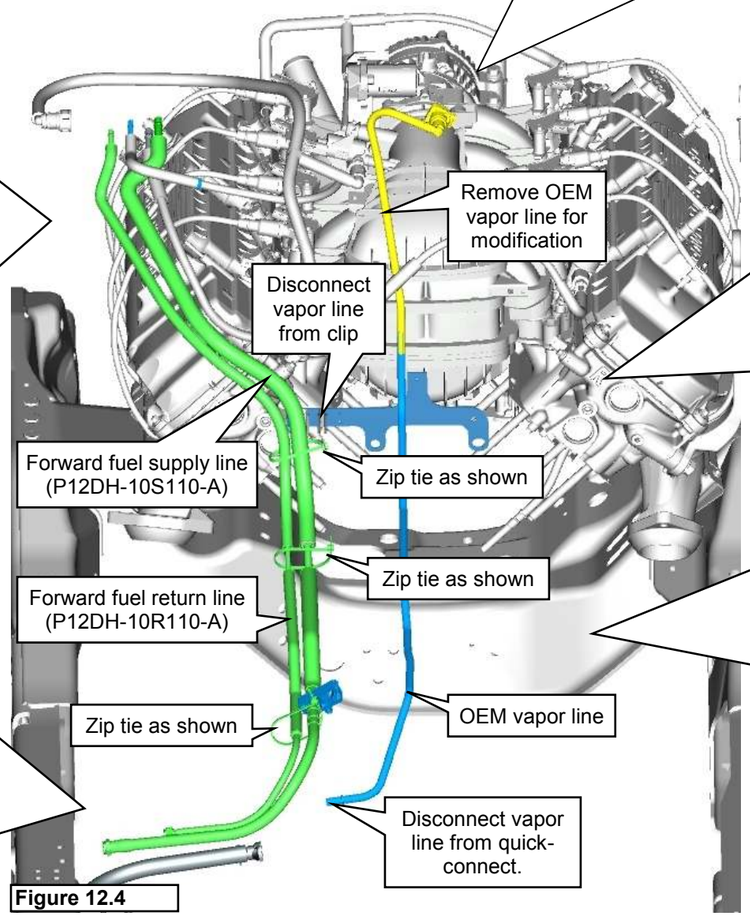


Figure 12.4

Figure 12.2

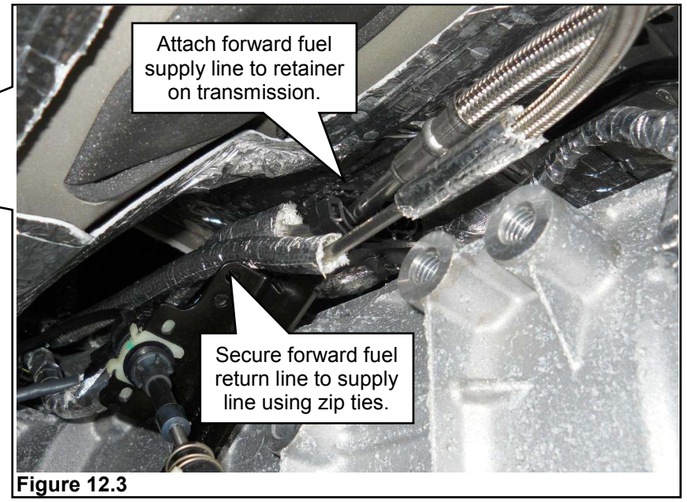


Figure 12.3

DISCARD REUSE NEW

INSTALLING NEW ALONG FRAME FUEL LINES

1. Install the along frame fuel supply line from the forward fuel supply line into the top slot of the OEM retention clips on the frame rail. **Note:** The along frame fuel supply line should pass behind the EFPR. **Figure 13.1**.
2. Connect the along frame fuel supply line into the quick-connect fitting of the forward fuel supply line. **Figure 13.1**.
3. Install the along frame fuel return line against the fuel supply line and secure it to the supply line using six double snail retainer clips. **Note:** The along frame fuel return line should pass behind the EFPR. **Figures 13.2**.
4. Connect the along frame fuel return line into the quick-connect fitting of the forward fuel return line. **Figures 13.2 and 13.3**.

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

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

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

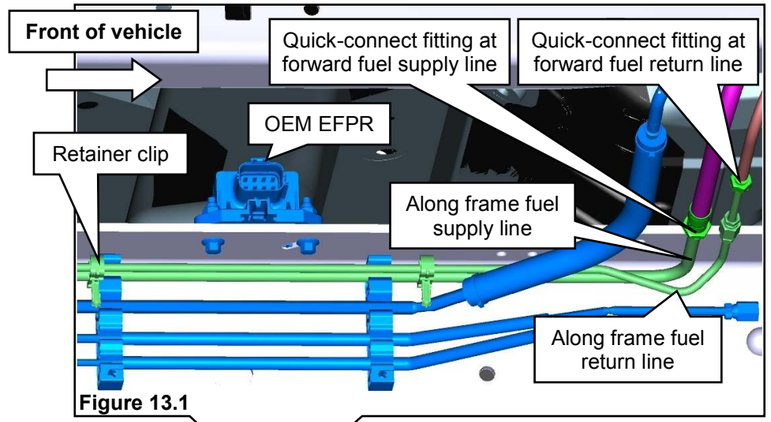


Figure 13.1

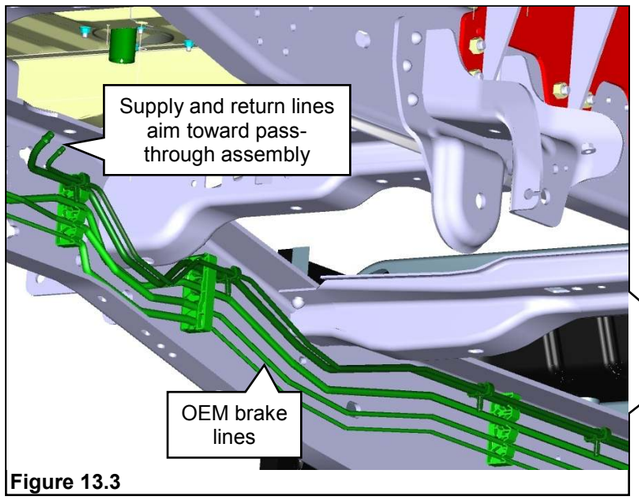


Figure 13.3

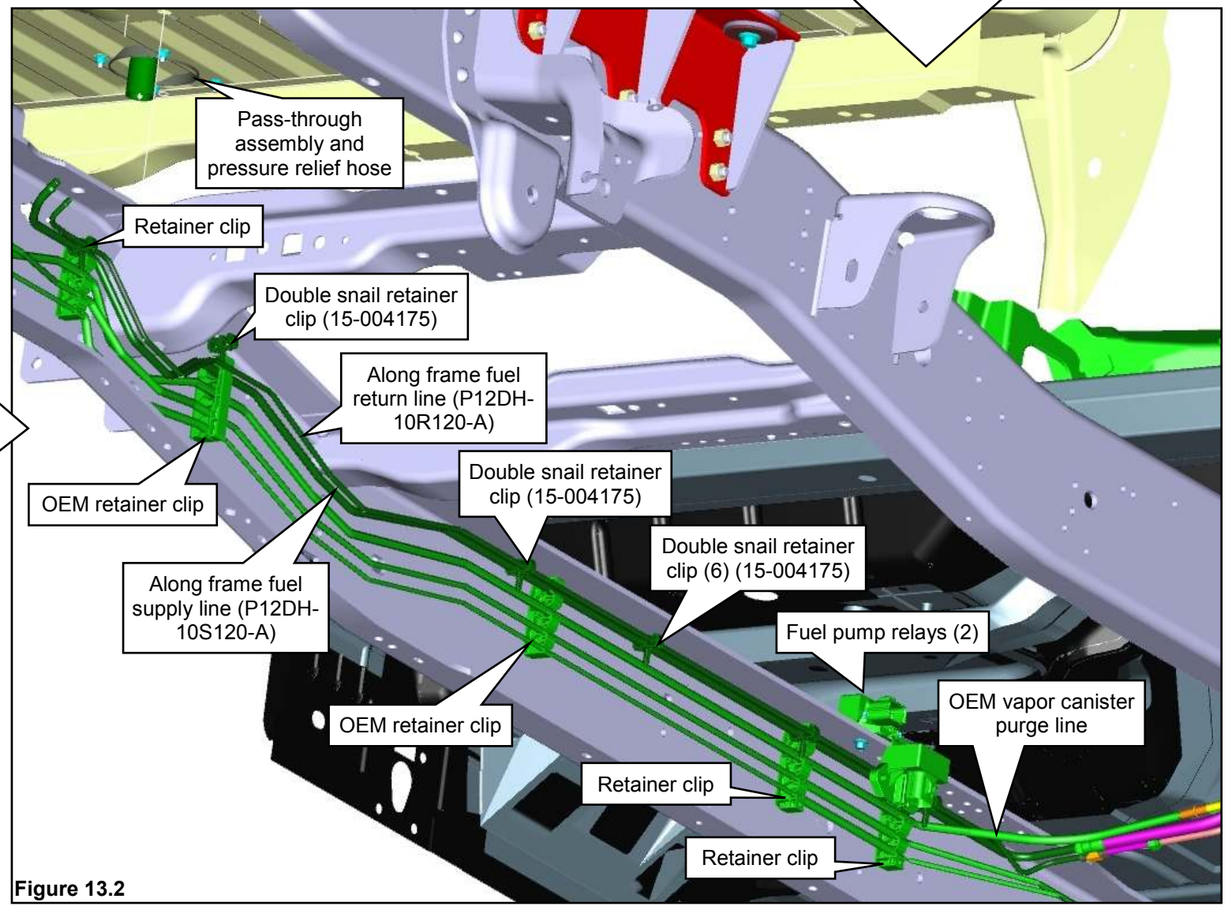


Figure 13.2

DISCARD REUSE NEW

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 OEM electronic fuel pump relay (EFPR) at the front of the rail. Do NOT secure the harness with zip ties until all connections have been made. **Figures 14.3–14.5**.
2. Attach the new EFPR to the new bracket by snapping it in place. **Figure 14.2**.
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 14.1–14.2**.
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 14.4**.
5. Connect the rear harness to the underhood harness and zip tie to the vehicle harness. **Figure 14.3**. Route the rear frame harness along the vehicle harness to the rear. **Figures 14.5, 14.8 and 14.9**.
6. 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. The top side port is reserved for the vapor line/hose to the VMV on the engine. **Figure 14.11**.
7. 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. Moving the harness forward, plug the jumper harness into the OEM vehicle harness. **Figure 14.12**.

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 9.6** on page 9.

Figure 14.1

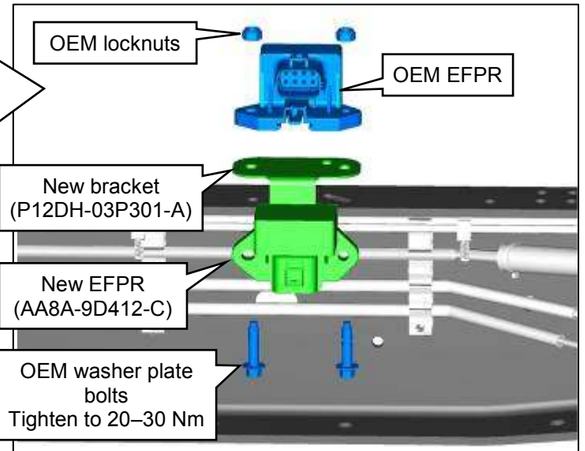


Figure 14.2

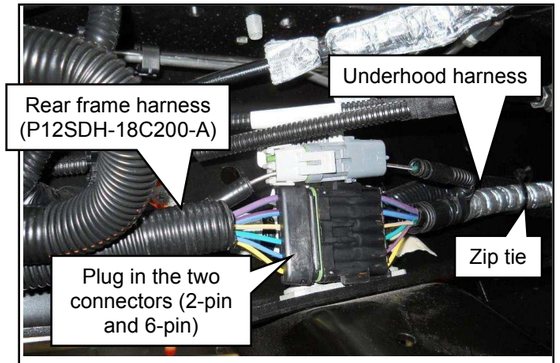


Figure 14.3

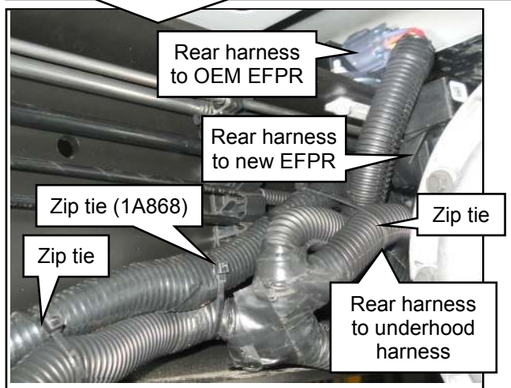


Figure 14.4

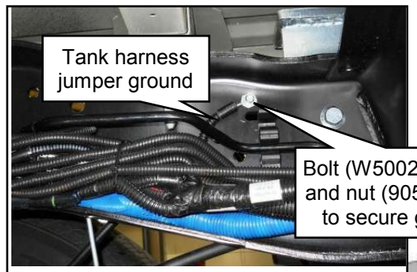


Figure 14.10

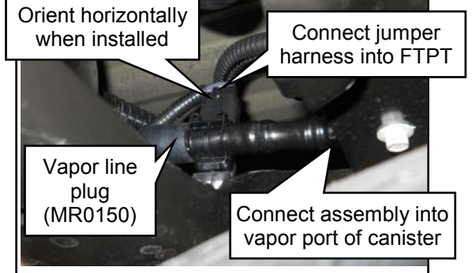


Figure 14.11

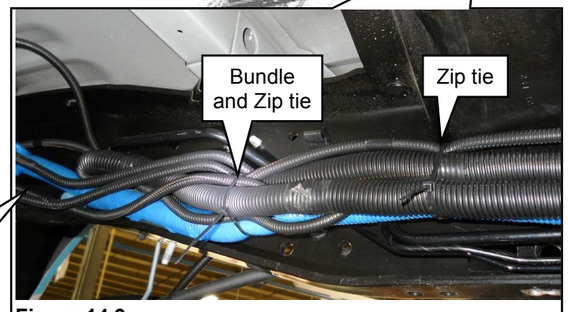


Figure 14.9

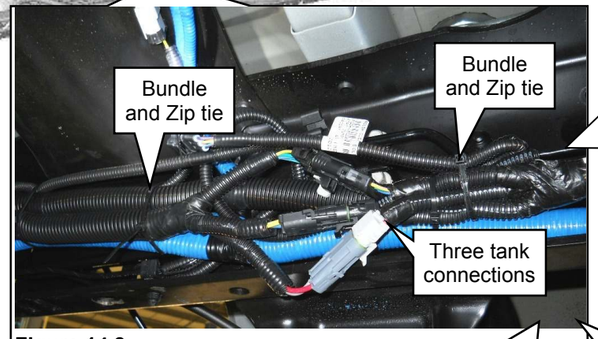


Figure 14.8

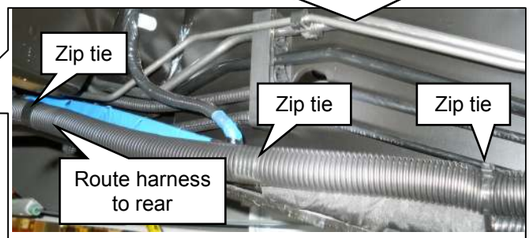


Figure 14.5

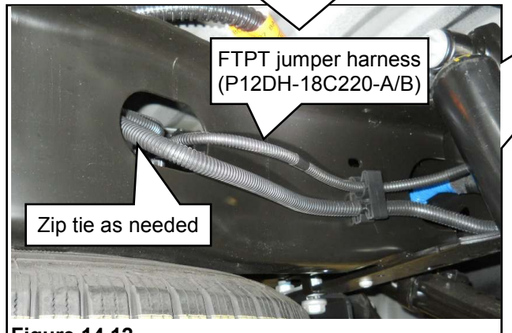


Figure 14.12

8. 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 14.8 and 14.9**.
9. Connect the rear harness ground lead to the frame at OEM ground location near the front of the harness. 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. 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. **Figures 14.7 and 14.10**.

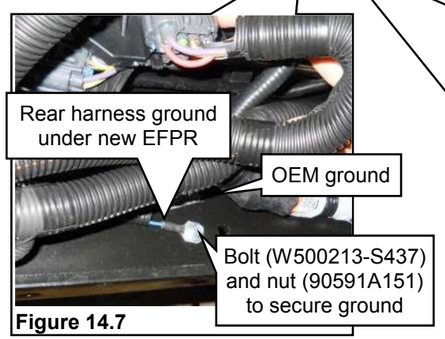


Figure 14.7

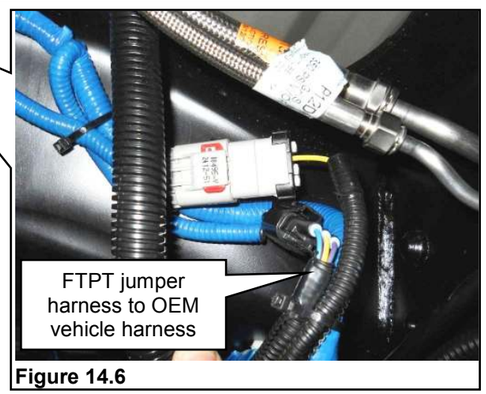


Figure 14.6

DISCARD REUSE NEW

PREPARING THE TRUCK BED

F-250/F-350 Pickups

1. Mark the locations for the four tank mounting hardware holes (do this from under the vehicle using the tank bracket holes as a guide to center the holes). Mark the location for the harness and fuel line pass-through bracket hole. **Figure 15.1**.
2. Center punch the pilot hole location for drilling the 4-1/4” pass-through bracket hole. Use the measurements provided. Drill the pilot hole. **Figure 15.1**.
3. Using a 108-mm (4-1/4”) hole saw centered in the pilot hole, drill the pass-through bracket hole.
4. Center punch the four pass-through bracket mounting hole locations. Use the bracket as a template for accurate locations. **Note:** The pass-through bracket must be properly oriented. An arrow on the bracket is for this purpose and must face forward. **Figure 15.1**.
5. Drill 1/8” pilot holes in the four locations for the pass-through bracket fasteners. Using an 8-mm bit, drill the final holes for the fasteners.
6. Using a 76.2 mm (3”) hole saw centered in the pilot holes (previously drilled), drill the four 3” holes. Refer to *page 11* regarding the pilot holes. **Note:** If not done, locate the four 3” tank mounting hardware holes using the dimensions provided. Drill the pilot holes from underneath using the tank mounting brackets as a guide. **Figure 15.1**.
7. Deburr all holes and vacuum up any metal chips created when drilling the holes. Coat the holes with touch-up paint and premium aerosol undercoating to protect the exposed surfaces. Refer to the *Special Tools* section.

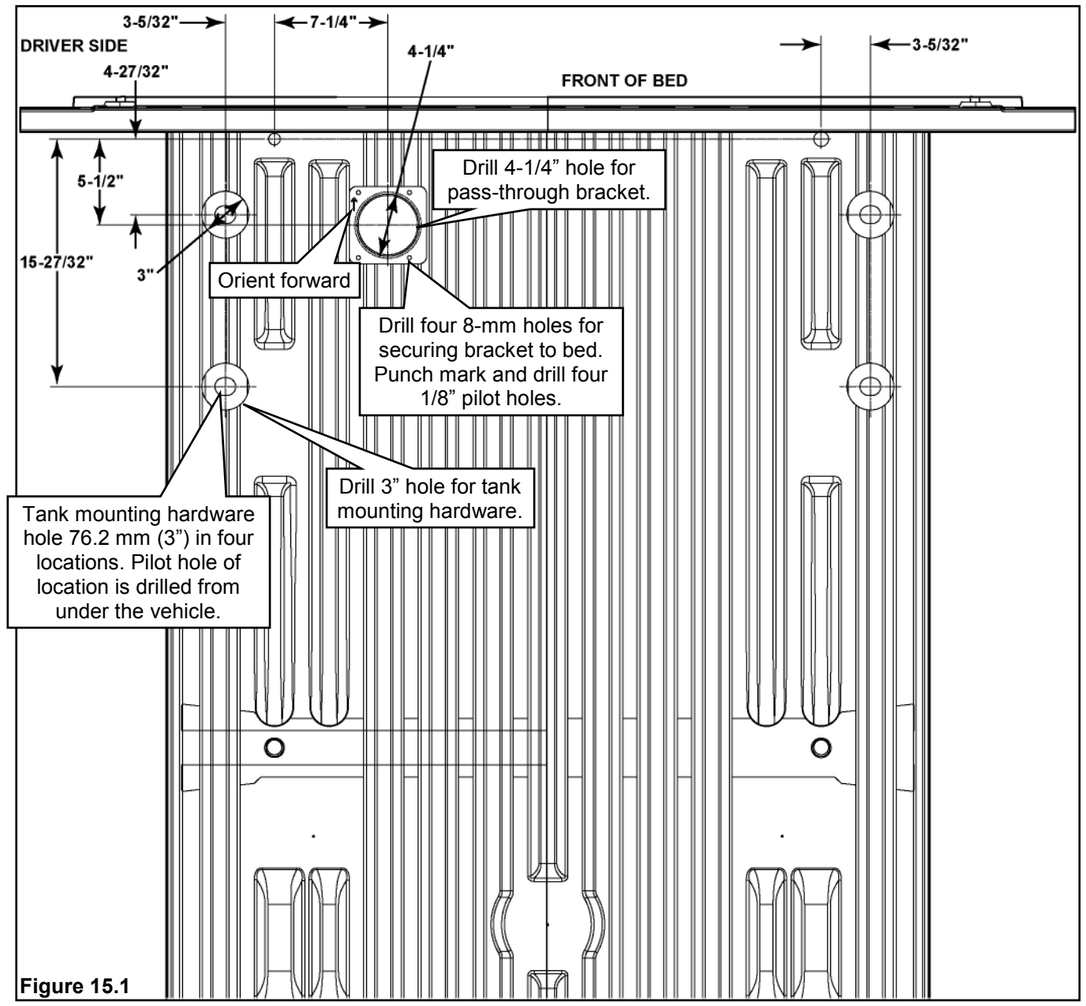


Figure 15.1

INSTALLING PASS-THROUGH BRACKET ASSEMBLY

1. Position the pass-through bracket assembly over the cutout in the bed. The arrow punched in the bracket should point to the front of the vehicle and the short (welded on) pass-through standoffs to the right side of the bed and the longer (welded on) standoffs are to the left side of the bed. **Figure 15.2**.
2. Place the two separate standoffs over the right two short studs (and welded standoffs). Position the pass-through bracket through the bed floor.
3. From underneath, secure the bracket with four M6 nuts. Tighten the nuts to specification. **Figure 15.3**.
4. At all tank bracket locations, install the four rubber isolators (one above each tank mounting bracket), four crush limiters and the four spacer plates. **Figure 15.4**.

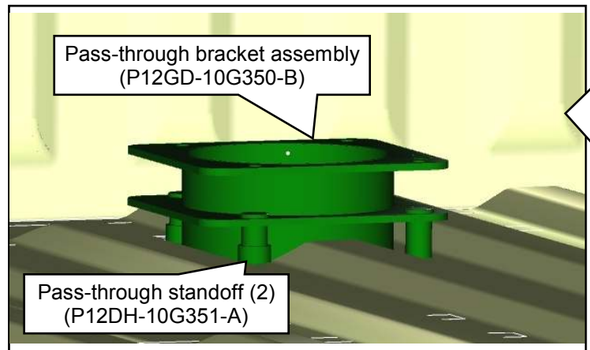


Figure 15.2

Figure 15.3

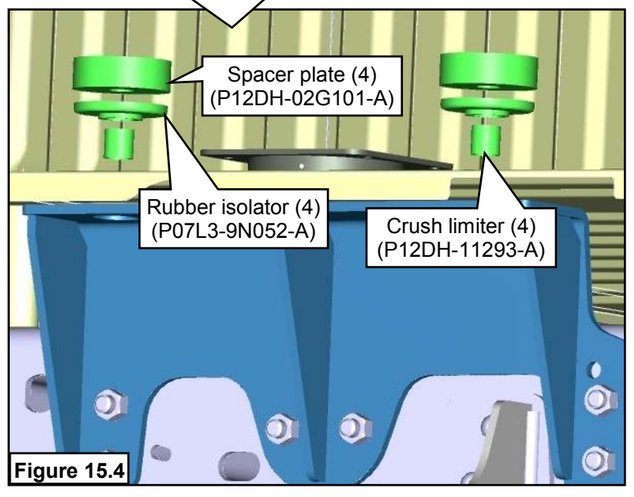


Figure 15.4

DISCARD REUSE NEW

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 16.1**.
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. **Figure 16.2**.
4. Obtain two double snail retaining clips and install into two lower brackets welded to tank. Push in to secure. **Figure 16.3**.
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 16.4**.
6. Unscrew the worm clamp so that the filter can be installed. Orient the clamp so that it can be easily tightened.
7. 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 16.5**.
8. 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 the fittings to specification. **Figure 16.6**.

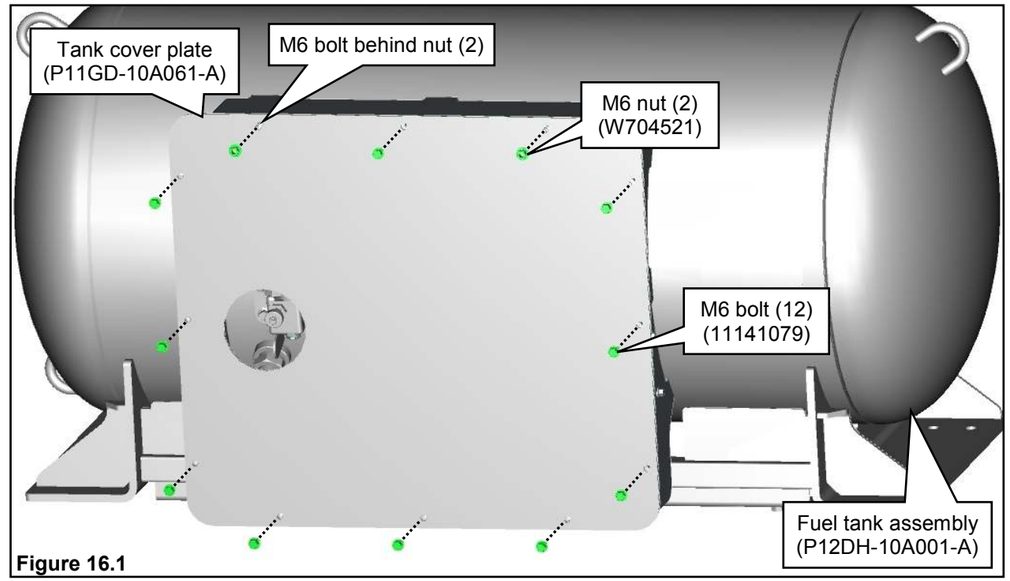


Figure 16.1

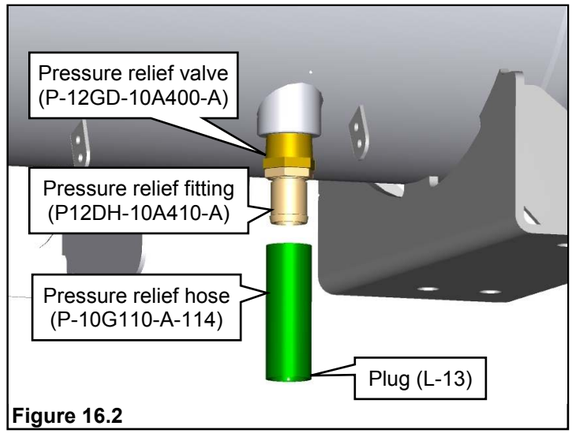


Figure 16.2

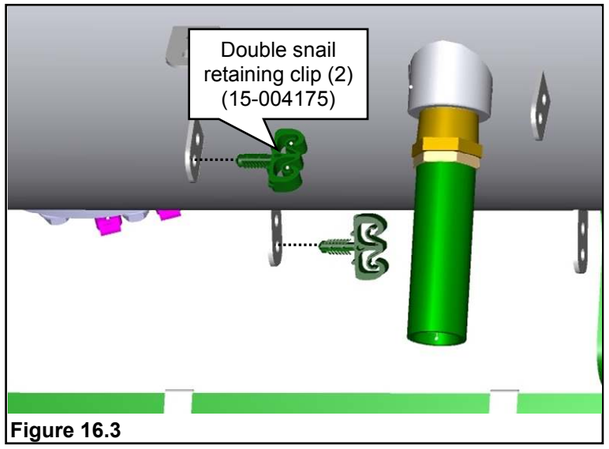


Figure 16.3

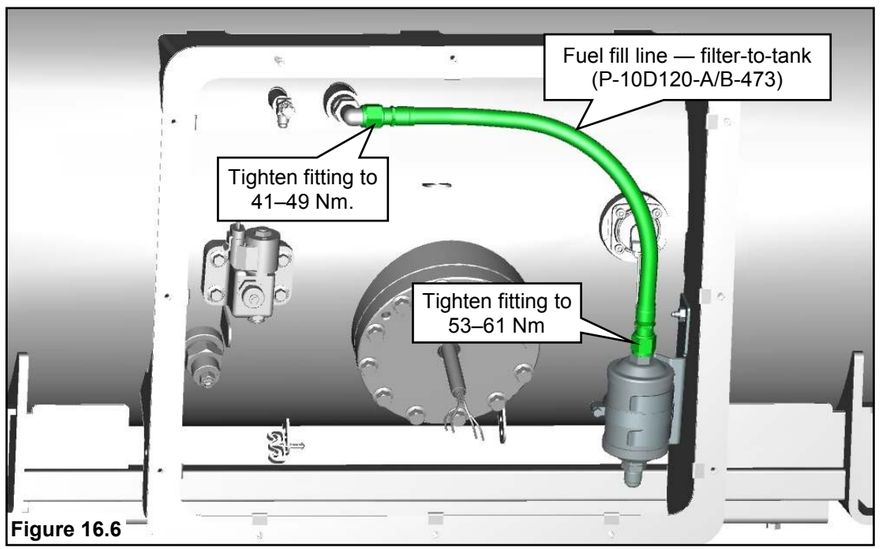


Figure 16.6

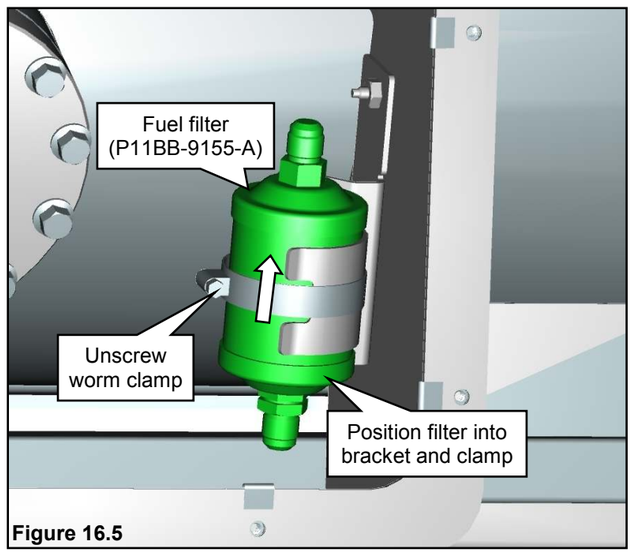


Figure 16.5

Figure 16.4

DISCARD REUSE NEW

PREPARING NEW TANK ASSEMBLY (CONTINUED)

9. Position the tank fuel supply and fuel return lines under the tank to the front. Orient and connect the fuel supply line to the fuel supply circuit assembly. Orient and connect the fuel return line to the fuel return circuit assembly. Push and pull on the quick-connect fittings to make sure the lines are securely in place. **Figure 17.1**.
10. Attach the fuel supply and return lines into the two double snail retaining clips under the tank. **Figure 17.1**.
11. Connect the solenoid/sender harness to the fuel supply solenoid and to the fuel level sender. **Figure 17.2**.
12. Connect the fuel tank jumper harness to the solenoid/sender harness and to the two fuel pump connectors. **Figure 17.2**.
13. Position the fuel tank jumper harness pass-through end under the tank to the front. **Figure 17.4**.
14. Bundle the two harnesses together and zip tie to the welded bracket above the tank cover plate. **Figure 17.2**.
15. Place convolute over the fuel fill line and install the line to the fuel filter. Tighten the fitting to 53–61 Nm. **Figure 17.3**.
16. Bundle the tank harness to the fuel fill line. Secure the harness and fill line to the bracket on the bottom rear of the tank. **Figure 17.4**.
17. Attach the harness and fill line to the brackets under the tank and secure with zip ties. Zip tie the harness and fill line together and to the brackets in several places. **Figure 17.5**.
18. Full view with alternate jumper harness routing. **Figure 17.6**.

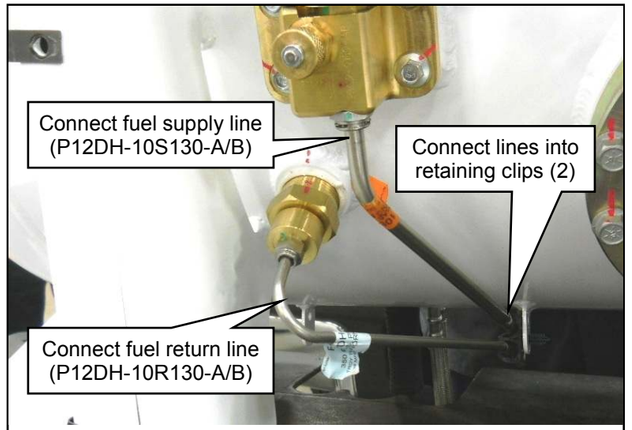


Figure 17.1

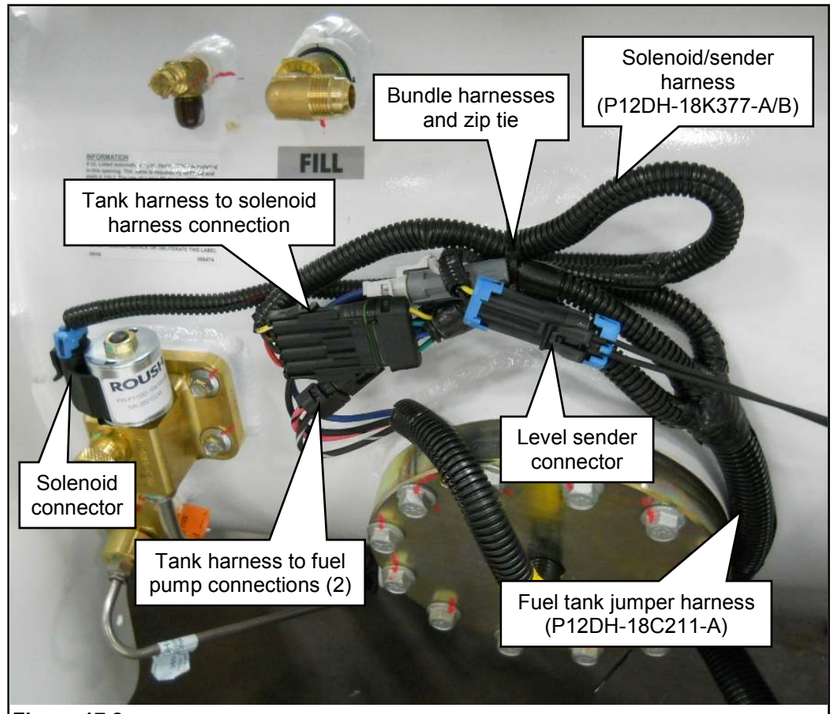


Figure 17.2

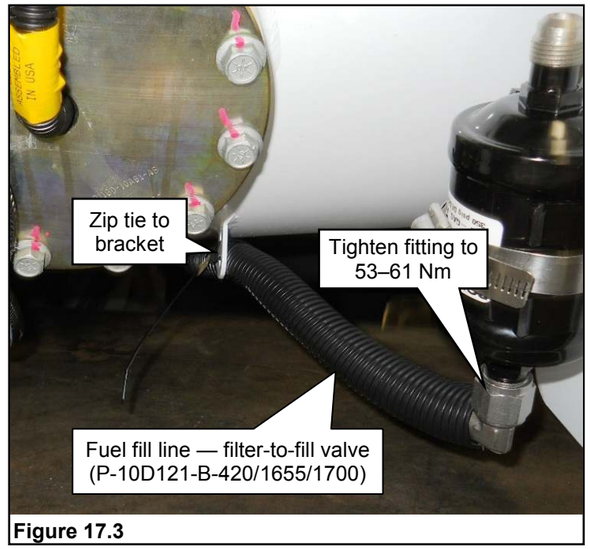


Figure 17.3

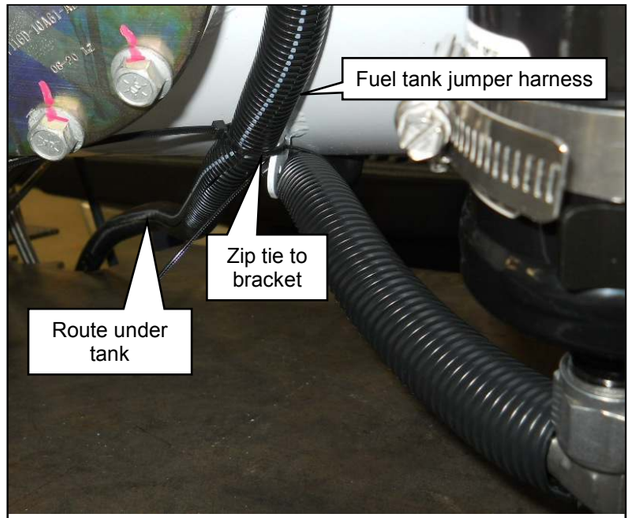


Figure 17.4

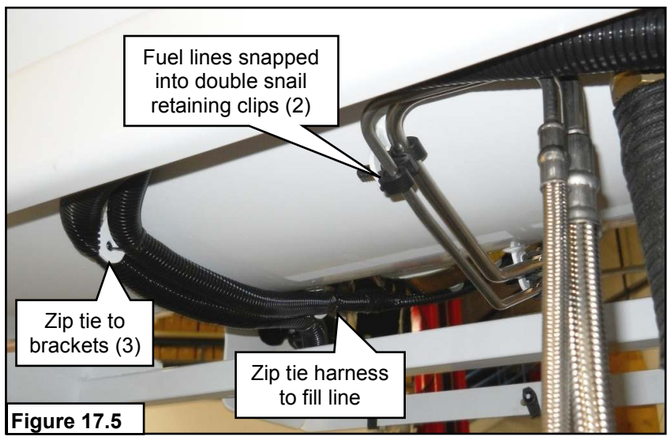


Figure 17.5

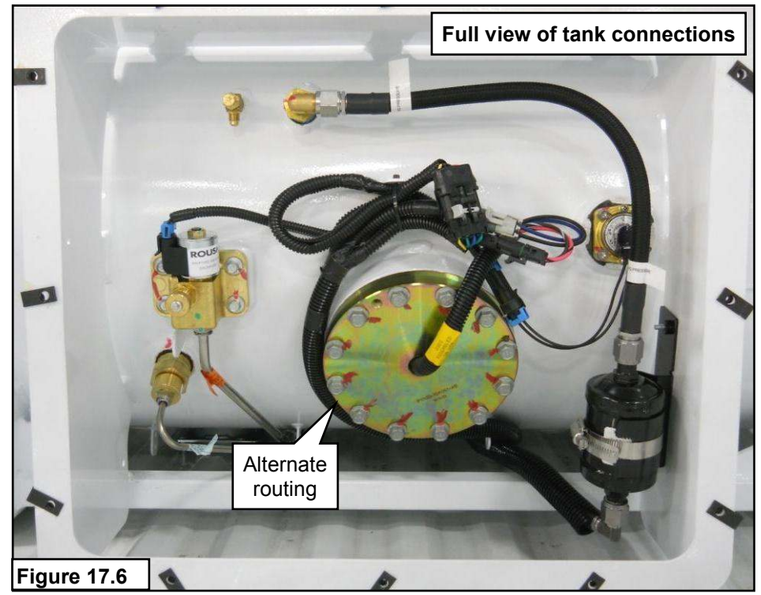


Figure 17.6

DISCARD REUSE NEW

INSTALLING NEW FUEL TANK

1. 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 spacer plates.
2. Position the fuel tank and mounting brackets over the bed. Align the four mounting holes in the tank brackets with the mounting pass-through holes in the bed. Carefully lower the tank onto the spacer plates protruding through the floor of the bed, making sure the tank is firmly seated and all four holes are aligned. **Note**: Make sure the tank is lowered straight down over the spacer plates and that the pressure relief hose, fuel lines, fill line and wiring harness drop through the pass-through bracket assembly. Also make sure the front tank bracket clears the pass-through bracket. **Figures 18.3 and 18.4**. **Note**: The following steps require an assistant to install the tank mounting hardware.
3. Install four lower rubber isolators into the tank mounting brackets and crush limiters. Install one washer onto each of the four tank mounting bolts found in hardware kit P12DH-TANKMOUNT-A/B. **Figures 18.2 and 18.6**.
4. From under the bed, install each of the four mounting bolts through the washer, lower isolator, crush limiter, tank mounting bracket, upper isolator and spacer plate. Position the nuts onto the tank bracket, align the holes and thread the bolts into the nuts. **Figures 18.1 and 18.5**. Hand tighten the bolts and nuts until all are started. Tighten the fasteners to specification. **Figure 18.2 and 18.6**. **Note:** If desired, the four bolts can be installed from the top, down through the tank and mounting hardware. **Figure 18.7**. The nuts are then installed from below.

Note: There are four holes in each tank bracket to secure the tank. Use the appropriate two holes in each of the tank brackets, either the two inner or the two outer holes. **Figure 18.7**.

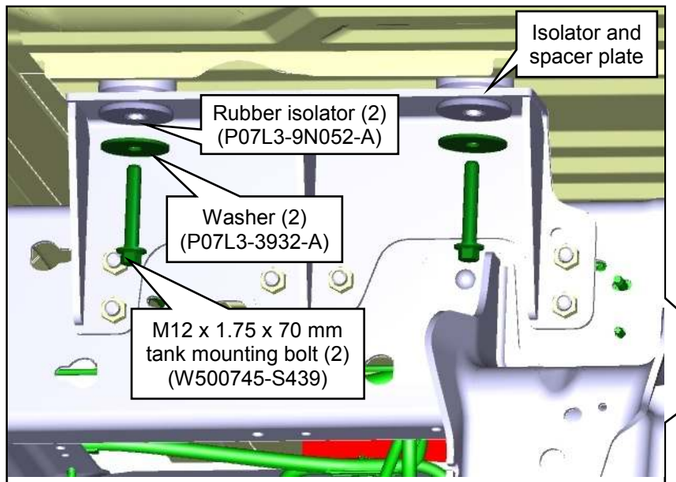


Figure 18.6 — Left Side Tank Mounting Bracket

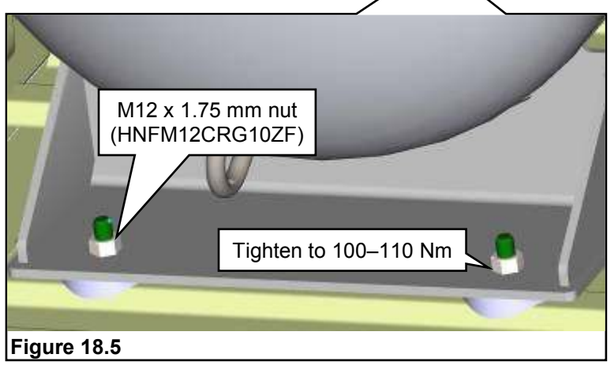


Figure 18.5

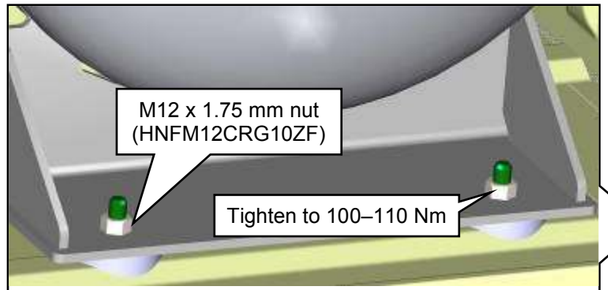


Figure 18.1

Figure 18.7

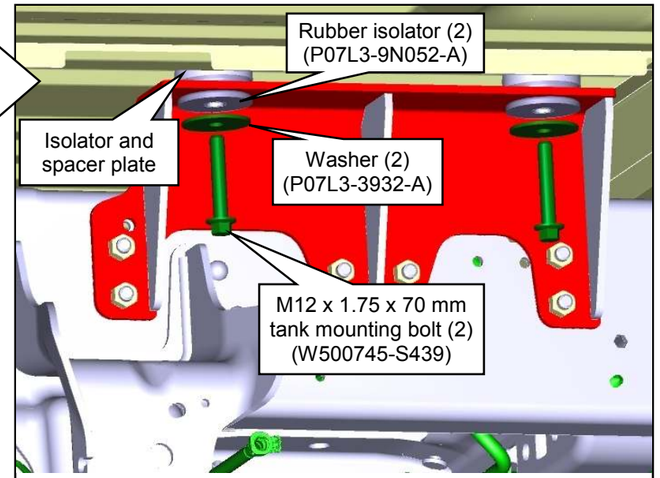


Figure 18.2 — Right Side Tank Mounting Bracket

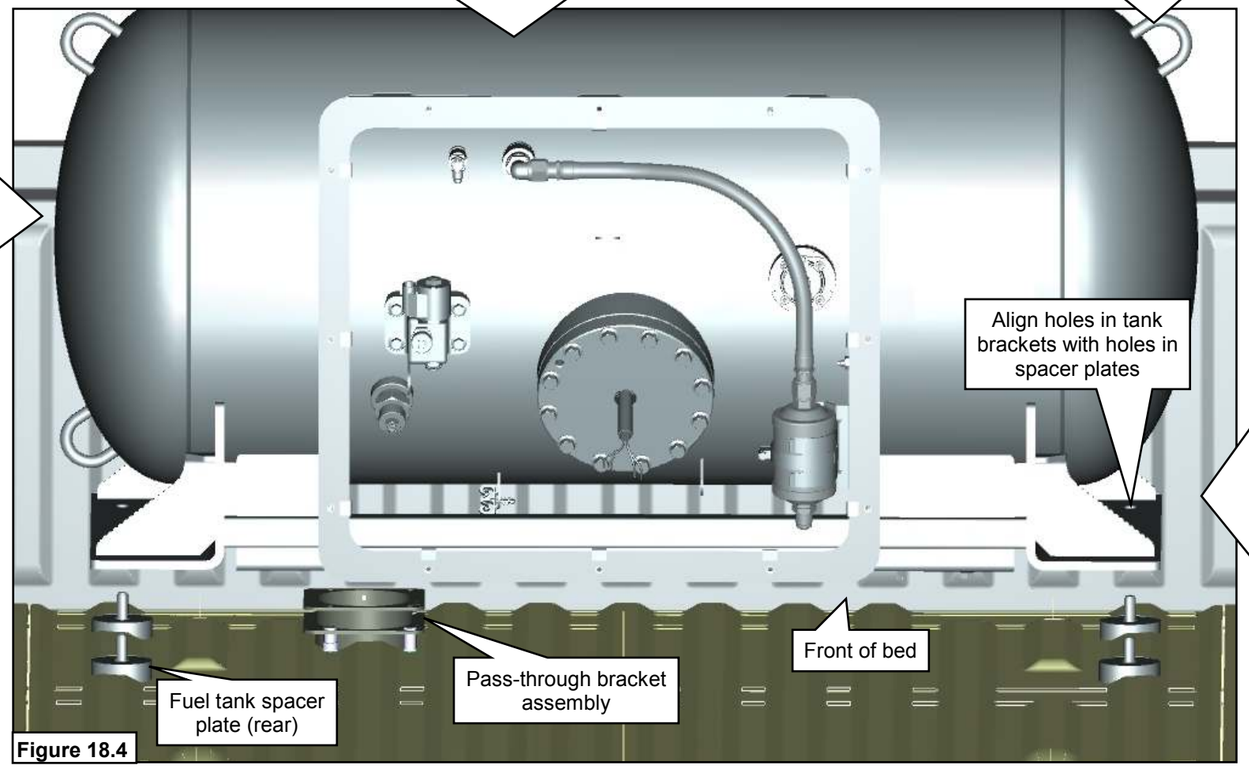


Figure 18.4

Figure 18.3

DISCARD REUSE NEW

INSTALLING NEW INTANK FUEL SUPPLY AND RETURN LINES

1. From underneath, route the fuel supply line over to the fuel supply line on the frame rail. Route the fuel return line over to the fuel return line on the frame rail. **Figure 19.2**.
2. Connect the flex portion of the in-tank fuel supply line to the fuel supply line on the frame rail with the quick-connect fitting. **Figure 19.1**.
3. Connect the flex portion of the in-tank fuel return line to the fuel return line on the frame rail with the quick-connect fitting. **Figure 19.1**.
4. If not done, zip tie the in-tank harness to the rear harness and make sure the three in-tank harness connectors are plugged in to the rear harness.

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

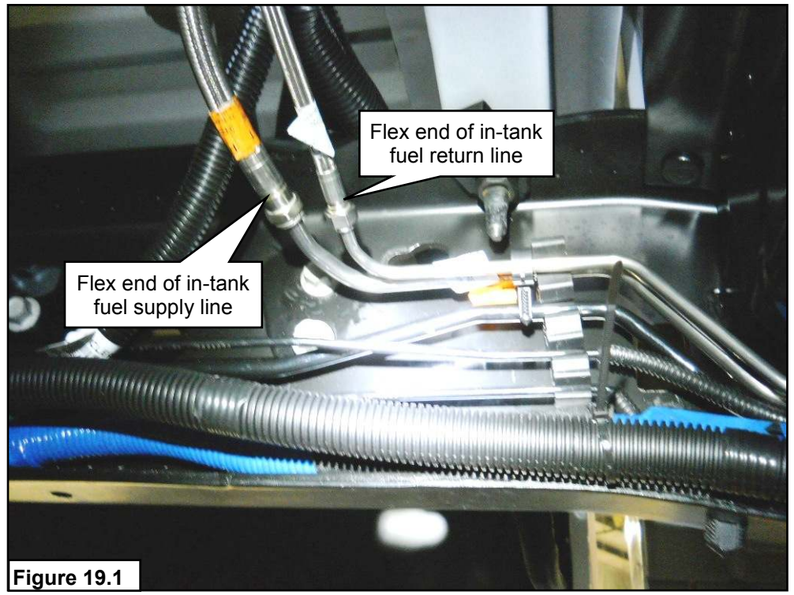


Figure 19.1

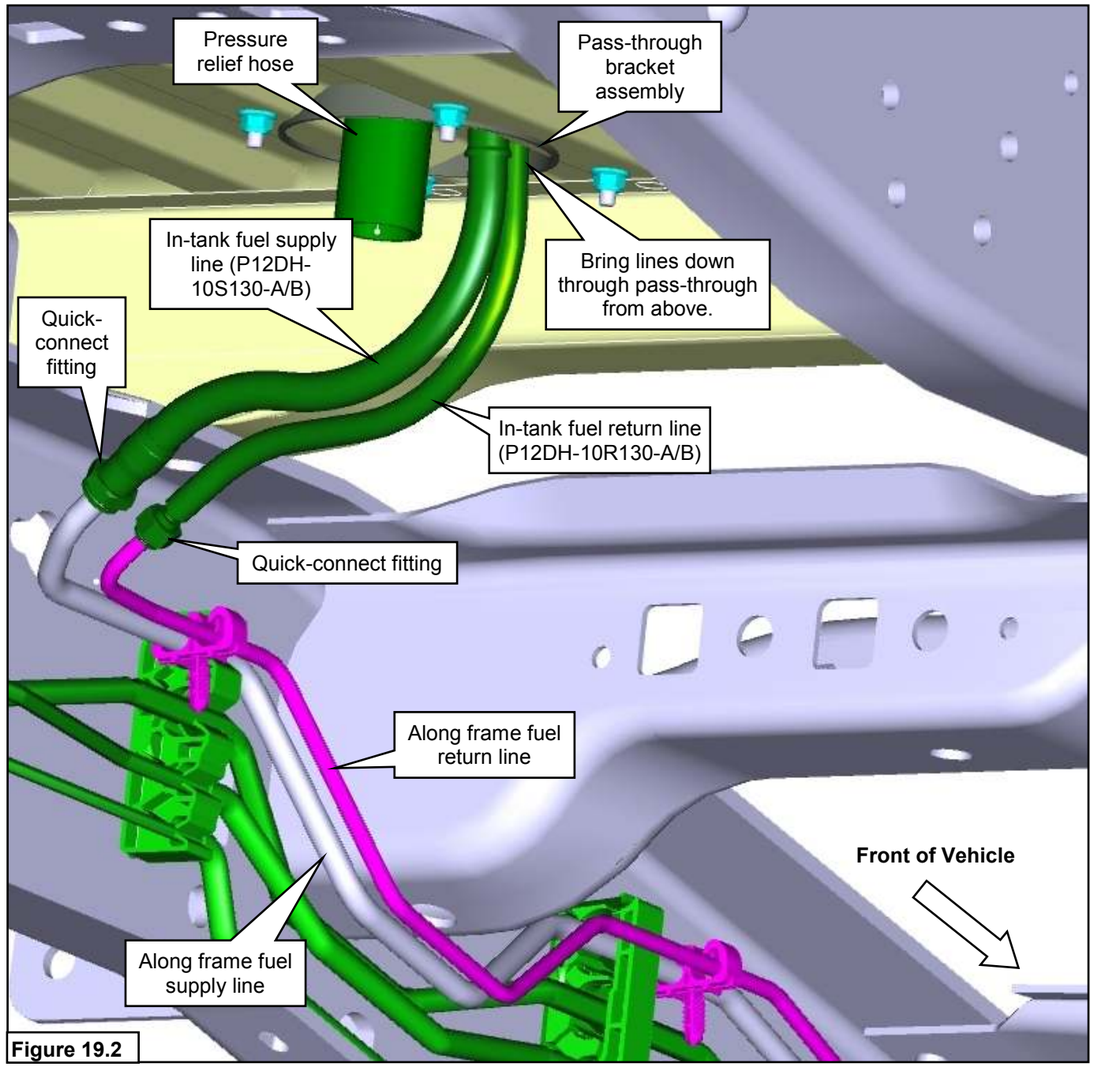


Figure 19.2

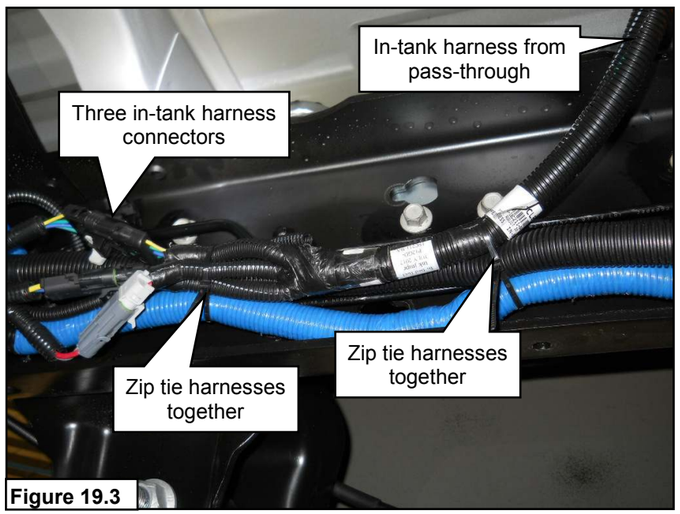


Figure 19.3

5. Route the in-tank harness over to the rear wiring harness. Bundle the harnesses together and use zip ties to secure the harnesses to each other. **Figure 19.3**.
6. Attach the three in-tank harness connectors to the rear harness in-tank connections. **Figure 19.3**.
7. Make sure the in-tank harness ground is attached to the left frame rail. Clean the frame rail so that there is a good ground connection. **Figure 19.4**.

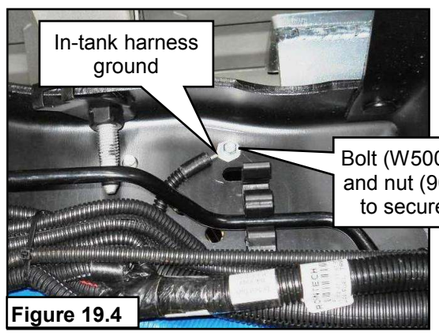


Figure 19.4

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 20.1**.
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 20.2 and 20.3**.
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 20.4 and 20.5**.
4. Secure the fill line to the body using a cable tie edge clip. **Figure 20.6**.

Note: The fuel fill line (fill valve-to-filter) has various part numbers based on the vehicle configuration, such as body style and wheelbase. They are: P-10D121-B-1655, P-10D121-B-420 and P-10D121-B-1700.

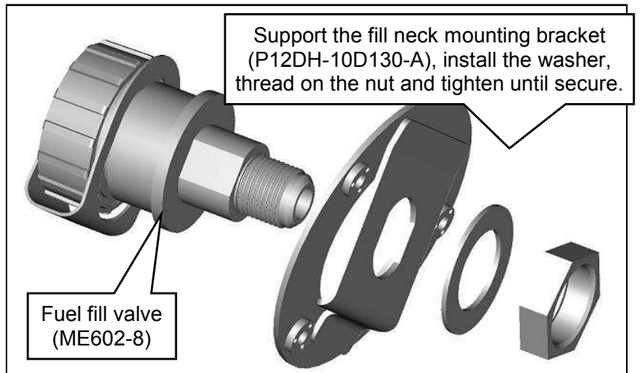


Figure 20.1

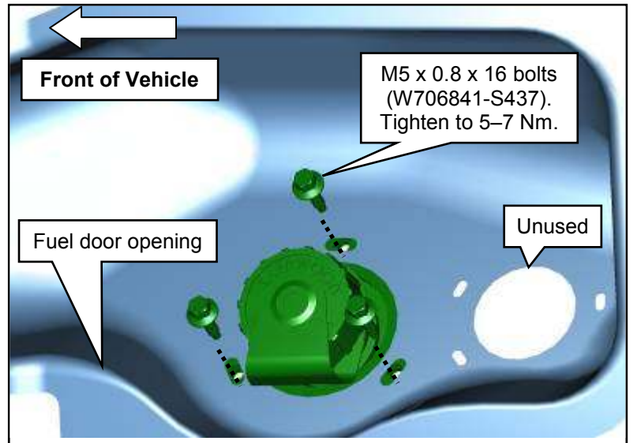


Figure 20.2

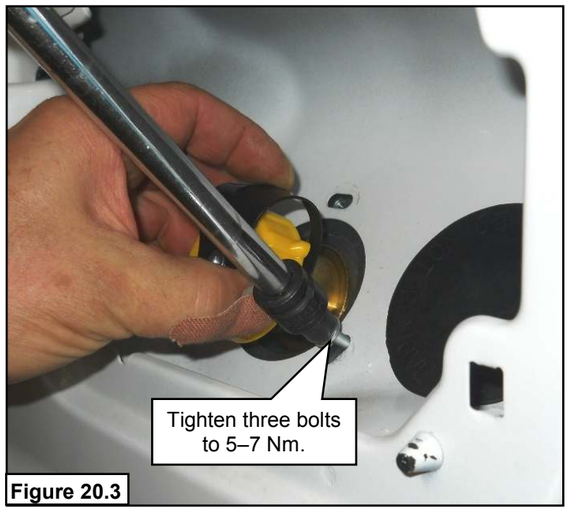


Figure 20.3

Figure 20.6

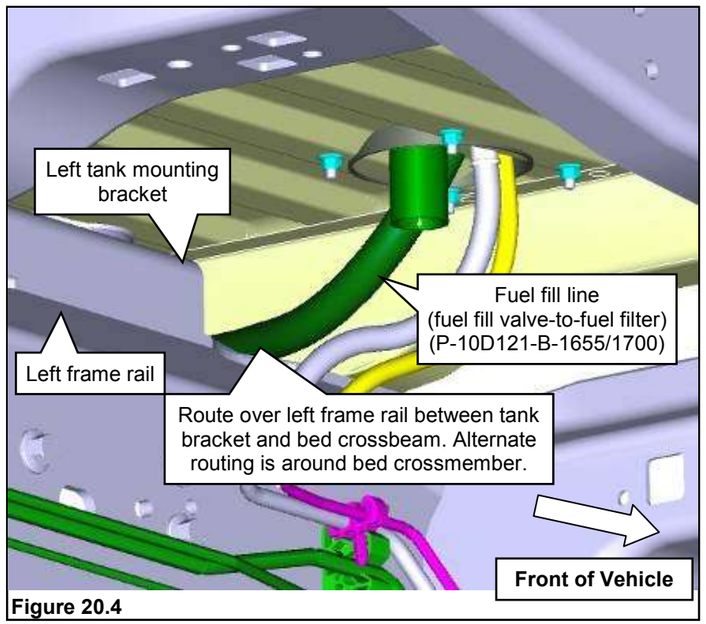


Figure 20.4

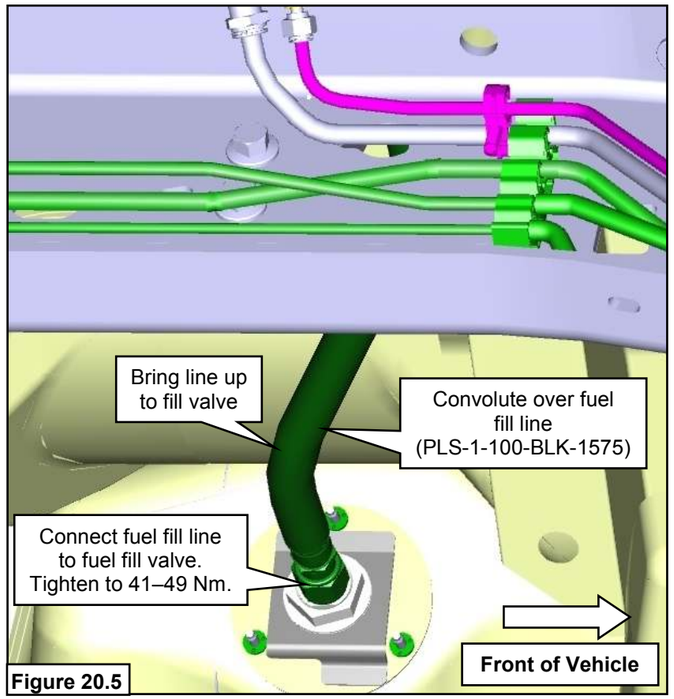


Figure 20.5

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 21.5, 21.6** and **21.7**.
   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 21.6**.
   - 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 21.6.**
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. Tighten the four bolts to 8–12 Nm. **Figures 21.1 and 21.2**.
3. Install original PVC hoses.
4. Attach the FRPCM harness connector into the underhood harness. Bundle the harnesses and use a zip tie to secure. **Figure 21.3**.
5. Connect the lower end of the new vapor purge hose onto the modified OEM vapor line. Position the constant tension clamp and release to secure the hose to the line. **Figure 21.4**.
6. Snap the forward fuel supply line into the original retention clip above the transmission. **Figure 21.4**.
7. Using zip ties, secure the forward fuel lines and vapor line to the bracket on the transmission and along the line routing as needed.

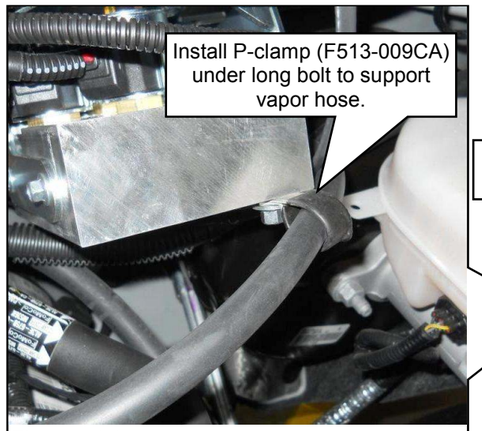


Figure 21.1

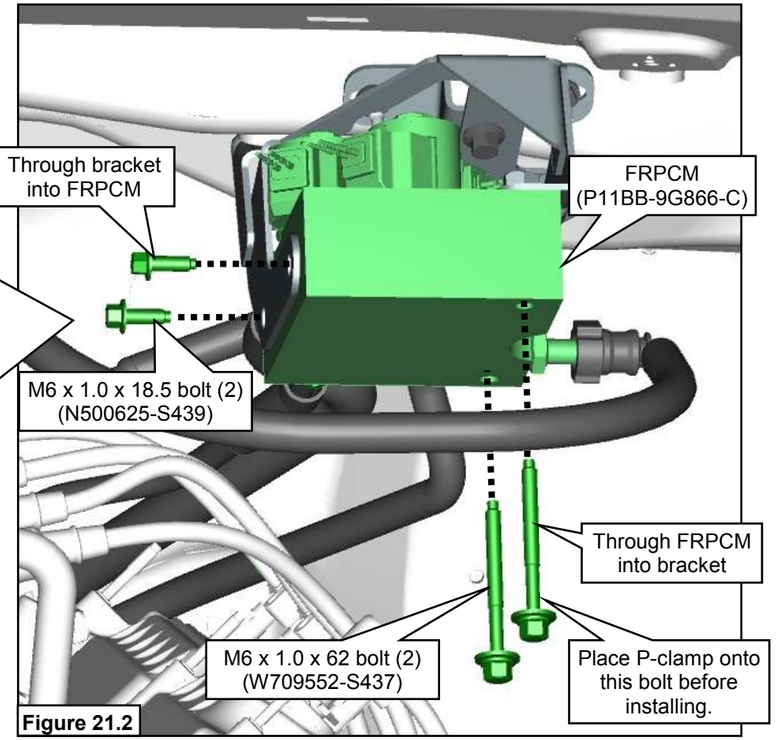


Figure 21.2

Figure 21.6

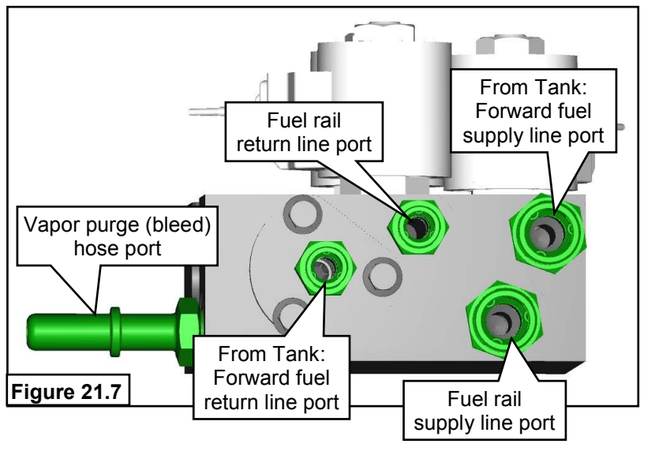


Figure 21.7

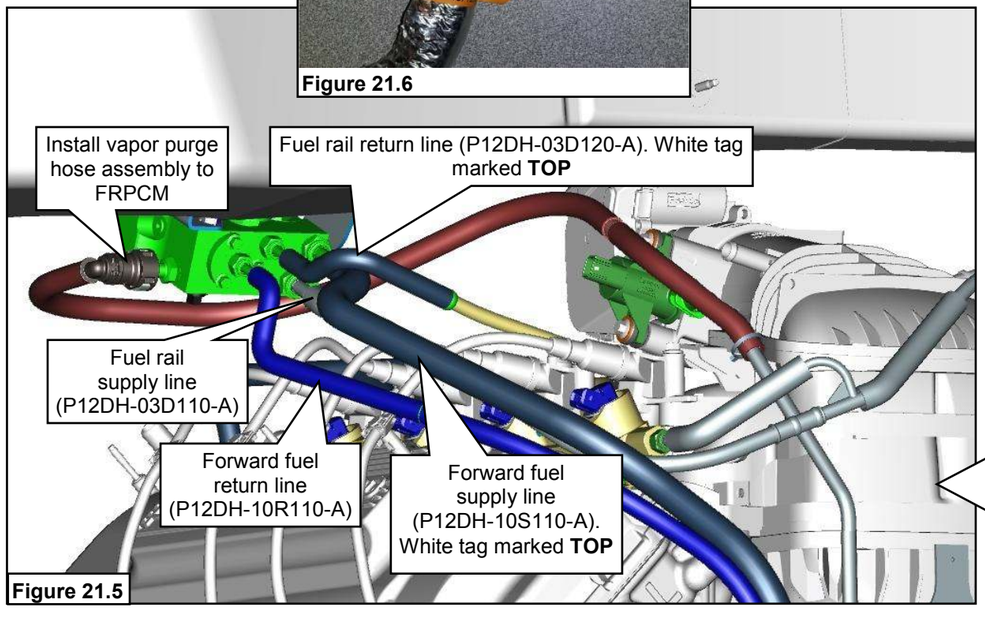


Figure 21.5

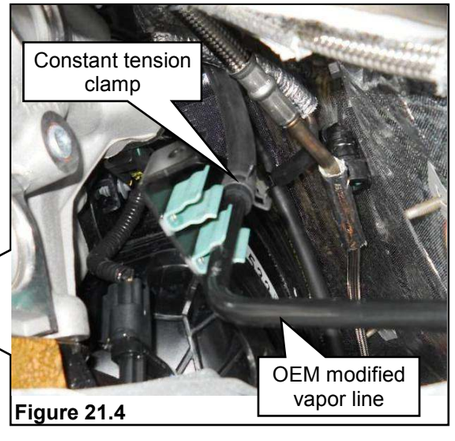
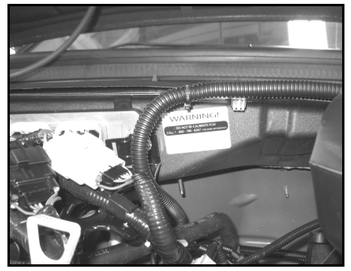


Figure 21.4

Figure 21.3

DISCARD REUSE NEW

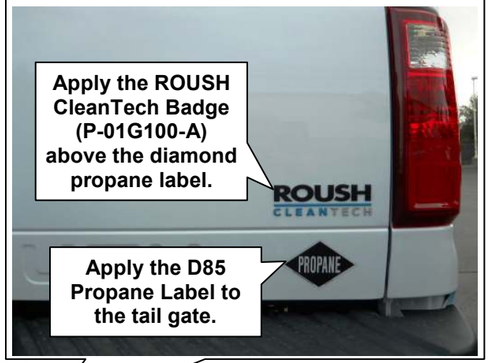
INSTALLING BADGES AND LABELS AND COMPLETING THE KIT INSTALLATION

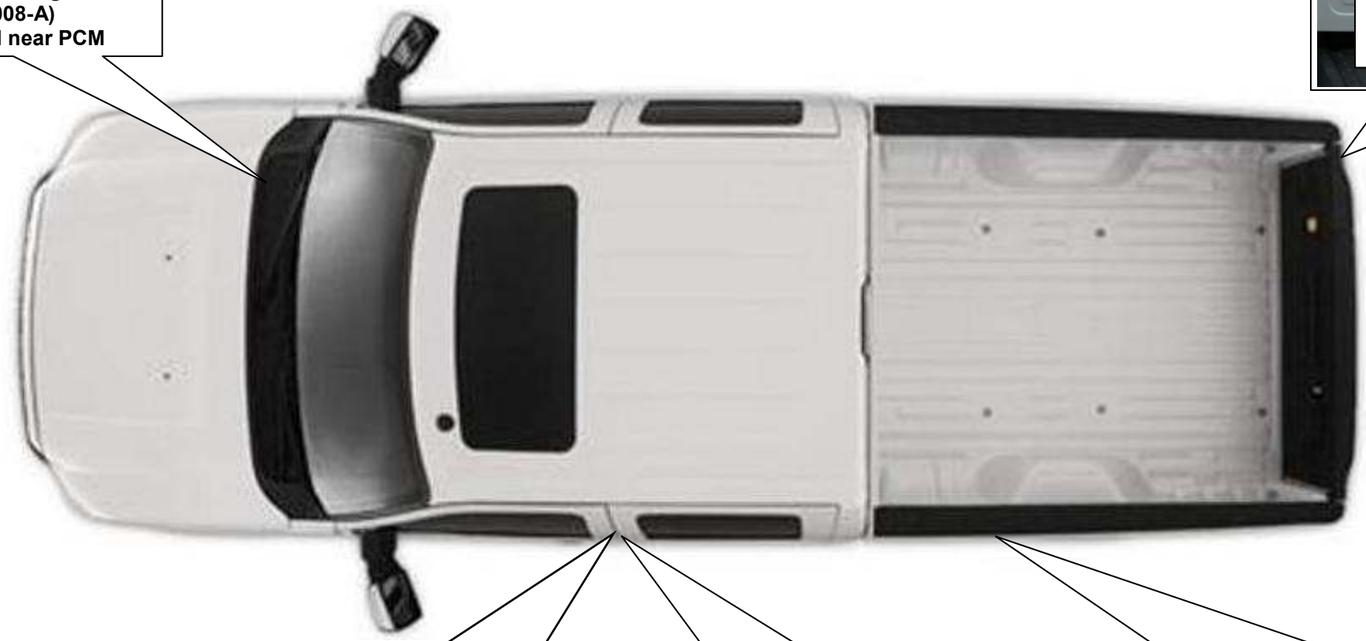


PCM Tamper Warning Label (R07100008-A) on dash panel near PCM

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.

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.

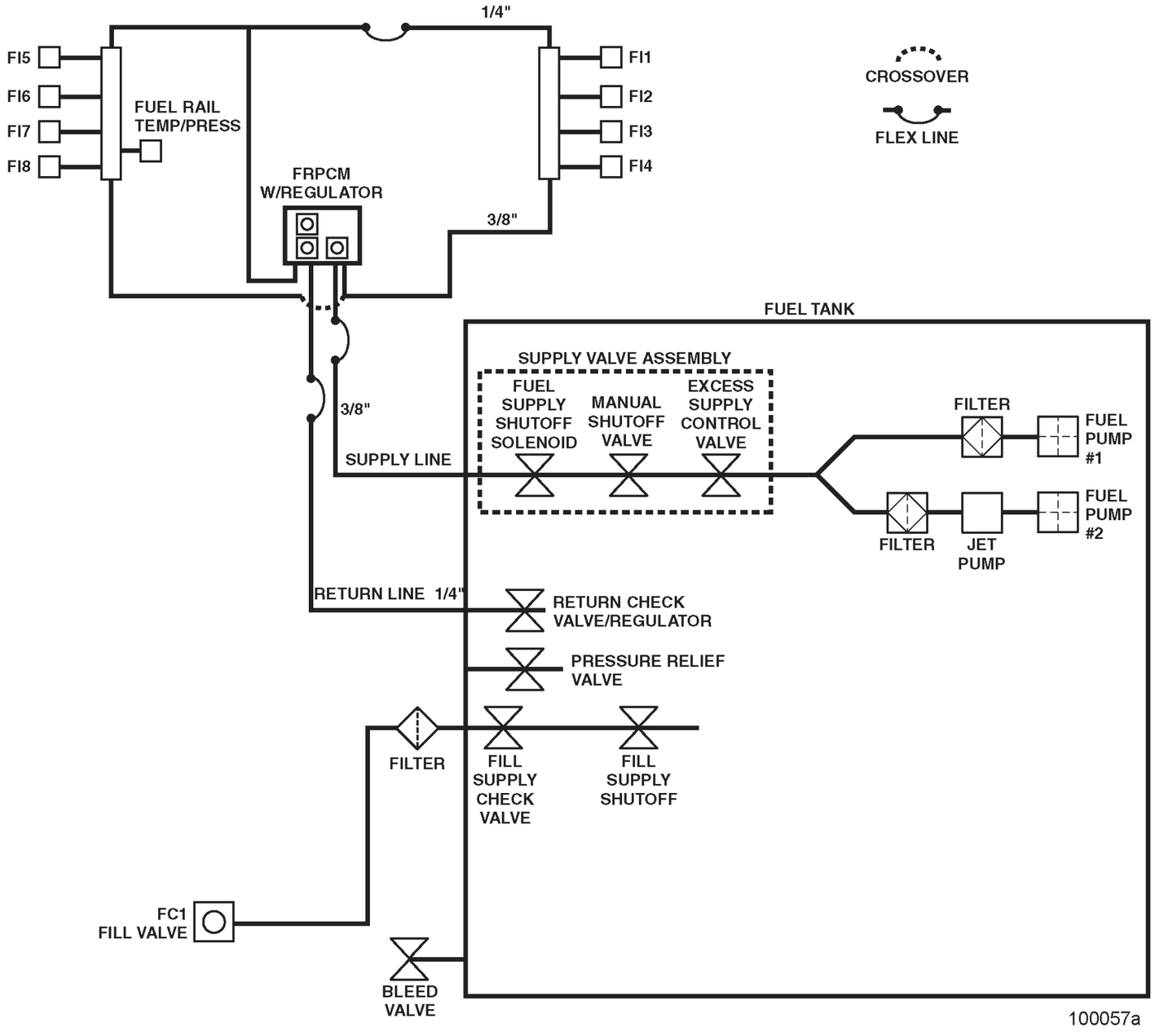
ROUSH
CLEANTECH

ROUSH CLEANTECH BADGE INSTALLATION TEMPLATE

For F-250 and F-350 Pickup Trucks

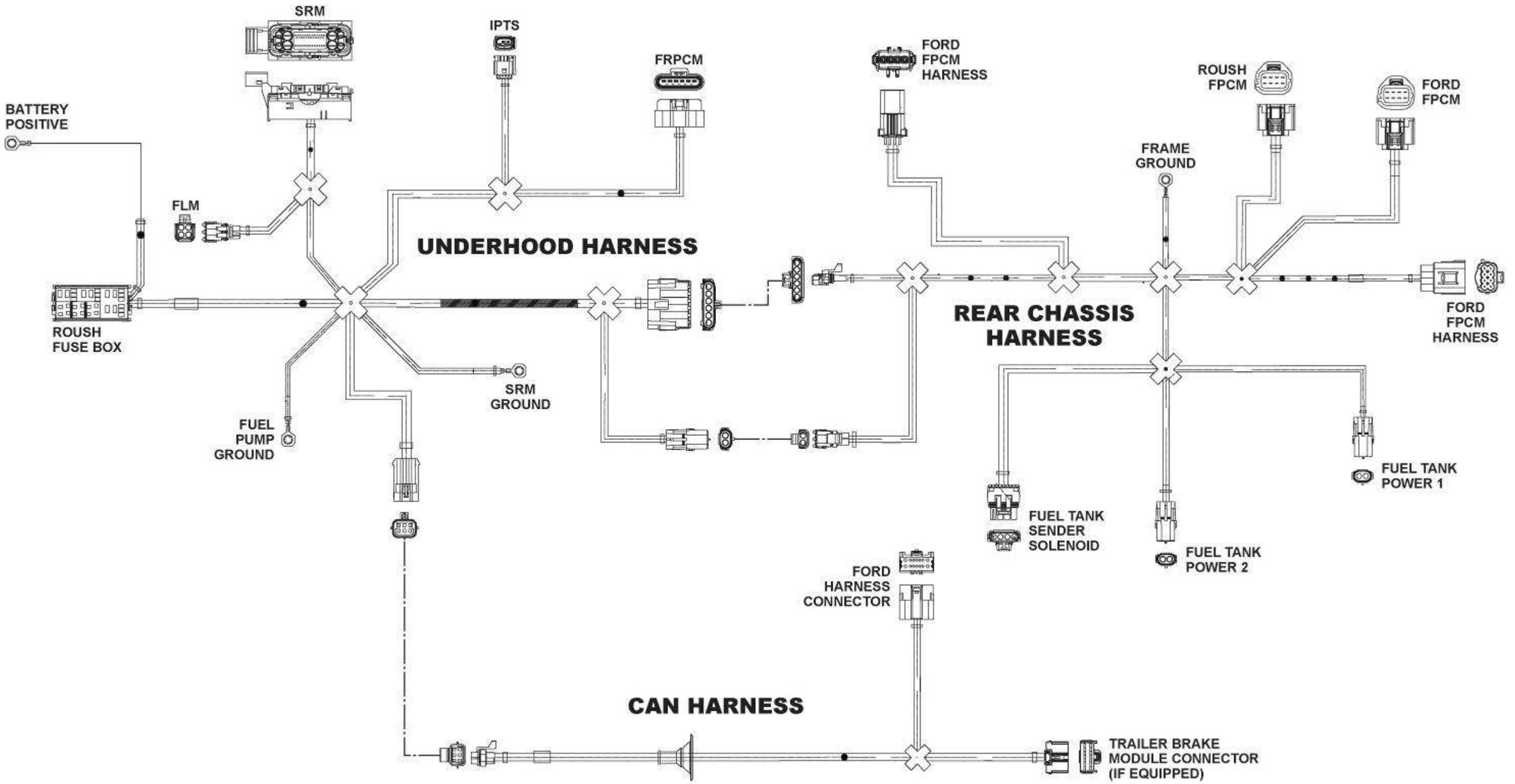
1. Clean the badge bonding area using isopropyl alcohol with a lint free towel.
2. Wipe the bonding surface dry immediately with a dry, lint free cloth or allow the solvent time to flash off.
   Note: The time between surface preparation and badge install must NOT exceed 20 minutes.
3. Using non-marring 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

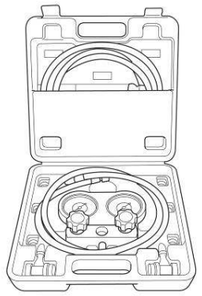
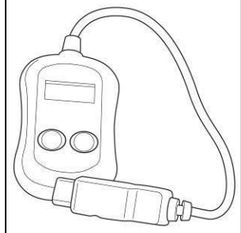
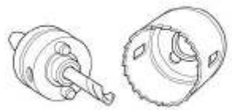


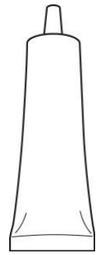
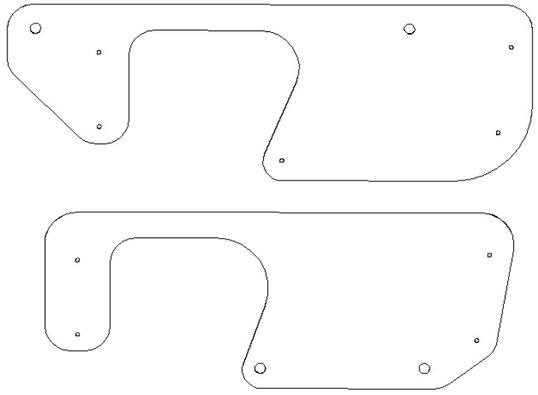
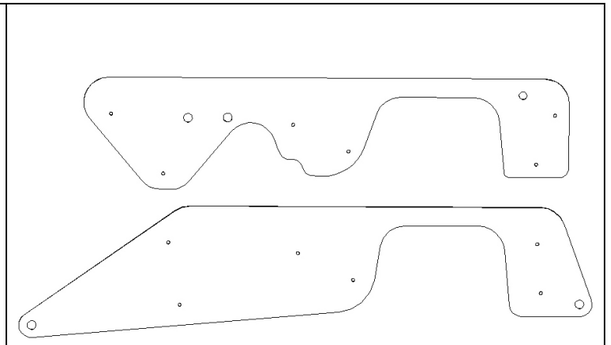
SCHEMATIC — WIRING HARNESS

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 — 29 mm, 3” and 4-1/4”**

					
Drill Bits — 8 mm, 1/8”, 1/2”, 9/16” and 5/8”	**Vacuum Gauge**	**Vacuum Pump**	**Dielectric Grease**	**Tank Mounting Bracket Templates — 6 ft Bed (Top = Right, Bottom = Left)**	**Tank Mounting Bracket Templates — 8 ft Bed (Top = Right, Bottom = Left)**