ROUSH CLEANTECH

Ford E-150 / E-250 / E-350 Cargo Van & Wagon
Liquid Propane Autogas Fuel System – Extended Range

Installation Instructions

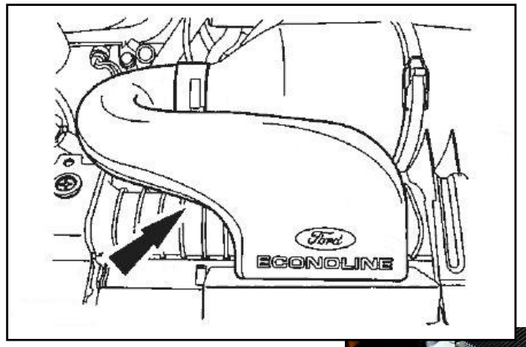
P12GD-01F001-BB

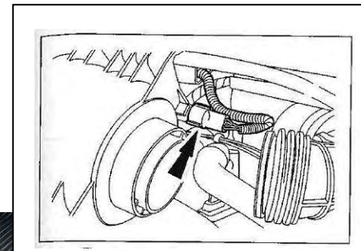
August, 2012

CONTENTS

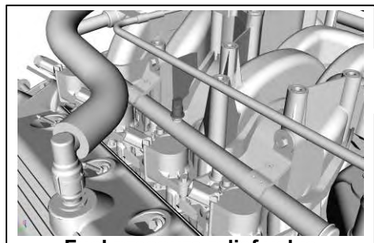
REMOVING THE POWERTRAIN CONTROL MODULE

1. Using a scan tool, check for all error codes. Correct all errors before continuing.
2. Remove upper radiator shroud (cover) for tool access. Remove air cleaner inlet assembly, disconnect mass air flow (MAF) sensor connector and remove air cleaner cover.
3. Remove the powertrain control module (PCM) following the procedure in the *Ford Workshop Manual, Section 303-14, Electronic Engine Controls.* Keep all fasteners for reuse.
4. Depressurize the fuel rail using the procedure described in the *Ford Workshop Manual, Section 310-00 Fuel System, General Information*.
5. Disconnect and remove the battery from the vehicle.
6. From inside the passenger compartment, remove the engine cover.
7. Install the hang tag label onto the rear view mirror of the vehicle.

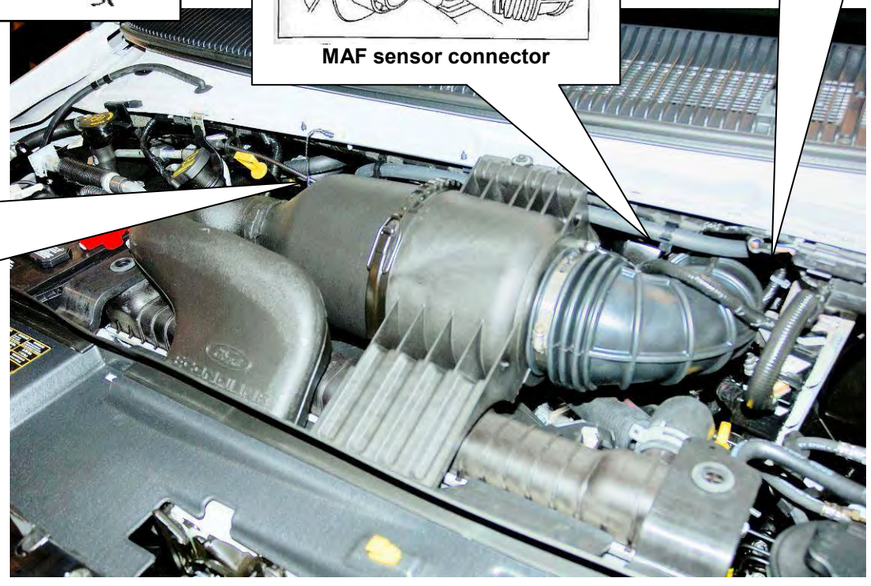


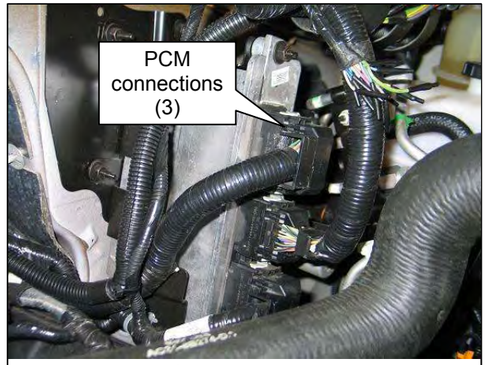


MAF sensor connector



Fuel pressure relief valve





PCM connections

SENDING THE PCM FOR REPROGRAMMING

ROUSH CLEANTECH

E-450 PROPANE PCM LABEL

Purchaser's Full Name _____

Purchaser's Address _____

Vehicle Model Year _____ Mileage at Installation _____

Vehicle Test Group _____

Vehicle Identification Number _____

☐ Hang Tag Installed

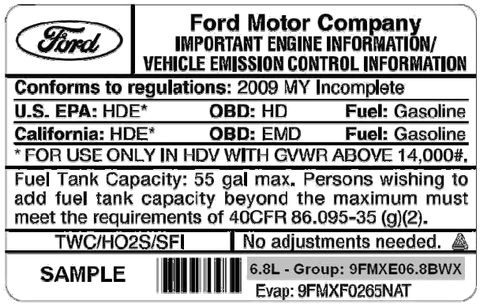
(Must be installed for PCM to be flashed)

GVWR Front _____

GVWR Rear _____ Tire Size _____

Propane Fuel Tank Serial Number _____

PBC2-9A095-DB



Ford Motor Company
IMPORTANT ENGINE INFORMATION/
VEHICLE EMISSION CONTROL INFORMATION

Conforms to regulations: 2009 MY Incomplete

U.S. EPA: HDE* **OBD:** HD **Fuel:** Gasoline

California: HDE* **OBD:** EMD **Fuel:** Gasoline

* FOR USE ONLY IN HDV WITH GVWR ABOVE 14,000#.

Fuel Tank Capacity: 55 gal max. Persons wishing to add fuel tank capacity beyond the maximum must meet the requirements of 40CFR 86.095-35 (g)(2).

TWC/HO2S/SFI | No adjustments needed.

SAMPLE

6.8L - Group: 9FMXE06.8BWX

Evap: 9FMXF0265NAT

1. Write the requested information, including the gross vehicle weight rating (GVWR), on the PCM Return Label (P10C2-9A095-E). The test group information will be found on the original vehicle emissions control information (VECI) label (example: 6.8L – Group: 9FMXE06.8BWX). 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.

2. Pack the PCM securely in the shipping box (P10C2-SB-AA) 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.

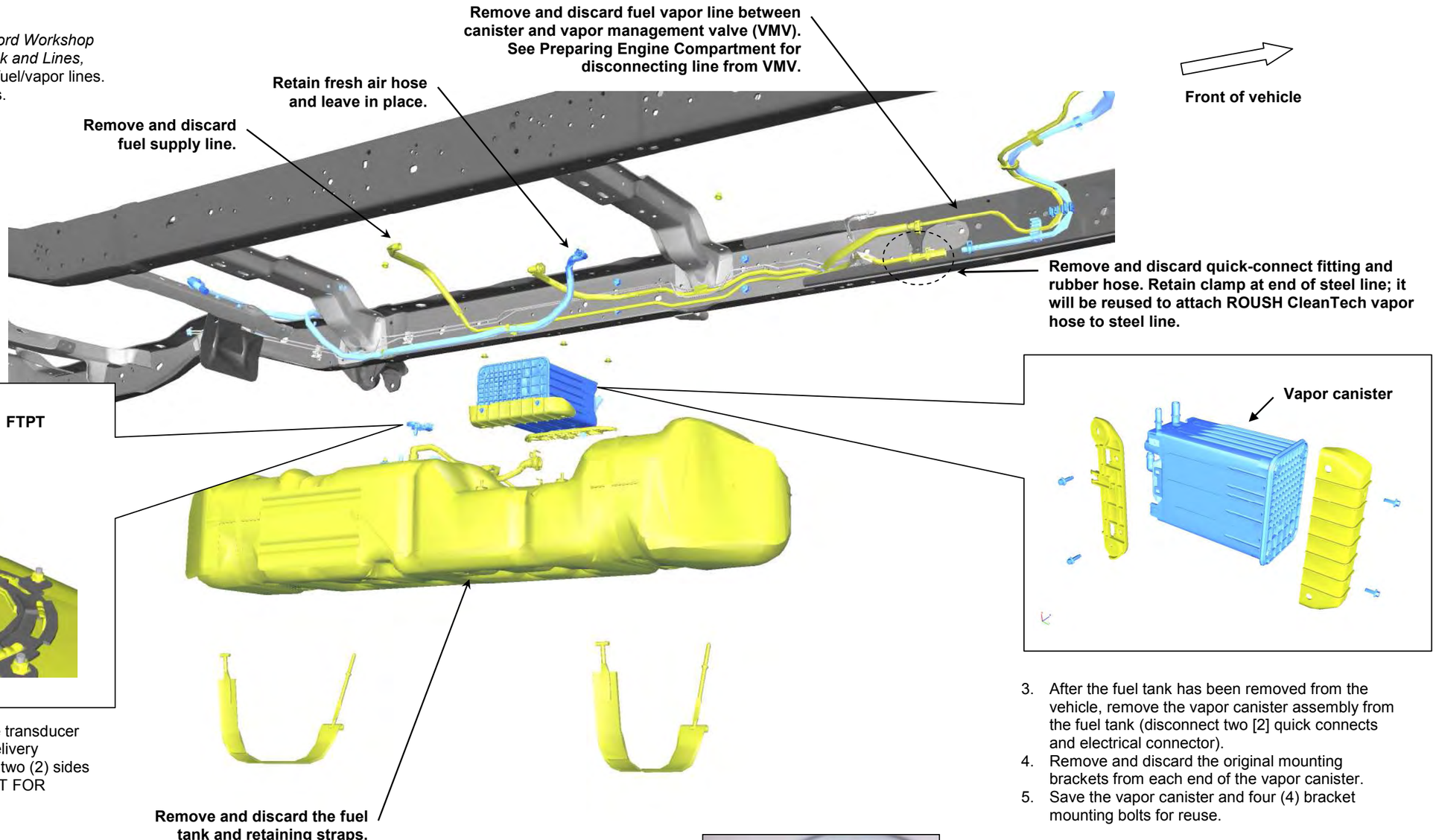
FedEx will deliver the package to ROUSH CleanTech via overnight service. ROUSH CleanTech will reprogram the PCM during the day in which it is received and return it to you via overnight service.

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.

REMOVING THE ORIGINAL FUEL TANK AND FUEL/VAPOR LINE

1. Following the instructions in the *Ford Workshop Manual, Section 310-01, Fuel Tank and Lines,* remove the original fuel tank and fuel/vapor lines. **Note:** Do NOT remove brake lines.



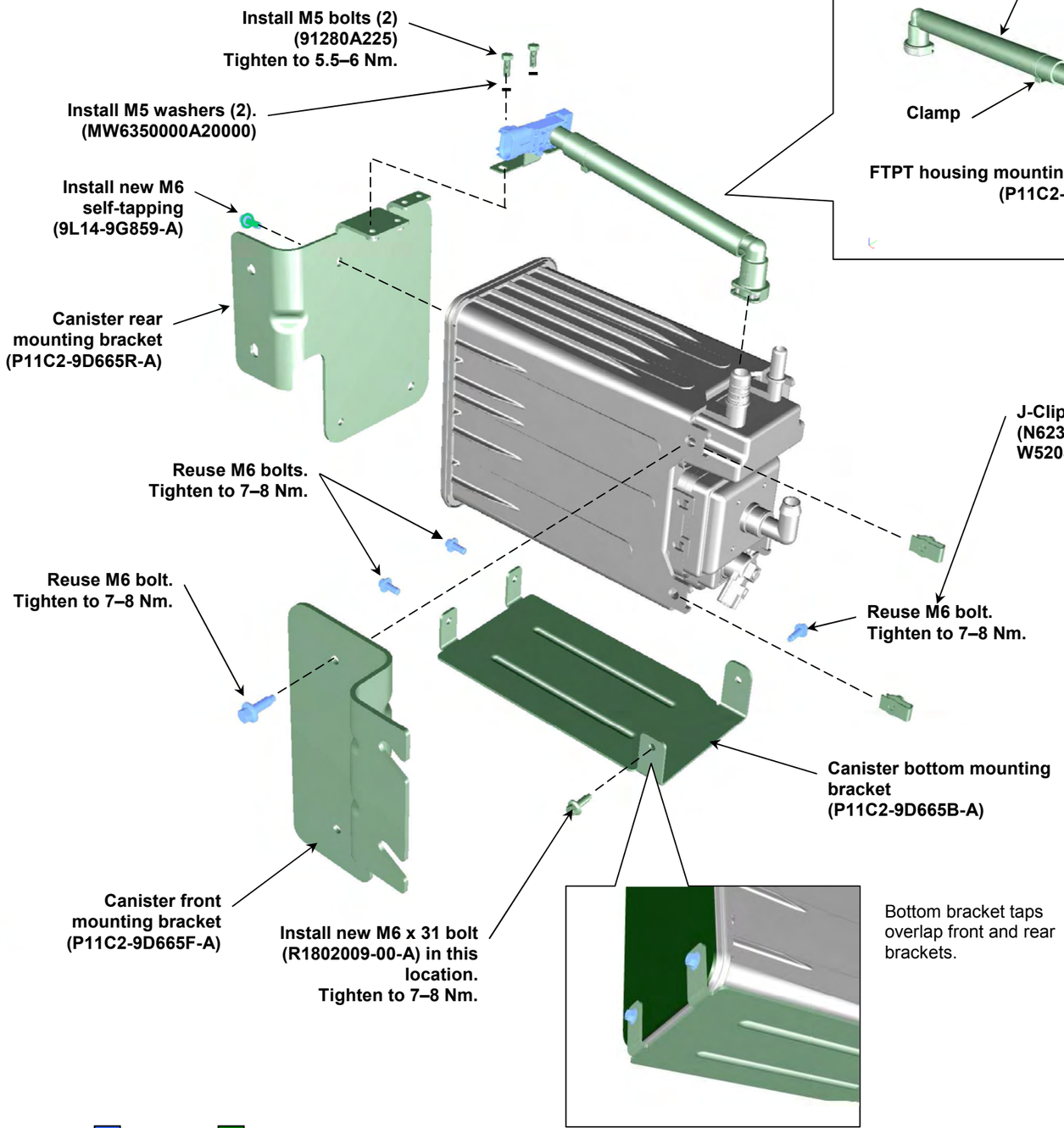
2. Remove the fuel tank pressure transducer (FTPT) sensor from the fuel delivery module by gently prying up on two (2) sides of the sensor. SAVE THE FTPT FOR LATER USE.

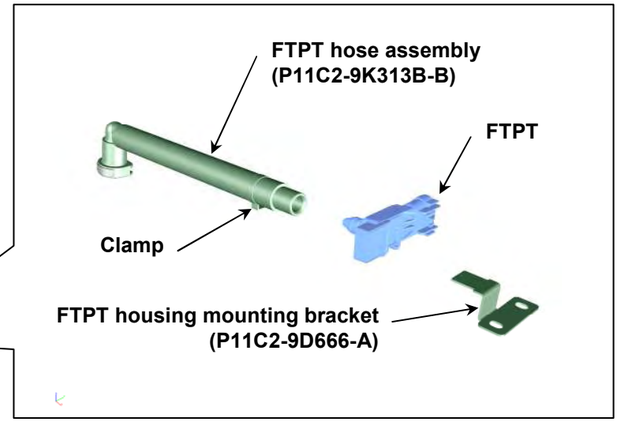
3. After the fuel tank has been removed from the vehicle, remove the vapor canister assembly from the fuel tank (disconnect two [2] quick connects and electrical connector).
4. Remove and discard the original mounting brackets from each end of the vapor canister.
5. Save the vapor canister and four (4) bracket mounting bolts for reuse.

6. Remove and discard the fuel fill line and cap extending from the fuel door mounting bracket to the fuel tank.

DISCARD REUSE NEW

ASSEMBLING THE VAPOR CANISTER — BENCH PROCEDURE





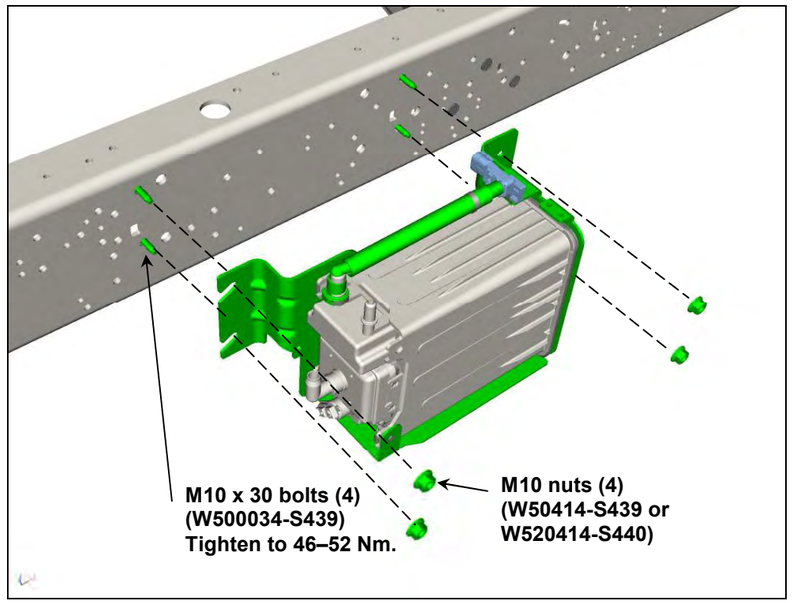
Inspect the FTPT seal to ensure that it is clean.

Apply glass cleaner to the open end of the hose assembly and install the FTPT, oriented as shown.

Bottom bracket taps overlap front and rear brackets.

Note: Parts for assembling the vapor canister are found in hardware kit P11GD-EVAPKIT-A.

INSTALLING THE VAPOR CANISTER



From inside frame rail, insert front two (2) M10 bolts and thread nuts part way onto front bolts. Slide slotted holes of canister bracket onto bolts.

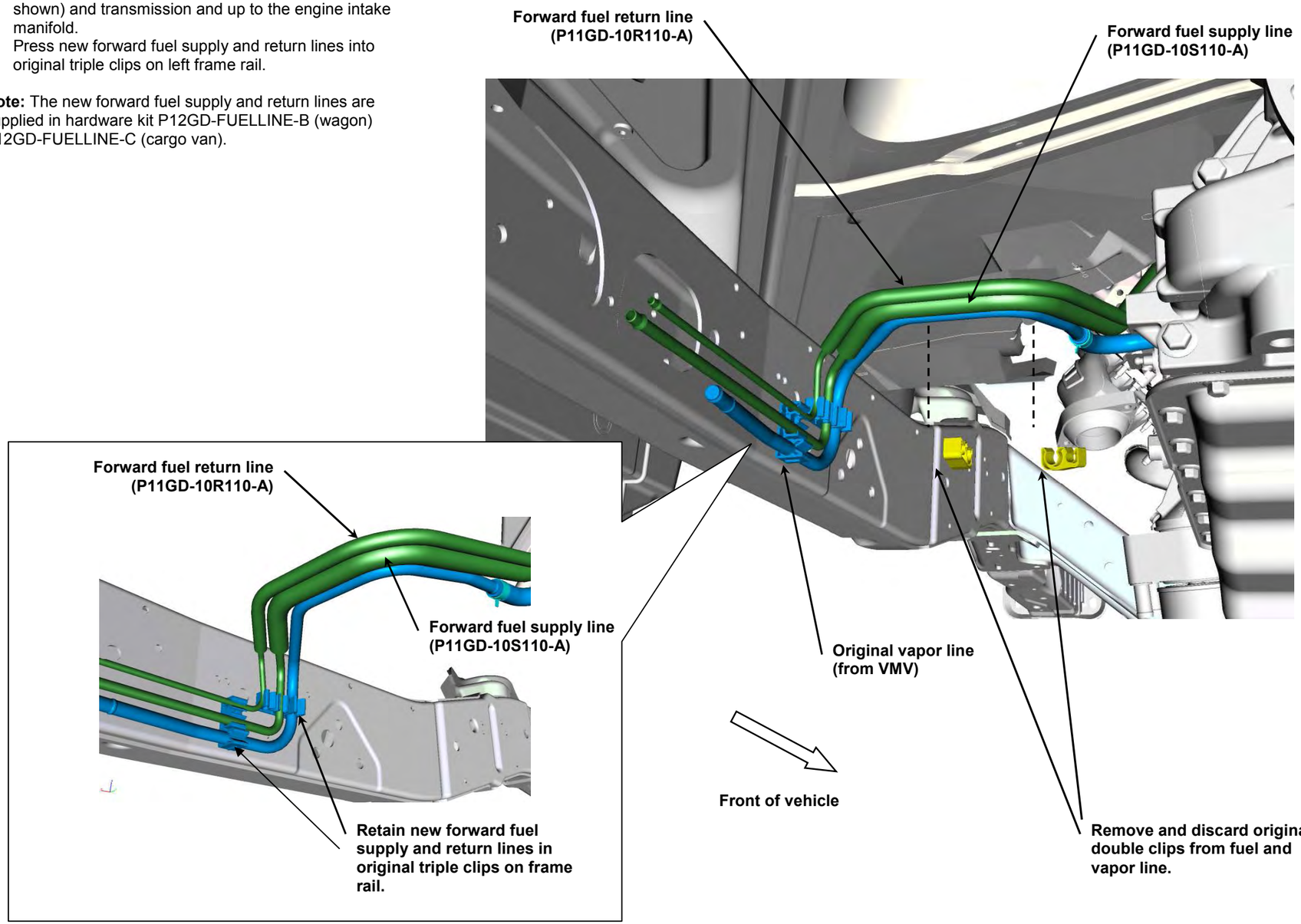
Align canister rear bracket mounting holes with frame boles and install two (2) remaining M10 bolts.

DISCARD REUSE NEW

INSTALLING NEW FORWARD FUEL LINES

1. From underneath the vehicle, route the fuel supply and return lines over the exhaust pipe heat shield (not shown) and transmission and up to the engine intake manifold.
2. Press new forward fuel supply and return lines into original triple clips on left frame rail.

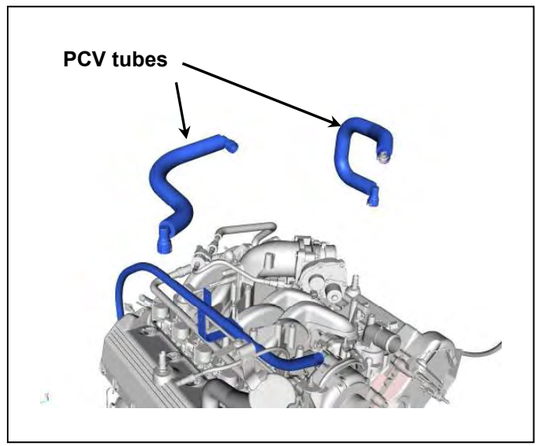
Note: The new forward fuel supply and return lines are supplied in hardware kit P12GD-FUELLINE-B (wagon) P12GD-FUELLINE-C (cargo van).

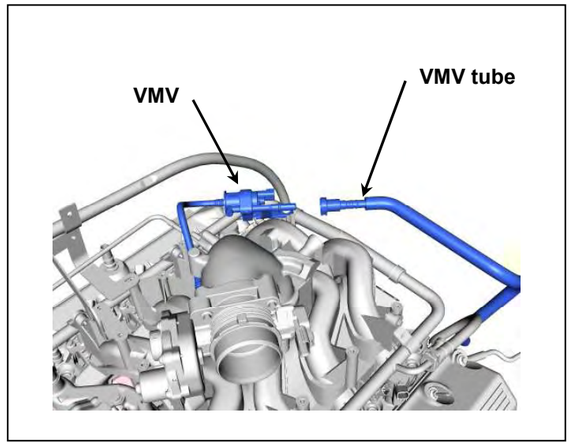


DISCARD REUSE NEW

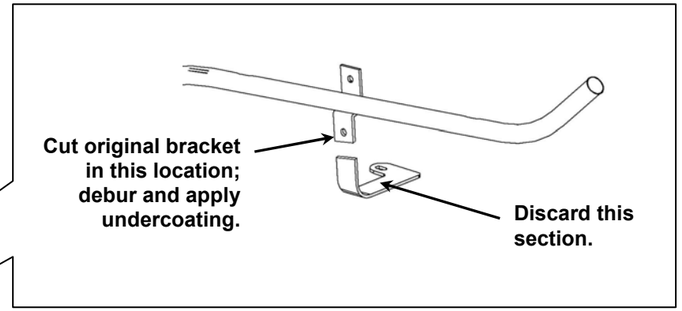
PREPARING ENGINE COMPARTMENT

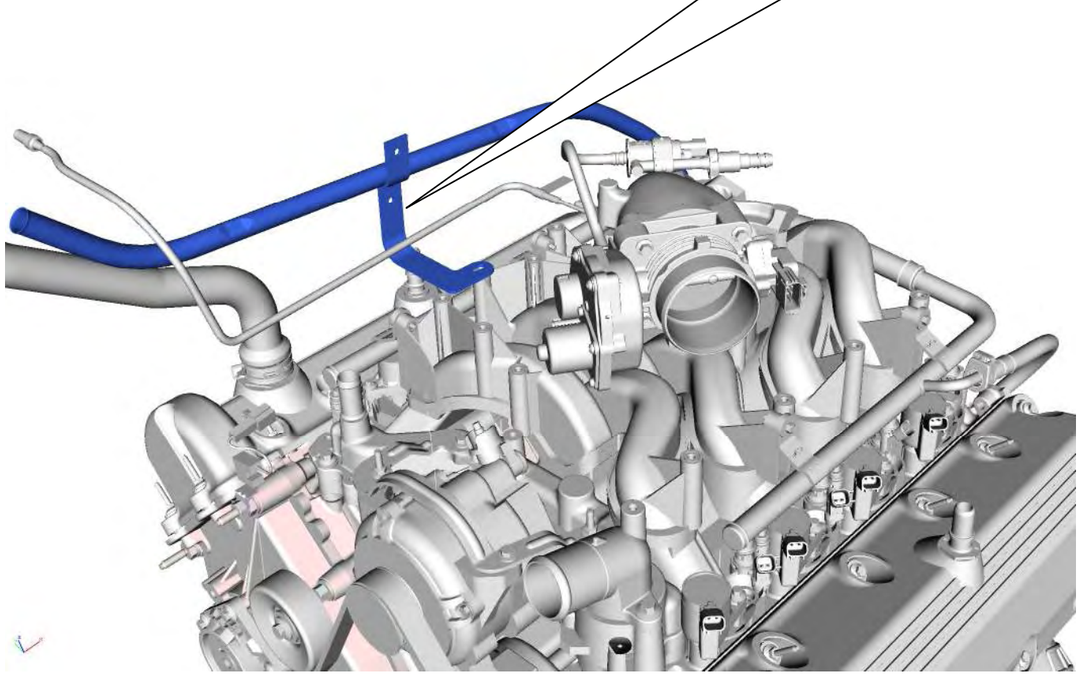
1. Disconnect and remove both positive crankcase ventilation (PCV) tubes for additional working clearance.
2. Disconnect the tube from the VMV. Do NOT remove the VMV from the engine.





3. Remove the bolt that retains the transmission dipstick mounting bracket to the intake manifold. Do NOT remove the dipstick tube from the transmission. The following modification can be done in vehicle. Place a suitable cloth below the dipstick mounting bracket to cover engine components and catch metal cuttings and debris. Carefully remove cloth and clean away any dirt and/or dropped metal cuttings from around injector ports before removing fuel rails.

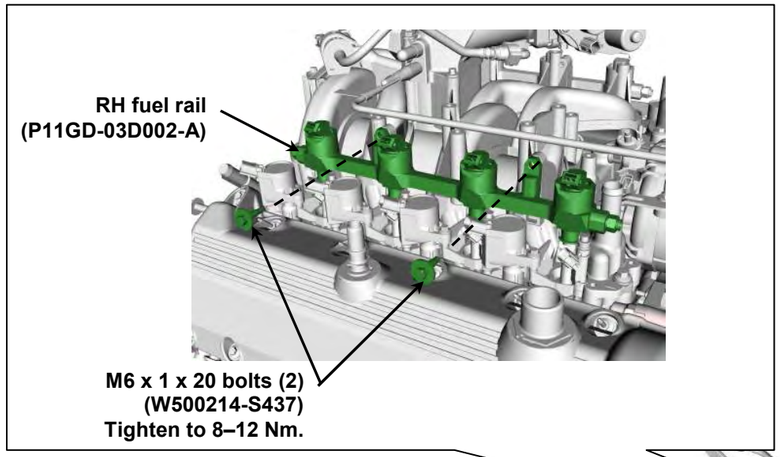


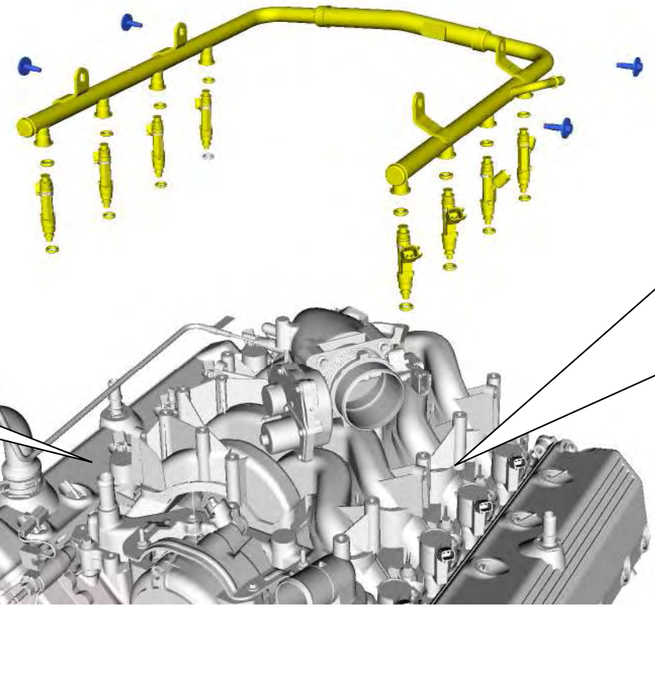


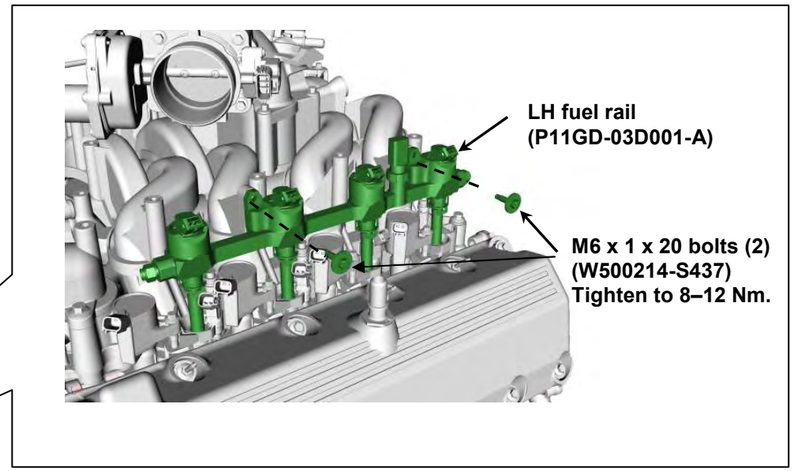
DISCARD REUSE NEW

INSTALLING NEW FUEL RAILS

1. Disconnect the wiring harness connectors from the fuel injectors.
2. Remove the four (4) mounting bolts and remove the fuel rail assembly from the engine. Save three of the mounting bolts for reuse in mounting the transmission dipstick bracket, P10C2-7H379A.

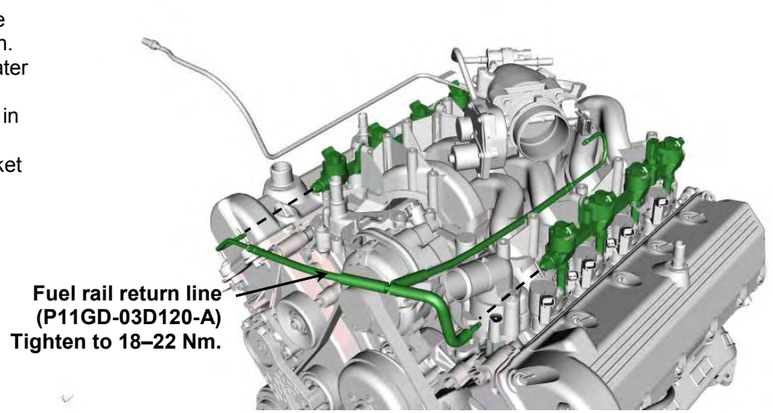


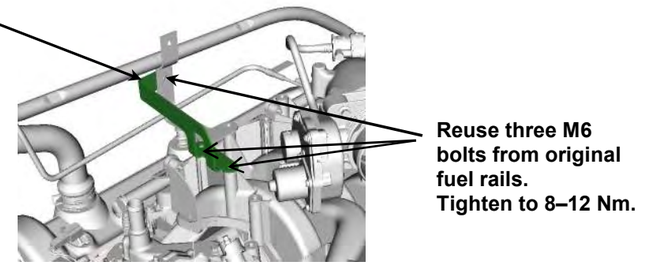




3. Using engine oil (Motorcraft SAE 5W-20 or equivalent), lubricate the lower O-rings on the injector nozzles before seating the ROUSH fuel rail assemblies into the intake manifold injector bores.
4. Starting with the LH fuel rail assembly on the driver side of the intake manifold, fully seat the nozzles in the injector bores. Using two (2) M6 bolts found in hardware kit P11GD-ENGKIT-A, secure the LH fuel rail to the intake manifold. Carefully install bolts by hand to avoid cross-threading; then, tighten to specification.
5. Repeat Step 4 to install the RH fuel rail assembly on the passenger side of the intake manifold.

6. Orient and install the fuel rail return line and tee assembly onto the forward ends of the fuel rails and tighten the fittings to specification. **Note:** The rear connection of the fuel rail return line will be done later after the FRPCM is installed.
7. Install the new dipstick mounting bracket (P10C2-7H379-A) found in hardware kit (P11GD-ENGKIT-A) to both the intake manifold and modified transmission dipstick mounting bracket. Secure the bracket reusing M6 mounting bolts removed from the original fuel rails.

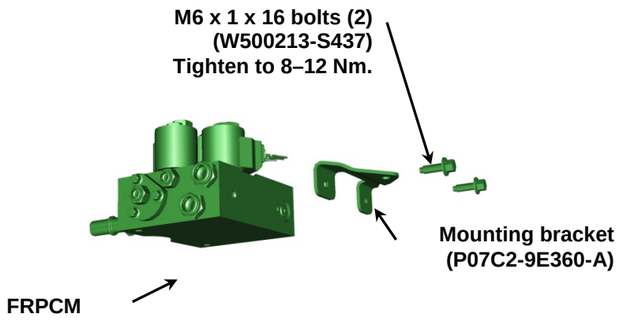




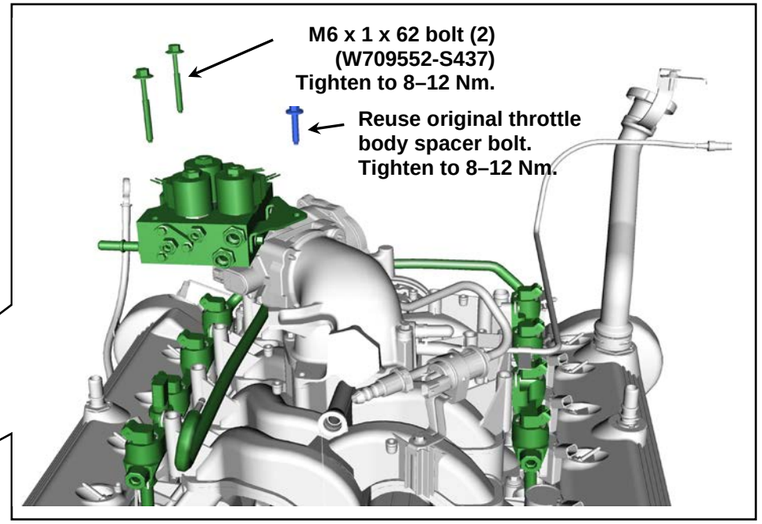
DISCARD REUSE NEW

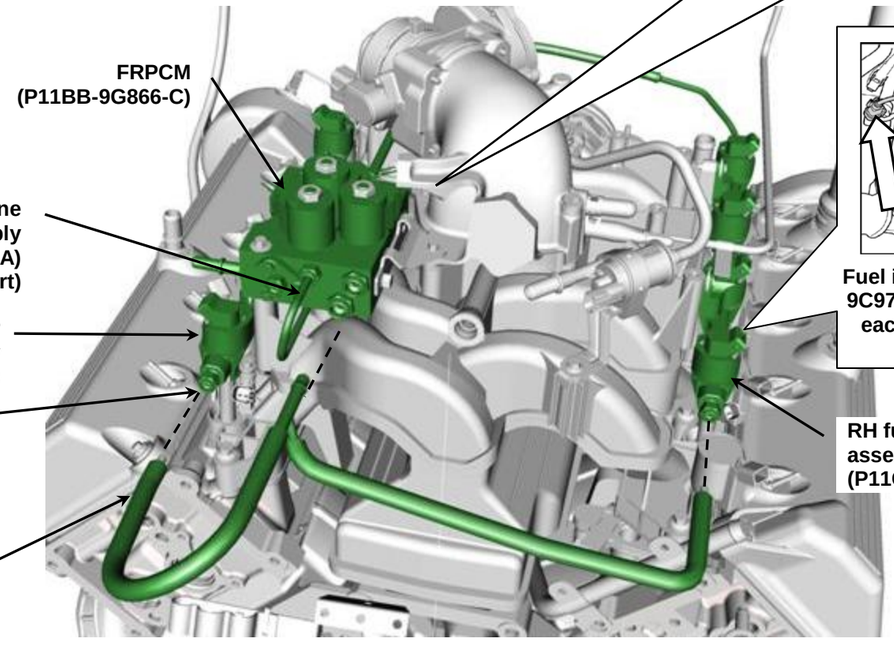
INSTALLING FUEL RAIL PRESSURE CONTROL MODULE ASSEMBLY

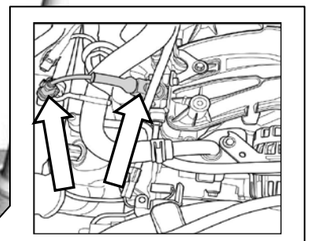
1. Attach mounting bracket to the fuel rail pressure control module (FRPCM) using two (2) M6 bolts. These parts are supplied in hardware kit P11GD-ENGKIT-A.

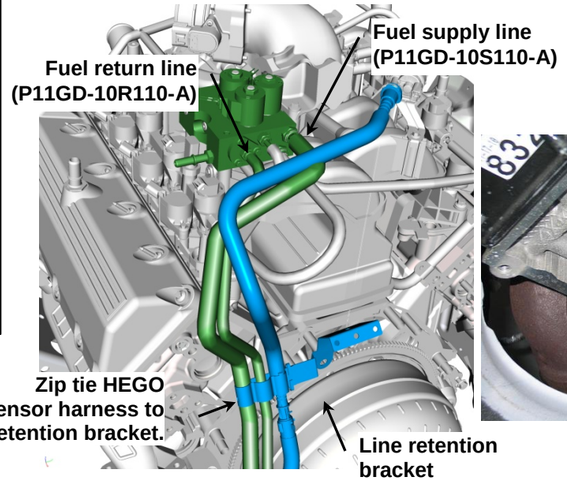


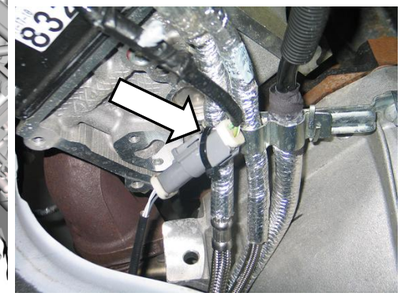
2. Remove and retain the left-rear throttle body spacer-to-intake manifold bolt.
3. Positions the FRPCM on the two (2) vertical bosses located on the left rear corner of the intake manifold and at the same time connect the fuel rail return line and tee assembly. Loosely install two (2) M6 fasteners found in hardware kit P11GD-ENGKIT-A to secure the FRPCM to the intake manifold. The mounting bracket should now be aligned with the rear left throttle spacer mounting hole. Reinstall the throttle spacer bolt.



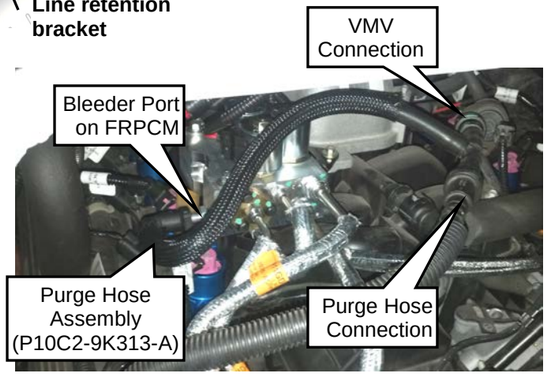








4. Connect the fuel rail fuel return line and tee assembly installed earlier into the top left port on the FRPCM.
5. Install the fuel rail fuel supply line and tee assembly between the fuel rails and bottom right port of the FRPCM.
6. Connect one (1) fuel injector jumper to each original harness connector (8 locations). These jumper harnesses are supplied in hardware kit P11GD-ENGKIT-A. Ensure that each jumper is attached to the correct mating connector to avoid cross wiring.
7. Connect the forward fuel supply and return lines to the FRPCM.
8. Install the original PVC tubes (hoses).
9. Install the purge hose assembly (P10C2-9K313-A) to the bleeder port on the FRPCM and tee in to VMV and the original Ford purge hose.
10. Detach the HEGO sensor retainer clip from the line retention bracket and clamp the fuel supply and return lines along with the vapor line in the retention bracket at the transmission.
11. Using zip ties, secure the HEGO sensor harness to the fuel supply line.

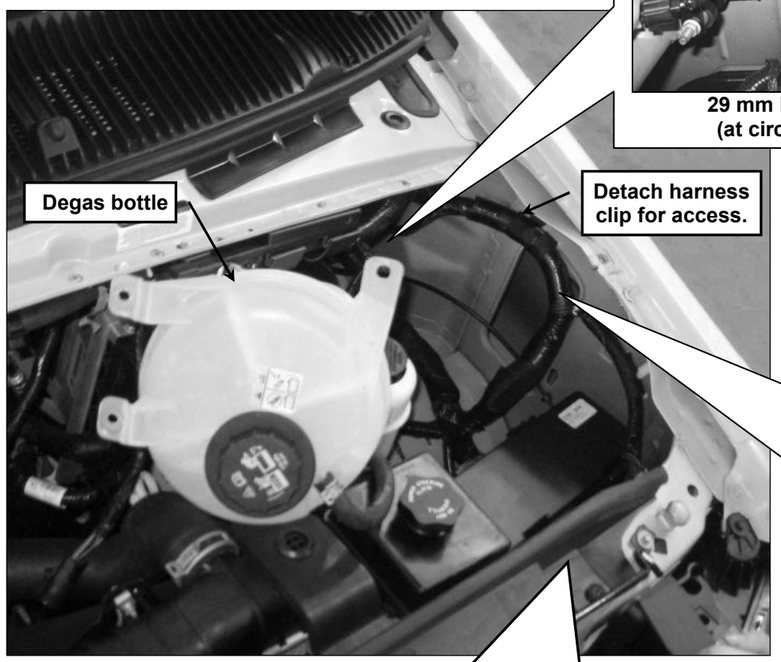


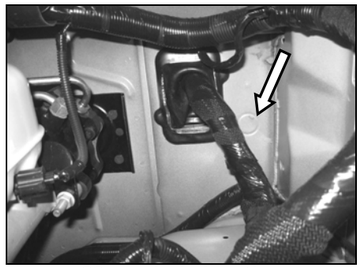
DISCARD REUSE NEW

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 P12GD-ELECKIT-B.

1. Remove and retain the three (3) degas bottle mounting fasteners. Lay the degas bottle on its side atop the brake booster as shown.

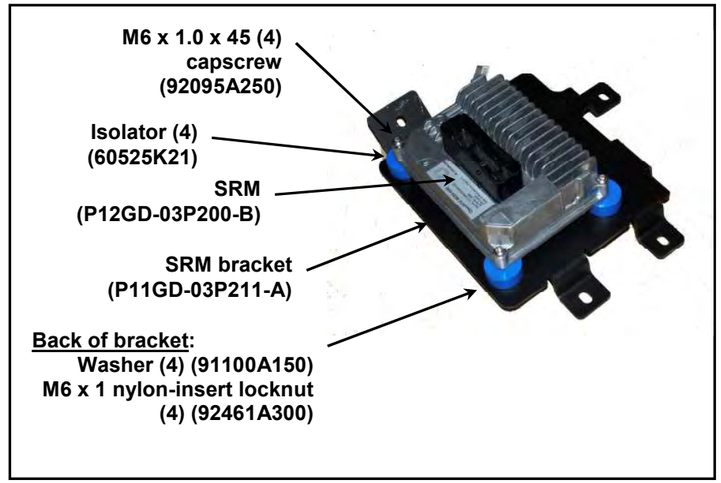



29 mm hole location (at circular indent)

2. Drill a 29 mm (1-1/8”) hole in the dash panel to the right of the master cylinder and main wiring pass through in the location shown (see circular indent in sheet metal).

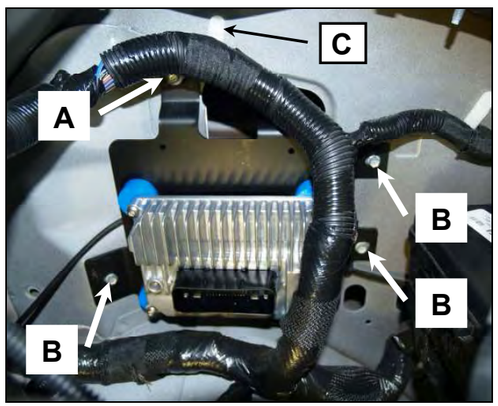
   Use care when drilling to avoid damaging the wiring harness in the cab interior behind the panel. Use a 29 mm hole saw with a pilot bit extending NO MORE than 13 mm (1/2”) beyond the saw teeth and push the drill no deeper than what is necessary to cut through the metal panel.

3. Assemble the SRM to the SRM bracket using four (4) M6 socket-head capscrews, washers and nylon-insert locknuts. Tighten until snug.



4. Remove retainer clip securing the Ford harness to the fender panel and install one (1) M6 x 1 J-clip on the retainer hole.
5. Place the SRM and bracket assembly in position on the fender panel as shown and install one (1) M6 x 1.0 x 16 bolt in the top hole (hole with J-clip).
6. Center punch and install an M6 x 16 self-tapping screw in each of the three (3) remaining mounting holes.


M6 x 1 J-clip (N623332-S439 or W520822-S439) (used in top hole of SRM bracket)



A – M6 x 1.0 x 16 bolt (W500213-S437) Tighten to 8–12 Nm.
B – M6 x 16 self-tapping screw (91324A580)
C – Harness clip

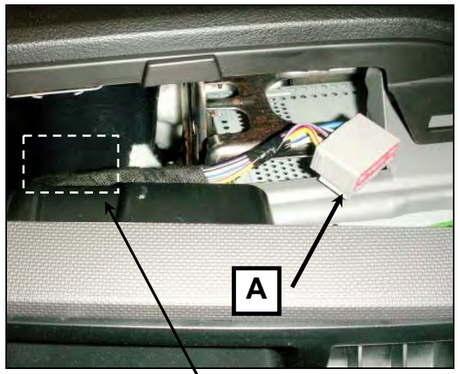
7. Install one M6 x 1 J-clip in hole at top of body flange (between fuse box and radiator).
8. Install the auxiliary fuse box bracket with an M6 x 16 bolt in the top hole.
9. Center punch and install an M6 x 16 self-tapping screw in the lower mounting hole to secure the bracket.

10. Position the original Ford harness over the SRM and secure in place with the harness clip.

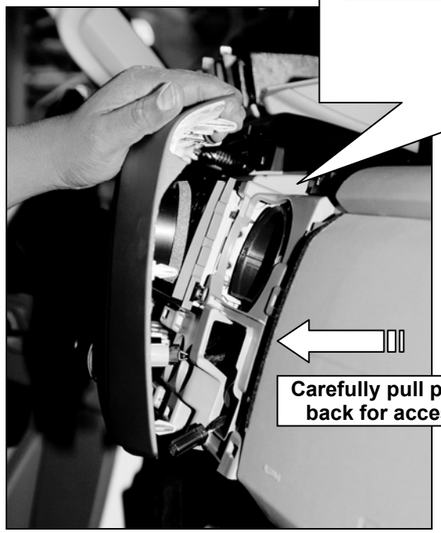
DISCARD REUSE NEW

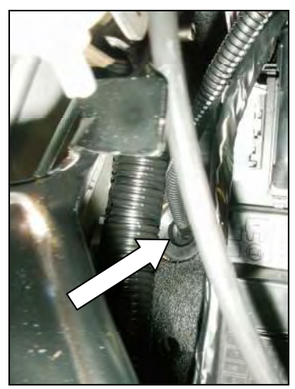
INSTALLING INSTRUMENT PANEL WIRING HARNESS

1. From the passenger side of the instrument panel, grasp the instrument cluster finish panel at the lower right corner and the top and carefully pull back to release the retention tabs. Carefully continue to pull the right side of the panel back just enough (approximately 76 mm [3"]) to gain access to connectors for completing the ROUSH CleanTech CAN harness connections.
2. If vehicle is equipped with an electronic trailer brake controller, disconnect the harness from the brake controller. On models not equipped with the electronic brake controller, the unused original wiring harness connector "A" is stowed in an area at the right side of the finish panel as shown here.



Brake controller located here, if equipped.

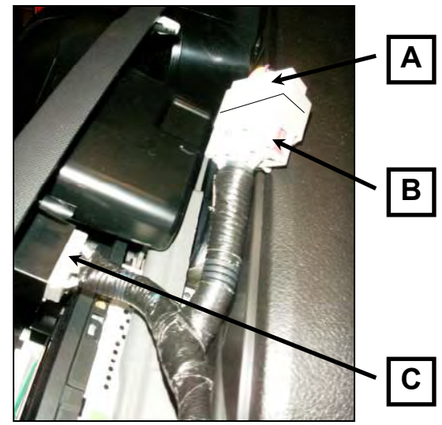




Pass-through hole

ROUSH CleanTech CAN harness connections

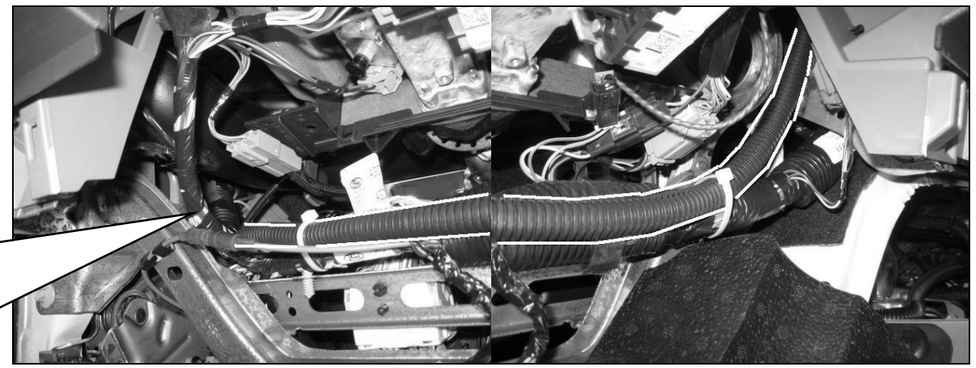
1. Connect the terminal end "B" of the controller area network (CAN) harness to the vehicle harness connector "A".
2. Connect the terminal end "**C**" to the brake controller (if equipped) or stow the unused terminal end "**C**" in the slot at the back of the instrument finish panel (see image at right).



CAN harness (P11GD-18B100-A)

CAN harness routing to engine compartment

1. With connections to vehicle harness and the brake controller (if equipped) complete, route the harness end with the single connector down behind the finish panel and to the area behind the close-out panel under the steering column. (The close-out panel must be removed to access this area.)
2. Route the CAN harness under the steering column and over to the newly drilled 29 mm pass-through hole (see Installing Smart Relay Module [SRM] and Auxiliary Fuse Box Bracket). Using zip ties, secure the CAN harness to the original factory wiring harness.

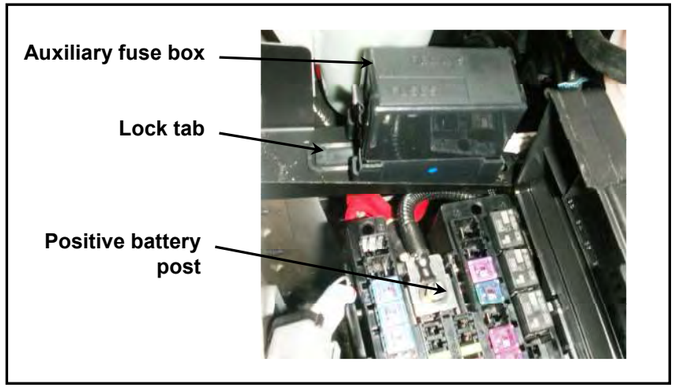


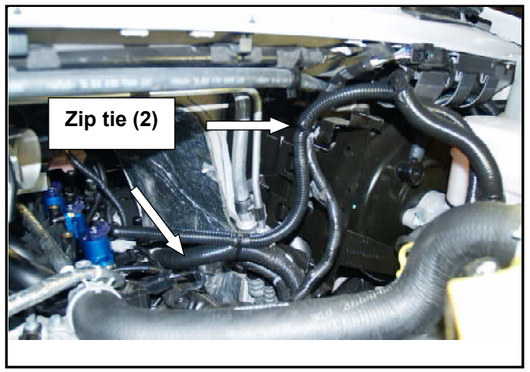
3. Insert the CAN harness single-connector end through the 29 mm pass-through hole to engine compartment. From the engine compartment, carefully pull the harness through the dash panel until the grommet is correctly seated in the pass-through hole.
   Note: See *Installing Smart Relay Module (SRM) and Auxiliary Fuse Box Bracket* for connecting CAN harness to underhood harness.
4. Reinstall the instrument cluster finish panel and the close-out panel below the steering column.

DISCARD REUSE NEW

INSTALLING UNDERHOOD WIRING HARNESS

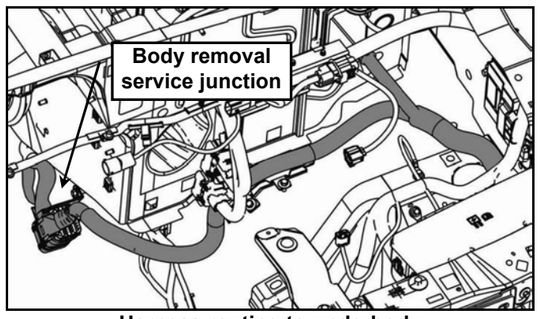
1. Install the auxiliary fuse box (part of harness) on the mounting bracket. Check to ensure that fuse box tabs are fully seated and locked in place. Add a zip tie to secure the harness to the bracket.
2. Open the Ford fuse box and connect the new underhood harness battery positive eyelet to the positive post.





Harness routing to FRPCM and IPTS

7. Route the break out with the FRPCM and integrated pressure temperature sensor (IPTS) connectors along the cowl above the brake booster. Continue routing along the left side of engine and make the connections to the FRPCM and the IPTS. Using zip ties, secure the break out to the Ford harness and to the Ford harness below the FRPCM.

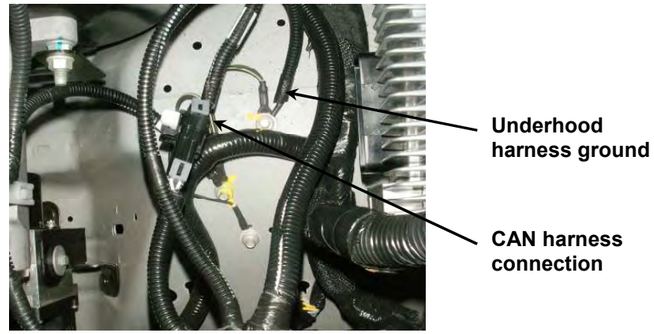


Harness routing to underbody

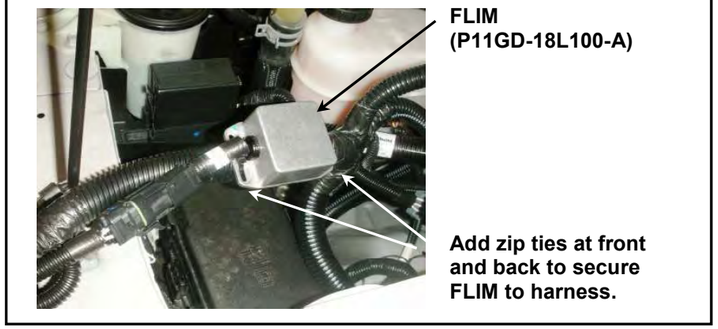
8. Route the break out with the 6-pin service connection along the wheel well and back toward the left (driver side) frame rail, following the Ford chassis harness to the left of the steering column. **Note:** Make sure to secure the ROUSH CleanTech underhood harness to the Ford harness to keep it away from the steering column.

9. Reinstall the degas bottle using the original fasteners.

3. Connect the underhood harness ground eyelet to the existing Ford ground location on wheel well near the SRM.
4. Attach the underhood harness connector to the SRM.
5. Connect the CAN harness to the underhood harness.



6. Plug the fuel level interface module (FLIM) into the underhood wiring harness. Use narrow zip ties to secure the FLIM to the underhood harness.



Note: All parts for installing the ROUSH CleanTech underhood harness are supplied in hardware kit P12GD-ELECKIT-B.

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.

DISCARD REUSE NEW

FLOOR PREPARATION SELECTION

There are several variants of Econoline vehicles. Follow the floor preparation method for tank installation of the vehicle types below. Refer to Install Method Selection.
Contact ROUSH CleanTech with questions regarding which method to use.
If using the floor preparation template, skip to preparing the floor with the template method. Refer to *Preparing the Floor (With Template)* for more information.

Install Method Selection:

E-350 Passenger Van — See *Preparing the Floor (Wagon)*.
E-350 Extended Van — See *Preparing the Floor (Extended Body Wagon)*.
E-150 Passenger Van — See *Preparing the Floor (Cargo Van)*.
E-150, E-250 and E-350 Cargo Van — See *Preparing the Floor (Cargo Van)*.

PREPARING THE FLOOR (WAGON)

Holes must be drilled in the rear cargo floor area to accept the tank mounting brackets and floor pass-through assembly. The hole locations can be determined and drilled following the procedure below. As an alternative to this procedure, a drilling template is available and can be used. Refer to *Preparing the Floor (with Template)*.

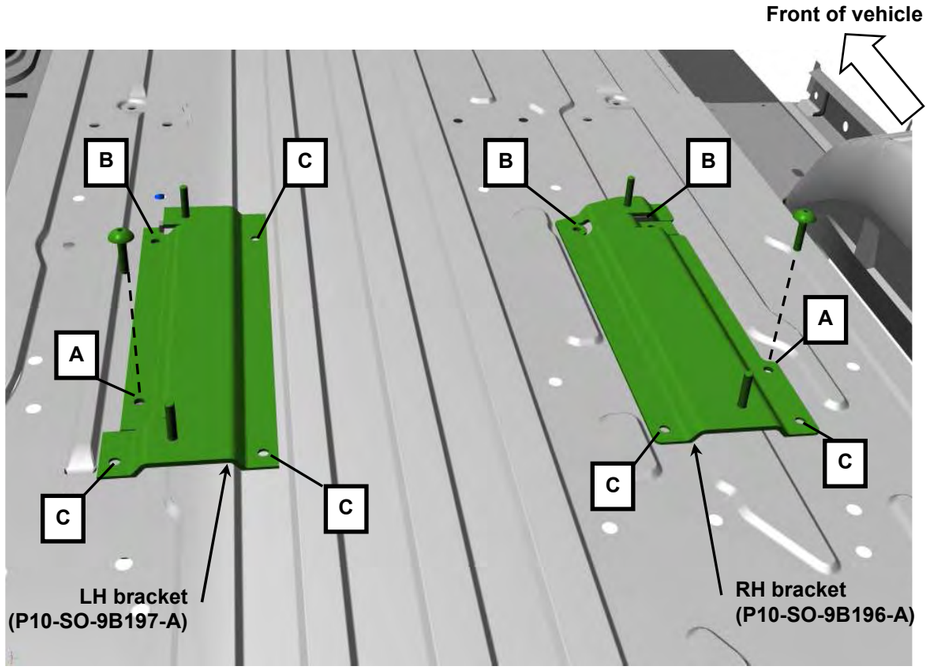
1. Remove the third-row seat if so equipped.
2. Position the LH and RH fuel tank mounting bracket assemblies over the carpet (floor mat) on the cargo floor, aligning the assemblies with the two seat mounting holes (A). Loosely install two bolts to hold the brackets in position. Using the brackets as templates, cut through the carpet (floor mat) and remove the carpet (floor mat) from under the brackets.
3. Position the brackets on the steel floor in their installed position and center punch the location of the additional eight mounting holes that must be drilled.
   Note: Under **three of the locations (B) where holes are to be drilled, there are weld nuts in the subframe. The process for drilling the** holes at these locations is different than the process for drilling the remaining five holes (C).

Locations with weld nuts in subframe (B)

4. Remove the brackets from the cargo floor.
5. Using a 14-mm hole saw, cut only through the top sheet metal flooring; remove the metal cutout.
6. Cut threads in the weld nuts using a M12 x 1.75 tap.
   Note: Locate the correct weld nut locations from underneath the floor; it is easier to cut the threads from under the vehicle.

Locations without weld nuts in subframe (C)

7. Position both mounting bracket assemblies on the floor and loosely install M12 x 1.75 x 45 bolts in the three newly drilled holes and the two original seat bolt holes.
8. With the mounting plates in position serving as templates, drill mounting holes in the five remaining locations using a 12-mm drill bit. Use smaller diameter drill bits and successively increase the bit size until 12 mm is reached.



PREPARING THE FLOOR (EXTENDED BODY WAGON)

Holes must be drilled in the rear cargo floor area to accept the tank mounting brackets and floor pass-through assembly. The hole locations can be determined and drilled following the procedure below. As an alternative to this procedure, a drilling template is available and can be used. Refer to *Preparing the Floor (with Template)*.

Locating the Tank Mounting Brackets

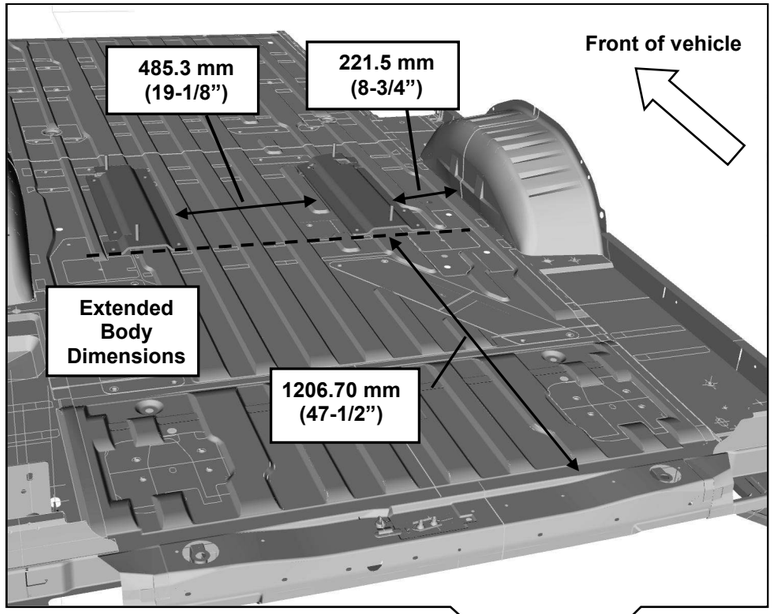
1. Remove the third-row and fourth row seats if so equipped.
2. Position the LH and RH fuel tank mounting bracket assemblies over the carpet (floor mat) on the cargo floor, aligning the assemblies with the seat mounting hole (A) in the left hand bracket. Loosely install a bolt to hold the left hand bracket in position. Measure across the floor from the front and back inside edge of the left hand bracket to locate the correct positioning of the right hand bracket. Using the brackets as templates, cut through the carpet (floor mat) to remove the carpet (floor mat) that is under the brackets.
3. Position the brackets on the steel floor and center punch the location of the other nine mounting holes that must be drilled.
   Note: Under three of the locations (B) where holes are to be drilled, there are weld nuts in the subframe. The process for drilling the holes at these locations is different than the process for drilling the remaining six holes (C).
   Note: If having trouble locating the brackets, a small pilot hole can be drilled through location (B) weld nuts from underneath the vehicle using a 90 degree drill.

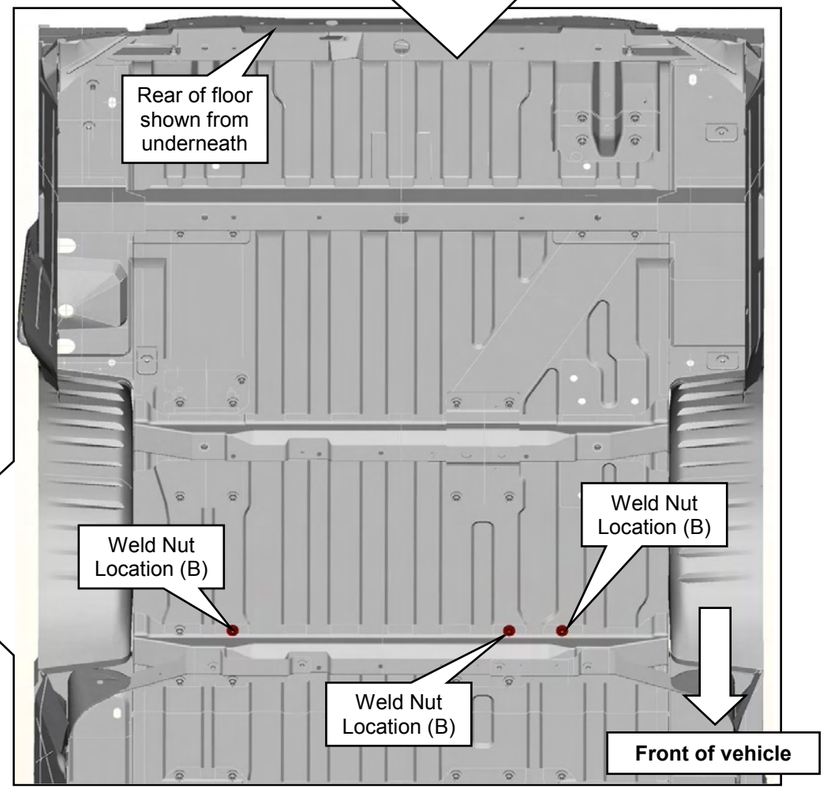
Locations with weld nuts in subframe (B)

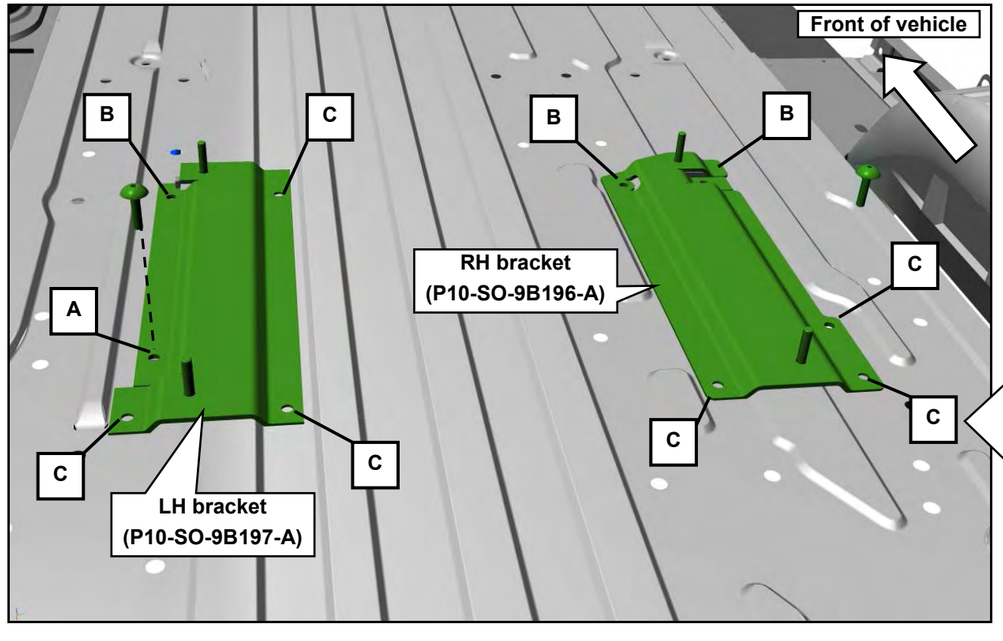
4. Remove the brackets from the cargo floor.
5. Using a 14-mm hole saw, cut only through the top sheet metal flooring; remove the metal cutout.
6. Cut threads in the weld nuts using a M12 x 1.75 tap.
   Note: Locate the correct weld nut locations from underneath the floor; it is easier to cut the threads from under the vehicle.

Locations without weld nuts in subframe (C)

7. Position both mounting brackets on the floor and loosely install M12 x 1.75 x 45 bolts in the three newly drilled holes and the one original seat bolt hole in the left hand bracket.
8. With the mounting brackets in position serving as templates, drill mounting holes in the six locations (C) using a 12-mm drill bit. Use smaller diameter drill bits and successively increase the bit size until 12 mm is reached.







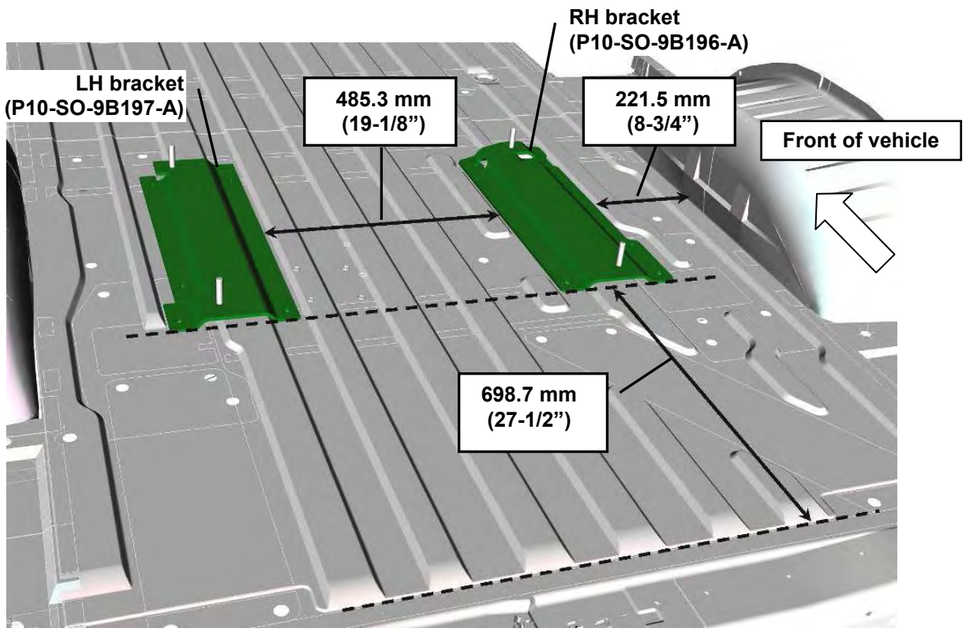
DISCARD REUSE NEW

PREPARING THE FLOOR (CARGO VAN)

Holes must be drilled in the cargo floor area to accept the tank mounting brackets and floor pass-through bracket assembly. The hole locations can be determined and drilled using the following procedure.
Note: A drilling template is available and can be used as an alternative for locating and drilling the tank mounting bracket holes. Refer to *Preparing the Floor (with Template)*.

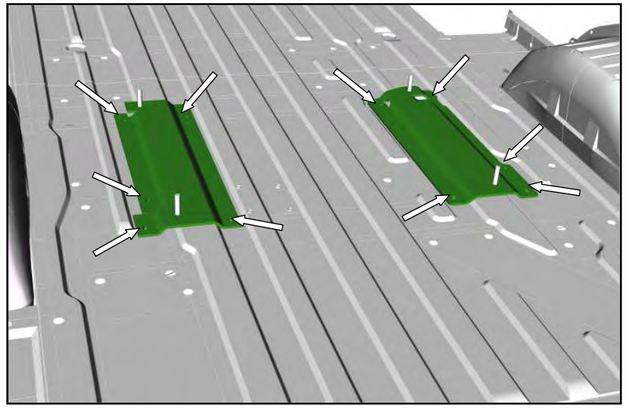
Locating the tank mounting brackets (without template)

1. If equipped, fold the carpet (floor mat) and roll forward of the rear wheel wells. Remove the eight push-pin retainers securing the carpet (floor mat) trim piece at the rear.
2. Position the LH and RH fuel tank mounting brackets on the floor. Align the brackets with the dimensions shown.



Drilling the tank mounting bracket holes

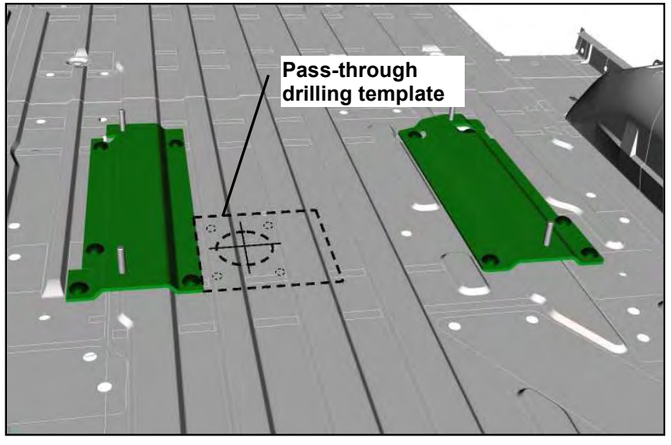
1. With the brackets in position, center punch the location of all ten mounting holes to be drilled.
2. Drill mounting holes in the ten locations using a 12-mm drill bit. Use smaller diameter drill bits and successively increase the bit size until 12 mm is reached.
3. Temporarily insert a few mounting bolts to hold the brackets in position.



LOCATING THE BODY PASS-THROUGH BRACKET ASSEMBLY

The following applies to all variants of the vehicle regardless of the install method selection.

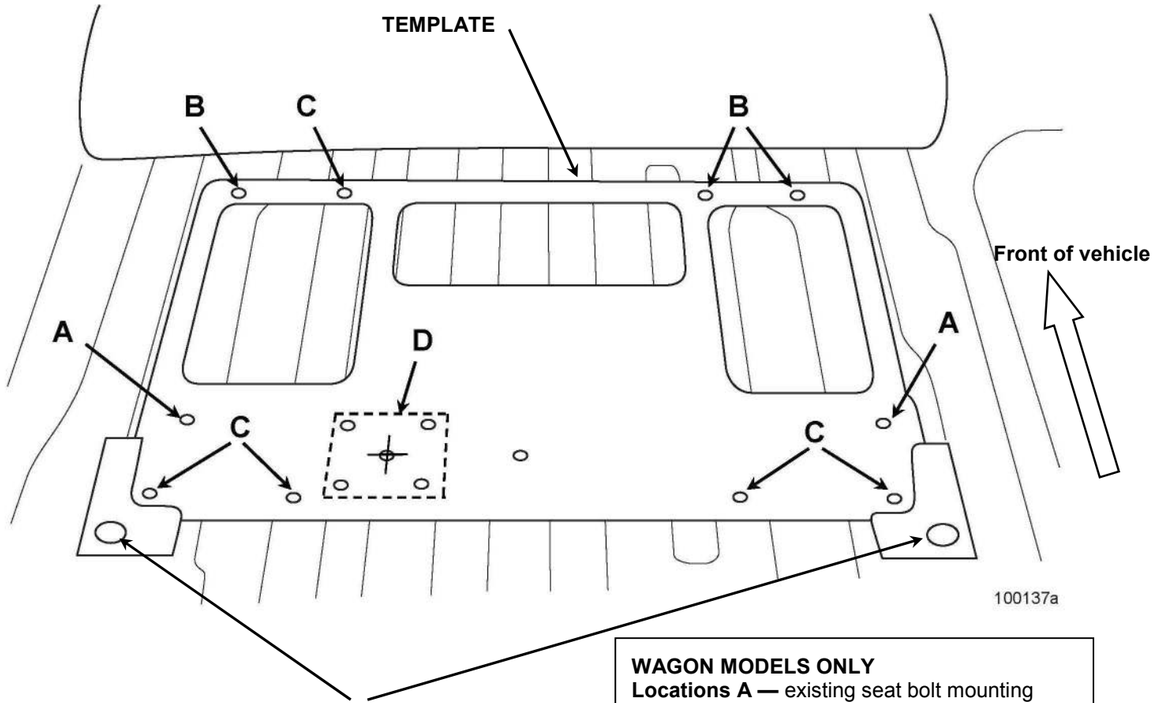
1. Position the body pass-through drilling template to the inner rear of the LH tank mounting bracket. Refer to *ROUSH CleanTech Pass-Through Bracket Installation* for the template. Cut around the template and remove the carpet (floor mat) from under the template.
2. Place the template back in position and center punch the location of the pass-through hole and the four pass-through bracket mounting holes.
3. Using an 8 mm bit, drill the four pass-through bracket mounting holes. Using a 105 mm (4-1/8") hole saw, cut the pass-through hole.
4. Deburr the holes and vacuum up any metal chips created when drilling the holes.



PREPARING THE FLOOR (WITH TEMPLATE)

E-350 Wagon

1. If equipped, remove the third-row seat and fold the carpeting (floor mat) forward.
2. Position the template onto the floor with the two rear corner holes aligned over the body mounting bolts.
3. Center punch holes at thirteen locations (B, C and D). Two locations (A) are existing seat bolt holes with no drilling required.



Place the two outer template holes over the body mounting bolts.

WAGON MODELS ONLY
Locations A — existing seat bolt mounting holes; no drilling required.
Locations B — positions with untapped weld nuts in the vehicle subframe; special drilling process and tapping required.
Locations C — additional holes to be drilled.

4. Using an 8-mm bit, drill five holes in location (D).
5. Using a 12-mm bit, drill holes at five locations (C).

Note: For the wagon models, there are weld nuts in the subframe under three locations (B) where holes are to be drilled. The process for drilling the holes at these locations is different than the process for drilling the remaining five holes (C).

6. Remove the template and at three locations (B), drill holes as follows:
   - Using a 14-mm hole saw, cut only through the top sheet metal flooring and remove the metal cutout.
   - Cut threads in the weld nuts using an M12 x 1.75 tap.
7. Refer to *Completing the Floor Pass-Through.*

E-150/250/350 Cargo Van

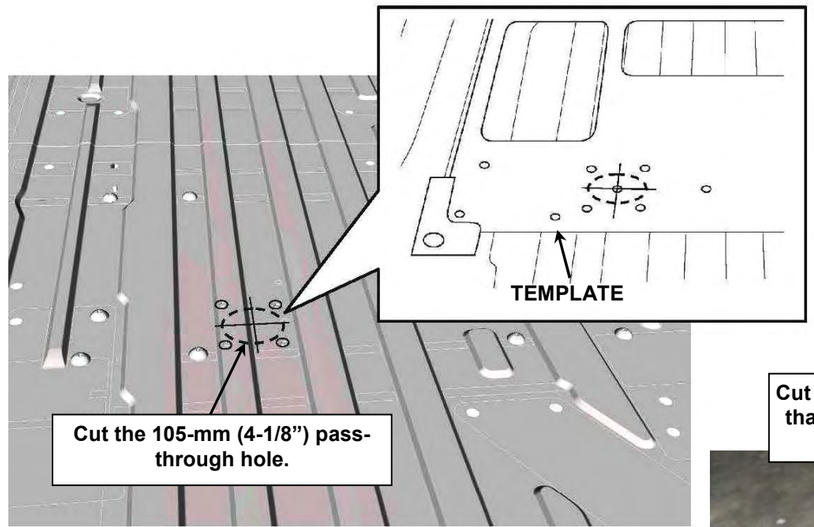
1. Remove the eight push-pins securing the trim plate at the rear edge of the floor.
2. If equipped, fold carpeting (floor mat) forward of the rear fender wells.
3. Place the template in position on the floor with the two rear corner holes aligned over the body mounting bolts.
4. Centerpunch the locations to drill. Using a 12-mm bit, drill the tank mounting bracket holes at all ten locations (A, B and C). Use smaller diameter drill bits and successively increase the bit size until 12 mm is reached.
5. Centerpunch the location of the pass-through bracket holes, as well as a pilot hole for the pass-through bracket. Using an 8-mm bit, drill five holes in location (D) for the pass-through assembly.
6. Remove the template from the vehicle.
7. Refer to *Completing the Floor Pass-through.*

Completing the Floor Pass-Through

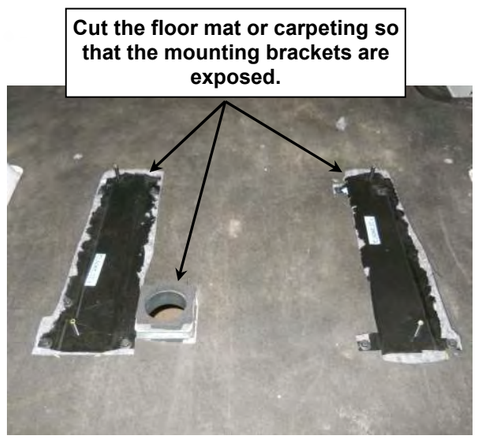
Wagon and Cargo Van

Note: Before drilling the 105-mm (4-1/8”) pass-through hole, from under the vehicle, check the distance from the pilot hole to make sure there is enough room to drill the hole without drilling into any body crossmembers.

1. Using a 105-mm (4-1/8”) hole saw centered in the pilot hole in location (D), cut the pass-through hole.
2. Deburr the holes and vacuum up any metal chips created when drilling the holes.



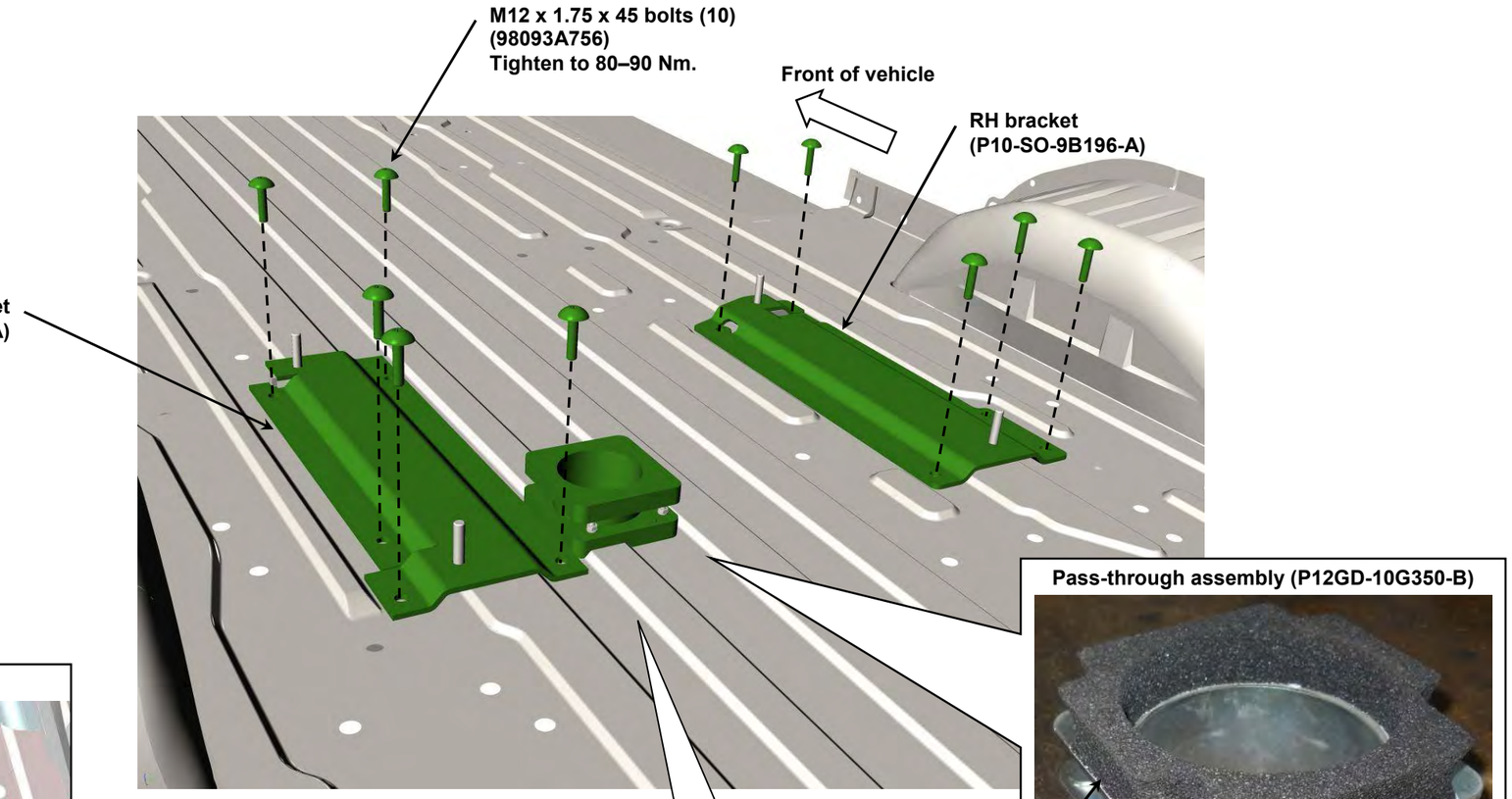
3. Complete the floor preparation by laying the carpeting (floor mat) back in place. Determine the installed positions of the tank mounting brackets and pass-through assembly. Cut out the carpet (floor mat) from under each tank bracket.



DISCARD REUSE NEW

INSTALLING THE TANK MOUNTING BRACKETS AND PASS-THROUGH ASSEMBLY

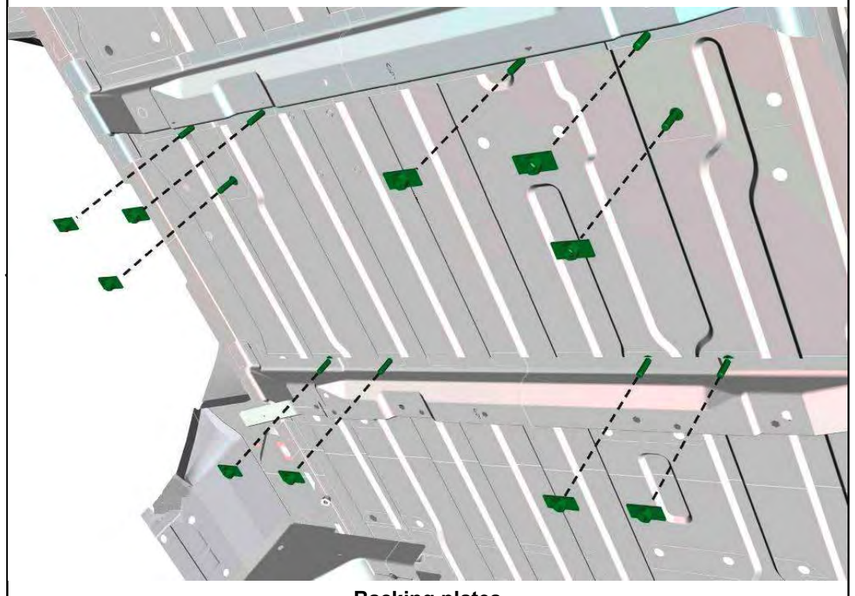
1. Remove the tank mounting brackets.
2. Debur and coat all bare metal using a premium undercoating. ROUSH CleanTech suggests Motorcraft Premium Undercoating (PM-25-A).
3. Place the LH and RH fuel tank mounting brackets in position on the floor and insert the ten (10) M12 bolts in the mounting holes.



4. From underneath the vehicle, start the backing plate assemblies (with M12 weld nuts) onto the tank mounting bracket bolts. With the help of an assistant in the vehicle, tighten the bolts to 80–90 Nm.

Note: Cargo van and E-150 wagon vehicles require 10 M12 backing plates. E-350 wagons require five M12 backing plates for standard vehicles and six backing plates for extended body versions. Extra backing plates may be included, depending on vehicle configuration.

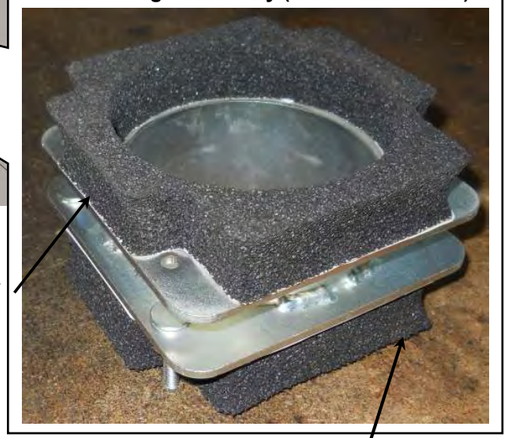
UNDERFLOOR VIEW



Backing plates (P10-SO-02G001-A)

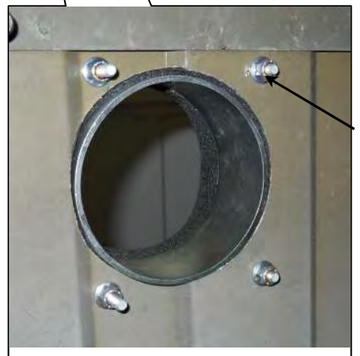
5. Remove the self-adhesive backing from the upper and lower vapor barrier gaskets. Position them correctly onto the pass-through bracket. These parts are found in hardware kit P12GD-FUELLINE-B (wagon) or P12GD-FUELLINE-C (cargo van).
6. Position the pass-through bracket assembly over the floor cutout. The arrows punched in the bracket should point to the rear of the vehicle and the short crush limiters on the two holes drilled on the rib of the floor.
7. From underneath the vehicle secure the bracket with four (4) M6 nuts. Tighten the nuts to 8–12 Nm.

Pass-through assembly (P12GD-10G350-B)



Upper Vapor Barrier Gasket (P12GD-10G420-B)

Lower Vapor Barrier Gasket (P12GD-10G420-B)



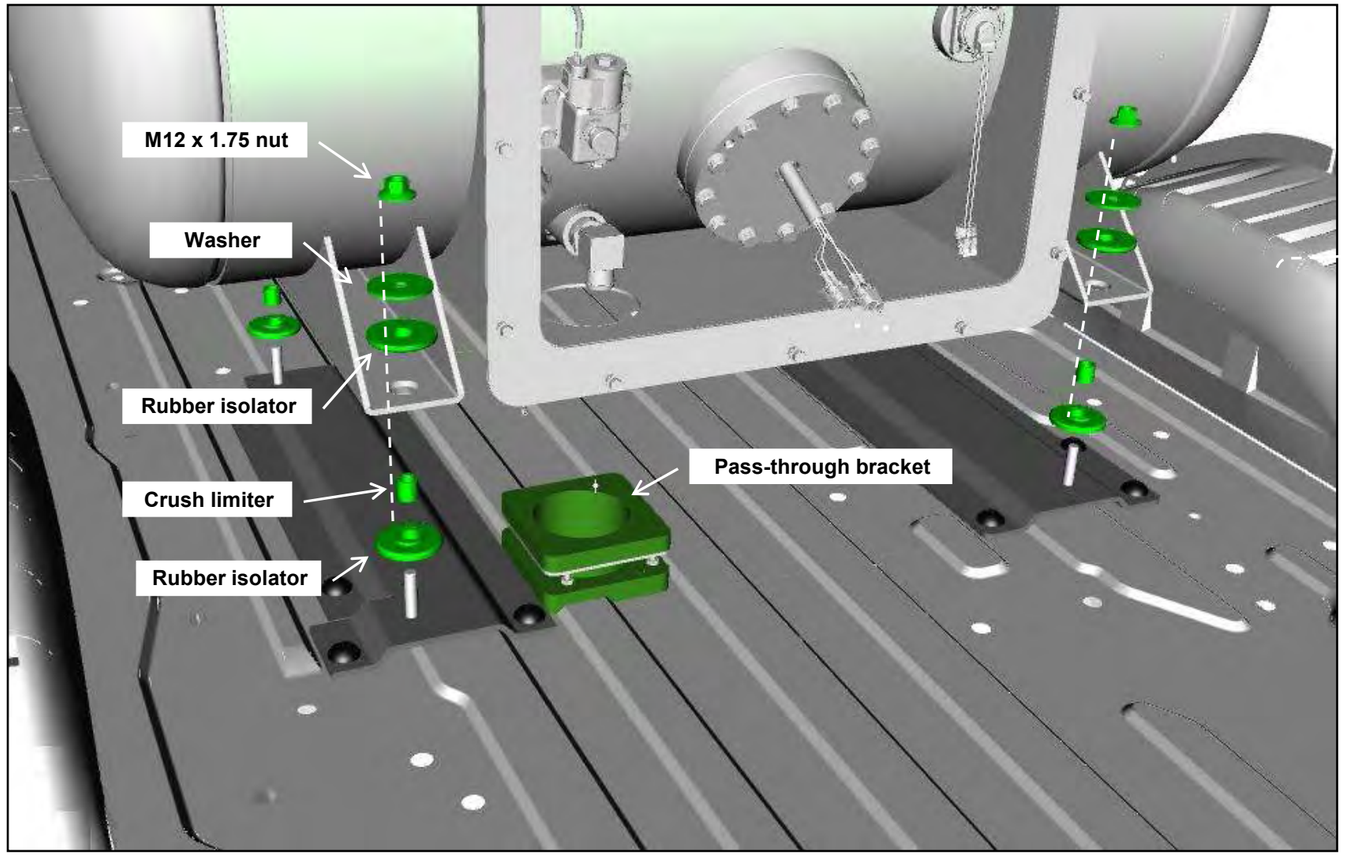
Four M6 nuts (92461A300)
Tighten nuts to 8–12 Nm.

Pass-through from underneath

DISCARD REUSE NEW

INSTALLING NEW FUEL TANK

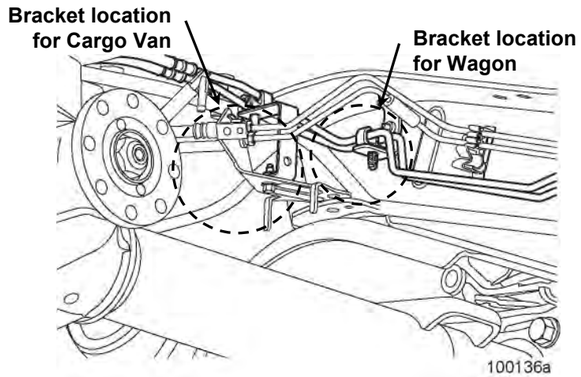
1. Install one (1) rubber isolator and one (1) crush limiter, found in hardware kit P12GD-TANKMNT-B (wagon) or P12GD-TANKMNT-C (cargo van) on each stud bolt in the LH and RH mounting brackets.
2. With the tank prepared for installation and using a suitable lifting device, carefully position the fuel tank over the mounting brackets. Align the four (4) mounting holes in the tank brackets with the mounting bracket stud bolts. Carefully lower the tank onto the rubber isolators, making sure the tank is firmly seated.
   Note: Make sure the tank is lowered straight down over the stud bolts and the upper vapor barrier gasket.
3. Install four (4) additional rubber isolators, four (4) washers and four (4) M12 x 1.75 nuts, found in hardware kit P12GD-TANKMNT-B (wagon) or P12GD-TANKMNT-C (cargo van), to secure the tank. Tighten the bolts to 100–110 Nm.



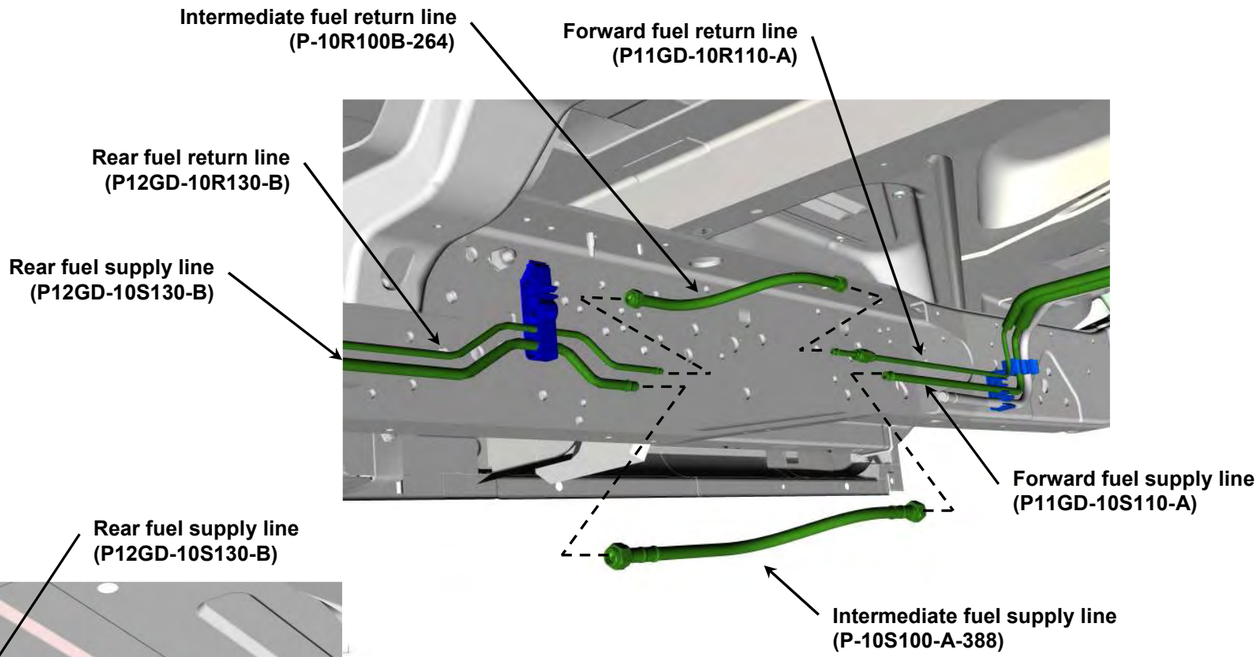
DISCARD REUSE NEW

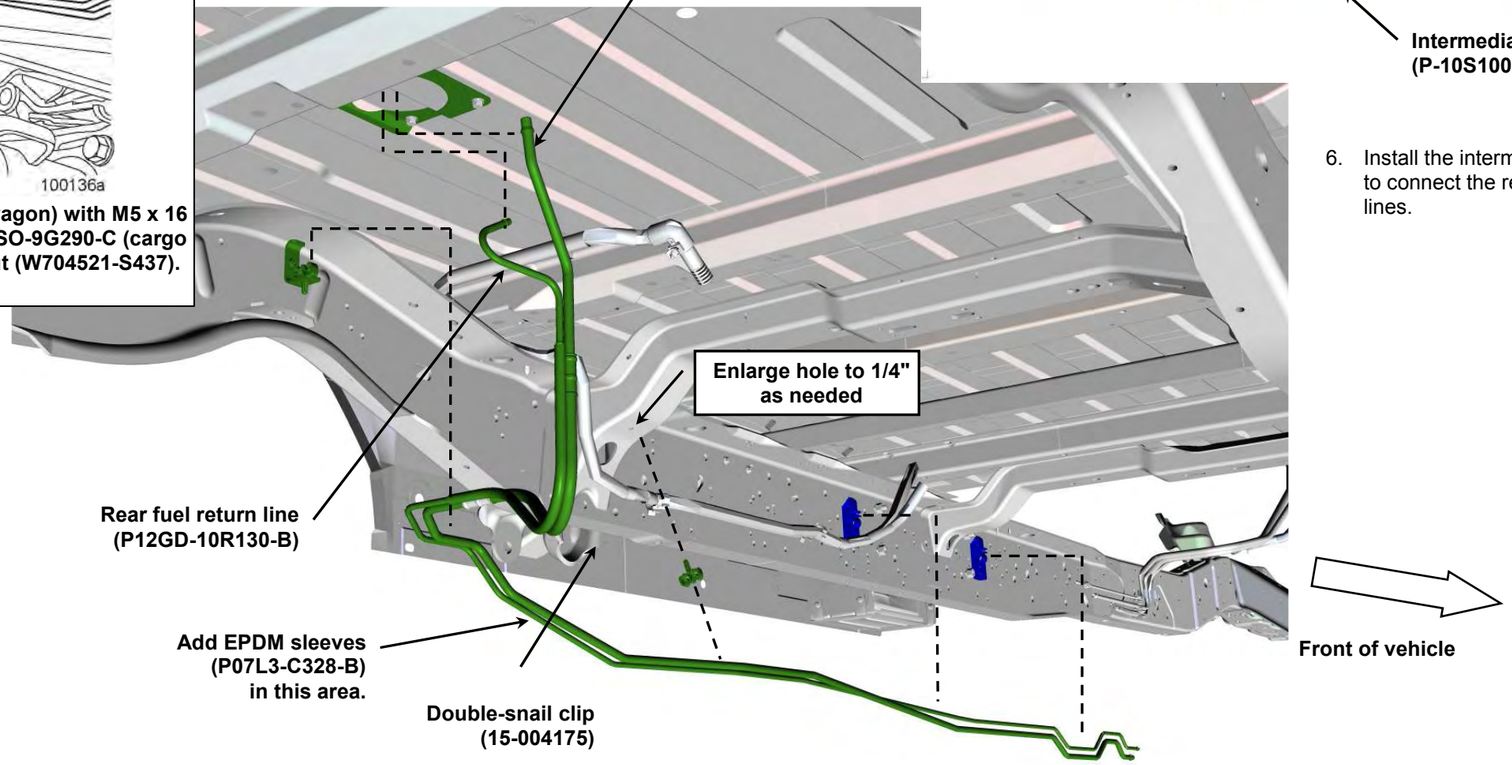
INSTALLING NEW FUEL AND VAPOR LINES

1. Install the rear fuel supply and return lines from the floor pass-through area and along the left frame rail over to the forward fuel lines.
2. Install the fuel line retention bracket, found in hardware kit P12GD-FUELLINE-B (wagon) or P12GD-FUELLINE-C (cargo van), to an existing hole in the frame rail above the axle (wagon) or on the brake line retention bracket attached to the lower frame rail flange (cargo van). Press the fuel lines into the bracket double-snail retainer clip.
3. Install a double-snail retainer clip, found in hardware kit P12GD-FUELLINE-B (wagon) or P12GD-FUELLINE-C (cargo van), into the existing hole in the crossmember. If necessary, enlarge the hole to 1/4" to fit the clip. Press the fuel supply and return lines into the clip to retain them (supply line on inside of snail clips and return line on outside of snail clips.
4. Install EPDM sleeves (P07L3-9C328-B) to the fuel return lines where they located in the retention clips.
5. Press fuel supply and return lines into the existing Ford retention clips.



Fuel line retention bracket P10-SO-9G290-B (wagon) with M5 x 16 retaining bolt (W706841-S437) or bracket P10-SO-9G290-C (cargo van) with M6 x 16 bolt (W500213-S437) and nut (W704521-S437). Tighten to 5–7 Nm.

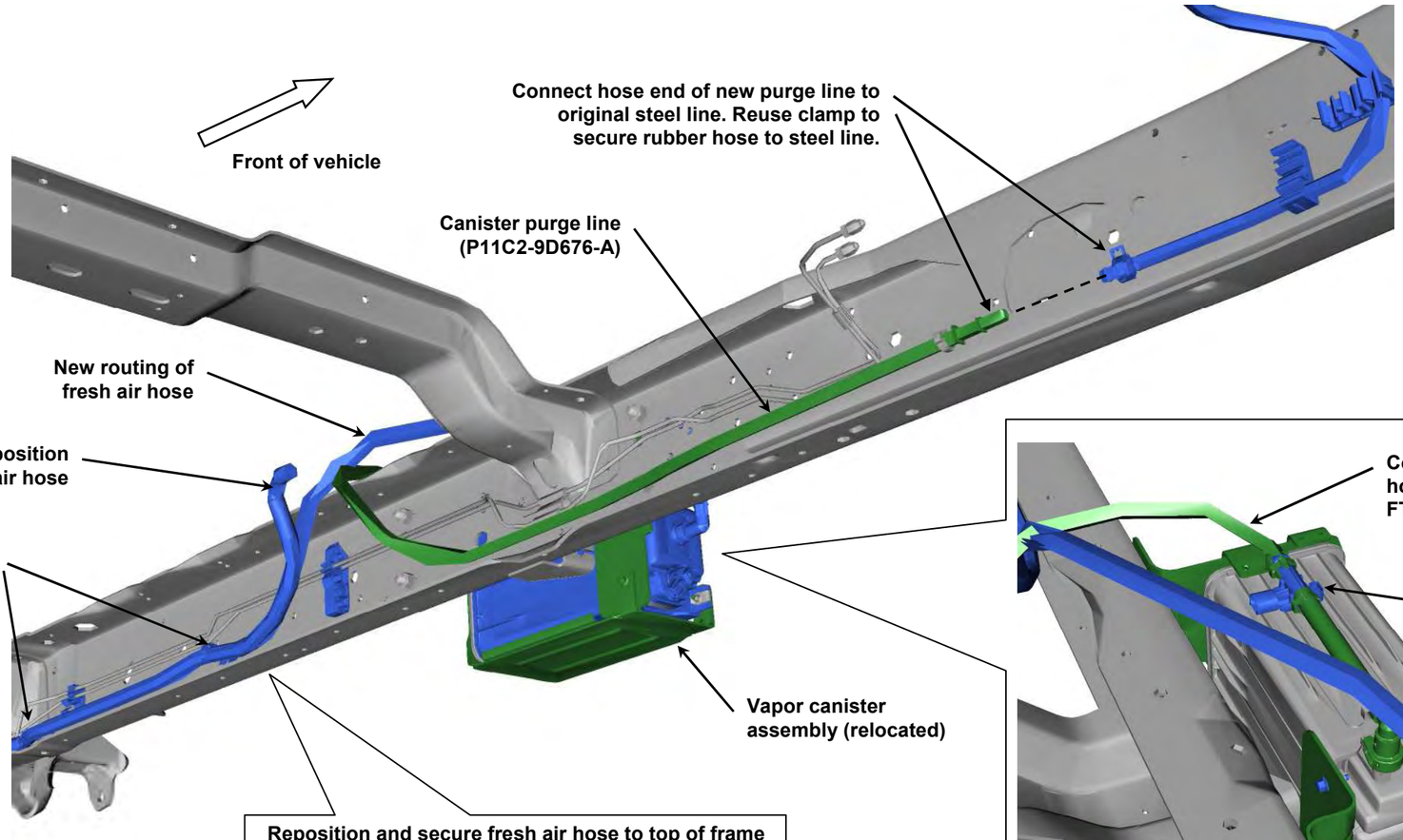




6. Install the intermediate flex supply and return lines to connect the rear fuel lines to the forward fuel lines.

DISCARD REUSE NEW

INSTALLING VAPOR CANISTER PURGE LINE AND FRESH AIR HOSE

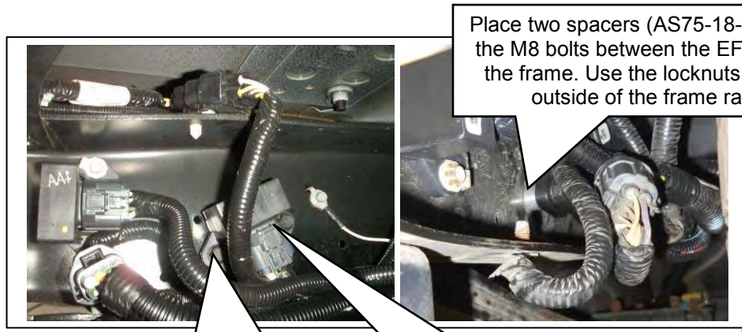


Reposition and secure fresh air hose to top of frame rail with two (2) edge clips.

DISCARD REUSE NEW

INSTALLING NEW WIRING HARNESS

1. Install and route the ROUSH CleanTech rear frame harness along the Ford vehicle harness from the ROUSH CleanTech underhood harness along the left frame rail to the original electric fuel pump relay (EFPR) at the rear of the frame rail next to the spare tire. Do NOT secure the harness with zip ties until all connections have been made.
2. Install the new EFPR just forward of the original EFPR. Use spacers between the EFPR and the frame rail when installing the M8 mounting bolts and M8 x 1.25 locknuts (92461A400). These parts are supplied in hardware kit P12GD-ELECKIT-B.
3. Connect the rear frame harness to both EFPRs and the Ford vehicle harness. Use zip ties to secure the new harness to the vehicle harness.
4. Connect the three ROUSH CleanTech jumper harness connectors to the rear frame harness and route the jumper harness up through the floor pass-through bracket for fuel tank connections.
5. Connect the rear frame harness and the jumper harness ground leads to the frame rail. Install the bolt on the inside of the frame rail and the nut on the outside of the frame rail. Location varies.
6. Route the FTPT harness lead from the Ford vehicle harness over the left frame rail and connect it to the FTPT sensor.
7. Connect the rear harness to the underhood harness. Use zip ties to secure the 6-pin harness connector to the vehicle harness inside the frame rail.
8. Route the original canister vent harness lead under the left frame rail and connect to the vent solenoid.
9. After all electrical connections are made and the harness are correctly routed, secure the harnesses using zip ties (1A868).

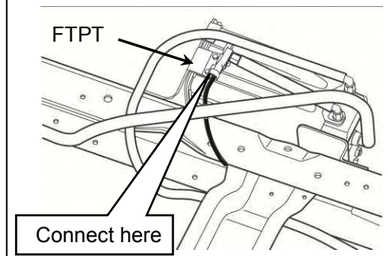


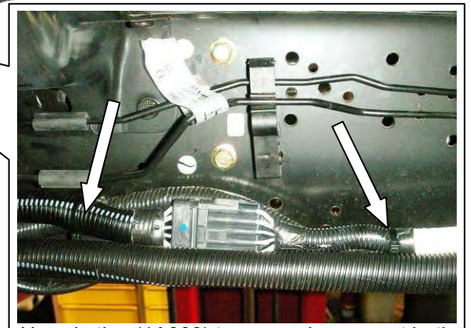
M8 x 1.25 x 35 bolts (98093A553) and M8 x 1.25 locknuts (92461A400). Tighten to 10 Nm.

Place two spacers (AS75-18-32) over the M8 bolts between the EFPR and the frame. Use the locknuts on the outside of the frame rail.

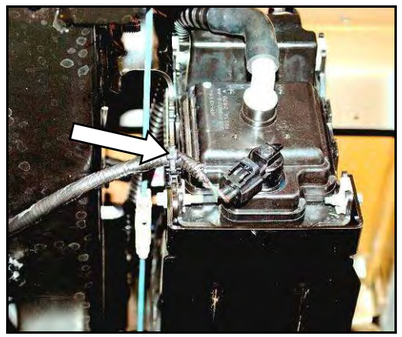
New EFPR (AA8A-9D412-C)

Rear frame harness and jumper harness grounds — use M6 x 1.0 x 16 bolt (W500213-S437) and nut (90591A151). Tighten both grounds to 8–12 Nm.

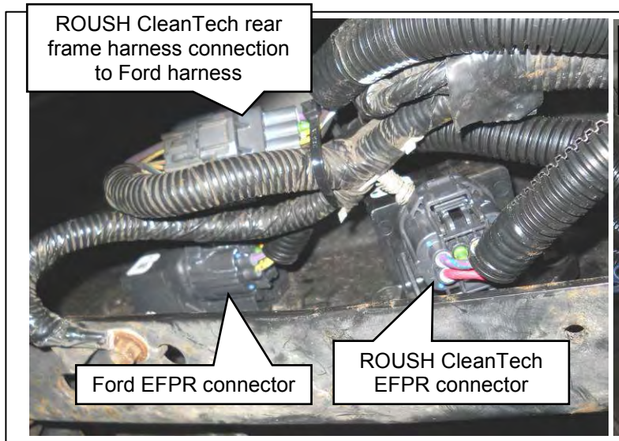


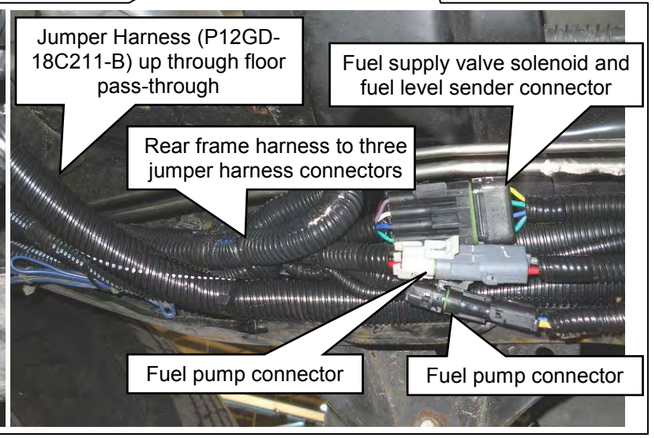


Use zip ties (1A868) to secure harness at both sides of 6-pin connector.



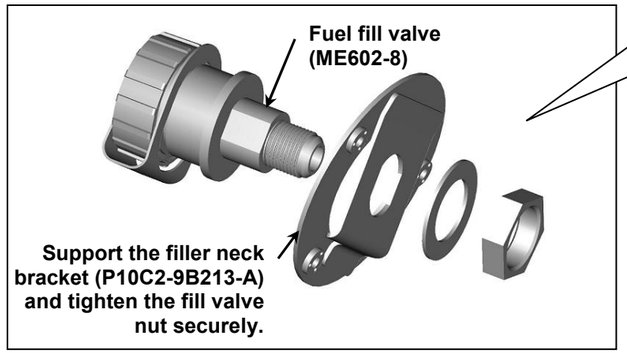
Use edge clip (156-00109) and a zip tie (1A868) to secure the vent harness lead to the canister front bracket. Parts are found in hardware kit P11GB-EVAPKIT-A)

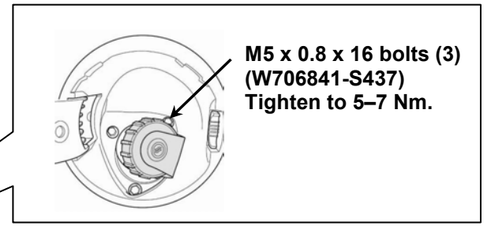




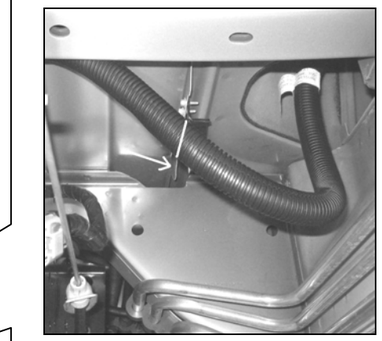
INSTALLING NEW FUEL FILL SYSTEM

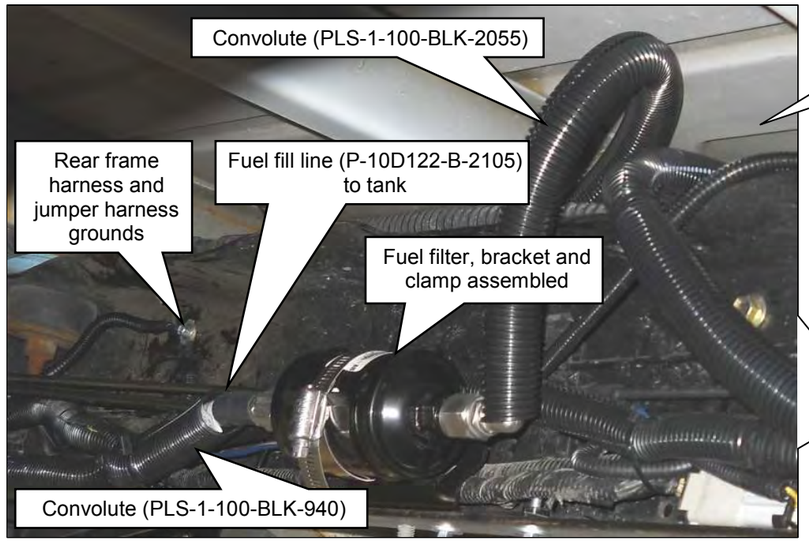
1. Attach the fuel fill valve to the filler neck mounting bracket using the washer and nut supplied with the valve. These parts are found in hardware kit P11GD-FILLKIT-A.

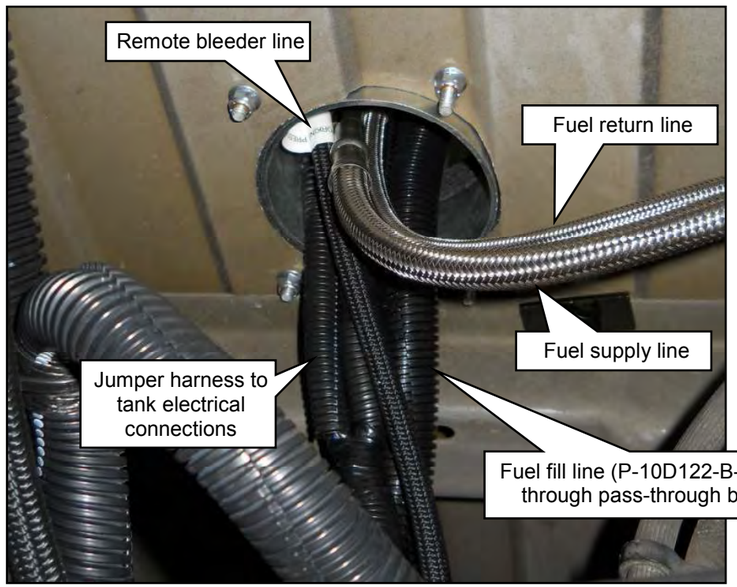




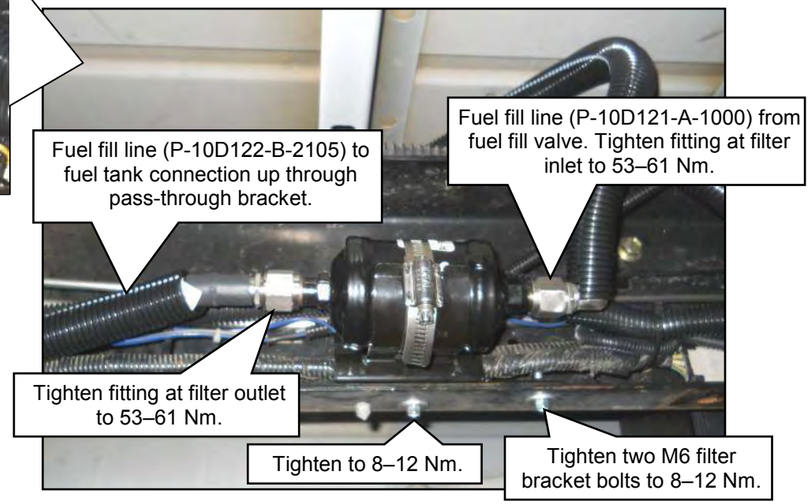
2. Position the fill valve and bracket assembly to the fill door mounting bracket. Secure the assembly to the mounting bracket with three M5 bolts supplied in hardware kit P11GD-FILLKIT-A.
3. Attach the fill line to the fill valve and leave loose. Route the fill line with convolute over the top of the frame rail and over to the fuel filter area.
4. Locate the holes in the frame rail, position the filter bracket (P11GD-10D220-A) to the rail and install two M6 bolts found in hardware kit P12GD-FILLKIT-B. Tighten the bracket bolts to 8–12 Nm.
5. Unscrew the worm clamp (6P-300-52) and install it onto the filter bracket. Orient the clamp so that it can be easily tightened. Close the clamp and start a few of the threads to hold the clamp in place on the bracket, but loose enough to install the filter.
6. 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 directing of fuel flow; in from the fill valve and out to the tank.
7. Tighten the clamp to secure the filter to the bracket.


Use zip tie to secure fuel fill line with convolute to original retention bracket.





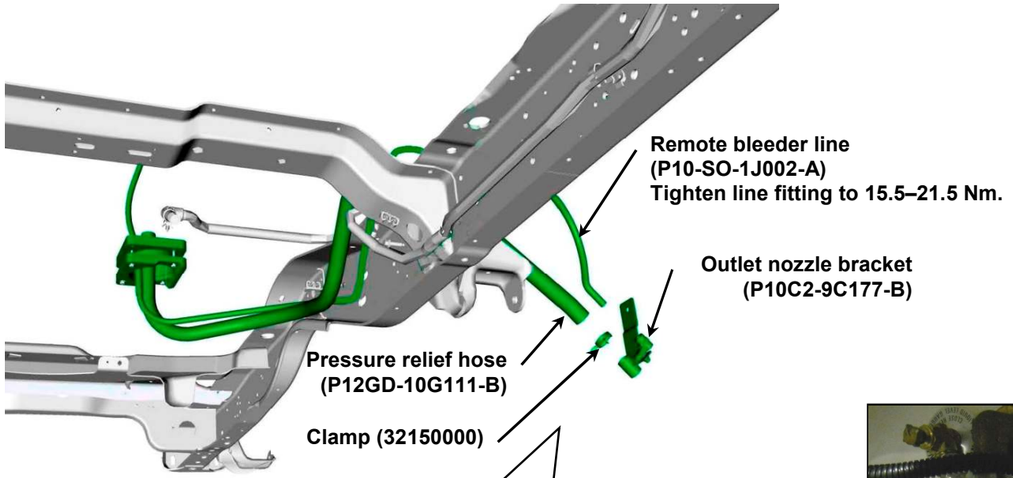
8. Attach the fuel fill line from the fill valve to the inlet of the fuel filter and tighten to 53–61 Nm. Tighten the fill line fitting at the fuel fill valve to 41–49 Nm.
9. Using a zip tie, secure the fuel fill line to the original retention bracket on underbody.
10. Attach the fuel fill line to the filter outlet and route it up through the pass-through bracket up to the fuel tank. Tighten the fill line fitting at the filter outlet to 53–61 Nm. Tighten the fill line fitting at the tank fitting to 41–49 Nm. Secure with zip ties as needed.

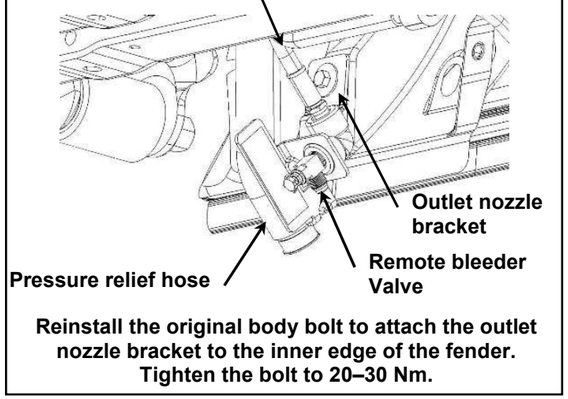


DISCARD REUSE NEW

INSTALLING NEW OUTLET NOZZLE BRACKET, PRESSURE RELIEF HOSE AND REMOTE BLEEDER VALVE AND BRACKET ASSEMBLY

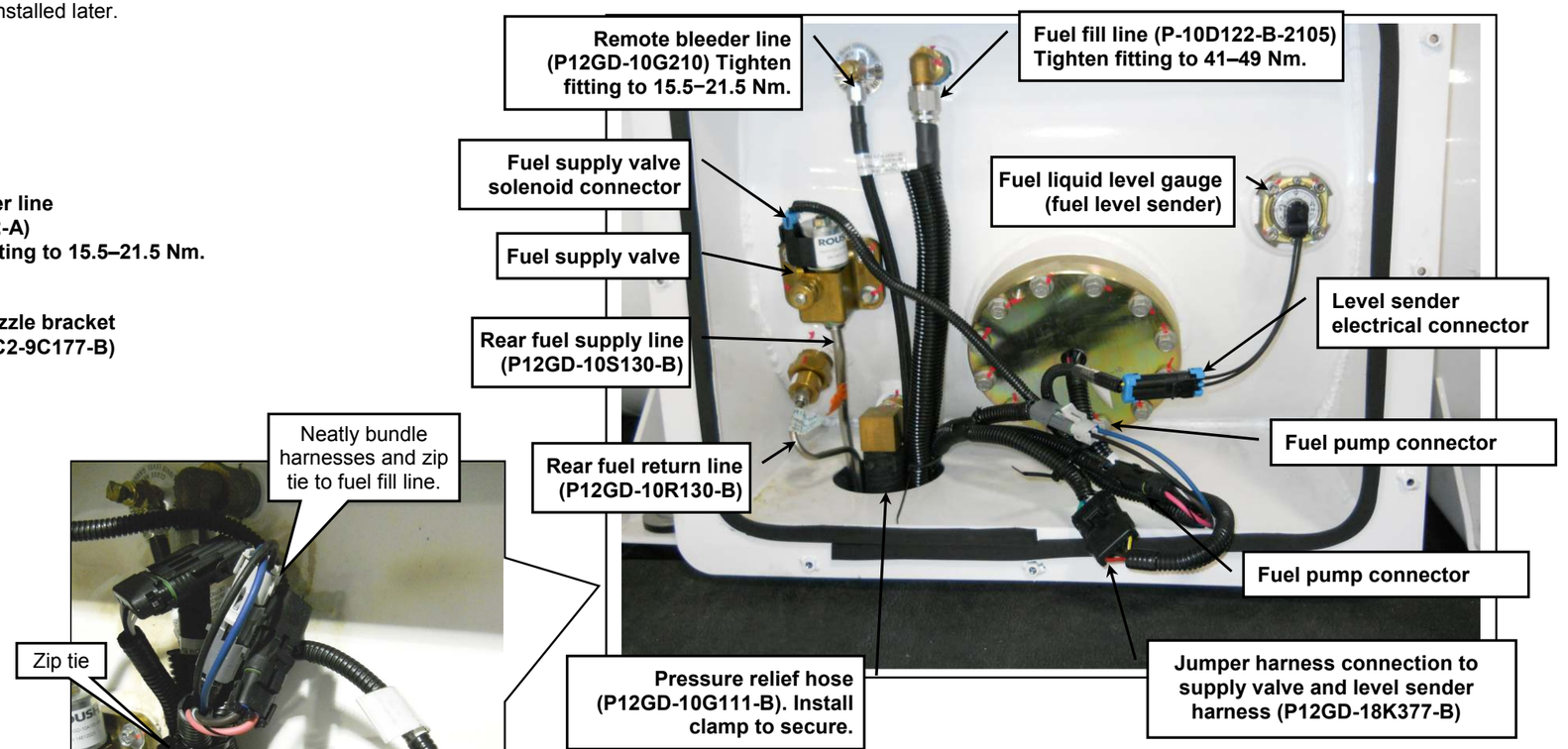
1. Remove the inner fender fastener and position the pressure relief outlet nozzle bracket (with remote bleeder line attached), found in hardware kit P12GD-FUELLINE-B (wagon) or P12GD-FUELLINE-C (cargo van), onto the inner rear fender support. Reinstall the original bolt through the van body and bracket into the nut on the inside edge of the fender. Tighten the bolt to 20–30 Nm.
2. Route the bleed line over the frame rail, crossmember and up through the body pass-through bracket to the bleeder valve on the tank.
3. Route the pressure relief hose through the body pass-through bracket, over the crossmember, frame rail and to the outlet nozzle. Use a hose clamp (31250000) found in hardware kit P12GD-FUELLINE-B (wagon) or P12GD-FUELLINE-C (cargo van) to secure the hose at the outlet nozzle bracket. Install the pressure relief cap (VC-985-8) onto the open port on the bottom of the outlet nozzle bracket.
4. Install zip ties as needed to secure the remote bleeder line to the pressure relief hose.
5. Close the remote bleeder valve. Do NOT install the valve cover at this time; it will be installed later.





MAKING LINE AND WIRING CONNECTIONS TO TANK

1. Insert the new fuel fill line through the body pass-through and connect the line to the 90-degree fitting at the top of the tank. Tighten the line fitting to 41–49 Nm.
2. Install the pressure relief hose to the elbow fitting on the tank. To position the elbow to the correct orientation, adjust the lock nut below the elbow. Connect the pressure relief hose to the elbow. Use a hose clamp (31250000) to secure the pressure relief hose to the fitting.
3. Connect the remote bleeder line to the bleeder valve on the tank. Tighten the line fitting to 15.5−21.5 Nm.
4. Connect the supply valve and level sender harness (found in hardware kit P12GD-TANK-B) to the jumper harness.
5. Make the four electrical harness connections to the fuel supply solenoid, fuel level sender and the two fuel pump connections. Use zip ties to neatly secure the electrical harnesses to the convolute of the fuel fill line.
6. Once all fuel line and wiring harness connections have been made, place the tank cover plate in position and install the 12 retaining screws to attach the cover to the tank. Tighten to 8–10 Nm.

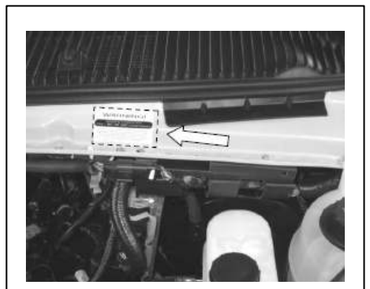


DISCARD REUSE NEW

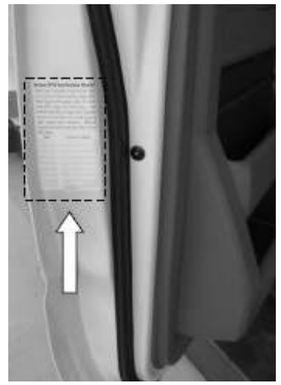
INSTALLING BADGES AND LABELS AND COMPLETING THE KIT INSTALLATION

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 P11GD-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 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.

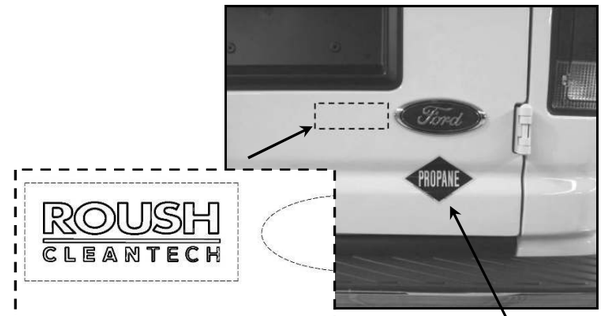


PCM Tamper Label (R07100008-A) on cowl near PCM



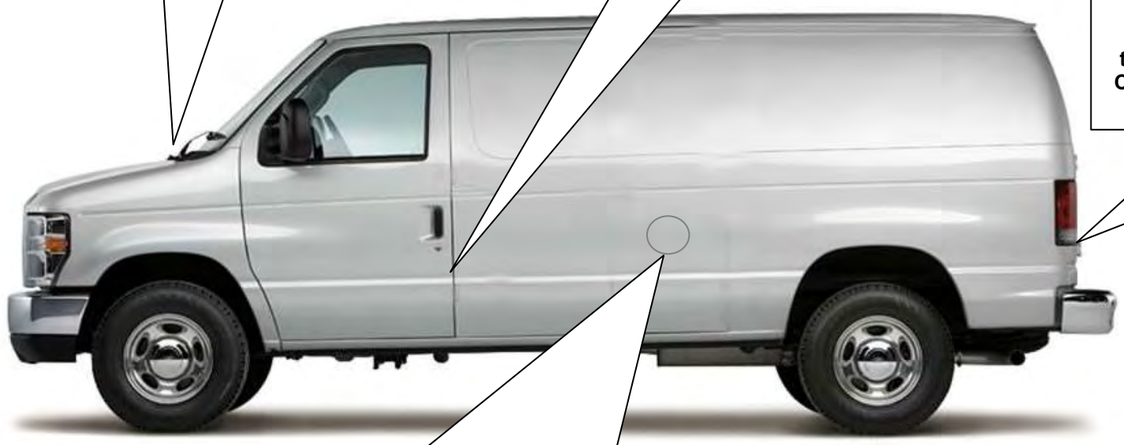
Overflow Protection Device Label (P07L3-9A095-C) driver side door

Right corner of passenger side rear door

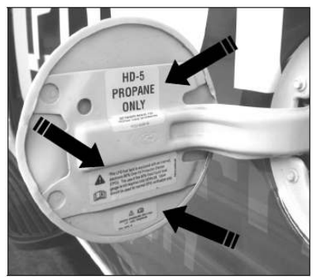


Apply the ROUSH CleanTech Badge (P-01G100-A) to the left of the Ford logo using the template for correct positioning. Note: The template can be found on the next page of this document. Cut the template out of the page.

Apply the "Propane" Label (D85) to the door in the position shown.



Overflow 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

Completing the Kit Installation

1. Install the reprogrammed PCM following the procedure in the *Ford Workshop Manual, Section 303-14, Electronic Engine Controls.*
2. Reinstall the vehicle battery and connect the positive and negative terminals. Tighten to 8–12 Nm.
3. Perform the Fill/Start/End-of-Line Check following the established ROUSH CleanTech procedure.
4. After system leak check, close the bleeder valve on the tank, and open the remote bleeder valve to evacuate the bleed line. When complete, close the remote bleeder valve as well.
5. Install the fuel tank cover and tighten the cover screws to 8–10 Nm.
6. Reinstall the air induction system in the reverse order it was removed.
7. Reconnect the MAF sensor.
8. Reinstall the close-out panel over the radiator, securing it in place with the push-pin retainers (amount varies).
9. Reinstall the engine cover inside the passenger compartment.

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 BADGE INSTALLATION TEMPLATE

For E-150/250/350 Van/Wagon and E-150/250/350 Extended Range Vehicles

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 right rear door 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.

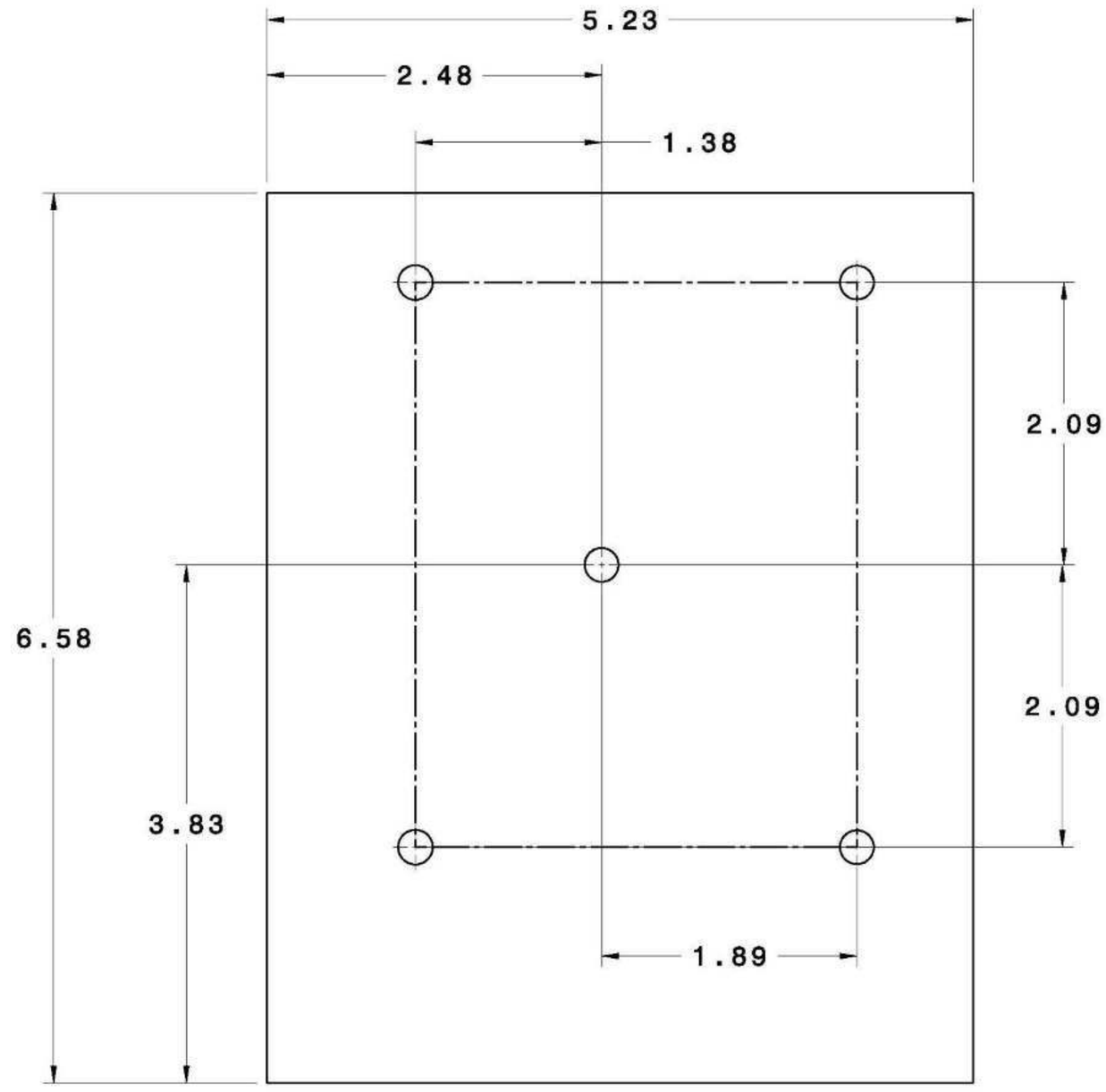
ROUSH CLEANTECH PASS-THROUGH BRACKET INSTALLATION

Print this template on 11 x 17 paper set to landscape with scaling set to “None.”
Cut the template out of the page, and if necessary, save for reuse. Cut along the lines.
Use non-marring tape to secure the template to the floor where indicated by the instructions.
Refer to *Locating the Body Pass-Through Bracket Assembly*.

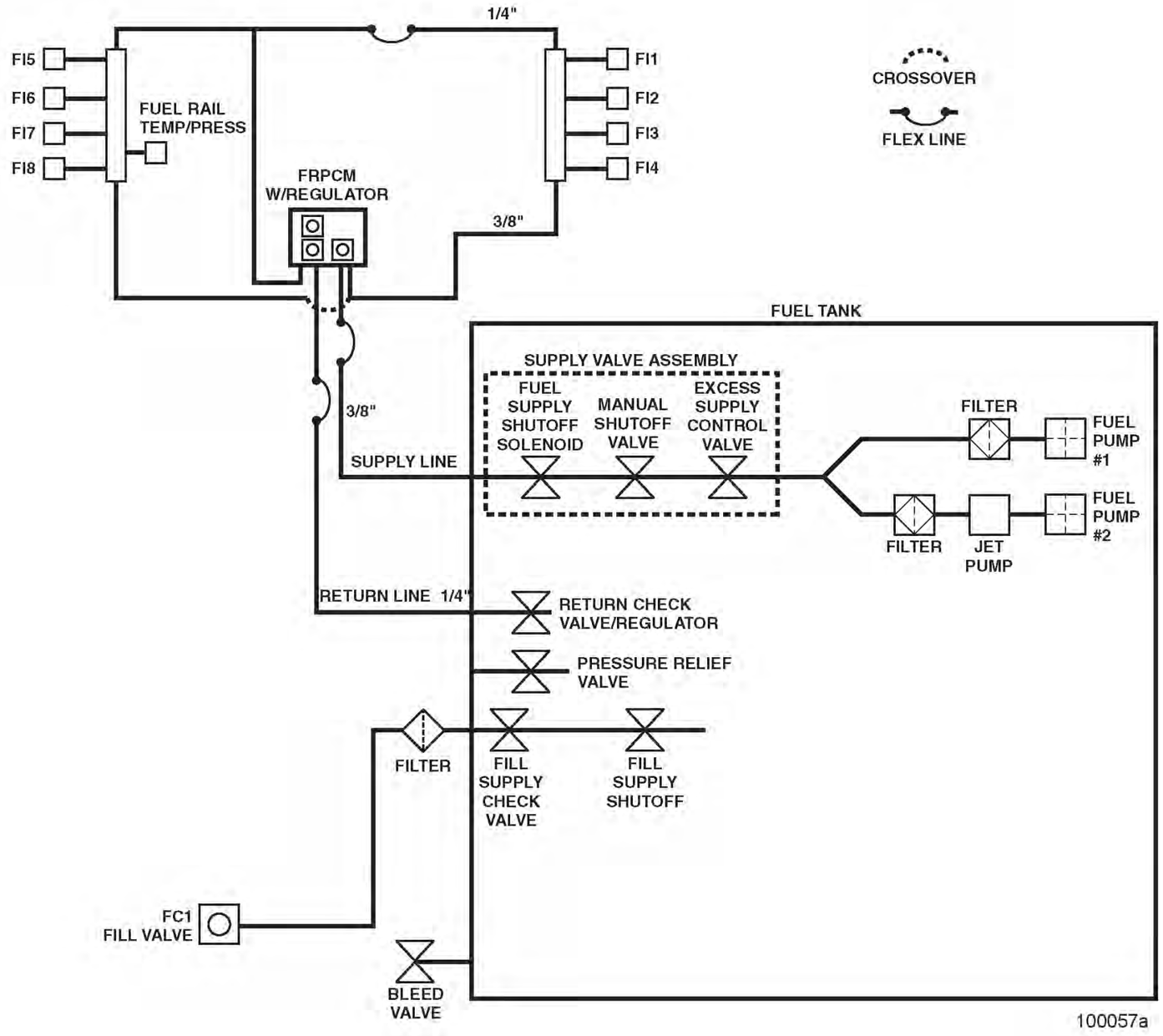
Note: When using this template, before cutting the template out of the page, physically measure the template dimensions to make sure the template is the correct size for proper drilling. Use the measurements shown. Print this page. Make sure the printer is set to “No Scaling” or original (actual) size at 100%. Also, make sure the printer is set to “Landscape.”

ROUSH CLEANTECH PASS-THROUGH BRACKET INSTALLATION TEMPLATE

For E-150/250/350 Cargo Van and Wagon Extended Range Vehicles

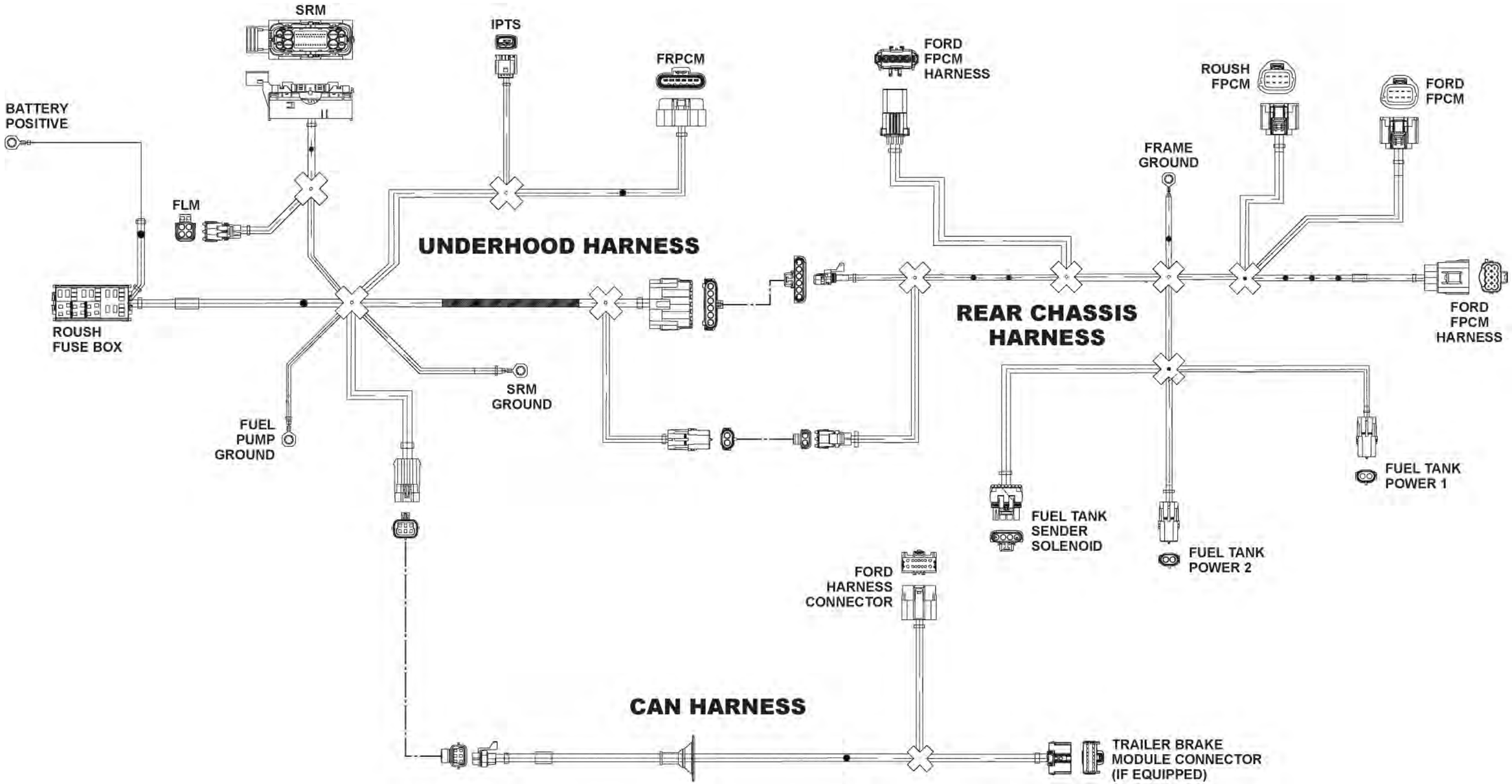


SCHEMATIC — ROUSH CLEANTECH FUEL SYSTEM

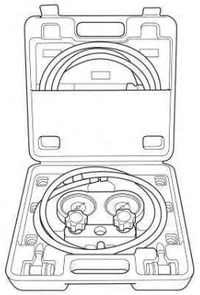


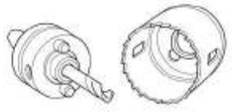
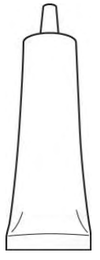
SCHEMATIC — ROUSH CLEANTECH WIRING HARNESS

Note: This wiring harness print does not include the attachment locations for the ROUSH CleanTech jumper harness or the tank harness in the rear of the vehicle.



SPECIAL TOOLS

							
Touch-Up Paint	**Liquid Leak Detector**	**Premium Aerosol Undercoating (PM-25-A)**	**Torque Wrenches (to 22 Nm and to 200 Nm)**	**5/8”-11 Eyebolt and Locknut**	**A/C Manifold Gauge Kit**	**Gloves (Approved for Propane)**	**Scan Tool**

					
Jiffy-Tite Disconnect Tool (1/4” and 3/8”)	**Hole Saw — 29 mm Hole Saw — 105 mm**	**Drill Bit — 11 and 15 mm**	**Vacuum Gauge**	**Vacuum Pump**	**Dielectric Grease**